

The Impact of the Public Authorities' Messages – the European Central Bank Case

■

Ioan Talpoș

Ph.D. Professor

Bogdan Dima

Ph.D. Senior Lecturer

Cosmin Enache

Candidate Ph.D. Lecturer

Valentin Munteanu

Ph.D. Senior Lecturer

Mihai Mutașcu

Ph.D. Lecturer

West University of Timisoara

Abstract. *The public authorities (the agency) messages could play a key role in the social subjects' decisions. How and when the agency communicates the path of its future policies influences the present social and economic architecture.*

The aim of this paper is to advance an explanatory framework for the connections between the transparency and credibility of the public authorities and the volatility of the social output. In order to provide some empirical evidences, the paper will consider the case of the European Central Bank as a representative monetary authority.

The main output of the paper resides in the thesis that, with a certain consistency, there are some connections between the agency's mandates, the types of the messages transmitted by the agency and the volatility of the obtained results, and also in the idea that an agency entrusted with a "strong" mandate could transmit "mixed" type messages (i.e. "informative-persuasive" ones) which, in special conditions, could influence the decisions of certain categories of clients and/ or non-members.

Of course, the following core question still remains: "How sustainable could be the effects induced by the impact of different agency messages received by the various beneficiaries?" And this, because in the end "The one who knows does not speak and the one who speaks does not know" (LAO ZI - DAO DE JING).

Key words: agency; cultural paradigm; financial markets; central bank policies; messages.

JEL Classification: C01, E44, E52, E58, Z1

Category: econometric analysis; monetary policy.

■

1. Introduction

In one of our previous papers (Talpos et al., 2005), we proposed a version of the mandate theory, which tried to explain the way in which the society, as a whole, as well as its individual components (the

associations), delegate a certain set of social responsibilities to the public authorities (the agencies), based on some social utility functions, which include the characteristics of the dominant cultural model.

Following this line of research, in a more recent paper (Talpos et al., 2006), we presented the “oasis model” as an attempt to describe the complex web of the interactions between the *agency*, its clients and the non-members in the production/(re)distribution processes.

The proposed model argued that there is an economic base for the mandate theory and it tried to explain the causes and the formation mechanisms of the social transfers.

The social allocation of the resources is a complex process in which different categories of social subjects interact in a dynamic web of negotiations, conflicts and alliances. The architecture of the power relationships between the various “points of social coagulation” is not uniquely determined by the “economic reasons”. Instead, there is a large set of factors, which influence its exact configuration including not only the economic ones, but also the cultural and behavioral variables.

In this theoretical framework, the *agency*’s activities as a (re)distribution social center depend both on its prerogatives included in the “social contract” as it was formal formulated, as well as on the power relationships with its individual clients, with *negotiation associations/parallel associations* and with non-members, and are modulated in concordance with the dominant paradigm.

In Talpos et al. (2005, p. 20), we provided the following definition of the *paradigm*: “*Through paradigm we understand the dominant collective mental model that individualizes a society from another. This paradigm represents a societal integration factor, by offering common values and goals for the members of the society. Also, this represents the subject of some learning and inter-generational transmission process, which slowly modifies itself, in “long cycles” and we argued that multi-directional linkages between the paradigm, the social institutions and the economic performances can be identified. In particular, in caeteris paribus conditions, the differences in the production/(re)allocation processes between two social spaces will be explained by the cultural differential.*

So, in the present paper our intention is to study much closer the interactions between the agency and its clients, in the larger framework of the entrusted mandate exertion. More precisely, in Part 2, we will try to identify the relations between the ways of communication chosen by the agency and the expected results. Using a support framework

of socio-cultural dimensions derived from Hofstede and Trompenaars, our analysis takes into account the connection between the mandate’s types, the diversity of communication messages of the agency and the volatility of expected results from the agency’s members and from external agents (clients, non-members and other *agencies*).

In Part 3, we will test our theoretical assumptions for the case of the European Central Bank as a representative monetary authority (“the agency”) in order to provide some empirical evidences.

In Part 4, we will try to advance some explanations for the output of our empirical analysis and also we will mention some limits of the proposed approach.

2. Theoretical Background

The *agency* should communicate with its members, its clients and non-members as well as with other *agencies* in order to exercise its authority. Having this in mind, it is useful to distinguish between the *internal* and *external* communications of the *agency*. The first ones are designed for its own members and have a strategic/operational content. The second ones are designed for *external agents* (clients, non-members and other *agencies*).

From a formal point of view, the *agency*’s messages could be: 1) *explicit* and respectively 2) *implicit*.

The *explicit* messages are a set of sentences with a highly operational content. This kind of message is used by the agency in order to communicate the current measures taken in the pursuit of its mandate. Additionally, these messages could be used to announce the agency’s future intentions. Their content is rather “neutral” or “technical” and is destined to “passive” receptors. Due to this fact, it could be or not an immediate reaction.

The *implicit* messages tend to have a pronounced “strategically” content, being destined to “active” subjects. Their reactions are usually expected in a longer time period, after the persuasive impact of such communications exceeds a certain “critical level”.

The impact of the *agency*’s messages is *inter alia* connected with the nature and formalization of the entrusted mandate. Several situations could be distinguished here:

1) *There is a precise and explicit mandate with a high degree of formalization.* In this case, *the messages should be formulated very clear, with a great density of information, while the receptor is*

expected to “immediately” react and to take a precise set of answer actions (case “A”).

2) There is “medium” formalization of the mandate. For such a situation, the content of the message could be structured more permissively and some receptor’s reactions could be “lagged” (case “B”).

3) There is a low formalization of the social mandate. If so, then the message is rather vague and the expected reaction is weakly defined and significantly delayed (case “C”).

From a formal point of view, given a message of the agency, the receptor’s “reaction set” could be described as a set of actions A_k , where $1 \leq k \leq N$. In this case, the expected result is $R(A_k)$, and the derived utility is $u_k = u(R(A_k))$. The temporal distribution of these results has certain volatility $D(R(A_k))$. For each of the three cases previously described, this volatility has distinct levels. At this moment, this is a central point in our argumentation:

P_i : For every type of mandate, the responses’ volatility has distinct levels and it significantly depends mostly on the degree of the formalization of the agency’s mandate given by its members.

The optimal repartition of the action set ($p_k \geq 0$) is the one that maximizes the average quantity of “useful information”. This could be derived using the “weighted informational entropy” (Guiaşu, 1967).

$$G(p, u) = - \sum_{k=1}^N u_k \times p_k \times \ln(p_k), \quad (1)$$

$u_k \neq 0, 1 \leq k \leq N$

with the following conditions:

$$\sum_{k=1}^N p_k = 1 \quad (2)$$

$$\sum_{k=1}^N p_k \times R(A_k) = R^* \quad (3)$$

$$\sum_{k=1}^N p_k \times D(R(A_k)) = D^* \quad (4)$$

where R^* , D^* represent the target-levels of the global result, and, respective, of the aggregate volatility which is defined by the following relation:

$$p_k = \frac{e^{\frac{a+b \times R_k + c \times D_k}{u_k}}}{\sum_{k=1}^N e^{\frac{a+b \times R_k + c \times D_k}{u_k}}} \quad (5)$$

where a, b, c are the solutions of the equation system given by the relations (2)–(4).

If the actions’ sets specific for the “A”, “B”, and “C” cases are considered together, then their ensemble structure is given by the following modified form of the relation (5):

$$p_{k_i} = \frac{\sum_{i=1}^3 e^{\frac{a_i + b_i \times R_k + c_i \times D_{k_i}}{u_k}}}{\sum_{i=1}^3 \sum_{k=1}^N e^{\frac{a + b \times R_k + c \times D_{k_i}}{u_k}}}, i = A, B, C \quad (6)$$

In accordance with the value of the c parameter, and since $|D_{k_A}| < |D_{k_B}| < |D_{k_C}|$, it is possible to obtain $p_{k_A} > p_{k_B} > p_{k_C}$.

In other words, the increased results’ volatility registered in the case of “weak” mandates determines an increased preference of the agency for messages that are focused on the mandate components which are clearly and rigorously formulated and which describe certain precise actions.

This result is questionable. In our opinion, one of the most important critics here is regarding the feedback mechanisms that are incorporated in the mandate. More precisely, if the mandate includes the penalties that the agency has to support in the case of a wrong exercise of the mandate, then the agency’s relative preference for explicit messages that have a pronounced informational character will be lower than its relative preference for implicit messages that prescribe a set of behaviors for the clients or for the non-members.

Thus, it could be considered that it is necessary to reformulate the relation (6) in order to take into account the messages’ content. One could distinguish between:

- Information messages, which are used by the agency to report the status of exercise of the entrusted mandate (IM);
- Order messages, which contain orders transmitted by the agency to hierarchically inferior entities (OM);
- Persuasion messages, which are intended to determine a certain reaction of some entities that could be or could not be hierarchically inferior to the agency (PM).

Taking into account the mandate type and the existence/inexistence of some penalty mechanisms, one could make the following combinations regarding the level of volatility:

Volatility, mandate and agency's message types

Table 1

Message Mandate	IM	OM	PM
„A”	D _{IMA} :Low	D _{OMA} :Low/Medium	D _{PMA} :Medium/High
„B”	D _{IMB} :Medium	D _{OMB} :Medium	D _{PMB} :Medium/High
„C”	D _{IMC} :Medium/High	D _{OMC} :Medium/High	D _{PMC} :High

In short, the next situations are possible:

Message Mandate	IM	OM	PM
„A”	$p_{k_{IMA}} \leq p_{k_{OMA}} \leq p_{k_{PMA}}$ $p_{k_{IMA}} < p_{k_{IMB}} < p_{k_{IMC}}$		
„B”	$p_{k_{IM,B}} \leq p_{k_{OM,B}} \leq p_{k_{PM,B}}$ $p_{k_{OM,A}} < p_{k_{OM,B}} < p_{k_{OM,C}}$		
„C”	$p_{k_{IMC}} \leq p_{k_{OMC}} \leq p_{k_{PMC}}$ $p_{k_{PMA}} < p_{k_{PMB}} < p_{k_{PMC}}$		

In other words, the agency will have a stronger relative preference for the information messages in the context of an „A” type mandate.

This conclusion has to be amended by taking into account the existence/inexistence of some *penalty mechanisms* associated to these *information messages*. More precisely, if *the mandate* entrusted to *the agency* clearly prescribes certain actions that have to be taken by *the agency* and also specifies some target-levels for the results of these actions, then the relative preference for *information messages* will be diminished by the deviation of the effective results from the target levels.

