

**MONETARY POLICY:
THEORETICAL FRAME AND EMPIRIC EVIDENCE IN A SCHEME OF
EXPLICIT INFLATION GOALS**

I. THE PRESENTATION OF THE IMPOSSIBLE TRINITY OF THE OPEN MACROECONOMY

The process of globalization that has characterized the world economy during the last decade has propitiated greater capital mobility, which as redounded in greater availability of funds to finance the investment in emerging economies. Also, the technological process induced by the mentioned globalization has propitiated the creation of new and varied financial instruments that allow diversifying the risk and reducing transaction costs in financial markets. Said technological process has also facilitated the availability of information in real time at a low cost. The better and greater availability has propitiated, at the same time, a greater interaction between the diverse financial markets around the world, which has declared an increase in the volume of mobilized financial resources as in the speed in which these are transferred from one country to another.

In the described context, the design and management of the macroeconomic policy have benefited from the increase in the quantity and quality of available information, with which it has been possible to sophisticate and improve the operational procedures with which said policy is implemented.

Contrasting the indicated, the globalization of the world economy has also generated restrictions in the management and implementation of the macroeconomic policy, which have been the object of profound analysis and debate in the framework of the contemporary economic theory. The most evident restriction is expressed in the postulate known as the “**Impossible Trinity of the Open Macro economy**”, which establishes that, in the presence of a substantial capital movement (phenomenon that given the evolution of the financial market is irreversible) it is not possible to adopt a regimen of the fixed exchange rate and, at the same time implement an independent monetary policy that has as its objective the stability in the general level of prices. In effect, according to said postulate an economy cannot have two nominal anchors, in this case: the nominal exchange rate and the inflation. From there anchoring the economy in an only nominal variable is a fundamental



requirement to observe effective management of the macroeconomic policy; as a matter of fact, in modern macroeconomic literature the nominal anchor is considered a public asset, since on the same there rests the sustainability of all efforts of macroeconomic stabilization of a country, aspect that is fundamental to promoting growth and orderly development of an economy. .

A. THE NOMINAL ANCHOR LESSON

The countries that choose an exchange rate as a monetary policy nominal anchor, adopt, either a *dollarization* scheme, as in the case of Panama, Ecuador and El Salvador, or a the scheme of the super fixed exchange rate, which is the case of the Currency Board in Argentina (1991-2001)¹. It is worth indicating that the adoption of the scheme of the super fixed exchange rate looks to stabilize the internal inflation at international levels.

On the other hand, the countries that choose a monetary aggregate as a nominal anchor or those who adopt an explicit inflation goals scheme², also avoid incurring in the macroeconomic inconsistencies derived from the impossible trinity; in other words, respect the nominal anchor, allowing the monetary authorities to consistently stabilize the general level of the internal prices, which positively influence in the expectations of the economic agents, aspect that strengthens and gives sustainability to the macroeconomic stability³, but mainly to the monetary policy.

B. THE LOSS OF THE NOMINAL ANCHOR

It is important to point out that when the impossible trinity postulate is not observed, the monetary authority loses control over the nominal anchor and, therefore, incurs in macroeconomic inconsistencies. In that regard, following are two possible cases in which the nominal anchor is lost in a small and open economy.

¹ The sustainability and effectiveness of the Currency Board requires fiscal discipline, price flexibility and salaries and a high level of international monetary reserves. It is worth pointing out that the collapse of the Currency Board in Argentina is basically due to the lack of fiscal discipline and salary rigidity.

² In this monetary scheme it is fundamental to give solidarity to the fiscal consolidation efforts.

³ The focus of explicit inflation goals the advantage had that even when a country does not have the adequate capital market that allows implementing a sustained monetary policy according to the Taylor Rule, the monetary management can accompany the traditional financing programming scheme, but that it balances the effectiveness of said focus, as in the case of Guatemala.



1. When in the presence of an independent monetary policy that allows the stability in the general level of prices, adopt the objective of a nominal exchange rate

The loss of the nominal anchor in the economy can happen when a country has been adopting a monetary policy that pursues the stability in the general level of prices, in a context of the flexible exchange rate simultaneously decides the nominal exchange rate anchor; in other words, decides to pursue the objective of the nominal exchange rate.

When adopting an objective of the administered exchange rate, the nominal exchange rate becomes an exogenous variable; in other words, that the central bank fixes a value and, therefore, the rest of the macroeconomic variables, especially Money offer, must adjust automatically to the prevalent real and financial conditions in the economy.

In the context of an administered exchange rate, the *endogeneity* of the monetary offer means that the same is determined by the result of the payment balance. So when the payment balance experiments an increase in the international monetary reserve, the monetary authority has to acquire the excess of foreign currency in the monetary exchange, in exchange for internal currency, which translates into an increase in the monetary offer. On the contrary, when the payment balance exhibits a decrease of international monetary reserve, the central bank must provide the foreign currency exchange market, which implies a reduction of the internal monetary offer.

The fact that the Money offer is determined by the result of the payment balance implies that the central bank is not fully able to use the monetary policy to stabilize the internal level of prices. In effect, the income (expenditure) of foreign capital would translate into increases (decreases) of the international monetary reserves and, therefore, in increases (reductions) of internal monetary offer, which could propitiate, at the same time, a marked variability in the internal prices, in the interest rates and in production.

Additionally, when the capital expenditure is significant, for example, the high mobility of capital can generate the depletion of the international monetary



reserves of the central bank and induce the economic agents into modifying their expectations regarding the functions of local currency, which, according to international experience, regularly, translate into the abandonment of the administered exchange rate. On the other hand, when an excess income of foreign capital is given, the economy will experiment an inflationary process accompanied by the appreciation of the real exchange rate, which, when eroding the competitiveness of the exportations, could also induce authorities to abandon the administered exchange rate.

Of the previous analysis it is possible to infer that it is impossible to simultaneously and sustainably maintain, an objective of the administered exchange rate and an independent monetary policy, since, as was pointed out, the mobility of capital (common element in small and open economies) induce an unstable behavior in the money offer.

In that sense, to avoid incurring in the inconsistency of the impossible trinity, several countries have adopted a flexible exchange system, given that under said scheme the central bank has direct control on the monetary offer and, therefore, an dedicate its efforts toward stabilizing the internal prices (*Inflation Targeting*), so that the external sector adjustment is made by autonomous movements of the nominal exchange rate, according to the supply and demand conditions of the exchange market.

2. When in the presence of an independent monetary policy that pursues the stability in the general level of prices, in the framework of a flexible exchange rate, using the exchange policy for the real exchange rate anchor

It is worth mentioning the fact that the monetary policy has been assigned the objective of stabilizing the general level of prices, sustained that, in the long term, a nominal variable (monetary offer) can only affect another nominal variable (internal prices) and, from no point of view, a nominal variable can influence in the behavior of a real variable, like the real exchange rate.



In the following we will go over some of the relative aspects of the exchange policy and the exchange rate, nominal as well as real.

a) Exchange Policy and Nominal Exchange Rate

The participation (or, if it were the case, the lack of participation) of the central bank in the exchange market has a determining effect in the level the nominal exchange reaches in said market. This fact is sometimes called on to recommend the application of an exchange policy that pursues the nominal depreciation to favor the competitiveness of the exporting sector. In that regard, it is recommended that the exchange policy be active in some cases, in that sense that the participation of the central bank in the exchange market leads to a nominal depreciation that, as a minimum, compensates the exporting sector due to loss of competitiveness that is derived of the differential between internal inflation and commercial partners inflation.

