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. This

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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 succeed 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 finds 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[1] 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:

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

Variable identification:

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

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

[1] NBER, working paper series, N° 7725.

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 well 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:

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

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

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

[1] The quadratic form of the first term indicates that costs are positively with inflation.

$$\boldsymbol{Min\ Z_t}$$
$$= \boldsymbol{Z_t} + \frac{\mathbf{1}}{\mathbf{1}+\boldsymbol{r_t}}\boldsymbol{Z_{t+1}} + \frac{\mathbf{1}}{(\mathbf{1}+\boldsymbol{r_t})(\mathbf{1}+\boldsymbol{r_t}+\mathbf{1})}\boldsymbol{Z_{t+2}}$$
$$+ \frac{\mathbf{1}}{(\mathbf{1}+\boldsymbol{r_t})(\mathbf{1}+\boldsymbol{r_t}+\mathbf{1})(\mathbf{1}+\boldsymbol{r_t}+\mathbf{2})}\boldsymbol{Z_{t+3}}$$
$$+ \frac{\mathbf{1}}{(\mathbf{1}+\boldsymbol{r_t})(\mathbf{1}+\boldsymbol{r_t}+\mathbf{1})(\mathbf{1}+\boldsymbol{r_t}+\mathbf{2})(\mathbf{1}+\boldsymbol{r_t}+\mathbf{3})}\boldsymbol{Z_{t+4}}$$
$$+ \frac{\mathbf{1}}{(\mathbf{1}+\boldsymbol{r_t})(\mathbf{1}+\boldsymbol{r_t}+\mathbf{1})(\mathbf{1}+\boldsymbol{r_t}+\mathbf{2})(\mathbf{1}+\boldsymbol{r_t}+\mathbf{3})(\mathbf{1}+\boldsymbol{r_t}+\mathbf{4})}\boldsymbol{Z_{t+5}} + \cdots$$
$$+ \frac{\mathbf{1}}{(\mathbf{1}+\boldsymbol{r_t})(\mathbf{1}+\boldsymbol{r_t}+\mathbf{1})[\mathbf{1}+\boldsymbol{r_t}+(\boldsymbol{n}+\mathbf{1})][\mathbf{1}+\boldsymbol{r_t}+(\boldsymbol{n}+\mathbf{2})][\mathbf{1}+\boldsymbol{r_t}+(\boldsymbol{n}+\mathbf{3})]}\boldsymbol{Z_{t+(n+1)}}$$

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 π_t without that she knows r_t and b_t. Similarly, the agents form their anticipation π_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): Min E_{Z_t}. The solution of discretionary policy is therefore: $\pi^{disc} = \frac{\bar{b}}{a}$. Then, private agents anticipate rationally inflation which will be equal to: $\pi_t^* = \pi^{disc} = \frac{\bar{b}}{a}$

After inflationary shocks eventually become zero $(\pi_t^* - \pi^{disc} = 0)$, so, there will be a cost of discretionary policy, by period, equal to: $Z_t{}^{disc} = (b)^2/2a$. 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, 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 $\pi^{règ} = 0$. The cost per period associated with this policy will therefore be to $Z_t{}^{règ} = 0$. 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; witch 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[1] 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 Wadhwani (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.

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

For several decades, especially the mid-1970s, the world was governed by high

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

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[1] 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 yt-1 is the output of the previous period, and ρ (<1) the degree of persistence of the gap. The inflation rate is represented by πt and the rational anticipation of inflation rate, subject to the information at the end of the previous period, Et-1 πt. The parameter α: expresses the strength of the response of production to an unexpected variation of inflation (or the price level). The economy undergoes a supply shock ε during each period. It is independent shocks to identical probability with mean zero and variance, σ^2.

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

[1] The model presented here is that of Svensson (1999b), presented in the form simplified by Dittmar and Gavin Kydlind (1999a).

differential output gap from zero and the square of the variance of the rate of inflation from the target. The coefficient λ 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 β (<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[1]. 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:

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

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:

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

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

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

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

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

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

A Central Bank that attaches great importance to the evolution of the production, (λ= λ*), sets b=1/α in order to output gap follows path ρy_{t-1} with zero unconditional variance.