In a formal manner, if k_j is the penalty unit cost, π^*_j is the target level for an individual action j from the compulsory set of M actions and π_j is the achieved result of this action, then:

$$p_{k_i} = \frac{\sum_{i=1}^3 \sum_{j=1}^M e^{\frac{a_i + b_i \times R_k + c_i \times D_{k_i} - \alpha_j k_j (\pi^*_j - \pi_j)}{u_k}}}{\sum_{i=1}^3 \sum_{k=1}^N \sum_{j=1}^M e^{\frac{a + b \times R_k + c \times D_{k_i} - \alpha_j k_j (\pi^*_j - \pi_j)}{u_k}}}, i = A, B, C \quad (7)$$

where d are empirical coefficients.

P_2 : *The expected results volatility for different kinds of messages, which the agency releases during the exertion of its mandate, depends inter alia on the society's cultural paradigm configuration.*

In order to find out this configuration, we propose a multidimensional model using (for the present paper) only the relevant socio-cultural dimensions from the classical models of Hofstede and Trompenaars.

In these conditions, we consider that the socio-cultural dimensions most important to us are the following:

1. *Power distance* (Hofstede model) which is associated to the social relations character and indicates the acceptance degree of the fact that the power is unequally distributed. A high power distance is specific to the societies that are characterized by a big gap between the agency and its clients, a low social mobility, a low weight of the middle class and a concentrated political power (similar to an oligarchy). A low power distance is specific to the societies that are characterized by a more leveled distance between the agency and its clients (in this case the agency represents the authority), an important social and professional mobility, a representative political system and an important influence of the middle class.

2. *Uncertainty avoidance* (Hofstede model) which is associated to the manner in which the members of a culture feel threatened by uncertain or unknown situations. The agencies that are exerting their mandate in societies that are characterized by a strong uncertainty control are concerned with the development of some methods for the minimization of the anxiety produced by the future uncertainty. These agencies use plans that are founded on detailed and rigorous forecasts and implement centralized resources collection processes. In these societies, the need for consensus is very strong and there is a low level of tolerance to dissident trends. On the other hand, the agencies which activate in societies with a low level of uncertainty avoidance consider the risk as a common part of life (which is a natural axiom). These kinds of societies are characterized by cyclical changes, with a relative high frequency and a gradual impact, and also by a decentralized resources collection and allocation system. Even more, different opinion trends are accepted and encouraged.

3. *Universalism – Particularism dichotomy* (Trompenaars model). The universalism is based on rules rather than on relations. The mandate's exertion supposes mechanisms that forbid exceptions because if these appear the system's

functioning is affected (there is only one reality perspective – a single, objective truth). The particularism opposes the people to the rules. The application of the agency’s abstract social codes depends on the inter-personal or inter-group relations. For each individual there is more than one perspective of reality (every individual has its own subjective truth).

4. *Specificity disposal* (Trompenaars model) – associated to the manner in which a situation is handled and to the interference between the private and social space of the individual. In strong specific cultures, the messages are direct, clearly formulated, and with precisely stated purposes. The elements of a message are first analyzed separately and then synthesized (the whole is the sum of its parts). In strong diffuse cultures (contextual or weak specific cultures), the communication is started from the ensemble. Each element of a message is analyzed in the context of the ensemble. The messages are analyzed from a global perspective (the whole is more than the sum of its parts; the relations between the parts represent more than the parts themselves).

5. *The relation with the nature* (Trompenaars model) - every culture has developed an attitude towards the natural environment. Survival has meant acting with or against nature. The way in which people relate to the environment is linked to the way people used to seek to have control over their own lives, destiny or fate. *Internalistic cultures* have a mechanistic view of nature. They see nature as a complex device, which can be controlled using the right and appropriate expertise. In these societies, terms like luck or predestination don’t operate: people can dominate nature if they make the effort. *Externalistic societies* have a more organic view of nature. Mankind is one of nature’s forces, so it should operate in harmony with the environment. People should cohabitate with nature and go along with its forces. The members of an externalistic society don’t believe that they can shape their own destiny, and are focused to adapt their actions to external circumstances.

Having in mind the agency’s mandate types, the type of messages preferred by the agency and the results’ volatility, and taking into account the analyzed cultural dimensions, we could construct the following table (which represents a “cultural extension” of Table 1):

Cultural differences, mandate’s nature, agency’s preference for one type of message and expected volatility of the results

Table 2

Cultural Dimension	Mandate Type	Preferred Message Type	Result's Volatility	
Power Distance	High	A	IM, OM	Low
Uncertainty Avoidance	Low	B, C	IM, PM	Medium/High
Universalism – Particularism Dichotomy	High	A	IM, OM	Low
	Low	B,C	IM, PM	Medium/High
	Universalism	A,B	IM, OM	Low/Medium
	Particularism	C	PM	High
Specificity Disposal	Specific Cultures	A	IM, OM	Low
	Diffuse Cultures	B,C	IM, PM	Medium/High
Relation with Nature	Internalistic	A,B	IM, OM	Low/Medium
	Externalistic	C	PM	High

The arguments for the logic of the table are the following:

1. A high power distance implies a high degree of formalization. This makes it to be specific for the agencies that are hierarchical oriented and that are exerting their mandate in a type “A” manner. The communication is focuses both on information/report messages and on order messages. The expected reaction is immediate, exact, focused on the result and without any interpretations (with a low volatility). A low power distance supposes a relaxation of the formalization. This is specific to the agencies that are founded on a participative democracy for which the mandate type is “B” or “C”. The preferred way of communication is represented by the information messages and, essentially, by the persuasion messages, with a higher expected volatility.

2. A high degree of uncertainty avoidance implies rigorous strategies and planning. This is specific to the agencies for which the actions should be precisely and programmed in detail. These agencies exert a type “A” mandate. They frequently make reports about the state of the mandate’s exertion and transmit precise instructions that are meant to be rigorously followed by the receptors (low volatility). On the other hand, the agencies which recognize the integral unpredictability of the future do not use a strict programming of the tasks and activities. These agencies exert medium or weak formalized mandates (type “B” and “C”). The communication is focused on information and persuasion. By consequence, they accept a medium volatility of the messages’ results (at least).

3. The universalism, being focused on rules, implies a certain degree of formalization of the way in which the agency exerts its mandate (which would be, by consequence, a type “B” or “A” one). For the transmission of rules, the agency uses information messages (which will make the rule known) and order messages (which enforce the rule). There is also a low acceptance of the interpretability of the rule (a low acceptance of the volatility of results). The particularism is focused on the relations, which makes it specific for a type “C” mandate. The transmitted messages are mainly persuasive, with the acceptance of delayed relations and with a significant abatement from the expectations (high expected volatility of results).

4. Specific cultures, being strongly focused on the results, need a rigorous exertion of the mandate (characteristic for type “A”). The communication should be clear, frequent, and with a high level of the information content (order messages and information messages). The acceptance of some temporal or objective abatement of the results is minimal (low volatility). The diffuse cultures, being strongly contextual, permit situational interpretations (high medium volatility). This makes them specific to the agencies which are exerting their mandate in a medium or low formalized manner (type “B” or “C”), with a preference for persuasion and information messages.

5. The agencies characterized by internalistic cultures are interested in environmental control as an uncertainty reduction factor. They formalize to a high degree their functioning procedures and mechanisms, exerting a type “A” or “B” mandate. These agencies use their communication channels with their subordinates in order to transmit these procedures and to make it known, that its observance is mandatory and not questionable (the preference for information and order/coordination messages, with an accepted expected volatility less than medium). The agencies characterized by externalistic cultures consider themselves as a part of the environment, accepting its dynamic. This permits them to give up a strict formalization, exerting type “C” mandates. Their communication objectives are the information and the persuasion, accepting a higher volatility of results.

A particular case of this theory is represented by the communication architecture of the monetary authorities.

There are two key features for the case of the modern central banks:

- The institutional and functional independence;
- The pursuit of financial stability as a primary objective.

So, a significant characteristic of the institutional design of the central banks of the contemporary economies is represented by their independence related to the conception and implementation of the monetary policy, as well as to the relation to the fiscal authority.

More precisely, it could be noticed that the efforts made to ensure the financial and monetary stability were synthesized during the 80’s in a functioning framework for the central banks, to ensure a high level of independence.

The arguments for a negative correlation between the central banks independence and the inflation dynamics are of three types (Eijffinger, De Haan, 1996): a) arguments based on public decision theory; b) arguments based on so called Sargent-Wallace approach (Sargent, Wallace, 1996); c) arguments based on the temporal inconsistency of the monetary policy problem.

a) According to the first category of arguments, the central bank is exposed to the political pressures in order to act in accordance to the executive objectives. A restrictive monetary policy could worsen the budgetary deficit caused by the fiscal revenues reduction due to a general reduction in the level of the economic activity and/or the raising of public debt service. In these conditions, the executive power could prefer a relaxed monetary policy which will permit the budget deficit financing. As reduced is the central bank independence as limited is its capacity to oppose such potential inflationist orientation.

b) Sargent and Wallace based their analysis on the possible relations between the central bank and the monetary authority. If the monetary policy instruments used intensively are of fiscal nature and if the central bank could not influence the budget deficit, then the money supply tends to be endogenous. If the economic subjects could not (or would not) absorb a part of the budget deficit, then the fiscal authority will try to transfer the budgetary constraint on the monetary authority, by asking it to finance the deficit through a supplementary money supply.

If, otherwise, the preference for the monetary policy prevails, the fiscal authority will be forced to reduce the deficit without the help of the central bank.

c) The third type of arguments, and the most important, refers to the temporal inconsistency of the monetary policy (time-inconsistency problem). This inconsistency appears when a monetary policy program with an optimal character in the current period becomes suboptimal in the next period due to the changes in the fundamental drawing up conditions (among the sources of temporal inconsistency are considered factors like: the changing of the fiscal authority's inflation aversion before and/or after the economic subjects have incorporated in their expectation formation mechanism a certain level of nominal interest rate; the existence of a "seigniorage revenue" for the fiscal authority, so significant that to try to determine a monetary expansion, changing its inflation aversion before and/or after the economic subjects have chosen their objective level for a real monetary balance; information asymmetry situation etc.).

The analytic models constructed so far in order to explain the temporal inconsistency problem are based on the idea that the fiscal authority and the economic subjects are confronted with a "prisoner dilemma" situation. The proposed solutions are based on the idea of some fixed rules for the conception and implementation of the monetary policy (Barro, Gordon, 1994). These rules assure some feedback mechanisms able to absorb the exogenous shocks that are affecting the level of the output. In the conditions in which the central bank has the capacity to impose this kind of rules, the fiscal authority is forced to accept some limitations of its possibilities of action on the economy (this is presumed to be stable, at least on the long run). An alternative solution to the problem of temporal inconsistency is represented by the existence of a solid reputation of the central bank, able to ensure the monetary policy credibility. Fratianii and Huang (1994) prove that in information asymmetry conditions there is no certitude that the central bank reputation will lead to the solution of the temporal inconsistency problem in the framework of Barro-Gordon model).