The problem that the recommendation of the mentioned policy encloses is that the active exchange policy in that sense implies the adoption of a nominal exchange rate goal, which is compatible with the adoption of any other nominal goal (for example as an inflation goal or a growth goal of a monetary aggregate). Therefore, the active exchange policy in question is incompatible with the adoption of a scheme of explicit inflation goals (independent monetary policy), which makes inflation become an endogenous variable and not in a variable determined by the monetary policy; in other words, the inflation goal is no longer a nominal anchor of the monetary policy. Additionally, it must be indicated that the active exchange policy referred to does not look for consecution of a determined nominal exchange rate (in other words, not using the exchange rate as a nominal anchor), but looking to generate a nominal depreciation that compensates, as was indicated, the differential between internal inflation and external inflation; but, said differential does not *ex-ante* determine, since, as it was mentioned, the same policy makes internal inflation be determined endogenously. Therefore, an active



exchange rate implies the absence of a well defined nominal anchor in the monetary policy. In a situation of nominal indetermination as is the case, inflation levels and exchange depreciation would be determined by self-fulfilled expectations of the economic agents, in an environment monetary exchange growth instability and, in general, macro economically. In summary the active exchange policy that would want to improve the competitiveness of the exporting sector generates fundamental inconsistencies between monetary and exchange policies, avoiding that the central bank fulfills its fundamental objective, which is the stability in the general level of prices.

b) Exchange policy and the real exchange rate

According to the expressed, the active exchange policy that seeks the nominal depreciation does not have an enduring effect on the exporting sector and, therefore, in the competitiveness of the economy, because said policy implies a loss of inflation control and, therefore, does not lead to a real depreciation (except, possibly in the very short term). The reason why the exchange policy does not affect the real exchange rate in a sustained manner, is that said policy essentially affects nominal variables (the nominal exchange rate and the monetary offer), so much so that the real exchange rate is, as its name indicates, a real variable. As a matter of fact, the real exchange rate reflects the price of external goods in terms of internal goods. So that the real exchange rate increases (in other words, for a real depreciation), it is necessary that the level of prices of external goods increase regarding the level of internal prices of goods; this in practice, implies that the level of prices of internal goods increase less than the level of prices of external goods. For that to occur, the macroeconomic policy must sufficiently restrict the aggregate demand of goods produced internally. Said restriction of aggregate demand are completely out of reach of central bank policies (monetary and exchange), taken as isolated, due to the fact that the same can only be achieved through the combined effect of macroeconomic policies,



among which are the fiscal policy (that determines the level of savings of the public sector and affects the level of private savings sectors) and the structural policies that affect the relative prices of the internal and external goods (like the foreign commerce policy) and those that affect the decision of savings and investment (like financial and foreseeable policies).

In conclusion, it is convenient to have the lack of viability and inconsistency of assigning the exchange policy the objective of the competitiveness of the exporting sector in mind. Said objective should be assigned to a more integral presentation of the macroeconomic policy, so much so that the exchange policy should be limited to be compatible with the search of the fundamental objective of the monetary policy, which is to propitiate the stability in the general level of prices. As long as the monetary policy concentrates on propitiating the consecution of a well defined inflation goal, the exchange policy, to be consistent, must allow that the nominal exchange rate is freely determined in the market without the participation of the central bank, expect, in the particular case, to avoid the excess exchange volatility.

II. THE ORIENTATION OF THE MONETARY POLICY

During the last ten years the macroeconomic policy around the world has experimented deep transformations, due, among others aspects, to the new economic and financial structure of the world economy, which is characterized by a greater integration and real interdependence and financial among economies. In effect, the process of globalization in the world economy demands macroeconomic discipline so the economic agents can extract greater benefit in said process.

In that sense, there is consensus referring to the stability in the general level of prices is a basic condition to promote growth and economic development. This is due to the fact that the stability in the general level of prices reduces the volatility in the relative prices, which promotes a more efficient assignment of economic resources.



The mentioned implies that a central bank must concentrate and direct their actions and achieve the stability in the general level of prices, since this constitutes a greater contribution than the monetary policy can give to promote a macroeconomic environment in which the markets of *loanable* funds, goods and services, of Money and work can operate efficiently, promoting production and employment. It is also worth indicating that the stability in prices reduces the uncertainty and, therefore, cooperates with the economic agents in adequate decision making in matters of savings, investment and employment.

The effectiveness in the reduction of the uncertainty implies that a central bank must be transparent and render accounts on their actions. In that sense, must provide the public with opportune information and true on the inflation goal that strives for a determined horizon, which implies that the inflation rate becomes the nominal anchor of the monetary policy⁴.

The fact that the fundamental objective of a central bank consists of reaching and preserving the stability in the general level of prices is sustained not only in the convincing that the high and volatile inflation is damaging to the economic growth, but also, in the simultaneous search of other objectives on behalf of the monetary authority (for example, the exchange rate) is economically inefficient and can set the consecution of the stability objective at risk. That is why the use of the general level of prices as a nominal anchor of the monetary policy implies and demands the adoption of a regimen of exchange flexibility, so that the nominal exchange rate be determined by the supply and demand, which means that the adjustment of the external sector basically fall back on the nominal exchange rate.

The importance of focusing the monetary management toward achieving the stability of the internal general level of prices, and makes the external adjustment fall back on the nominal exchange rate, implying that a central bank through the combination of its different instruments implements the monetary policy through changes in the interest rate, which guarantees that the same keep control on its nominal anchor.

⁴ It is important to point out that the loss of the nominal anchor of the monetary policy has high economic and social costs, since it can lead an economy toward a process of high economic and financial inflation and instability, such as is shown in the evidence of countries that tried to use the monetary policy to reach various objectives.



The deepening of stability and efficiency of the macro economy also requires the consolidation of public finance. If effect, the fiscal discipline is important not only to avoid the weight of stabilization falls exclusively on the monetary policy, which could generate distortions in the main macroeconomic variables, but also to cooperate in producing an efficient adjustment to the external sector, since the excessive public expense translates into an increase of the aggregate demand and internal interest rate, as well as into an excess of appreciation of the real exchange rate.

In practice, the fiscal lack of income produces an excess of aggregate demand that, at the same time, translates into an increase in importations of payments. Also, the excess of public produces an increase in the price of internationally non-tradable goods, aspect that generates an appreciation of the real exchange rate, which influences negatively in the competitiveness of national exportations and, therefore, cooperates in the deepening, as was indicated, the lack of balance in the payment balance account. Another probable negative effect of fiscal indiscipline is that the same can propitiate the so called displacement effect, which at the same time translates in an increase of the internal interest rate, propitiating the income of external speculative capital that can place the exchange and financial stability at risk.

The mentioned implies that the consolidation of fiscal discipline is important so that the monetary policy efficiently reaches its fundamental objective, as well as to produce an adequate adjustment of the external sector. In that sense, the intensification of its efforts to keep the monetary and fiscal discipline is fundamental to propitiate the reduction of the differential of the internal interest rate regarding the external, aspect that propitiates a gradual mobility of capital toward the exterior, leading to an adjustment, also gradual in the nominal exchange rate, which, at the same time cooperates in the adjustment of the external sector.

As can be appreciated, the consistency of the monetary policy, based on the existent of a nominal anchor, is of fundamental importance to create the ideal conditions for the orderly and sustainable growth of the economy; however, it is necessary to highlight that said policies on their own are not a



sufficient condition to permanently generate the economic growth and development.

In effect, the generation of growth and development also requires disciplined monetary and fiscal policies that coincide with structural character policies, like commercial, work and others that promote a better use of the production factors, increasing economic productivity, all of which will redound in greater competitiveness of it in international markets and, in that way, favor the economic growth in the long term that allows a sustained elevation of the level of life of the population.

III. THE MONETARY POLICY IN GUATEMALA IN A SCHEME OF EXPLICIT INFLATION GOALS

A. OF MONETARY GOALS TO EXPLICIT INFLATION GOALS

The Monetary Board resolved to approve the process of adopting a scheme of explicit inflation goals⁵ in order to consolidate the stability in the general level of prices in Resolution JM-185-2005, among other aspects; it is also true that the establishment of inflation goals goes back to the beginning of the nineties.