[1] 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*".

Arbitration between the variability of output and inflation depends on b and α, ρ and σ. 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: ρ = 0, 9 and α = 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 ρ and α, 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/α, the output gap is stabilized in zero and the inflation rate is highly variable around its value target π*. 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.

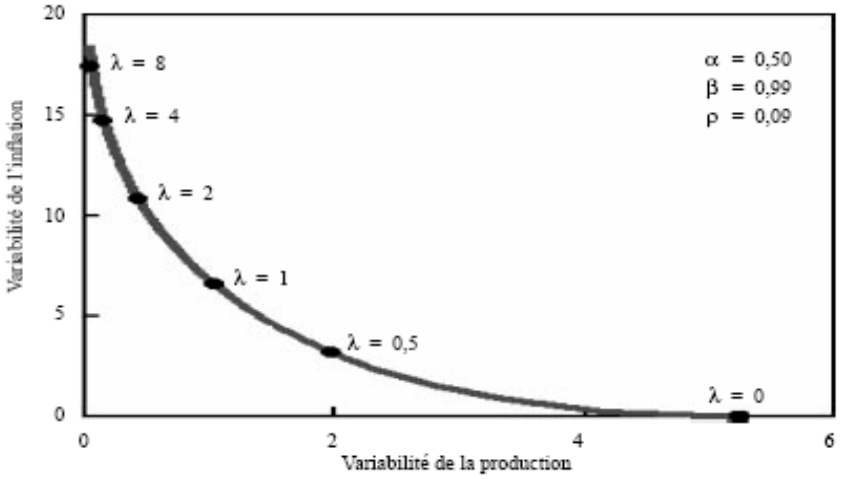

Figure 1. Arbitrage between the variability of output and inflation

(*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 $\begin{cases} \beta > 0 \; et \; 0 \leq \lambda \geq 1 \\ \alpha > 0 \end{cases}$

Where ε and η 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 ε_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 η_t.

If hypothetically the two shocks ε_t and η_t are not anticipated by the public$\left(E_{\eta_t} = E_{\varepsilon_t} = 0\right)$, 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:

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

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:

$$E[\pi_{t+2}] = E[\pi_{t+1}] + \alpha E[y_{t+1}] \qquad \text{“2’”}$$

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

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

$$E[Y_{t+1}] = -qE[\pi_{t+1}] \qquad E[\pi_{t+2}] = E[\pi_{t+1}].(1 - \alpha.q) \qquad \text{« 2’’»}$$

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/α], 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 [π (t+2)]) to another level equal zero. Referring to the equation of generalization expressed above by:

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

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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Impact of Major Economic Variables on Economic Growth of Pakistan

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Abstract: The aim of this paper is to examine the impact of major economic variables *includes inflation rate, interest rate* and *exchange rate* on economic growth of Pakistan. The secondary data has been taken for the years from 1981 to 2013. The results from multiple linear regression model describe that both *inflation rate and interest rate spread negative impact on Pakistan's economic growth* while *exchange rate is found positively significant on the economy*. Therefore, all selected variables having less impact on economic growth of the country as compare to other factors that put a serious impact on Pakistan's economy conditions.

Keywords: economic growth; exchange rate volatility; interest rate; inflation; Pakistan

JEL Classification: A10; E430; O19

1. Introduction

Economic growth refers to an ability of an economy to increase its productive capacity through which it becomes more capable of producing additional units of goods and services. This economic growth is also seen as holly grain for economic policies. The growth or development of a country can be measured through various economic indicators such as Human Development Index (HDI), Total Factor Productivity (TFP) and Gross Domestic Product Growth Rate (GD) etc (Smyth, 1995). Over a long period of time, the unsustainable and low level of economic growth in developing countries is producing difficulties for policy makers, professionals and Government. The main causes of unsustainable growth includes (i) high inflation, (ii) rising foreign debt, (iii) currency exchange rate volatility (iv) consume more & save less (v) poor governance & policy implications, (vi) trade imbalancement , (vii) spend more earn less, (viii) energy & water shortages and (ix) political instability etc. Continuous increase in the rate of economic growth with the low level of inflation rate is one of the main objectives for policy makers to perform efficient role in economic policies formulation. The relationship between major

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macroeconomic variables such as GDP, CPI, PPI, Consumer Confidence Survey, Current Employment Statistics, Inflation, the Labor Market, currency exchange rate, and interest rate with GDP growth rate depends on the state of the economic development. High rate of growth rate without increase in the inflation is beneficial for good economic health of a country.