But in which conditions one could appreciate that a central bank is independent? We have considered that it is very difficult to answer unequivocal at this question. And this, because the central bank's independence is a multi-dimensional notion which includes a variety of institutional, operational, decisional, economic and financial aspects. More, the central bank's

independence is associated with the relationship between the central bank as monetary authority and the other state's authorities (especially the executive authority) as well as with the restrictions imposed by the internal and external economic environment in the conception and implementation of its monetary policy programs.

So, Grilli, Masciandaro and Tabellini (1991) distinguish between two components of the central bank independence: "political independence" and "economic independence". Their argumentation is based on the idea that the political independence is determined by a set of factors which include the electing procedure of the governor and the other Board's members, the duration of the mandate (longer terms being correlated with an increased level of decisional independence) and the existence of a formal note in the central bank statute regarding its responsibility for the stability of prices. In other words, the concept of political independence of the central bank reflects the degree in which this could follow its main objectives without any interference from the political authorities. More, these authors suggest that the economic independence is high when the central bank has the capacity to control the volume and the conditions of the credit granted to the executive. Also, the economic independence depends on the measure in which the central bank could choose and use the monetary policy instruments (the accent is put on the freedom to choose the refinancing of the interest rate and on the prudential supervision activity). It should be noticed that, in this vision, the political independence and the economic independence are strongly connected. For example, the limitation of the executive interference in the conditions of the credits granted to it (a component of the economic independence) could depend significantly on the political independence of the central bank.

Debelle and Fischer (1995) tackle the central bank independence problem in terms of "independence in objectives selection" and "independence in instruments selection". The first aspect is referring to the central bank liberty to choose the final objectives of the monetary policy. More exactly, they make a distinction between the stability of prices and the output level as final objectives and conclude, in accordance with Grilli, Masciandaro and Tabellini, that the central banks have a higher degree of independence in the situation in which the objective of the stability of

prices is explicitly formulated in the legal framework that is regulating their activity. It could be observed that the definition of independence in the selection of the objectives is more limited than the definition of political independence because it does not take into account the political pressures that could intervene once the monetary policy objectives were chosen. Also, the independence in the selection of the instruments is defined as the central bank's freedom "to choose the means through which it follows the accomplishment of the objectives".

Also, Loungani and Sheets (1997) distinguish between "independence in the objectives' selection" (defined as the express formulation in the central bank statute of the prices stability objective as its main objective), and "economic independence" which includes a variety of elements like: the central bank management appointment and cancellation, the mandate duration, the degree in which the executive interferes with the central bank decisions etc.

Cukierman (1992) and, respectively, Cukierman, Webb and Neyapti (1992) propose a methodology for the central bank independence degree estimation which is the most complex of the presented approaches. This methodology takes into account criterias, like the duration and the conditions of the central bank management appointment/cancellation, the central bank objectives as they are defined in the statute, the legal capacity of the autonomous conception of the monetary policy measures, the legal limits of financing the budget deficit etc.

Synthesizing the different points of view presented above, we consider that in defining the central bank independence we can distinguish between:

a. *operational independence* of the central bank, which is the effective legal capacity to define by itself the diverse objectives for its monetary policy (final, intermediary, operational), to select the set of instruments to be used in reaching these objectives and to conceive and apply its current monetary policy measures without interferences from the other state authorities;

b. *financial independence* of the central bank, which is its statutory capacity to construct and use its own financial resources according to its objectives;

c. *economic independence* of the central bank, which is the degree in which the central bank is obliged to participate in the financing the budget deficit, and it is also referring to the conditions of this participation;

d. *political independence* of the central bank, which reflects the measure in which the legal framework that regulates the monetary authority's functioning allows it to manage the pressures of the executive and other state authorities.

A complementary problem to that of independence is represented by the central bank's credibility problem.

In our analysis, our intend is not to operate with a detailed definition of the credibility concept because this creates numerous difficulties and exceeds the purpose of this paper. By the "central bank credibility" we will understand the situation in which the economic subjects are taking their current decisions based on the explicit objectives of the central bank and/or the situation in which these decisions incorporate "optimistic" expectations regarding the evolution of the macroeconomic variables that are decisively influenced (formal or informal) by the central bank.

It could be noticed that this definition of the credibility raises numerous questions. One is its vague character regarding the typology of the economic subjects that appreciate the degree of the central bank independence. So the definition permits the lack of some precise information about the central bank's attributions which limits the possibility of a frontal approach to the problem. In order to compensate this situation, we will take into account only the case in which the rational economic subjects are able to appreciate the level of this credibility. Among other aspects this is equivalent to the fact that the formal/informal objectives followed by the central bank are known.

The usage of some "discretionary" economic policy measures (we understand by discretionary economic policy that kind of policy conceived and applied by the central bank in the absence of a pre-defined set of rules) contributes to an increase of the difficulties to which the economic subjects are confronted in the process of information collection and process. From the point of view of the individual economic subjects, the discretionary economic policy generates random "white noises" which affects their expectations. Because in the framework of neoclassic macroeconomics the discretionary economic policy does not have a systematic effect on the output dynamics, the conclusion that could be drawn is that it is necessary to give up such policies and to adopt some formal rules in the conception and implementation of diverse policies, rules that have to be *ex-ante* known by the economic subjects.

The way in which *de jure* and *de facto* independence and credibility of the monetary authority are realized influences the taxonomy and the contextual structure of the operational mandate as well as of the message types which formulated and transmitted in a specific manner.

So, ensuring *de jure* the independency implies that the monetary authority is functioning in the framework of a clearly defined mandate in which “the rules of the game” are precisely formulated and the mechanisms of reinforcement of this independence are strong enough to isolate it from external interferences.

Consequently:

P₃: The more the mandate entrusted to the monetary authority places a big emphasis on the independence issue the more this mandate will present more the characteristics of a type “A” mandate.

More precisely:

The monetary authority independence and the structure of its mandate

Table 3

Fundamental objective	Clearly stated; other eventual objectives followed only in the measure in which these are non-conflictual in respect with to the primary objective
Relations with the fiscal authority	Fiscal authority non-interference stated in a non-ambiguous manner; eventual collaboration with monetary authority in the quantitative formulation of the fundamental objective; budget deficit financing – prohibited
Relations with other public authorities	Monetary policy decision competence is well designed
Choice of monetary policy instruments	At the monetary authority discretion
Penalty mechanisms for failure of fundamental objective	Precisely defined as <i>exoneration clauses</i>

If this constitutive elements could be considered as defining a type “A” mandate, then:

P₄: The monetary authority will have a relative preference for IM messages which describe the operational measures taken for the fulfilling of the fundamental objective and also the current state of accomplishment.

This output should be amended by taking into account two critical aspects: (1) the possibility that the monetary authority is functioning also as a regulating and supervising authority in the financial-banking sector, and respectively, (2) the indirect impact exercised by the measures adopted

by this authority on the decisions of different categories of economic subjects, impact that could generate a significant persuasive content for operational messages.

So, the prudential supervision implies the public authorities’ intervention in regulating and supervising the activity of financial and banking sector. These authorities’ necessity to apply a set of rules and authorizing, regulating and supervision measures derives from the crucial role exercised by them in the efficient functioning of the financial resources allocation and re-allocation mechanisms, and consequently, in the global dynamic of modern economic systems.

A critical impediment for a proper exertion of the financial-banking sector functions is represented by the information asymmetry inherent situations (that is the situations in which the information is not uniformly distributed between the participants at a financial transaction. For instance, the debtors dispose a superior volume of information regarding the characteristics and risks associated to an investment project that has to be financed with the resources gathered from the creditors. This asymmetry generates three types of problems in the functioning of the financial-banking sector: (i) adverse selection; (ii) moral hazard; (iii) free-rider problem.

(i) *Adverse selection* represents an information asymmetry situation showed clearly before a financial transaction which consists in the tendency of the debtors, who would like to finance investments with a superior level of risk, to accept to pay for attracted financial resources a interest bigger than the usual. Consequently, there is a significant probability that the financial resources requests selection made by the financial intermediaries to take into account the financial resources requests for some investments which have a higher associated level of risk, which could lead to a worsening of the financial portfolios of these intermediaries and to the restraint of their credit capacity. Avoiding such situation requires adequate methods of *ex ante* identification of diverse credit risks.

(ii) *Moral hazard* could show up clearly after a financial transaction as a result of the debtors’ tendency to engage some activities that are undesirable from the creditors’ point of view. These activities could generate higher returns but are more risky and, consequently, diminish the loaned resources recovery probability. The potential

interest conflict between creditors and debtors determined by the moral hazard could generate a reduction of the financial resources supply and a suboptimal level of investment funded using these resources. In order to solve this problem it is necessary that the creditors impose restrictions on the usage of the borrowed resources and some penalty mechanisms for debtors that do not respect this kind of restrictions.

(iii) *Free-rider problem* appears due to the possibility of diminishing the collection and processing information costs for some economic subjects. This costs reduction is due to the fact that some economic subjects use (freely) the information collected by other subjects. More precisely, the costly actions undertaken by the debtors, creditors or financial intermediaries on the base of some collected information transmit an informational signal reflected in the price of the financial resources. This will guide the actions of other participants on diverse segments of the financial markets, diminishing the marginal utility of supplementary information acquisition. Or, this fact results in to a deepening of the adverse selection and moral hazard problems, thus amplifying its negative impact.

In practice, it could be noticed an extremely diverse situation in the assignment of the responsibilities in prudential supervision field. This situation is due to the action of two contradicting factors: (a) the existence of some divergent historical evolutions of “classical” central banks; and (b) a regulation harmonization tendency respective to the prudential supervision responsible monetary authority. So, in the contemporary economies three solutions are being used: (1) responsibility assignment in central bank field (sometimes to a distinct entity organized inside the central bank); (2) prudential supervision at the fiscal authority level; (3) assignment of the supervision tasks to an entity different from the central bank and the fiscal authority. In our opinion, there are at least three significant arguments in favor of the first of these three solutions:

- The existence of a synergy effect in the case of combined functions of the central bank: as a monetary policy conception and implementation unit and as a supervision authority.

- The existence of a favorable impact of supervision activity on the central bank capacity to exert the creditor of last resort function and to ensure the stability of financial system.