In effect, in 1991, within the monetary scheme of goals⁶, for the first time defines and announces an inflation goal, fixed at 15% for this year. In 1992, an expected inflation rate of 8% was made known. It is worth indicating that in said year subsidies and exchange restrictions were eliminated and a more flexible process of the nominal exchange rate was begun. In 1993, an inflation goal of 8% was established. It is worth mentioning that in the referred year a public sale mechanism for foreign currency was adopted that fixed prices according to the exchange market conditions. In 1994, an inflation goal was fixed and the foreign exchange market was made more flexible. In 1995 and 1996, for the first time it was explicitly announced that the central objective of the monetary

⁵ The "Scheme of Explicit Inflation Goals" is a reference framework of monetary policy characterized by the public announcement of quantitative goals (or ranges) of official character (inflation rates) regarding one or more temporary horizons, with the explicit certainty that a low and stable inflation is the main long term objective.

⁶ The monetary goals scheme is fundamental in the quantitative theory of Money, in which when controlling the growth of the monetary offer, it influences in the general level of prices. In that sense, said scheme says that a goal can be established for a particular monetary aggregate (for example, payment means and monetary issue) and intermediate goals for other relevant monetary aggregates, in order to reach the final objective of the monetary policy.



policy would consist in achieving the stability in the level of prices, for that the inflation goal was fixed in a range of 8% and 10%; establishing intermediate goals for external assets, internal assets and money offer, as to the operation of the monetary program. In both years, the exchange scheme continued being flexible, establishing, in 1996, the Electronic System of Negotiation of Foreign Currency –SINEDI [For its acronym in Spanish]-, mechanism that was adopted to ease the exchange rate would establish market conditions. In 1997, a goal of 8% and 10% and began giving emphasis to the use of open market operations as a monetary control instrument. In 1998 a new range of inflation was established, which was defined between 6% and 8% and advanced in the use of open market operations as the main instrument in order to regulate the liquidity in the economy. In 1999 and 2000 an inflation range between 5% and 7% for both years was announced, but between 2001 and 2005, the inflation goal range was established between 4% and 6%. On the other hand, in 2006 the goal was fixed at 6% +/- 1 percentage point.

Following is a graph that summarizes the inflation goals referenced to above, as well as the deviation of the inflationary rhythm observed regarding the same, for the 1991-2006 period.

METAS DE INFLACIÓN Y RITMO INFLACIONARIO
Período: 1991 - 2006

Años	Meta de inflación			Ritmo inflacionario	Desviación en puntos porcentuales
	Punto fijo	Rango de la meta			
		Mínimo	Máximo		
1991	15			10.03	-4.97
1992	8			14.22	6.22
1993	8			11.64	3.64
1994	8			11.59	3.59
1995		8	10	8.61	
1996		8	10	10.85	0.85
1997		8	10	7.13	-0.87
1998		6	8	7.48	
1999		5	7	4.92	-0.08
2000		5	7	5.08	
2001		4	6	8.91	2.91
2002		4	6	6.33	0.33
2003		4	6	5.85	
2004		4	6	9.23	3.23
2005		4	6	8.57	2.57
2006 *	6	5	7	3.85	-1.15

*/ A octubre



In the described context, as is observed in the above graph, under the scheme of monetary goals, in 1991 the deviation of the inflationary rhythm was significantly lower regarding the established goal for that year. On the other hand, in the 1992-1994 period, said deviation was higher than the goal. In 1995, the inflationary rhythm was located within the range-goal established. For 1996, a slight deviation was observed of the established range for this year; whereas in 1997 the inflationary rhythm was located under the inferior limit of the goal-range. In 1998, the actions in monetary matters allowed the new inflationary rhythm to December of that year so no deviation was observed. Finally, within the referred scheme of monetary goals, in 1999, the inflationary rhythm was slightly below the lower limit of the established goal-range for said year.

It is worth pointing out that as of 2000 there were important changes in the manner in which the Monetary Board determined the Monetary, Foreign Exchange Rate and Credit Policy, since the following indicative variables were issued: monetary issue, interest rates, banking credit to the private sector, real exchange rate, subjacent inflation, monetary conditions index and a parameter rate, that reflects a similar criteria to the Taylor Rule.

The referred variables were adopted to orient the decision in monetary policy matter due, among other factors, to the fact that the monetary aggregate (due to financial innovation, especially) had lost a lot of its informative and predictive value.

On the other hand, it is worth indicating that with the enforcing of Decree Number 16-2002 the Congress of the Republic, Organic Law of the *Banco de Guatemala*, the Monetary Board decided the necessary legal framework for the adoption of a scheme of explicit inflation goals, giving priority to the established in the general level of prices; strengthening its formal, operative and financial autonomy (patrimonial restoration); delimiting its role of last instance lender; assigning importance to its responsibility of watching the payment system; obligating it to increase its transparency as to spreading the reports on the results in inflation matters; obligating it to render accounts through the appearing of the President of the Central Bank before the Congress of the



Republic twice a year (January and July) to render the corresponding reports; and, privileging the use of indirect instruments of the monetary policy, particularly, of the monetary stabilization operations at market interest rates.

On the above, a fundamental change in the operative autonomy of the Central Bank was the establishment of an Execution Committee, through which the *Banco de Guatemala* executes the monetary, foreign exchange rate and credit policy determined by the Monetary Board. The Execution Committee has the following attributions:

- ✓ Use the instruments of monetary policy in the manner of approval by the Monetary Board;
- ✓ Inform in the next Monetary Board meeting, through its coordinator, regarding the execution of the monetary, exchange and credit policy adopted by them; and,
- ✓ Exercise the other attributions that the Monetary Board assigns for executing the monetary, foreign exchange rate and credit policy.

In the context of attributions of the Execution Committee, it is worth mentioning that in 2005 they approved the introduction of modifications to operations of monetary stabilization with the purpose of increasing the efficiency of the monetary policy; among these we can mention: i) fixing the leading short term interest rate (LTDs in 7 day terms); ii) setting a calendar for decisions regarding changes in the leading interest rate; iii) reduction of the number of biddings; and iv) fixation of quotas for the fund-raising of LTDs that are placed through the bidding mechanism.

On the other hand, in 2005 and in 2006 the *Banco de Guatemala* participated in the exchange market through an explicit participation rule, that is oriented toward eliminating the discretion in the participation of the Central Bank in said market and whose objective consists of moderating the volatility of the exchange rate, without affecting its tendency.

Also, concerning the projections of macroeconomic variables for a better conduction of the monetary policy, in 2006 was implemented as an analysis tool



of the Semi-structural Macroeconomic Model- MMS⁻⁷, whose purpose is to help the Central Bank in the interpretation of the state of the economy and in the policy decision-making that contributes to the achievement of its fundamental objective. The MMS consists of a system of equations that allow quantifying the direction and magnitude of the relations between the main macroeconomic variables, as well as the foreseeable evolution of the same, taking into account the reaction of economic agents before the decisions of the monetary policy of the Central Bank. In this manner, the MMS has been designed as an analytical framework that allows discussing the more precise and orderly manner of the implementation of policy actions to moderate the inflation expectations.

The MMS generates forecasts that are conditioned to the central bank fulfilling a monetary policy that leads inflation toward its balance values in the mid and long terms⁸.

On the other hand, in matters of explicit inflation goals, transparency and account rendering constitutes key factors for the design, implementation and effectiveness of the monetary policy. Therefore, the decisions of the monetary policy are periodically spread through the following reports:

- **Publication of monetary policy reports**

According to the established in the organic law, the *Banco de Guatemala* publishes a monetary policy report twice a year that contains an explanation of the operations made to reach the fundamental objective.