2. Effects of Major Economic Variables on Global Economy

It was anticipated earlier in the World Economic Repot from last few years that world economy would be weakened considerably in the years 2012-2013. The impact of economic woes in developed economies are falling over the developing economies which becomes a cause of lower demand for their exports, heightened volatility in capital flows and high prices of commodities. The overall world economy faced many ups and downs in growth for last few decades. Many developed economies have experienced financial crisis and continuously struggling to overcome the effects of such crises. According to the report economic growth has recorded 2.1 percent while the target for the growth was 2.4 percent. A growing developed economies especially in Europe countries experienced double-dip recession in 2012. (De Gregorio & Guidotti, 1995). Most of the developed economies are caught high unemployment, increase public debt, and continuous fluctuation in the rate of inflation.

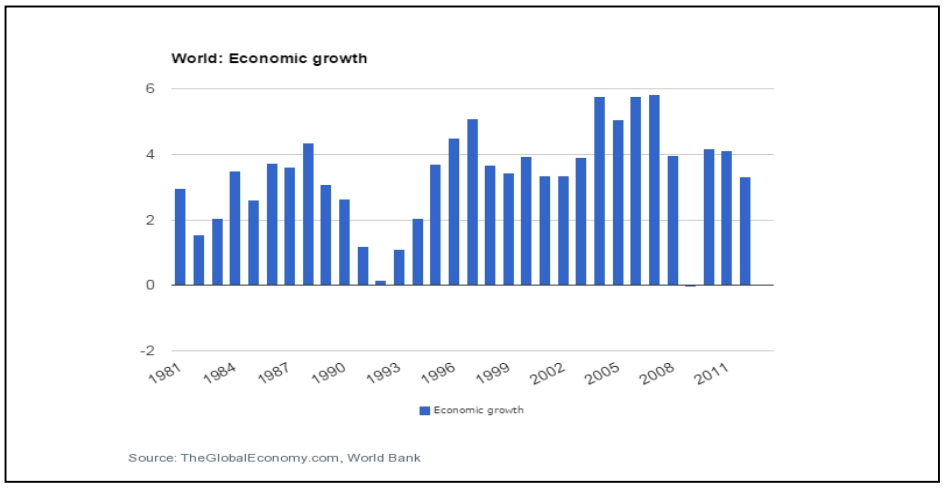

Figure 1. World GDP Growth Rate (1981-2013)

On the other side a large number of developing economies also suffer home-grown economic problems; however including China facing weak investment demand due to financing constraints. Most of the low income countries are facing adverse

spillover impacts due to slowdown of both developed and middle-income countries (Galbis, 1995). Other aspects that are changing the case of world economic scenario are (i) high unemployment, (ii) inflation fadeout worldwide but still a concern in some developing countries, (iii) sharp slowdown of world trade, (iv) oil prices soften but risk premium remains, (v) rising food prices, (vi) continues exchange rate volatility and increase (vii) globalization. The nature and extent of impact for above factors varies country to country regarding to the economic environment while the economic obstacles for developed country are different from developing country (Hooper et al., 1989).