- The contribution of an efficient supervision policy to the increase of the central bank capacity to control an important channel of monetary policy transmission – the credit. So, a series of studies carried out in the rational expectation hypothesis (Sargent and Wallace, 1975, Barro, 1976, etc.) argue that if the economic subjects form their expectations in a rational way, the central bank could promote an anti-cyclical monetary policy, on the base of some informational advantage. It could be remarked here that the rational expectation hypothesis implies the fact that the economic subjects recognize the form of the central bank utility function, so that the supplementary information should refer to other aspects than the ones related to the monetary policy evolution itself. Or, such information could be collected by the central bank during its prudential supervision activity and could permit a more accurate decision-making process based on an adequate perception of financial-banking system situation and general economic conjuncture. This fact becomes even more clear if one takes into account the fact that the central bank could benefit from a double information asymmetry: the one between the central bank and the financial-banking sector and the one between the financial-banking sector and the rest of the world. More precisely, if the central bank collects information about the financial-banking sector it could anticipate in a more accurate manner the way in which this system will react to diverse monetary policy measures. On the other hand, in their current activities, the components of this system obtain themselves information about the non-banking subjects’ activities. This information will be incorporated in their decisions. Or, knowing these decisions, the central bank could benefit directly or indirectly from the information on which these decisions were based.

The existence of some difficulties at the commercial bank level signals most of the times the existence of some ensemble difficulties of the economy (because the average performance level of financial-banking system is in a direct and tight dependent relation to the whole economic system performances).

In the opposite way, the financial-banking intermediaries role in the collection and redistribution of financial resources and the influence exercised by these intermediaries on some key macroeconomic variables, such as interest rates or money velocity, and their

implication on the payment system functioning make that the source of many economic problems to be under the influence of their activities.

The measure in which the central bank has some relevant information about the double connection between the nominal and real sectors of the economy determines the capacity to realize a general analysis of the economic conjuncture, to make more accurate forecasts and to conceive and apply, on this basis, monetary policy measures. It should be insist on the fact that the existence of this informational advantage of the central bank does not cancel the rational character of the expectation formulated by the other economic subjects' categories. These could form their expectations on the base of the ensemble of information that they have. Or, among this information we could also find that ones regarding the current monetary policy measures which are based on the information collected by the central bank in previous period. This fact is equivalent to the fact that the central bank distributes this information in the rest of the economy, allowing to the diverse economic subjects categories to improve their individual expectations. From this point of view, the central bank appears as a subject specialized in the collection and distribution of information.

The prudential supervision activity impact on the informational quality of monetary policy decisions could be formalized as follows:

$$X_{t+i} - E_t(X_{t+i} : I_t^*) = \alpha_0 + \alpha_1(X_{t+i} : I_t) + \alpha_2 Z_t + \varepsilon_t \quad (8)$$

where:

X_{t+i} represents the effective value at the moment $t+i$ of a set of macro-variables relevant for the monetary policy objectives;

$E_t(X_{t+i} : I_t^*)$ represents the values of these variables estimated by the central bank on the basis of the information that it have at the moment t ;

$E_t(X_{t+i} : I_t)$ is the value of the macro-variables estimated by the economic subjects on the basis of the information that they have at the moment t ;

$\alpha_0, \alpha_1, \alpha_2$ are empirical coefficients;

Z_t is a variable which contain the information collected by the central bank during the prudential supervision process;

$X_t - E_t(X_{t+i} : I_t^*)$ represents the anticipation error of the central bank. The value of the α_1 parameter permits an estimation of the degree in which the information collected by the central bank in the prudential supervision process contributes to the amelioration of the quality of its formulated expectations.

It could be appreciated that this parameter becomes extremely important in the situations in which the central bank is confronted with generalized economic crisis, placed both at the level of financial-banking system and at the level of other sectors. The central bank capacity to manage these crises and to contribute to maintain the viability of financial-banking system and payment mechanisms could critically depend on the quality and the relevance of the available information.

Even in the usual situations, the central bank needs information like the ones collected in the process of prudential supervision. This is because the malfunctions appeared at the level of diverse individual components of the financial-banking system could affect the spreading of the monetary policy measures effects and of the final results of these measures. This aspect is relevant especially if one considers that the monetary policy is non-neutral, in the long run. But, if one appreciates that the economic subjects have the possibility to also anticipate correctly, on the long run, the behavior of the financial-banking system, it could be argued that they will take into account the distortions generated by this behavior as well as *the facto* central bank intentions, and will make the necessary corrections in their decisions, "cleaning" implicitly the signals sent by the central bank from attached "informational noises". More, the economic subjects will react to the existence of the information asymmetry through an information collection process (or through an acquisition process of the information stored on the economic system), canceling or diminishing in this manner the informational advantage of the central bank. The implicit foundation of this kind of argumentation is that the existence of some informational advantage of the central bank is a background for an active monetary policy which has a disturbing potential for the stable equilibrium state. We are skeptical about the viability of such an approach. This is because as long as this informational advantage is kept, the central bank could "surprise" the economic subjects with its monetary policy measures. And this "surprise effect" remains even if the economic subjects know the utility function of the central bank, that is, they know what type of measures will adopt this authority, and this is because they can't estimate with sufficient accuracy the exact moment when a certain anti-cyclical monetary policy measure. So, it will obtain an increased efficiency of the

monetary policy and a more effective character of the measures of the central bank. Certainly, the question could be raised, if the central bank could systematically put to a good use the informational advantage gained from the prudential supervision exertion. Our opinion is that as long as the mentioned double information asymmetry remains, the operational margin of the monetary authority remains large enough to permit it to carry on anti-cyclical activities in a systematic manner.

It could be noticed the fact that the exact dimension of this operational margin depends, among others, on the reports between the financial-banking sector and the central bank. So, if its components are sensibly dependent on the refunding obtained from the central bank, the action of regulating and prudential supervision will have, at least as a rule, an increased efficiency relative to the legal measures that could be adopted by the monetary authority in the case of prudential regulations violation. More, to this we could add the fact that the supplementary pressure exerted by the central bank possibility to refuse the refunding of that financial-banking intermediaries which violate these regulations. Or, the situations in which “the banks are in the Bank” (are dependent on the financial resources obtained from the monetary authority) are frequently met in the case of the developing countries, in which the level of divers types of risks that could affect the economic system is quite high. Therefore, in these countries may exist supplementary arguments in order to entrust the regulating and prudential supervising activities of the central bank. Also, in crisis situations that affect the financial-banking sector, the central bank is facing a true dilemma: to act as a refunding of the last resort for the financial intermediaries that are in difficulty, accepting the attached moral hazard risks and also the risk of compromising the monetary stability or to choose a firm monetary policy in order to preserve this stability, even with the double risk of collapse of some entities and of amplifying crisis dimension.

In this context, the exertion of the supervision activity by the central bank could be a solution, but in the measure in which, in the virtue of the assigned duties, this authority could proceed to an “isolation” of critical points, preventing in this way a contagion of the difficulties which some individual components of the system are confronted with. Such a capacity of the monetary authority to act for identifying the cases of prudential

regulations violation and for imposing penalties permits it to avoid to resort to its role of borrower of last resort (excepting some extraordinary situations). More, depending on the concrete content of the prudential regulations, the monetary authority could influence the general conditions in which the borrowing activity is carried out and could prevent the extinction to the real sector of some shocks originated in the financial-banking sector.

So:

P₅: In the situation in which the competence sphere of the monetary authority includes the regulating and prudential supervision attributions it will register an increase of the weight of OM, through which it communicates the prudential regulations and intervention measures.

Also, besides the “direct” transmission channels for the impulses generated by the changes in the level of instrument-variable of the monetary policy, it could be emphasized an “indirect” channel represented by the impact exert on the expectation mechanisms of diverse economic subjects categories.

An uniform framework for the description of this channel could be adopted by taking into account a “rational” structure of the economic subjects’ wealth. So, it could be considered that a *rational* economic subject will structure its wealth taking into account the current and anticipated levels of the variables which define the “budgetary constraint” as well as the current and anticipated risk adjusted returns for different incorporated assets. Formally, the multi-period optimization problem for the economic subjects’ wealth structure could be described as follows:

$$\begin{aligned}
 & x_{i,t} \geq 0, \sum_{i=1}^N \sum_{t=1}^K x_{i,t} = 1 \text{ with } i=1+N \\
 & \text{and } t=1+K \quad - \text{the logical restriction} \\
 & \sum_{i=1}^N \sum_{t=1}^K x_{i,t} (c_{i,t} + c^*_{i,t}) + \sum_{a=1}^Z \sum_{t=1}^K (M_{a,t} + M^*_{a,t}) + \\
 & + \sum_{b=1}^E \sum_{t=1}^K (D_{b,t} + D^*_{b,t}) = \sum_{g=1}^F \sum_{t=1}^K (Y_{g,t} + Y^*_{g,t}) \\
 & - \text{the budgetary restriction} \\
 & \frac{\sum_{i=1}^N \sum_{t=1}^K x_{i,t} (\eta_{i,t} + \eta^*_{i,t})}{\sum_{i=1}^N \sum_{t=1}^K x_{i,t} (R_{i,t} + R^*_{i,t})} \rightarrow \text{MAX} \quad - \text{the objective function} \quad (9)
 \end{aligned}$$

where:

„*”- denotes the anticipated level of the variables;

t - current period;

N - the number of „real” and „financial non-monetary” assets which could be incorporated into the wealth;

K - the number of next periods over the which the anticipations are formatted;

Z - the number of different monetary assets available;

E - the typology of the borrowed financial resources;

F - the different types of incomes from work and capital;

x - the weight of a particular „real” or „financial non-monetary” i asset in the wealth;

c - the acquisition and usage costs for a „real” or „financial non-monetary” i;

M - the „monetary balances” (the stock of the most liquid assets);

D - the level of the financial resources which could be borrowed;

Y - incomes from work and capital;

η - the yield of the „real” and „financial non-monetary” assets;

R - the risk of detaining and using the „real” and „financial non-monetary” assets.

In this framework, it could be considered that the changes produced on the level of instrument variables of monetary policy affect both the current levels and the expected levels of the optimization problem.

So, these changes influence:

- The dynamic of the real assets prices and the return of their usage;

- The components of the interest rates system, and, through this, the prices of the financial non-monetary assets and the return of their possession;

- Exchange rates, prices and foreign financial non-monetary assets returns.

Supplementary, the instrument variables of the monetary policy could influence the expectations mechanisms taken into account for structuring the wealth in at least two cases:

- When these mechanisms have a significant self-adaptive component;

- When the implementation of the monetary policy implies the setting of some target-levels for some decisional variables, levels that will be comprised in the formulation of the expectations.