- **Report to the Congress of the Republic of Guatemala**

In the month of January every year, the President of the *Banco de Guatemala* must appear to render a report before the Congress of the Republic, that contains the deeds and policies of the Central Bank in the previous year and explain the objectives and policies forecast for

⁷ It is important to point out that this model has been built with the technical assistance of the International Monetary Fund in the matters of adopting a scheme of explicit inflation goals.

⁸ The model is calibrated so that, in the long term, the inflation converges at an annual rate of 3%.



the current fiscal year. In the month of July, a report of the execution of the monetary, foreign exchange rate and credit policy must be given in the current fiscal year.

- **Presentation of the deeds of the Execution Committee**

Weekly, the *Banco de Guatemala* on its Internet page presents the deeds that contain the discussions of the members of the Execution Committee regarding the guidelines for the execution of the monetary policy with a weeks' delay.

- **Presentation of the deeds of the Monetary Board**

Monthly, the *Banco de Guatemala* publishes a summary of the arguments of the Monetary Board taking into account their decisions in matters of determining the leading interest rate of the monetary policy with a months' delay.

- **Release of the information of the *Banco de Guatemala***

According to the organic law, the *Banco de Guatemala* through the media presents its general balance, including notes of explanation and an outline of administrative expenses, monthly. Also, once a year, present financial statements in an analytical form, verified by an independent auditor.

The *Banco de Guatemala* also publishes a study that contains the most relevant aspects of the national economy annually; also, releasing the main macroeconomic statistics of monetary, foreign exchange rate and credit character, of the payment balance, the *Aide de memoir* of the Central Bank, the monetary program, the evaluation of the monetary policy and other relevant documents.



B. THE INTERNATIONAL EXPERIENCE IN MATTERS OF EXPLICIT INFLATION GOALS

A low and stable inflation rate is fundamental to promoting sustainable economic growth.

In this context, the scheme of explicit inflation goals constitutes a reference framework so that the monetary policy, through the use and combination of different instruments, efficiently ensures the stability of the general level of prices.

In the following we present a general vision that contains the conceptual aspects of the mentioned scheme and the international experience of the same.

1. The role of economic information in the design and follow-up of the scheme of explicit inflation goals

The majority of monetary policy strategies, like the growth goals of monetary aggregates, make intense use of intermediate goals (for example, the balance of Money in a reduced sense or in an ample sense), that can be reasonably controlled by the monetary authorities, but only have an indirect effect and an uncertain statistical relation with the objective variable, inflation in this case.

Based on this, the central banks are supported on more variables that provide useful information on the economic situation, known as informative variables or indicative variables, which are chosen to project, as good forecasters. However, it is worth indicating that these variables must be used with caution, since there is no guarantee that the information that they contain will remain constant in the future. On the other hand, the better option is to combine the use of information variables with forecast models sustained in the econometric methods.

2. Discretion or established rules

During the nineties many central banks sustained the operative procedures in monetary policy rules. These rules were destined to eliminating the possible inflationary bias as well as the strengthening of the credibility of the



monetary policy; however, the rigidity of the mentioned rules made the need to count on a scheme for the monetary policy evident that simultaneously, could eliminate the possible inflationary bias and positively affect the expectations of the economic agents.

The monetary policy scheme that fulfills the mentioned requirements should reach a solution of fulfillment among the models of established rules and those of absolute discretion; in other words, should incorporate the advantages of both schemes and avoid, as possible, the probable disadvantages attributed to the same.

Said solution of fulfillment came from the experience of several countries that decided that its central banks publicly announced inflation goals that committed to reaching a determined horizon. Also, together with the announcement of inflation goals (*inflation targeting*) should make known operative and analytical procedures to the economic agents that the monetary authority will implement of reaching the announced goal.

The implementation of the monetary policy in the mentioned terms has the advantage of committing the central bank in fulfilling the announced, which eliminates any inflationary or deflationary bias that could derive in a monetary policy dynamically inconsistent and also, positively affect the expectations of the economic agents, due to the fact that these count on the relevant information on the possible evolution of the monetary management.

3. The election of a nominal anchor: a crucial element

In choosing the nominal anchor of the monetary policy, the managers of the same have three basic choices: the nominal exchange rate, a monetary aggregate or the inflation.

In the countries with a regimen of a flexible exchange rate, the nominal anchor can be a monetary aggregate (monetary base issue or interest rate). According to this system, the central bank uses its instruments, for example, the interest rates, to control the monetary aggregates that are considered the main determining factor of the long term inflation. In this way, the control of monetary aggregates would be equivalent to stabilizing the inflation rate as to the value



goal, which ensures not losing the nominal anchor in the economy. Evidently, the possibility that the monetary aggregates act effectively depend on the stability of its empiric relation with the goal variable (the inflation rate) and its relation with the monetary policy instruments (generally the monetary stabilization operations).

Even though the growing integration of world capital markets in the last twenty years has taken place, and the growing lack of stability of the capital current from the European Monetary System (SME, for its acronym in Spanish), in 1992, especially after the most recent financial crisis in Asia and Latin America, the conditions to maintain the fixed exchange rate system has become more complicated. In effect, the developing and transition economies that continue keeping a fixed exchange rate as a nominal anchor of the monetary policy are the object of growing pressure whether it be more flexible mechanisms or on the other end of the spectrum, privileging the conversion till mechanisms or the *dollarization*. Of this account, a measure that the financial institutions create money substitutes, money demand is each time more unstable, evidencing that, although there is an important correlation in the long term between money and inflation, its short term correlation is difficult to point out. Therefore, from the beginning of the nineties the number of countries that have adopted a scheme of explicit inflation goals as a strategy for conducting the monetary policy has increased.

4. Operative aspects of explicit inflation goals strategies

The adoption of a scheme of explicit inflation goals commits the central banks to stabilize the inflation rate. The process habitually begins with a public announcement of the central bank of an explicit quantitative goal that must reach a determined horizon (for example, a 5% annual rate in a two year period). After, the central bank, that must have the freedom to decide how to use their monetary instruments (instrumental independence), has the responsibility of reaching that foal and must periodically inform the public on its monetary policy strategy. This transparency obligation contributes to reducing the uncertainty regarding the future direction of the monetary policy and



promoting the credibility of the central bank and the account rendering on its behalf.

Normally, the central banks that adopt this strategy adjust its instruments (for example, the monetary stabilization operations) at a level that will take the inflation rate previsions for one or two years ahead. The previsions act like an intermediate goal; the discrepancy between the forecast and the fixed goal motivate monetary policy decisions that allow closing the gap.

In practice, the central bank habitually decides the future course of the monetary policy through an evaluation of the information coming from a series of indicators or indicative variables, like the inflationary forecast of the structural and semi structural macroeconomic models, the previsions generated with more mechanical criteria (like the models of autoregressive vector models or time series) and the surveys of the inflationary expectations of the market. The monetary authorities also study the evolution of the fundamental monetary and financial variables, like money and credit, the structure of interest rate terms, the price of assets and the labor market conditions. In the measure in which more than one of these indicators suggests that the future inflation could overcome the goal, making the need to activate the instruments that allow restricting the monetary conditions more evident.

5. Importance of transparency

The monetary policy is more efficient if the markets of goods and services, money; lending and exchange funds make up the objectives of the policy and the links between the monetary policy measures and its objectives. Also, transparency transmits the idea that the central bank is responsible for the results to the market agents, which at the same time, could influence in the design and implementation of the policy.

It is worth indicating that the central banks will inspire greater trust if they have had a good trajectory in the achievement of the announced inflation goals. In that context, all central banks that apply a strategy of explicit inflation goals publish periodic reports of the monetary policy or reports on inflation, in which they indicate the direction of the monetary policy and explain the discrepancies



between the observed and the fixed inflation rate as a goal. To facilitate the comprehension of the strategy of the central bank, also include inflation forecast of inflation and a description of contingent policies. This anticipated announcement reduces the probability that the reaction of the bank before said contingencies be misinterpreted.