3. Effects of Major Economic Variables on South Asian Economy

The economy of South Asia in 1990s had grown at the level of 5.6%, which was faster than low income countries but slower than East Asian countries. The wide range of economic and political reforms have changed the economic scenario of South Asian countries while these economic reforms include (i) since 1991 political consensus has survived government changes in India, shift of power in Pakistan, Bangladesh, and Sri Lanka. (ii) Overall improvements have been seen in efficiency of resource allocation and utilization. But still most of South Asian countries are bearing obstacles towards their economic growth such as low growth in tax revenues, high expenditures on energy and security concerns, additional burden of food and limited fertilizer subsidies are the major problems that are affecting the economies of South Asian countries (Malik & Chaodhry, 2001). In the past two years economy of India which is almost three quarter of the South Asian region's growth was recorded as 9 percent in 2010 and 5.5 percent in 2012 slowest pace in 10 years due to large fiscal deficit, high inflation and political instability. In South Asian context India has an average inflation rate of 5 percent and Sri Lanka has higher inflation rate as compare to India which is 6 percent during the period of 2000-2013.

Political instability and security threats have considered stymie parts of South Asian economies. In Pakistan, causes of consumer price inflation include increase in oil prices and rise in demand of food commodities. Inflation rate declines after continuous increase from 6.3% in 2004 to 5.7% in 2007 and 5.5% 2008 due to strong improvement in macroeconomic fundamentals.

Table 1. Inflation Rate of Asian Countries (2000-2013) (Annual % Change in CPI)

Sl.	Country	Year													
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	South Asia	**6.1**	**3.8**	**3.5**	**5.0**	**6.3**	**5.3**	**5.9**	**5.7**	**5.5**	**11.2**	**11.6**	**10.3**	**9.1**	**8.0**
1	Afghanistan	-	-	5.1	24.1	13.2	12.3	5.1	7.0	8.0	-8.3	.9	10.2	7.2	7.6
2	Bangladesh	2.8	1.9	2.8	4.4	5.8	6.5	7.2	7.2	8.0	5.4	8.1	10.7	6.2	7.5
3	Bhutan	-	3.4	2.9	2.1	3.6	4.8	4.9	5.2	5.0	4.4	7.0	8.8	10.9	7.0
4	India	7.1	3.7	3.4	5.4	6.4	4.4	5.4	5.0	5.0	10.9	12.0	8.5	7.7	6.9
5	Maldives	-1.2	0.7	0.9	-2.9	6.4	3.3	3.5	7.0	6.0	4.0	6.6	12.8	12.1	2.3
6	Nepal	3.5	2.4	2.9	4.8	4.0	4.5	8.0	6.4	5.0	11.1	9.3	9.3	9.5	9.0
7	Pakistan	3.6	4.4	3.5	3.1	4.6	9.3	7.9	7.8	6.5	13.7	13.9	12.2	10.1	9.0
8	Sri Lanka	1.5	12.1	10.2	2.6	7.9	10.6	9.5	14.5	10.0	.6	2.8	5.1	3.0	2.3

Source: South Asian Economic Report (SAER) 2013: Statistical Appendix, Page – 53

Another South Asian country that is counteracting continuous war situation against Taliban from past decades is Afghanistan. Due to security concern Afghanistan is suffering from economic shut down. In October 2007 china faces low demand of their exports that hit hardly to their economic condition. In 2000-2013 Bhutan has facing very low inflation rate as compare to other South Asian Countries and Bangladesh has no problem due to inflation because economy is facing moderate level of inflation during this period.

4. Effects of Major Economic Variables on Pakistan Economy

After the independence the rate of economic growth of Pakistan is higher than the South Asian economic growth rate. But with the passage of time economic growth of Pakistan was affected by various issues including political instability, burden of foreign debt, poor exports and high imports, lack of implementation of the economic policies for many years (Khalid, 2005). Two wars with India first in 1965 on and second war in 1971 on Bangladesh independence brought Pakistan economy at recession stage. Therefore, 1970s, the economy saw the break-up of the country after a civil war, the nationalization of industries, high inflation, finance and education, flooding, a sharp hike in petroleum prices and recession in world market. The stifling of private initiative and entrepreneurship and the control over all key decision variables by the Government were a major setback to the economy causing huge uncertainty and loss of investor confidence.

The economy recovered in 1980s by adopting deregulation policy by the government and policy makers. Economic growth decelerated again in the 1990s with average

trend GDP growth of 4.4percent per year and stagnant TFP. Political instability, frequent changes in government, weak governance, poor macroeconomic management and unfavorable external environment were more dominant than the favorable impact of economic policies of deregulation, liberalization and privatization introduced in 1991. These reforms and policies were pursued haltingly and sporadically.