So, if *MPI* represents the set of monetary policy instruments, then, in order that its precedent and current levels to influence the economic

subjects’ expectations regarding the evolution of *X* decision variable it is necessary that their formation mechanism to be as the following:

$$X_t^* = \alpha h(X_{t-1}, X_{t-2}, \dots, X_{t-W}) + \beta (X_{t+1}^{\text{target}}, X_{t+2}^{\text{target}}, \dots, X_{t+K}^{\text{target}}) \quad (10)$$

If these conditions are verified, then the overall optimization problem framework could be rewritten as follows:

$$\begin{aligned} x_{i,t} &\geq 0, \sum_{i=1}^N \sum_{t=1}^K x_{i,t} = 1 \text{ with } i = 1 + N \\ &\text{and } t = 1 + K \quad - \text{the logical restriction} \\ &\sum_{i=1}^N \sum_{t=1}^K x_{i,t} (c_{i,t} (MPI_{t,t-1,\dots,t-W}) + c_{i,t}^* (MPI_{t,t-1,\dots,t-W})) + \\ &+ \sum_{a=1}^Z \sum_{t=1}^K (M_{a,t} (MPI_{t,t-1,\dots,t-W}) + M_{a,t}^* (MPI_{t,t-1,\dots,t-W})) + \\ &+ \sum_{b=1}^E \sum_{t=1}^K (D_{b,t} (MPI_{t,t-1,\dots,t-W}) + D_{b,t}^* (MPI_{t,t-1,\dots,t-W})) = \\ &= \sum_{g=1}^F \sum_{t=1}^K (Y_{g,t} (MPI_{t,t-1,\dots,t-W}) + Y_{g,t}^* (MPI_{t,t-1,\dots,t-W})) \\ &- \text{the budgetary restriction} \\ &\sum_{i=1}^N \sum_{t=1}^K x_{i,t} (\eta_{i,t} (MPI_{t,t-1,\dots,t-W}) + \eta_{i,t}^* (MPI_{t,t-1,\dots,t-W})) \\ &\frac{\sum_{i=1}^N \sum_{t=1}^K x_{i,t} (R_{i,t} (MPI_{t,t-1,\dots,t-W}) + R_{i,t}^* (MPI_{t,t-1,\dots,t-W}))}{\sum_{i=1}^N \sum_{t=1}^K x_{i,t} (R_{i,t} (MPI_{t,t-1,\dots,t-W}) + R_{i,t}^* (MPI_{t,t-1,\dots,t-W}))} \\ &\text{MAX} \quad - \text{the objective function} \end{aligned} \quad (11)$$

A critical point here is represented by the fact that the incorporation of the target-level in expectation formation mechanisms depends on the credibility of the monetary authority. So, the set of arguments specific to the neoclassical macroeconomics which emphasizes better the impact of central bank credibility on formation of the economic subjects’ expectations could be described using the following hypothesis:

- The central bank is maximizing an objective function, applying a discretionary monetary policy;

- This function is regarding the achievement of some objective level of prices (P^*) and to the achievement of a certain objective level of output abatements (Y) from its “natural” level (Y^*).

On this basis, we consider an objective function of the central bank (U_g) with a random form⁽¹⁾, such as:

$$U_g = -(P^*)^2 + 2(Y - Y^*) \quad (12)$$

We suppose that in the economic system, the relationship between the inflation (the dynamic of

prices) and output is correctly explained by the natural rate of output hypothesis, so that:

$$P^* = (Y - Y^*) + P^e \tag{13}$$

where P^e represents the expected level of prices.

The economic subjects are forming their expectations in a *rational* way, trying to maximize:

$$U_p = -(P^* - P^e) \tag{14}$$

The central bank has the capacity to choose the objective level of inflation rate, which is applicable to the whole economic system.

The choice of this level has to be done in such a manner that the function given in relation (12) to be maximized, given the constraint exposed in relation (13). This leads to the choice of a non-zero positive rate of inflation (let's consider, from a formal point of view, that this rate is $P^* = 1$. Because the economic subjects expectations have a *rational* nature (and, by consequence, the choice made by the central bank is correctly anticipated), the resulted central bank disutility will equal (formally) -1 . If the central bank choose a null inflation rate ($P^* = 0$), but the economic subjects anticipate this inflation level will be the same as in the previous case). In these conditions, one could raise the next question: why the central bank will choose a non-zero positive inflation rate, as a result of a utility maximizing behavior, if this will lead to a superior disutility? This problem could be formulated and analyzed, in simplified way, using the game theory. It could be considered that the central bank and the economic subjects are participants to a "game" in which the disutility resulted from the decisions regarding the objective level of inflation, and, respectively, its expected level depends on the other part's decisions.

Formal representation of a single-period game between the central bank and the economic subjects

Table 4

		Central Bank	
		$P^* = 0$	$P^* = 1$
Economic Subjects	$P^e = 0$	0,0	-1,1
	$P^e = 1$	-1,-2	0,-1

In the analyzed of single-period game, it could be supposed that every player knows exactly the structure of the game and the resulted disutility level

for each part⁽²⁾ and react in a "rational" way to this information (that leads to "mirrored decisions"). In these conditions, the concept of *Nash equilibrium* (defined as representing a combination of strategies that are optimal responses adopted by each player as a reaction to the other player moves) is the most useful in order to describe the game evolution.

The *Nash equilibrium* for this game, for $[P^e P]$ will be given by the pair $[1,1]$ but the game is paretian dominated by the pair of strategies represented by $[0,0]$. From here it could be considered that if the monetary policy has a discretionary character, an anti-inflationist monetary policy program will be temporal inconsistent. If, initially, the central bank affirmed, in a credible way, that it follows such a program (so that $P^e = 0$), and then intended to change the nature of this program in such a manner to obtain a higher utility (equal to "1" and not to "0" – that is if it tried to choose for a solution defined by $[-1,1]$), so that the expected price level to become $P^e = 1$, then this will force the central bank to redefine completely its objectives. This implies that the central bank accepts a inflationist monetary policy as the best available solution (it accepts a solution defined by the pair $[0,-1]$, which implies the acceptance of a superior disutility, equal to "-1").

This line of thought could be synthesized as follows: *any discretionary monetary policy ends by undermining the central bank's credibility because its actions are counteracted by the economic subjects' capacity to correctly anticipate them, so that, finally, the central bank is forced to adopt strategies that lead to an increase in its disutility.*

In conclusion, the monetary policy leads to optimal results only in the condition in which this does not have a discretionary character, keeping in this way unchanged the credibility of the central bank measures.

This aspect of monetary policy credibility presents a significant importance for the analysis of the multi-period decisions taken by the central bank. So, if this gets an anti-inflationist reputation in the long run, it could obtain a (paretian) superior result to that obtained in the condition of the absence of such a reputation. In other words, the optimal effect obtained in the long run could determine the central bank to renounce to a superior utility on the short run by producing a surprise current inflation.

In order to formally prove this thesis it should be made a distinction between the cases in which “the game” between the central bank and the economic subjects is repeated for a finite number of times or for an infinite number of times. In this last case, no matter how many times the game was played, there is always a non-zero probability that the game to be played once more and, by consequence, the comparison between the short run result and the long run result is fully plausible. In fact, in such a game appear “perfect” multiple equilibriums and some of them could produce a non-inflationary result (the concept of “perfect” equilibrium needs that all of the sub-games appeared in the repetitive sequence to generate a *Nash equilibrium*). This condition is imposed by the fact that, in an indefinitely repeated game every current strategy depends on the results obtained in the previous game, and the participants could adopt a variety of more complex strategies than in a single period game, when every participant has to choose only between two strategies.

In this framework, we consider that the economic subjects expect a null inflation so long as they do not experiment an inflationary situation and as soon as this kind of situation occurs, they will expect a non-zero inflation rate⁽³⁾.

In these conditions, the central bank will counterpart the superior utility of a surprise current inflation ($=”1”$) with the discounted present value of the difference between the output obtained in inflationary condition and the output obtained in non-inflationary conditions in all the subsequent sub-games ($\sum_i d^{i(-1)}$, where d synthesizes the discounting rate and the probability that the game to be repeated and is considered constant). When $d > \frac{1}{2}$, the central bank will choose an anti-inflationary policy because the disutility expected in the long run caused by an inflationary policy exceeds the short term gain induced by a unexpected current inflation.

If the game is repeated a finite number of times, d value is re-adjusted and it could lead to the situation in which this situation is less than $\frac{1}{2}$, case in which the central bank could choose an inflationary situation.

More precisely, in the situation in which the game is repeated a finite number of times, it could be recognized a deductive logical analysis which to explain the pro-inflation preference of the central

bank, so that is a last sub-game in which the central bank is not forced to support a disutility higher than the current one generated by an inflationary policy.

Consequently, this last sub-game is a version of a single-period game in which the central bank could choose an inflationary policy. In the last but one game, the economic subjects anticipate this aspect, so that in this game there will not be necessary that the central bank to obtain an anti-inflationary policy. This makes that, in the last but one game to be a version of a single-period game in which the central bank could choose an inflationary policy and so on. By consequence, the game is played “backwards”, from the last to the last but one game, the economic subjects anticipating all the way a non-zero rate of inflation.

This analysis could seem “naïve” relative to the way in which monetary policy is conceived and applied in real economic systems. But, in order to obtain a more realistic analysis, it is necessary to be taken into account the situations in which the economic subjects do not know precisely the incentives that rule the central bank behavior (that is, they do not know precisely the nature of its objective function).

Let’s consider that there is a certain probability q that the central bank to have a different objective function than the one presumed by the relation (14), in which the anti-inflationary stability to represent the main objective. We will consider such a central bank a “conservative” one (BCC). The disutility derived from central bank decisions in this case is presented in Table 5.

**Formal representation of a game
between a conservative central bank BCC
and the economic subjects**

Table 5

		Central Bank	
		$P^* = 0$	$P^* = 1$
Economic Subjects	$P^e = 0$	0,0	-1,-1
	$P^e = 1$	-1,0	0,-1

The results from the table 5 emphasizes the fact that even given the conditions that in the last sub-game $q \geq \frac{1}{2}$, there is no certitude that the economic subjects will expect a non-zero inflation rate.

In order to apply this idea it could be compared the result obtained by anticipating a null inflation

rate to the result obtained by anticipating a non-zero inflation rate. These result are identical when $q = \frac{1}{2}$. In these conditions, the previously described deductive process that generates non-zero inflationary expectations during the entire game will not appear certainly. In fact, there will be alternative equilibrium situations. In particular, if we consider that the economic subjects use a *Bayesian rule* in order to change their expectations, then a sequential equilibrium will appear in this game even if, initially, q will have values significant lower than $\frac{1}{2}$ ⁽⁴⁾. In this sequential equilibrium, it could appear an initial non-inflationary period followed by a period with an unexpected inflation and could end with a period in which the expected inflation rate is non-zero. So, it should be remarked an initial non-inflationary period which duration depends on the economic subjects uncertainty regarding the central bank objectives. It will follow a period of construction of a non-inflationary reputation (which could be accompanied by economic recession and it could end suddenly with inflation which, at its beginning, due to its unexpected character, could determine output expansion). When the central bank reputation was affected by the inflation, the rest of the game will be characterized by non-zero inflationary expectations from the part of economic subjects.