6. Other aspects of the implementation

The implementation of a strategy of explicit inflation goals demands that the authorities adopt various key decisions. First, they have to establish the measure of inflation to be used. The two natural options are the Consumer Price Index (CPI) and the implied deflector of the gross domestic product. Although the latter is the most attractive, given that it directly reflects the “internal” inflation concept, the CPI offers evident operative advantages: this is the most familiar index for the public; it is habitually available monthly and punctually (which allows periodic control) and is occasionally reviewed.

The second aspect is to decide the inflation goal. There is consensus in that it is not convenient to have a zero inflationary goal, since the presence of rigidity toward the decline of nominal salaries and prices requires a positive inflation rate to give margin to the necessary variations of real salaries and other relative prices of the economy. A zero inflation goal would not leave margin either so that, if necessary, the real interest rates would acquire a negative sign in some phase of the economic cycle. Certainly, one of the advantages of the strategies based on the explicit inflation goals is that they can avoid deflation, compensating the effect of negative systematic perturbations in the aggregate demand.

A third aspect is to decide if a punctual goal is adopted or an interval inflation goal. Usually, the central banks that apply a strategy of explicit inflation goals have chosen a goal with a lower limit and an upper predetermined tolerance limit. It is this way because of the difficulties of predicting inflation and the uncertainty in the precise temporary context of the natural de-phasing of the monetary transmission mechanisms, might not reach the announced punctual goal, which would cause loss of credibility. The punctual goal could demand a



very firm monetary policy to minimize the probability of lack of fulfillment. The interval goal, on the other hand, requires a decision on the wide band. A narrow band in some measure presents the same problem that the punctual goal. Whereas a band that is too wide, although it increases the probability of fulfilling the goal, could be an inefficient guide for the expectations.

The fourth aspect is the election of a temporary horizon of the monetary policy; in other words, which should be the speed of the trajectory toward the lowest inflation goal. Maybe initially gradual deflation criteria may be preferable before the long term contracts and an adjustment of the inflation expectations. At the same time, the need to overcome the inertia in the inflation expectations and promote the credibility, would point toward a more accelerated deflation.

A last aspect is the regimen of the exchange rate. The regimen that is compatible with the strategy of the explicit inflation goals is the flexible exchange rate, which allows an immediate and permanent adjustment of the external sector. An advantage of the exchange flotation is that it reduces the vulnerability of the countries before sudden speculative crisis. However, a common problem, especially for the countries with a history of high inflation rates, is the fear that the greater variability of the nominal exchange rate will be transferred directly to the prices (transfer effect). It is worth indicating that the nominal exchange rate is an important channel of the transmission mechanism of the monetary policy. The depreciations of great magnitude, for example, produced perturbations of the relation of exchange terms or due to capital currents, could be quickly translated into an increase in internal prices.

7. Degree of flexibility that is offered by the explicit inflation goals strategy

One of the questions presented by the strategy of explicit inflation goals is if it provides flexibility to implement the monetary policy or if the central banks inevitably adopt a “strict” focus, according to which the achievement of the inflation goal is the only objective of the monetary policy. It is evident that the central banks have not only tried to reduce the minimum gap between effective inflation and the fixed goal, as well as the inflation variability, but have been



worried by the variability of internal production around the potential level. However, the preoccupation regarding the stability of the internal production must never set the viability of the mid-term inflation goal at risk.

In the described context, it is important to present that there is an inverse relation between flexibility and credibility. If the regimen is too flexible, the objectives of the policy are not credible. On the contrary, if the regimen is excessively rigid, the variability of internal inflation can be greater than the desired. Definitely, caution is necessary. If the credibility is solid from the beginning, this inverse relation will continue to lose strength and increase the flexibility in the mid-term. The perseverance of the authorities in this environment sends the money and exchange markets the signal that the central bank enjoys true independence and credibility.

C. INTERNATIONAL EVIDENCE

The results obtained to date by the central banks that apply a strategy of explicit inflation goals in industrialized countries are satisfactory. The concentration in the stability of prices has contributed to a notable convergence of inflation rates of these countries. It is worth stating that the benign economic international environment in the last few years and the international integration process have contributed in part to this convergence, therefore some specialists point out that the strategy of explicit inflation goals has still not passed the trial of a complete economic cycle. However, the authorities that have applied these strategies have had to face a series of perturbations that have been registered in the crisis of Mexico, Asia, Russia, Brazil and Argentina.

1. Aspects that affect developing countries

The promising experience of the pioneers in the application of strategies based on explicit inflation goals and a series of failed experiences with exchange anchors in Asia and Latin America have persuaded several developing countries of the convenience of adopting a similar strategy to contain inflation, promote the credibility and anchor the expectations. In Latin America: Brazil, Chile, Colombia, Mexico and Peru have abandoned the



exchange bands and have gone to regimens of floating exchange rates. These countries, like other emerging economies, like Poland, the Czech Republic, South Africa and most recently, Thailand, Philippines and Korea conduct their monetary policy through a more or less formal process of explicit inflation goals. Although the majority of these countries have applied this strategy for only a short time, the experience to now has been inspiring. For example, Chile and Israel had similar experiences; both countries adopted a context of explicit inflation goals at the beginning of the nineties, when they registered annual inflation rates close to 20%. The strategy was gradually implemented and flexible in both countries, and since 2003, reduced the inflation to international levels without originating substantial costs in matters of economic growth.

The fixation of explicit inflation goals can benefit in developing countries in many ways, establishing a coordination instrument of inflationary expectations and a measure that allows judging the fulfillment of the commitment of the central banks. But the developing countries have specific problems that can make it more difficult than for industrial countries to implement the strategies based on explicit inflation goals. First, many developing countries still register relatively high inflation rates, so it is difficult to precisely foresee, future inflation. Therefore, the probabilities of not fulfilling the inflation goal are greater than in developed countries. Second, the degree of impact of the exchange variations on the prices (that tend to be greater in developing countries) and the generalization of explicit indexation and even implied mechanisms, give way to considerable inflationary inertia. Third, one of the prior requirements for the fixation of explicit inflation goals is that there is no commitment regarding another nominal goal (for example, the nominal exchange rate). Given that in many developing countries there is a great proportion of assets and liabilities denominated in foreign currency, a significant exchange variation could adversely affect the inflation and the degree of financial and real *dollarization* of the economy. Fourth, in many developing countries, the independence of the central bank is more theoretical than real, since its decisions continue to basically be regulated by the need to finance the fiscal deficit, so there is certain fiscal predomination.



In general, many developing countries have substantially reduced the central government's deficit, but some still have contingent liabilities that cover municipal obligations, public business and the central bank itself that threaten the consolidated fiscal situation of the public sector. In said circumstances, the central banks could doubt, for fiscal reasons, before the possibility of having to raise the interest rates to contain inflation. Last, some developing countries could find difficulties in fulfilling the complex information requirements and of formulation of inflation forecast (for example, reports on the main indicators and trustworthy econometric models). Notwithstanding these problems, the strategies based on explicit inflation goals seem promising for the developing countries, since they offer a series of operative advantages and obligate those in charge of policy formulation of deepening reforms and increasing the transparency and improving the fiscal orientation.

IV. THE ROLE OF THE MONETARY POLICY AND STABILITY

The empiric evidence, in developing countries, has shown that the main contribution that a central bank can make on economic development is to ensure the acquiring power of the currency is kept and that the only way to achieve it is through the stability in the general level of prices.

In that order of ideas, the Organic Law of the *Banco de Guatemala* incorporates the modern focus of assigning the Central Bank the fundamental objective of promoting the stability in the general level of prices. Said focus emphasizes the search of the efficiency in the actions of the Central Bank and substitutes the focus of the search of multiple objectives that prevail in the previous organic law. The fixation of a fundamental objective in terms of the search and maintenance of stability in the general level of prices, allows the *Banco de Guatemala* to concentrate its efforts in the consecution of this goal, in this way, maximizing the better contribution that could be offered in the achievement of the economic development of the country⁹.