The recent growth acceleration has also been accompanied by a similar increase in the investment ratio from 15.5 percent of GDP in 2001-02 to 20 percent in 2005-06. The recent growth acceleration has come largely from an increase in TFP. The contribution of TFP to growth in the last few years is similar or even somewhat higher than in the earlier growth periods.

5. Objectives of the Research

Following are the main objectives of the study.

1. to know the impact of major economic includes inflation rate, interest rate and exchange rate on economic growth of Pakistan.
2. to suggest significant policy implications for efficient economic growth.

Research Hypothesis

The paper carries following hypothesis:

H_1 = There is a significant impact of inflation on the economic growth.
H_2 = There is a significant impact of interest rate on the economic growth.
H_3 = There is a significant impact of currency exchange rate on the economy.

6. Literature Review

Muhammad et al. (2013) identified the nexus between interest rate and investment of the Pakistan for the span from (1964-2012). The study explored that investment was one of the main determinant of GDP that play an important role in boosting up the economy. Interest rate and investment were directly attached to each other, fluctuation in the rate of lending (interest rate) changes investment and saving pattern in the economy of Pakistan.

Ahmad (2013) found that high exchange rate is positively associated with growth rate. But in Pakistan imports balance is greater than exports balance due to the lack of advancement in exports goods. This difference between balance of payments and trade balance economy remains negative and results low growth rate.

Chaudhary et al (2012) investigated both the short run and long run relation of monetary policy, rate of inflation and growth rate in Pakistan during the period of 1972-2010. The investigation showed that credit disbursement to private sector leads to increase in the level of inflation that is harmful for the economy. When supply of money increases in the local market which not only increases the purchasing power of the people but also raises the demand for the goods and services against supply of goods and services.

Umaru and Zubairu (2012) investigated the effects of inflation rate fluctuation on the economic growth and development in Nigeria for period from (1970-2010). Most of the countries of the world used monetary policy as instrument to stable their consumer price index level. The study revealed that inflation possessed a positive impact on productivity and overall output level in the economy.

Badarand and Malawi (2010) concluded that interest rate fluctuations negatively attached with the investment sector in Jordan. Empirical analysis exploited that one percent increase in interest rate decrease the investment development by 0.44%. However income level has positively associated with the investment. Interest rate is associated with the investment while investment is associated with economic growth.

Khawaja and Din (2007) described that when interest increases it discourages the saving pattern and investment. The study also revealed that inelasticity of deposit supply has a major determinant of interest spread where there was no significant concentration that influence interest spread.

Qayyum (2006) examined the link between excessive money supply and inflation variability in Pakistan economy. A research stated that money supply affected the growth of economy which ultimately increased rate of inflation in the country. He concluded that inflation is monetary phenomenon and excessive money supply is important contributor to raise inflation in economy of Pakistan. In developing economies like Pakistan, this situation may occur because of loose monetary policy adopted by the policy makers.

Hussain (2005) concluded that was no definite level of inflation in the economy of Pakistan because 4 to 6 percent inflation rate is not harmful for the economy but at this level inflation encourages the overall productivity and investment returns. He further stated that a structural break level inflation rate was temporary harmful for economic stability in long run.

Levy-Yeyati and Sturzenegger (2002) conducted a de facto classification based study to investigate the link between exchange rate and economic growth on the sample data of all IMF reporting countries. Findings stated that there was a significant relationship found between currency exchange rate and growth and

confirmed that de facto classification based consequences did not apply to those countries which have limited access to the capital market.

Mallik and Chaodhry (2001) examined a long-run positive relation with economy of the four Asian countries (Bangladesh, India, Pakistan and Sri Lanka). They found that a long run significant relationship exists between GDP growth rate and inflation rate for all above four countries. By using co-integration and error correction model they concluded that a moderate inflation rate put positive impact on the economy.

Faria and Carneiro (2001) analyzed a negative impact of the inflation on Brazilian economy under both short run and long run scenario. The study found permanent inflationary shocks on the economy while such shocks of inflation didn't threatened the economy in extreme. However permanent increase in inflation rate would be trouble for the health of Brazilian.