In this way, we could notice a monetary policy cycle determined after all by the fact that the achievement of the central bank's credibility takes a long time, and which is longer if an inflationary monetary policy was used frequently in the past. Apart from this, the credibility could be quickly lost even in the situations in which the central bank's abatements from the planned monetary policy are temporary.

Summarizing:

P_6 : *The changes that occur in the level of monetary policy instrument variables affect the level and volatility of the variables attached to the structuring of the current and expected economic subjects' wealth (this happens in the extent in which the expectation mechanisms have a self-adjusting component and/or the monetary authority benefit from a high degree of credibility).*

From this, it could be stated that:

P_7 : *The monetary authority's IM messages have implicitly a significant component PM in the extent in which the transmission of information regarding*

the changes in the monetary policy is able to affect the economic subjects' expectations and, by consequence, their decisions regarding their wealth structure.

The interpretation given to the sentence P_7 is that the instrument variables of the monetary policy are able to exercise not only a "direct" effect on some key macroeconomic variables through the "classical" transmission channels of the monetary impulses, but also an "indirect" effect *via* the economic subjects' expectations. In other words, there is a *signaling effect of the monetary policy* which is showed clearly when the monetary authority explicitly announces the adoption of some new monetary policy measure and/or this authority silently changes its operational instruments.

It is worth mentioning that the viability of the first part of the previous affirmation needs the accomplishment of some special conditions. So, in order that a *de facto* change of monetary policy to affect the expectations' mechanisms it is minimally necessary that:

- The economic subjects to know and to systematically watch the monetary policy instruments;
- This change should be visible in "real" time and the information asymmetry problem should not have a special relevance;
- The "acquiring speed" of the new information appeared in expectations formation should be high enough;
- The economic subjects should know the "transmission channels" of the monetary policy impulses and should be able to estimate their amplitude.

More, the concrete way of signaling effect manifestation depends on the interpretations given by the economic subjects to the changes in the level of monetary policy instruments. More precisely, these changes could indicate:

- The fact that the monetary authority tends to keep or to change the manner in which conceive and apply the monetary policy;
- The fact that the monetary authority finds out/ expects some changes in the economic conjuncture and that it reacts to these changes.

Or, in our opinion, there are not sufficient *ex-ante* proofs to consider that the two situations determine uniform reaction from the part of economic subjects. So, these:

- Could agree or disagree a change or a preservation of the monetary policy configuration

and could consider that these will generate an output superior/inferior to that assigned to the current status of the monetary policy;

- Could have the same opinion or a different opinion respective to the monetary authority one regarding the current/expected economic conjuncture.

One could notice that these conditions could appear quite restrictive. For instance, the absence of information asymmetry could appear as a “strong” condition which could be hardly noticed for a fact. So, in practice, the accuracy of this problem is different for different economic subjects' categories. As an example, there are frequent situations in which the information asymmetry is more pronounced for the subjects from the “real” sector of the economy comparative to the ones from the “nominal” sector. So, it is possible that the viability of the previously presented thesis to be greater in the case of the decisions regarding the wealth structure of the economic subjects that carry on their activities in the financial field.

The formal treatment of the optimization problems formulated by these subjects could be realized on the basis of a version of the relation (10) in which the variables exclusively describe the elements which are specific to the financial assets. By consequence, a weaker version of P_7 it could be:

P_8 : *The monetary authority's IM messages have implicitly a significant PM component in the extent in which the transmission of information regarding the changes in the monetary policy is able to affect the economic subjects' expectations and, by consequence, their decisions regarding their wealth structure. This fact is valid especially in the case of economic subjects from the “nominal” sector and for their decisions regarding the shape of the financial component of their wealth.*

In other words, it is plausible that the signaling effect to be more evident if we consider its impact on the dynamic and volatility of the costs and returns associated to the acquisition and possession of non-monetary financial assets.

3. Methodology

The thesis that the changes in the monetary policy instruments as *signals* from the monetary authority affects the volatility of the financial markets dynamic is the main testable result of the

previous section. In order to find some empirical support for this thesis we took the following methodology:

1) *The estimation of the market index volatility by the involving of an Asymmetric Component ARCH Model.* The general representation of such a model is:

$$\begin{aligned} y_t &= x_t' \pi + \varepsilon_t \\ q_t &= \omega + \rho(q_{t-1} - \omega) + \phi(\varepsilon_{t-1}^2 - \sigma_{t-1}^2) + \theta_1 z_{1t} \\ \sigma_{t-1}^2 - q_t &= \alpha(\varepsilon_{t-1}^2 - q_{t-1}) + \gamma(\varepsilon_{t-1}^2 - q_{t-1}) d_{t-1} + \\ &+ \beta(\sigma_{t-1}^2 - q_{t-1}) + \theta_2 z_{2t} \end{aligned}$$

where z are exogenous variables, d is a dummy variable indicating negative shocks and $\gamma > 0$ indicates the presence of transitory leverage effects in the conditional variance.

The second equation of the previous relationship describes “the long run” component q_t , which converges to ω with powers of ρ , while the third equation reflects the “short run” shocks in volatility $\sigma_{t-1}^2 - q_t$, which converges to zero with powers of $(\alpha + \beta)$, where α and β are empirical coefficients and ε is a random variable.

This type of *ARCH* models displays a greater flexibility by introducing asymmetric effects in the transitory equation and better capturing the unequal effects of different informational shocks.

The main output of the model appliance consists in the two volatility components, which are estimated, based on the empirical values of the parameters.

2) *The simulation of the impact exercised by the changes in monetary policy instrumental variables on the volatility's components in a (Structural) VAR framework.*

The main purpose of this model estimation is to obtain non-recursive orthogonalization of the error terms for impulse response analysis. This alternative to the recursive Cholesky orthogonalization requires the user to impose enough restrictions to identify the orthogonal (*structural*) components of the error terms.

Let y_t be a k – element vector of the endogenous variables and let $\Sigma = E[e_t e_t']$ be the residual covariance matrix. Following Amisano and Giannini (1997), the class of *SVAR* models may be written as:

$$Ae_t = Bu_t$$

where e_t and u_t are vectors of length k , e_t is the *observed* (or “reduced” form) residuals, while u_t is the *unobserved structural* innovations.

A and B are $k \times k$ matrices to be estimated. The *structural* innovations u_t are assumed to be orthonormal, i.e. its covariance matrix is an identity matrix $E[e_t e_t'] = I$. The assumption of orthonormal innovations imposes the following identifying restrictions on A and B:

$$A \sum A' = B B'$$

It should be noticed the fact that the expressions on either side are symmetric and this imposes $\frac{k(k+1)}{2}$ restrictions on the $2k^2$ unknown elements in A and B. Therefore, in order to identify A and B

at least $2k^2 - \frac{k(k+1)}{2} = \frac{k(3k-1)}{2}$ additional restrictions should be provided.

Two types of supplementary restrictions could be distinguished: *short-run* and *long-run*.

In order to take into account the most general possible case we have specified the first type of restriction. Such a choice is based on the idea to let the changes in the monetary policy instruments to affect both components of the volatility.

In order to illustrate the application possibilities for this methodology, we take into consideration the case of European Central Bank/European System of Central Banks. In our opinion, the mandate could clearly be defined as a type „A” one.

The ECB/ECSB mandate's structure

Table 6

Fundamental objective	“...the primary objective of the ESCB shall be to maintain price stability. Without prejudice to the objective of price stability, it shall support the general economic policies in the Community” (Art. 2 of the Statute)
Relationships with fiscal authority	“In accordance with Article 101 of this Treaty, overdrafts or any other type of credit facility with the ECB or with the national central banks in favor of Community institutions or bodies, central governments, regional, local or other public authorities, other bodies governed by public law, or public undertakings of Member States shall be prohibited, as shall the purchase directly from them by the ECB or national central banks of debt instruments” (Art. 21)
Relationships with other public authorities	„In accordance with Article 108 of this Treaty, when exercising the powers and carrying out the tasks and duties conferred upon them by this Treaty and this Statute, neither the ECB, nor a national central bank, nor any member of their decision-making bodies shall seek or take instructions from Community institutions or bodies, from any government of a Member State or from any other body. The Community institutions and bodies and the governments of the Member States undertake to respect this principle and not to seek to influence the members of the decision-making bodies of the ECB or of the national central banks in the performance of their tasks”. (Art. 7)
Choice of monetary policies instruments	“The ECB shall establish general principles for open market and credit operations carried out by itself or the national central banks, including for the announcement of conditions under which they stand ready to enter into such transactions” (Art.18)
Penalty mechanisms for failure of fundamental objective	Not clearly specified

Consequently, it could be assessed that, for this case, the requests for P8 testing are significantly fulfilled.

As a variable-instrument of monetary policy is chosen *EONIA* (Euro OverNight Index Average), which is an effective overnight rate computed as a weighted average of all overnight unsecured lending transactions in the interbank market, initiated within the euro area by the contributing panel banks.

Certainly, it could be remarked that such a choice is only a reductionistic “work hypothesis” destined to facilitate described methodology application.

The chosen stock market indexes are:

ATX (*Austrian Traded Index*) comprises the blue chips of Wiener Börse and has been designed as underlying reference for futures and options. The ATX contains the most actively traded and highly capitalized stocks on the prime market segment.

BFX (*Euronext Bel-20*) is a real-time basket index reflecting the continuous price evolution of the 20 most liquid Belgian shares listed on Euronext Brussels and serves as Blue-chip index for Euronext Brussels. The weight of the index constituents is based on their market capitalization adjusted for free float by using the FTSE free float banding system.

OMX (Copenhagen 20) is the Copenhagen Stock Exchange's leading share index. The index consists of the 20 most actively traded shares on the Copenhagen Stock Exchange. The limited number of constituents guarantees that all the underlying shares of the index have excellent liquidity, which results in an index that is highly suitable as underlying for derivatives products.

DAX (Deutsche Aktien Xchange) measures the performance of the Prime Standard's 30 largest German companies in terms of order book volume and market capitalization. The index is based on prices generated in the electronic trading system Xetra®.

AEX (The Amsterdam Exchanges) is a stock market index composed of Dutch companies that trade on Euronext Amsterdam and it is composed of the 25 largest funds that trade on the exchange and its composition is adjusted annually on March 1 to keep it current.