⁹ The stability of prices has become a *sine qua non* condition to extract the maximum benefits that the globalization process can offer. This process has created an economic and financial environment that is extremely dynamic; which generates the need to count on efficient and versatile central banks to fulfill their stabilizing task.



As for the need to generally keep the stability in the general level of prices, and in particular, a low and stable inflation rate, the empiric evidence has made clear that said stability is a necessary condition to promote economic growth. An elevated inflation is harmful to growth and economic development due, among other reasons, to the fact that it promotes a deficient assignment of economic resources, which reduces the possibility of economic growth; also in the measure in which the volatility generates uncertainty and affecting the financial sector of the economy, reduce savings in real terms, negatively redistributes the income, due to the fact that salaries do not adjust at the same rhythm that prices do and promotes a high variability in the money demand, which makes the estimation of the same difficult and, therefore, makes the conduction of the monetary policy difficult.

In the described context, it is necessary that for 2007 and 2008 the *Banco de Guatemala* continue concentrating its efforts in the consecution of its fundamental objective, which is to promote the stability in the general level of prices.

V. SYSTEMS OF MONETARY POLICY FORECAST AND ANALYSIS

In a regimen of explicit inflation goals, the Forecast and Analysis System of the Monetary Policy (SPAPM, for its acronym in Spanish), consists of a set of technical tools (econometric models, information relevant coming from expert analysts, economic indicators, data bases and others) used to make relevant economic variables forecast for the Central Bank, mainly forecast of inflation and of economic growth, as well as in the activity group who make monetary policy decisions in the analysis of said forecast and future macroeconomic scenarios derived of the possible policy actions.

The SPAPM makes up part of operative reforms that the *Banco de Guatemala* has been making in the monetary policy transition period toward a scheme of explicit inflation goals. The design of said system began in March 2005, with the advice of the International Monetary Fund, and its application began in January 2006. During this last year, four forecast exercises were



made (in February, May, August and November), in the application of the referred system.

SPAPM is made up of three main elements: i) a semi structural forecast model for the Guatemalan economy; ii) auxiliary information to feed the semi structural model; and iii) the risks balance and the recommendation of the monetary policy. Each one of these components is explained in detail in the following clauses.

A. MACROECONOMIC SEMI STRUCTURAL MODEL -MMS-

The MMS consists of a system of equations that allows quantifying the direction and magnitude of the relations between the main macroeconomic variables, as well as the foreseeable evolution of the same, taking into account the reaction of economic agents before the decision of the monetary policy of the Central Bank.

It is important to indicate that the purpose of the MMS is to support the *Banco de Guatemala* in the interpretation of the state of the economy and in the decision making of the policy that contributes to the achievement of its fundamental objective. Therefore, said model is more useful in the measure in which it reflects a vision of consensus of directive and technical organs of the institution on the mechanism through which the policy actions, through diverse transmission channels, affect the general level of prices. In this manner, the MMS constitutes an analytical framework that allows precisely discussing the implementation of policy actions to combat the diverse inflationary pressures.

The MMS for Guatemala was built with the help of experts from the Czech Republic Central Bank, specialized in making this type of models, and that has integrated the technical assistance missions in matters of inflation targeting from the International Monetary Fund to the *Banco de Guatemala*¹⁰. The main equations that make up said model are described in the following¹¹:

¹⁰ The persons that contributed in the make up of SPAPM are: Jaromír Beneš, David Vávra and Jan Vlcek of the central bank of the Czech Republic and Luis Jácome of the International Monetary Fund.

¹¹ The complete model includes 43 equations; those that are not described mainly include definitions and movement laws that regulate the behavior of exogenous variables. Additionally, the IRIS3 platform is used to resolve the equation system that according to the model based on an algorithm of solution for rational expectation models. Said platform was also provided to the mentioned persons in the previous footnote.



Equation of Domestic Aggregate Demand

$$\bar{d}_t = A_1 \bar{d}_{t-1} + (0.90 - A_1) \bar{d}_{t+1} + A_2 \bar{R}_t + \mathbf{e}_t^{DD} \quad (1)$$

Where:

\bar{d}_t : gap of the domestic demand produce in t period

\bar{R}_t : gap of the real long term interest rate in the t period

\mathbf{e}_t^{DD} : shock of domestic aggregate demand in the t period

Equation of External Aggregate Demand

$$\bar{x}_t - \bar{x}_{t-1} = 0.99(\bar{x}_{t+1} - \bar{x}_t) + A_3(A_4 \bar{z}_t + \bar{y}_t^* - \bar{x}_t) + \mathbf{e}_t^{XD} \quad (2)$$

Where:

\bar{x}_t : gap of external demand product in the t period

\bar{z}_t : gap of the real exchange rate in the t period

\bar{y}_t^* : gap of the external product in the t period

\mathbf{e}_t^{XD} : shock of external aggregate demand in the t period

Equation of Total Demand

$$\bar{y}_t = A_5 \bar{x}_t + (1 - A_5) \bar{d}_t \quad (3)$$

Where:

\bar{y}_t : gap of total product in the t period

Equation of Aggregate Offer (Phillips Curve)

$$\mathbf{p}_t - \mathbf{p}_{t-1} = 0.99(\mathbf{p}_{t+1}^{e,t} - \mathbf{p}_t) + B_1((B_2 + B_3) \bar{z}_t + B_3 \bar{q}_t^{oil} + (1 - B_2 - B_3) \bar{y}_t) + \mathbf{e}_t^{PC} \quad (4)$$

Where:

\mathbf{p}_t : inflation rate in the t period

\bar{y}_t : gap of total product in the t period

$\mathbf{p}_{t+1}^{e,t}$: expected inflation in the t+ 1 period ,

\bar{q}_t^{oil} : price of diesel in the international market of the t period



e_t^{PC} : shock of the Phillips curve in the t period

Rule of the Monetary Policy

$$i_t = D_1 i_{t-1} + (1 - D_1)(i_t + D_2(p_{t+6} - \bar{p}_{t+6}) + D_3(\bar{y}_t)) + e_t^{PM} \quad (5)$$

Where:

i_t : nominal interest rate of the short term monetary policy in the t period

i_t : tendency of the nominal interest rate of the short term policy in the t period

\bar{p}_t : inflation goal in the t period

\bar{y}_t : gap of the product in the t period

e_t^{PM} : shock of the monetary policy in the t period

Discovered Parity of the Interest rate

$$I_t - I_t^* = 4(s_{t+1}^{e,t} - s_t) + r_t + e_t^{MD} \quad (6)$$

Where:

I_t : nominal interest rate in the long term in the t period

I_t^* : external nominal interest rate in the long term in the t period

$s_{t+1}^{e,t}$: expected nominal exchange rate in t for the t+1 period

s_t : nominal exchange rate in the t period

r_t : prime risk country in the t period

e_t^{MD} : shock exchange rate in the t period

Yield curve

$$I_t = F_1 I_{t-1} + (1 - F_1)(i_t + i_{t+1} + i_{t+2} + i_{t+3}) / 4 + term_t + e_t^{CR} \quad (7)$$

Where:

$term_t$: difference between the long term nominal interest rate and the short term
in the t period

e_t^{CR} : shock of the yield curve in the t period

Fisher Equation in the short term

$$r_t = i_t - p_{t+1}^{e,t} \quad (8)$$

Where:

r_t : real interest rate of the monetary policy in the short term in the t period

Fisher Equation in the long term

$$R_t = I_t - p_{t+4}^{e,t} \quad (9)$$

Where:

R_t : real long term interest rate in the t period

Inflation Expectations

$$p_{t+1}^{e,t} = W_1 p_{t+1} + (1 - W_1) p_{t-1} \quad (10)$$

Where:

$p_{t+1}^{e,t}$: expected inflation in t for the t + 1 period,

Expectations of the Exchange rate

$$s_{t+1}^{e,t} = W_2 s_{t+1} + (1 - W_2) \left(s_{t-1} + \frac{1}{2} (z_t + \bar{p}_t - p_{ss}) \right) \quad (11)$$

Where:

z_t : tendency of the real exchange rate in the t period

p_{ss} : value of the inflation in a seasonal state

According to the MMS, the monetary policy of the central bank is transmitted to the economic system and the general level of prices through the following channels: i) the aggregate demand channel; ii) the nominal exchange rate channel; and, iii) the inflation expectations channel.