Bleaney and Fielding (1999) analyzed the causes and effects of exchange rate and inflation rate volatility on overall output of developing countries. They stated that if the currency exchange rate of developing country pegged over the currency exchange rate of developed countries the level of inflation can be control in developing countries. They also concluded that adoption of floating exchange rate by the developing economies had a very expensive cost near about 10 percent per year which is greater than typically developed economies.

Bruno and Easterly (1998) found that there was a temporary negative relationship found between inflation rate and economic growth. The sign of relation depends on the level of inflation rate. If level of inflation is high than it would be harmful to economy growth while the level of inflation is low it could encourage high productivity as well as increase in output level.

7. Research Methodology

The aim of this paper is to examine the impact of major macro-economic variables includes inflation rate, exchange rate and interest rate on economic health of Pakistan. A secondary data for the year 1981 to 2013 have been collected from various issues of Economic Survey of Pakistan, World Bank Reports, Federal Bureau of Statistics and other website. There are number of theories developed by various economists for the purpose of identifying the factors that influence the economic growth of the country. For this current study a multiple linear regression model has been designed to test the research hypothesis as following:

$$\mathbf{Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e}$$

$$\mathbf{GDP = \alpha + \beta_1 INFR + \beta_2 EXCHR + \beta_3 INTR + Error\ Term}$$

Where as

Y = Growth Rate

α = Constant

INFR = Inflation Rate

EXCHR = Exchange Rate

INTR = Interest Rate

e = Error Term

β_1, β_2 and β_3 are the coefficient of independent variables

There is numerous numbers of variables which put affect on the economic growth of Pakistan in various ways. Different variables have been taken by many researchers to find out the relation between those variables and economic growth. But this paper includes three independent variables Inflation rate, exchange rate and interest rate.

Economic Growth

GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources (World Bank Definition). Annual GDP growth rate has been taken as dependent variable.

Inflation Rate

Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used (World Bank Definition). Inflation rate has been taken as independent variable.

Interest Rate

An interest rate is the rate at which interest is paid by a borrower (debtor) for the use of money that they borrow from a lender (creditor). Interest rates are typically noted on an annual basis. An interest rate per year has been taken as independent variable.

Exchange Rate

The price of a unit of domestic currency is expressed in terms of the foreign currency. An exchange rate thus has two components, the domestic currency and a foreign currency, and can be quoted either directly or indirectly. An exchange rate has been taken as independent variable.

8. Results & Discussion

For the purpose of finding the quantitative predictions regarding dependent and independent variables, regression analysis method has been adopted that shows the individual significance of each independent variable and overall significance of the model. Following are the results of regression analysis:

Table 2. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.648[a]	.420	.363	1.71013

a. Predictors: (Constant), Exchange Rate, Interest Rate, Inflation Rate

In the above model summary table the capital 'R' representing the coefficient of correlation. The coefficient of correlation 'R' determines the degree and direction of the variables which are associated with each other from the sample data. There is a range of coefficient of correlation which express the strength and direction of the correlation between the variables. This range includes '+1' and '-1'. If there is a strong positive linear relationship found between variables and the value of the 'R' would close to the '+1'. While the value of the 'R' will be closed to '-1' a negative linear relationship found between variables and if the value of 'R' will be zero which describes a weak relation between the variables.

The model summary table shows the value of $R^2$is found 0.42 that means 42% of economic growth of Pakistan are explained by the independent variables includes inflation rate, currency exchange rate, and interest rate. The value of 'R' is low because the economic growth is also depend on many other factors like political stability, government policies, government consumption, exports and imports of the country etc.

Table 3. Analysis of Variance(ANOVA)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	63.655	3	21.218	7.255	.001[a]
	Residual	87.736	30	2.925		
	Total	151.391	33			

a. Predictors: (Constant), Real Currency Exchange Rate, Interest Rate, Inflation Rate

b. Dependent Variable: Gross Domestic Product
[Sig.: Significance]
[Df.: Degree of Freedom]

To find out the overall significance of the model has been undertaken by F-statistics shows the value 7.255 is found significant at 0.001. The ANOVA model further explains the relation between both dependent and independent variables. The overall results of the F-statistics describes the model is best fitted which strongly leads to define a strong and significant relation between selected economic variables (inflation rate, interest rate, exchange rate) with GDP.