OSE (Oslo Stock Exchange) consists of all shares listed on Oslo Børs. The index is adjusted for corporate actions daily and the current outstanding number of shares is applied in the index.

IGBM (The Madrid Stock Exchange General Index) is not made up of a fixed number of companies as its number varies. At each six-monthly meeting all those companies that fulfill all the requirements are admitted and those that no longer do so are excluded.

FTSE 100 (Financial Times Stock Exchange) comprises the 100 most highly capitalized blue chip companies, representing approximately 80% of the UK market. It is used extensively as a basis for investment products, such as derivatives and exchange-traded funds.

SMI (Swiss Market Index) is Switzerland's blue-chip index, which makes it the most important in the country. It contains around 90 % of the entire free float market capitalization of the Swiss equity market and is made up of a maximum of 30 of the largest and most liquid SPI large-and mid-cap stocks.

The analysis is made for the period between January 2003 - July 2006 and the sources for the data are www.euribor.org (computed with the help of The European Central Bank) and <http://finance.yahoo.com>. The results are reported in Annex 1.

The stability tests for the VAR models (the analysis of the unitary roots, the VAR Residual

Portmanteau Tests for Autocorrelations, the VAR Residual Serial Correlation LM Tests and VAR Residual Normality Tests) not presented here suggest that the output could be seen as „satisfactory” from an econometric point of view.

4. Comments and Limits

The results from Annex 1 tend to shape a *puzzle*. Thus, these results suggest that the global impact of a shock in EONIA, like a variable – instrument of monetary policy of ECB/ESCN, is materialized in:

- a. A “compression – expansion” cycle for the *short-term* component of volatility for ATX, BFX, DAX and OSE;
- b. An “expansionist” cycle for this *short-term* component for AEX, IGMB, FTSE, OMX and SMI;
- c. An “expansionist” cycle for the *long-term* component of volatility for ATX, AEX and BFX;
- d. A “decreasing” cycle for this component for DAX, IGMB, FTSE, OMX and SMI;
- e. A “stationary” cycle for the long-term volatility occurred for OSE.

Also, it could be remarked that the possible “inflection point” which occur within the mentioned cycles are placed at the end of 1-2 quarters and such points has a relatively low frequency, the cumulated dynamic of volatility distinguishing some quite clearly trends.

Supplementary, the *informational leverage* (the γ parameter) is statistically significant for all the indexes (with the exception of the *AEX*), „positive” for *ATX, BFX, DAX, IGMB, OSE* and „negative” for the others.

Several explanations could be advance here: (1) nonuniform structure of financial markets, whose evolution is depicted by analyzed indexes; (2) nonuniform mechanism for operators' predictions shaping on this markets; (3) „informational asymmetry” between these indexes.

Thus:

- (1) Financial markets from EU continue to report some divergences regarding to capitalization, liquidity, „deepness”, institutional and functional mechanisms, together with a certain national specificity despite to unification impact of EURO (see Laganá et al. 2006, Bindseil and Papadia, 2006, Bê Duc et. al., 2005, Schmiedel and Schöenberger, 2005, Berg et al., 2005). Consequently, monetary shocks can

generate separate effects depend on those markets architecture, modulating financial assets' demand and offer in a specific manner and, as a result, the dynamic of those assets' volatility and level price. A key factor here is represented by the *speed of implied adjustments*. Thus, this speed is susceptible to grow up together with markets liquidity degree growing, and the perturbation generated by the portfolios' structures changes adopted as a response to monetary policy's variables –instrument variations are susceptible to be faster absorbed in the case of a high liquidity. Therefore, it could be argued that a *short-term volatility's "expansionist" cycle correlated with a long-term component's "decreasing" cycle has a increasing manifestation's probability at the same time with growing of financial markets liquidity and "deepness"*. A complementary explanation could consist in different taxonomy of investors on these markets, more precisely in dominancy of the "active" investors (with a very short and short term horizon of transactions), with a less disposal to take into consideration changes in "basics" macroeconomic conditions synthesized by changes of monetary policy's instruments and more concerned by markets "current" conjunctures or of the "passive" investors whose decisions seem more isolated from momentary fluctuations and more dependent on long-term evolutions and, therefore, on monetary authorities estimations regarding these evolutions. Certainly, is debatable the degree in which this fact can explain the cross-differences between countries since for each particular market one could note the existence of a mix investor's typology.

(2) As it is argued in Section 2, the concrete way of economical subjects' anticipations' shaping, anticipations which influence their decisions on different time horizons, depends both on self-adaptive component weight and monetary authorities credibility. Therefore, it is possible that a part of obtaining differences of pulse – function's aspect might be explained accordingly both with existence of non-uniform prediction mechanisms and a different "bonus of credibility" afforded to ECB. It could be remarked that a supplementary „background" explanation could be build up by taking into account the impact of *cultural paradigm's* specificity. Thus: (a) *The Power Index Distance Index* is smaller, the participants to the financial markets'

transactions will take more strongly into consideration the monetary authority's implicit messages regarded on *signalization effect*, not only the explicit messages; (b) *The Uncertainty Avoidance* is higher, *the informational leverage effect* is more significant; in other words, the implicit statements of monetary authority which report about *unfavorable evolution* of financial stability will be much more taken into consideration; (c) *The Particularism* and *Specificity Disposal* are more important within the *paradigm*, the expectations adaptive movements will be more hieratic; (d) The dominant *paradigm* of operators on financial markets is more *internal orientation*, the changes of the level of their anticipations will be more "smooth". Of course, such type of explanations could stand in the best case for the *long-run* component of market indexes volatility.

(3) As is it mentioned in Section 2, in order to take into consideration the messages transmitted by the monetary authority through its architecture's and level's variables – the changes of instruments in the shaping of anticipations, it is necessary that messages become "visible" and the targeted economic subjects get the capacity to receive and interpret in a proper manner these messages. Or, in our opinion, there are not enough *ex-ante* reasons to claim that such a capacity is uniform for all markets participants.

The viability of these explanations must be judged both oneself and within the general analytic framework purposed in Section 2. Or, regarding on this second component, it could be formulated some objections. Thus:

a. The classification of mandates in three categories has a more or less arbitrary nature, especially in absence of a accurately definition of differentiation criteria among them;

b. The same type of observation could be repeated for messages' classification, especially for the fact that one of obtained result particularly consists in arguing of combined informative – persuasive message's existence, message which is considered as critical for signalization effect's manifestation. Or, acceptance of this message is equivalent to introducing a "mixed" classification for messages, with different weights for "informative", "order" and "persuasive" components.

c. An opened line within argumentation broaches the thesis by virtue off the cultural

paradigm's components affect obtaining results' volatility under direct impact of agency's messages. But the real channels for transmitting of such influence are only vaguely mentioned, without a strong proof of their existence.

d. A core part of argumentation resides in postulating the existence of some clear connections between the agency's status and its relative preferences for different kind of messages. Again, the argumentation isn't very adequately, no type of empirical evidence being provided for that.

e. The optimization problem of patrimonial structure described by relation (1) doesn't emphasize in a special way on the risk profile of different economic subject. Or, this fact is debatable if it takes into considerations the entire standard manner for treatment of financial assets portfolios' build-up and manage problem.

f. In respect of rational agent paradigm, the special conditions claimed as necessary for economic subjects' anticipations influencing by the registered variations on monetary policy's variable-instrument's level, and the variation shaping mechanism themselves, as they are described in relation (9), presume, in an *ex-ante* manner, that these anticipations are at the best case specific in a bounded rationality representation. Obviously, it is clear that a simple postulating of this existence of such mechanisms isn't sufficient and a more detailed analysis is required at this point.

g. The select case study's proof is based on the idea that the "informational asymmetry" favors those economic subjects who are located in the financial sector, without providing of consistent arguing in support of such a hypothesis.

Also, from the methodological point of view:

1. There are many alternative methods for market indexes' volatility's estimation, respectively for its two components (i.e. cyclic and seasonal factors or shocks decomposition through application of X12-ARIMA or TRAMO/SEATS procedures). Thus, the selection of GARCH model class hasn't a sufficient argumentation and don't show comparative results.

2. Analogous, excepting Component ARCH Model, aren't discriminating others ARCH Models on the informational criterion basis.

3. The same type of objections could be formulated for the chosen (Structural) VAR framework in absence of discrimination among different VAR/VEC models.

4. The choosing of EONIA as a descriptive variable for monetary policy's set of instruments is very debatable (although, it could be argued that it is significantly under ECB/ ESCB control; but this last claim isn't equivalent with its *de facto* using as direct instrument for monetary policy).

Despite of this limits, we consider that the proposal analysis suggests, with a certain consistency, the existence of some connections between the agency's mandates, the transmitted types of messages by the agency and the volatility of obtained results. And it seems that here is a point.

5. Open Conclusions

This paper proposes a theoretical framework based on two main sets of thesis: (1) the existence of a complex set of connections between the structure of the mandate entrusted to the *agency* and its relative preferences for messages whose receiving by the clients and non-clients leads to an output which gets a certain specific volatility and, respective (2) the capacity of an *agency* entrusted with a "strong" mandate to transmit "mixed" type messages (i.e. "informative-persuasive" ones) which, in special conditions, could influence the decisions of *certain* categories of clients and/or non-members.

Accepting this thesis, despite of the previously mentioned limits for considered case study, there still remains the following core question: "How sustainable could be the effects induced by the impact of different agency messages received by their various beneficiaries?" Or, this question leads to a fascinating field of research, somewhere at the boundaries between the Lewin's *frozen effect theory* and Kiesler's *psychology of commitment*. And here, the communication, both verbal and non-verbal, is a main determinant of the target-subjects' reactions.

And this is because, in the end, "The one who knows does not speak and the one who speaks does not know" (Lao Zi - *Dao De Jing*).

Notes

- (1) Any special hypothesis has been made regarding the form of the objective function or the values of its parameters.
- (2) In other words, it is considered that between the game participants does not appear any information asymmetry.
- (3) That is to assume a long run memory of the economic subjects, in sense that the information collected from the previous games are permanently used in any of the future games.
- (4) It is worth noticing that this sequential equilibrium will have the characteristics of a “business cycle”.