The aggregate demand channel consists of the effects produced in the gap between the total product and inflation before a variation in the nominal interest rate of the monetary policy in the central bank, i_t . According to said channel, the increase in the nominal interest rate of the monetary policy would produce an increase in the nominal interest rates and real long term, as is established in the yield curve, equation (7), and the Fisher Equation of long term, expression (9). When increasing the real long term interest rate, the gap of said rate increases regarding its long term tendency, \bar{R}_t , which generates a reduction in the level of the planned investment, in the consumption of durable goods and, therefore, in the gap of domestic demand product, \bar{d}_t , according to equation (1), and in the total product gap, \bar{y}_t , according to equation (3). Additionally, the increase in the monetary policy interest rate produces a



positive variation in the differential of the long term interest rate (left side of expression (6)). This propitiates an affluence of capital toward the country since investors look for a better return rate for its capital. At the same time, even greater capital flows generate an increase in the foreign exchange monetary offer in the country and include the appreciation of the nominal exchange rate. Said exchange appreciation reduces the gap of the real exchange rate, \bar{z}_t , and, therefore, decreases the gap of the product of external demand, \bar{x}_t , according to equation (2), and the total gap product, \bar{y}_t , according to equation (3). The decrease in the gap of the total product contributes to reducing the inflation, P_t , as is indicated by the Phillips curve, equation (4).

The channel of the nominal exchange rate consists of the direct effect that has an exchange variation in the level of domestic prices. According to the Phillips Curve, equation (4), an appreciation of the exchange rate reduces the gap of the real exchange rate, \bar{z}_t , and, therefore, reduces inflation.

Last, **the channel of the inflation expectations** play an important role in the determination of the level of prices. The MMS contemplates inflation expectations, equation (10), and exchange expectations, equation (11). The inflation expectations are made up of a process that incorporates inertia and rational expectations. After, said expectations influence directly in the inflation through the Phillips Curve, equation (4). The exchange expectations are formed according to the process described by equation (11) and affect the economy through the discovered parity of the interest rate, equation (6).

B. AUXILIARY INFORMATION

The auxiliary information necessary to obtain the forecast through the MMS is the following: a) a data management system ; b) forecast of short term inflation; c) satellite models; and, d) other relevant information.

1. System of data management

The data management system consists of a data base that contains updated information of the main variables that make up the MMS, as well as the



reports the monitoring of information made up by those in charge of data base management.

This system facilitates the obtaining of information for the persons that manage the MMS and for those in charge of making the short term prognosis. Said information should be obtained opportunely.

2. Forecast of short term inflation

The short term inflation forecast is obtained by means of the unification of criteria pertaining to diverse experts in matters of inflation from diverse areas of the *Banco de Guatemala*. Said experts found their points of view in model of time series (Autoregressive Integrated Mobil Averages, ARIMA, (for its acronym in Spanish), Autoregressive Vectors -VAR- (for its acronym in Spanish), and others), as well as relevant information according to its experience, on behavior, in the near future, the CPI and its components.

The forecast derived of said consensus replace the inflation projections of the first two or three quarters that are produced by the MMS, since it is considered that the last is the most useful for obtaining mid and long term prognosis, in which each variable tends toward its balance value in the long term and the relations between variables, sustained in the macroeconomic theories, are explicitly taken into account.

3. Satellite Models

This type of model includes the models used to foresee the behavior of exogenous variables included in the MMS. The forecast for the exogenous variables derived of these models is included as consumption offers each one of the runnings of the MMS. In some cases, can use forecast generated by specialized signatures (for example, for the case of future prices of diesel and the macroeconomic variables of the United States of America.)

4. Other relevant information

Additionally, the mentioned elements previously, the MMS also feeds from relevant information provided by the analysts in charge of indicating the diverse



effects of internal or external variables in domestic prices. The opinion of said analysts is valuable for those in charge of writing up the MMS prognosis.

C. RISKS BALANCE AND MONETARY POLICY RECOMENDATION

The risks balance refers to the analysis of simulations of possible scenarios for the endogenous variables, mainly for the inflation and for the monetary policy inflation rate that can be derived from the future behavior of the exogenous variables contained in the MMS.

D. MECHANISM OF THE SPAPM OPERATION

The SPAPM is a process that is made quarterly in several stages and includes the entire Economic Area of the *Banco de Guatemala*. In square 1 is a list of the set of activities that the SPAPM deals with:



Activities of SPAPM

No.	Matter	Result of the Activity	Participants
1	Session on the Analysis of <i>Issues Meetings</i>	List of matters that deserve special attention for the short term inflation prognosis.	Economic Manager (GE) and Forecast Team (EP)
2	Session on Technical Forecast	List of modifications to the models that will be used in short term prognosis.	EP
3	Session on Initial Conditions (<i>Initial State Meeting</i>)	Economic explanation of the initial conditions for the MMS. Additionally, will establish the values that will be proposed to the Execution Committee (CE).	GE and EP
4	Session on the Initial State of the Economy	Values that will be used as initial conditions in the MMS, to make a prognosis. Within said values, long term forecast of exogenous variables obtained from external sources is included.	CE
5	First version of the Forecast	Economic Explanation of the forecast and list of adjustments to the forecast.	GE and EP
6	Announcement of the inflation forecast	The coordinator of the EP reviews the inflation report made known to the CE.	CE
7	Official announcement of the Inflation Forecast	El coordinador del EP traslada el reporte de inflación a la JM	JM
8	<i>Post mortem</i> analysis session	List of SPAPM modifications to be applied in the following quarter.	GE and EP

VI. THEORETIC ASPECTS ON THE TRANSMISSION MECHANISMS OF THE MONETARY POLICY¹²

A. INTRODUCTION

The effects of the monetary policy on the real sector of the economy, as well as the intensity, effectiveness and efficiency of said process, constitutes the transmission mechanism of the monetary policy.

¹² Bain, K. and Howells, P. (2002) "Monetary Economics. Policy and Theoretical Basis. Palgrave, New York, USA
Mies, V; Morandé, F. and Tapia, M. (2002) "Monetary Policy and transmission mechanisms: New Elements for an old discussion" Central Bank of Chile, Working Papers. No. 181 (Septiembre)



For the transmission mechanism to be a relevant topic in the monetary theory it is necessary that the monetary policy have real effects in the short term. On the contrary, the dichotomy between nominal and real variables (money neutrality) limits the objective of macroeconomic stability, that the monetary authority pursues, to finding a strategy that guarantees a determined inflation rate in the long term; however, whether it be by asymmetry in information, due to adjustment costs or simply due to rigidity of prices in key markets, actions of the monetary authority can have real short term effects.

Due to the abovementioned, it is important to know the potential effects of the monetary policy on the economy, the manner in which these produce and the magnitudes and intervals of time involved. It is also very important to have a clear and dynamic vision of the monetary management in order to modify it according to the structural changes that can be experimented by the economy (including the technological and institutional changes and in the scheme of the monetary policy scheme itself) that affect the transmission mechanism.