Table 5. Results of Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.485	1.390		2.507	.018
	Inflation Rate	-.167	.090	-.303	-1.846	.075
	Interest Rate	-.266	.108	-.402	-2.461	.020
	Real Currency Exchange Rate	.024	.007	.467	3.279	.003

a. Dependent Variable: GDP Growth Rate

Source: Authors' Calculation

The value of constant is found 3.485 which describes that if all independent variables remain zero the economy of Pakistan will remain affected by other variables that have not taken into account. The t-value of inflation rate is found -1.846 which describes that inflation rate has significant impact on Gross Domestic Product growth of Pakistan. Therefore H_I is accepted. Coefficient of inflation rate is showing negative impact on economic growth. The value of coefficient of inflation rate is showing that if inflation rate would increase by 1%the growth rate would be declined by16.7%. This result describes the importance of the inflation in the Pakistan's economy that only 1% increase brings about 16.7% declines in the overall economic growth.

The t-value of exchange rate is found 3.27 which state the significant impact of exchange rate on economic growth of Pakistan. The result also revealed that exchange rate and economic growth is positively associated with each other because 1% changes in exchange rate brings2.4% changes in economy of Pakistan. Hence H_2 is accepted.

Similarly, t-value of the interest rate is calculated -2.46 showing its impact on economy of Pakistan. This value also concludes that H_3 is accepted. The result also revealed that 1% increase in interest rate will cause a decline of GDP growth by 26.6%. The result for interest rate impact on GDP of Pakistan is strong rather than inflation changes. Because inflation rate fluctuation also put impacts on interest rate.

9. Conclusion

The study focuses on the consequences of impacts that have been exerted by the selected variables inflation rate, exchange rate and interest rate on economic growth rate of Pakistan. There are number of macroeconomic variables that influence the growth performance of any country. The type of influence of these economic variables varies from country to country such as developed economies and developing economies. The developing economies like Pakistan suffering from various issues such as energy & water shortages, political instability, lack of policy implication, continuous increase in inflation, security concerns, burden of foreign debt, and misbalance between import and exports payments etc. The empirical results describes about the selected two independent variables includes inflation rate and interest rate are negatively correlated with the GDP growth of the Pakistan and at the high values of these variables putting worst impact on the growth rate of the economy of Pakistan. On the other hand coefficient of exchange rate showing positive impact on the growth rate of Pakistan. In this span the influence of inflation rate, interest rate and exchange rate are lesser as compare to other factors that put impact on Pakistan's economy these factors includes political instability, security concerns, energy shortages, burden of foreign debts.

10. Policy Implications

The study suggests that the policy maker should take tight policies against reduction of inflation growth in the country by implementing the tools such as controlling money supply in the market through open market operation, setting up interest rate and setting of bank reserve requirement.

Government of Pakistan should take serious steps to control the inflation rate such as reducing imports & increasing exports, reducing government expenditures, give

priority to agriculture sector, take serious consideration to food prices, increase & utilize energy resources with low production cost and remove security threats.

In the context of interest rate that includes very important instrument used by the State Bank of Pakistan. Interest rates play a pivotal role in controlling inflation rate in the economy by increasing or decreasing the level of interest rate. Continuous fluctuations in interest rate may decrease the confidence of investors due to uncertainty about return on investment. Therefore policy makers should take serious consideration about changing rate of interest rate while controlling inflation rate.

Interest rate should be stable to generate deposits in the banks therefore; people have the change to save money in the bank instead of investing anywhere else.

The result of the current study shows positive impact of the exchange rate on the economy of Pakistan. A strong exchange rate leads low cost of production with cheap imports and also helps to control inflation due to low prices of foreign goods and services. Therefore study suggests to the policy makers to maintain high exchange rate in order to boost up the economy of Pakistan.

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