As was mentioned, the market imperfections delimit the process of monetary policy transmission. In an economy without rigidity, with perfect and complete market financial information, the monetary policy would be ineffective in stabilizing the economy and, therefore, to increase the welfare of the population; however, due to the fact that an economy without rigidity does not exist, the analysis of the transmission mechanism is very important, since it allows strengthening the efficiency and effectiveness of the monetary management, which must be translated into greater welfare.

B. CHANNELS THAT MAKE UP THE TRANSMISSION MECHANISM

The transmission mechanism is made up of various basic channels, which are not independent from each other, but simultaneously and, on occasion, complementary; however, at a theoretical level it is necessary to distinguish them to be able to analyze them adequately, while the relative importance of each channel or the ability to complement each other of some of them to the econometric; since each economy has one peculiar structure,



which makes it impossible to generalize on the importance of a determined channel in the transmission mechanism.

1. The traditional channel of the interest rate

This is the conventional mechanism that is used as a general framework to represent the compound effect of all channels. This channel indicates the way in which the central bank, through the modifications in the money supply, make changes in the nominal interest rates, which, due to the presence of the nominal rigidity in the economy, are translated into modifications of the real interest rate with effects on the consumption, investment and money demand. This, at the same time, influences on the level of production and prices. The effectiveness of the monetary policy will not depend not only on the ability to affect the real interest rate, but also the sensibility of the consumption, investment and money demand before the changes to this variable. The elasticity of the aggregate demand to the interest rate delimits the manner, speed and intensity of the effect of the monetary policy on the economy. Additionally, the rise in the interest rate will not only give a substitution effect that would under stimulate investment and consumption, but would also generate a richness effect that affects the debtor and creditor positions of economic agents.

In the described context, the effectiveness of the monetary policy depends on the measure in which the central bank can affect, through the management of a short term interest rate (leading interest rate), all the structure of the interest rate ; particularly, those of a longer term which are the most relevant for investment decisions.

The conventional monetary theory considers the long term interest rate as a weighted average of expected short term interest rates. The propagation of policy actions in the length of dependent rates of factors such as the structure of financial and expectation markets, which tend to be identified as transmission channels themselves and interact with the general mechanism.

A movement of the leading interest rate can be interpreted as a signal regarding the future conduct of the monetary policy, the interest rates reacting



consistently with this perspective. A low leading interest rate, for example, can be interpreted as a factor that will make future inflation increase, which should influence on the long term interest rate rise that could affect the investment of the current period and, therefore, on economic growth.

2. The assets channel

The assets channel is based on the existence of a wider set of assets than that of the simple bonus and money vision that is sustained in the first transmission channel. A particular case is the monetary focus, which establishes that excess attention given to the interest rate shadows the incidence of money in the determination of richness.

In general terms, it can be said that the monetary policy not only has certain impact on the interest rates, but on the wider set of assets prices. This generates an additional richness that reinforces the direct effect of the interest rate on consumption, investment and employment. In this manner, a small change in monetary policy could have an important effect on the economic activity through a significant change in the value of an asset that represents a significant proportion in the richness portfolio of economic agents.

In normal conditions, the price of an asset must fall as a result of a monetary contraction, whether by substitution (less relative return of the interest rates) or by the contraction of the level of expenditure of economic agents. It is evident that the intensity of these mechanisms is related to the operation of the remaining channels: the price of an asset will move in greater or lesser measure depending on the expectation of future flows and how they are affected by the behavior of the expected monetary policy. The structure of the financial market and the investment and credit options will determine how much the demand of a determined asset will fall and what the elasticity of the price regarding the movement will be.

3. The accelerated financial channel

This channel is an outlet of an assets channel. The market value of a company depends on the expected future flow and the value of the assets



contained in its portfolio, variables that can be affected by the interest rates. Before a monetary contraction the value of the companies could fall, due to the fact that the balance sheet (market value itself) is the collateral with which the company will obtain credit. The reduction of the market value gives incentive to businesses to take more risky projects (moral risk). The moral risk problem is combined with the adverse selection in the credit petition, the businesses with a lesser market value and those that have intact value will also come to request credit. The case can be given in which the banks grant credit to businesses with less market value and more risky loans; in other words, close credit on solvent businesses.

This channel explains that the effects of a monetary contraction can be magnified due to two factors: the lesser access to external credit of businesses that reduce the balance sheet and the lesser availability of banking credit. This phenomenon in economic literature is known as “financial accelerator”.

4. The exchange rate channel

The exchange rate could be included as a case within the assets channel, since it is the price of a financial asset: money from another country; however, the exchange rate receives the same treatment as a particular channel due to its importance as a relative price.

The interest rate (although ambiguously) influences the behavior of the exchange rate. In the first place, if the internal interest rate is greater than the international interest rate, it will produce capital income that will generate excess offer of foreign currency that will provoke the appreciation of the exchange rate, which reduces the net exportations and, therefore, the aggregate demand. Second, the rise of the interest rate provokes a fall of domestic money demand and translates into a depreciation of the exchange rate. This generates an expansive effect, due to the fact that they increase net exportations and with that the aggregate demand. Last, the exchange rate is also affected by the expectations; in that sense, an increase of the interest rate is expected to increase the demand of domestic money, due to the monetary restriction in the current period implying lesser inflation in the future. The



increase of domestic money demand propitiates an appreciation of the exchange rate and a reduction of the aggregate demand.

The exchange rate channel also depends on the characteristics of the financial market and of the coverage alternatives offered by them. In a market with few coverage instruments, the movements of the exchange rate can have significant impact on the balance sheets of businesses, if there is a shortage of currency. When local residents are net debtors, an appreciation of the exchange rate can provoke an improvement in their balance sheet and leads to an increase in the internal demand.

5. The credit channel

Businesses have at least two financing sources: external financing (banking credit) and internal financing (reinvestment of profits and/or assets and bonds issues). The cost of external financing to a business, regarding internal financing, will be relevant for those that can not obtain funds directly.

The economic theory suggests two mechanisms to explain the connection between the monetary policy assets and this cost: the channel of the balance sheets and the banking system loan channel, which implies that we have to distinguish between the effects on the ability of a business to come into debt and the amount of credit offered by the system banks.

6. The channel of economic agents' expectations

The expectations are a very important channel, given their inter-relation with the rest of the channels. In the financial sector, for example, the expectations can produce over-reactions of financial asset prices, which generate richness effects that are transmitted, by the already described mechanisms, to families, businesses and financial institutions of the economy. To avoid lack of adjustment like the mentioned, the monetary policy must be credible and transparent.

The credibility of the central bank is very important, since it allows the economic agents to clearly evaluate the consistency of the monetary management. A credible inflation goal implies that the monetary policy is



committed to the fulfillment of this goal, which allows the economic agents to generate clearer and less erratic expectations regarding the monetary policy in the future. The structure of the rates associated to a reduction of the policy rate, for example, will be consistent with the fact that the expected policy rates be coherent with the fulfillment of the inflation goal. Therefore, the behavior of the short and long term interest rates will reflect this consistency. In the case in which the goal is not credible or there is no clarity regarding the objective of the central bank, the effect on the rates structure will be ambiguous and will be given, due to the way in which the public can infer the future actions of the central bank.

The transparency and credibility promote the effectiveness of the monetary policy, since they strengthen the ability of persuasion of the central bank (the expectations positively respond to the announcement of the objectives of the monetary authority), which is particularly important within the scheme of inflation goals.

C. FINAL REFLECTIONS

Economic literature indicates that the monetary management affects the real sector of the economy through diverse channels, which make up the transmission mechanism of the monetary policy. The knowledge of the transmission mechanism is important to increase the efficiency and effectiveness of the monetary management in the fulfillment of its fundamental objective, which is to reach and maintain the stability in the level of prices.

In economies that implement a regimen of inflation goals it is very important to identify the channels that integrate the transmission mechanism. Also determining the relative weight of each channel and the speed and magnitude with which the real sector of the economy is affected.