References

- Amisano, G., Giannini, C. (1997). *Topics in Structural VAR Econometrics*, 2nd ed., Berlin: Springer-Verlag
- Barro, R. (1985). *Macroeconomie*, Dunod, Paris
- Barro, R., “Reputation in a Model of Monetary Policy with Incomplete Information”, *Journal of Monetary Economics*, nr. 17, 1986
- Barro, R., Gordon, D.B. (1994). *Rules, Discretion, and Reputation in a Model of Monetary Policy*, in Persson T., Tabellini G. (ed.) *Monetary and Fiscal Policy*, vol. 1: Credibility, MIT Press, Cambridge
- Barro, R., Gordon, D.B., “A Positive Theory of Monetary Policy in a Natural Rate Model”, *Journal of Political Economy*, August, nr. 91 (4), 1991, pp. 589-610
- Berg, E., van Rixtel, A., Ferrando, A., de Bondt, G., Scopel S., „The Bank Lending. Survey for the EURO Area”, *European Central Bank Occasional Paper Series*, 23/ February 2005
- Bê Duc, L., de Bondt, G., Calza, A., Marqués Ibáñez D., Van Rixtel A., Scopel S., „Financing condition in the EURO Area”, *European Central Bank Occasional Paper Series*, 37/ October 2005
- Bindseil, U., Papadia, F., „Credit risk mitigation in central bank operation and its effects on financial markets: The case of the Eurosystem”, *European Central Bank Occasional Paper Series*, 49/ August 2006
- Cukierman, A., Webb, S.B., Neyapti, B., “Measuring the Independence of central banks and Its Effect on Policy Outcomes”, *The World Bank Economic Review*, nr. 6, 1992, pp. 353-398
- Debelle, G., Fischer, S. (1994). *How Independent Should a central Bank be?*, in Fuhrer J.C. (ed.), “Goals, Guidelines and constraints Facing Monetary Policymakers”, *Federal Reserve Bank of Boston, Conference Series*, no. 38, Boston, pp. 195-221
- Eijffinger, S.C.W., de Haan, J., “The Political Economy of Central-Bank Independence”, Department of Economics, Princeton University, *Special Papers in International Economics*, no. 19, May, 1996
- Eijffinger, S.C.W., Hoerberichts, M. (1996). *The Tradeoff between Central Bank Independence and Conservativeness*, Tilburg University
- Eijffinger, S.C.W., de Haan, J., “The Political Economy of Central-Banking”, *Princeton Special Papers in International Economics*, nr. 19, 1996
- Fratianni, M., Haizhou, H. (1994). *Reputation, Central Bank Independence and the RCB*, in Siklos P.L. (ed.), *Varieties of Monetary Reforms: Lessons and Experiences on the Road to Monetary Union*, Dordrecht, Boston, and London, Kluwer
- Grilli, V., Masciandaro, D., Tabellini, G., “Political and Monetary Institutions and Public Financial Policies in Industrial Countries”, *Economic Policy Review*, nr. 13, 1991, pp. 341-392
- Guiasu, S. (1962). *Evoluția densității de probabilitate în spațiul fazelor, pentru sistemele mecanice neconservative*, Acad. Sc. Roumanie, vol. 12
- Hofstede, G. (2001). *Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations Across Nations*, Newbury Park, Sage Publications, 2nd edition
- Hofstede, G., Hofstede, G.J. (2004). *Cultures and Organizations: Software of the Mind: Intercultural Cooperation and Its Importance for Survival*, New York, McGraw-Hill
- Laganá, M., Peřina, M., Von Köppen-Mertes I., Persaud A., „Implications for liquidity from innovation and transparency in the European corporate bond market”, *European Central Bank Occasional Paper Series*, 50/ August 2006

- Lewin, K. (1947). "Group decision and social change", in Newcomb T., Hartley E.(Eds.), "Readings in social psychology", New York, Holt
- Kiesler, C.A. (1971). *The psychology of commitment. Experiments linking behavior to belief*, New York, Academic Press
- Loungani, P., Sheets, N., "Central Bank Independence, Inflation and Growth in Transition Economies", *Journal of Money, Credit and Banking*, nr. 29, 1997, pp. 381-399
- Ngassam, C., "Determinants of International Stock Listings: New Evidence", in *Journal of Comparative International Management*, vol. 4, no.1, 2001, <http://www.hil.unb.ca/Texts/JCIM/>
- Sargent, T.,Wallace, N., "Rational Expectations and the Theory of Economic Policy", *Journal of Monetary Economics*, April, 1976, pp. 169-183
- Schmiedel, H., Schönenberger, A., „Integration of securities market infrastructures in the EURO Area”, *European Central Bank Occasional Paper Series*, 33/ July 2005
- Talpoş, I., Dima, B., Enache, C., Mutaşcu, M., "Agency, associations and culture: a tale of state and society", *Public choice society, 2005 Annual Meeting*, New Orleans, Louisiana, U.S.A., 10-13 March 2005
- Talpoş, I., Dima, B., Mutaşcu, M., Enache, C., Munteanu, V., "Agency versus associations in the social allocation of the resources: the oasis theory", *Annual Meeting of the Public Choice Society 2006*, New Orleans, Louisiana, U.S.A., 30 March - 2 April, 2006
- Trompennars, F. (1998). *Riding The Waves of Culture: Understanding Diversity in Global Business*, New York, McGraw-Hill

The Asymmetric Component ARCH Model and The (Structural) VAR results - the EONIA impact on volatility's component (structural decomposition)

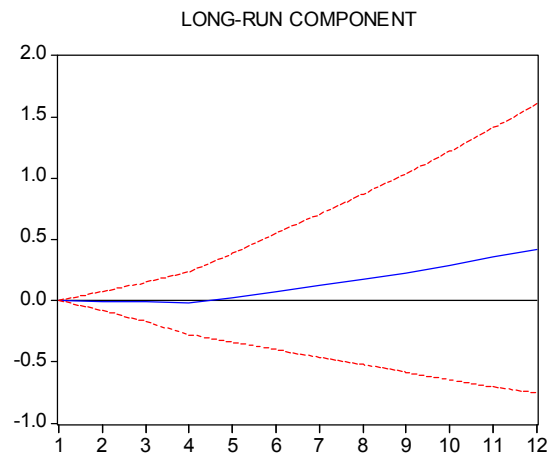
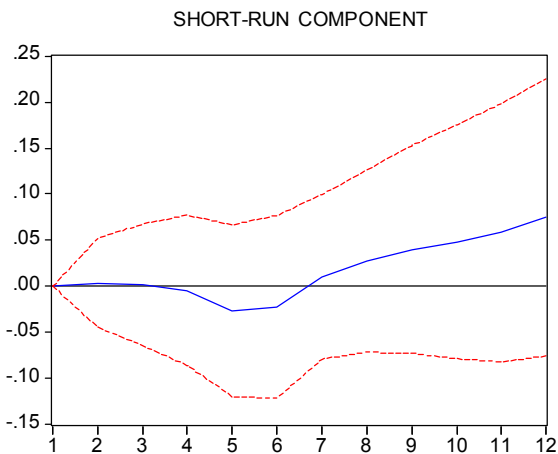
$$q = c_2 + c_3 * (q_{-1} - c_2) + c_4 * (\text{residuals}_{-1}^2 - \text{garch}_{-1})$$

$$\text{garch} = q + (c_5 + c_6 * (\text{residuals}_{-1} < 0)) * (\text{residuals}_{-1}^2 - q_{-1}) + c_7 * (\text{garch}_{-1} - q_{-1})$$

The Case of ATX (Austrian Traded Index)

	Coefficient	Std. Error	z-Statistic	Prob.
$\sqrt{\text{garch}}$	0.212606	0.032356	6.570864	0.0000
Variance Equation				
C(2)	0.874138	0.136119	6.421880	0.0000
C(3)	0.941907	0.024877	37.86200	0.0000
C(4)	0.107556	0.024148	4.453967	0.0000
C(5)	-0.140538	0.040043	-3.509671	0.0004
C(6)	0.214710	0.037455	5.732464	0.0000
C(7)	-0.084655	0.443292	-0.190968	0.8486
GED PARAMETER	1.427032	0.087084	16.38691	0.0000
R-squared	-0.012039	Mean dependent var		0.138017
Adjusted R-squared	-0.020238	S.D. dependent var		0.991729
S.E. of regression	1.001714	Akaike info criterion		2.581086
Sum squared resid	866.9645	Schwarz criterion		2.624855
Log likelihood	-1117.353	Durbin-Watson stat		1.872393

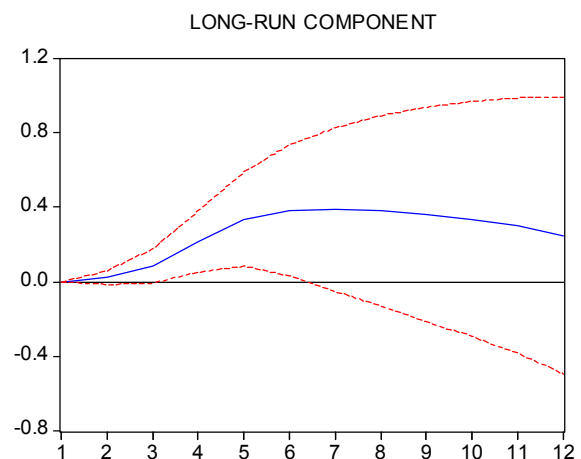
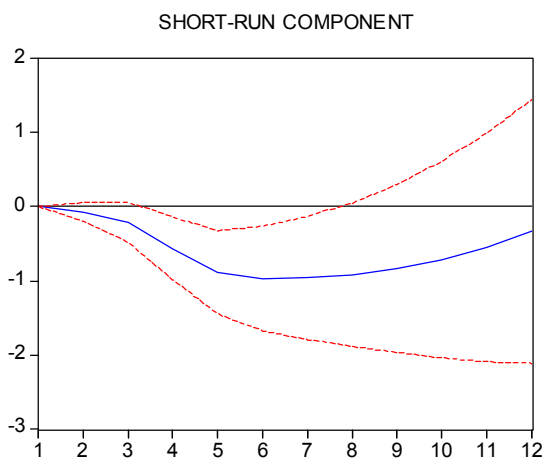
ATX



The Case of BFX (EURONEXT BEL-20)

	Coefficient	Std. Error	z-Statistic	Prob.
$\sqrt{\text{garch}}$	0.134601	0.030977	4.345252	0.0000
Variance Equation				
C(2)	0.476891	0.072755	6.554740	0.0000
C(3)	0.938005	0.031657	29.62999	0.0000
C(4)	-0.071932	0.140143	-0.513276	0.6078
C(5)	0.112013	0.142424	0.786476	0.4316
C(6)	0.072784	0.021695	3.354934	0.0008
C(7)	0.801997	0.144352	5.555826	0.0000
GED PARAMETER	1.631451	0.098042	16.64027	0.0000
R-squared	-0.001780	Mean dependent var	0.064525	
Adjusted R-squared	-0.009642	S.D. dependent var	0.992868	
S.E. of regression	0.997643	Akaike info criterion	2.336274	
Sum squared resid	887.8004	Schwarz criterion	2.378962	
Log likelihood	-1043.323	Durbin-Watson stat	1.870146	

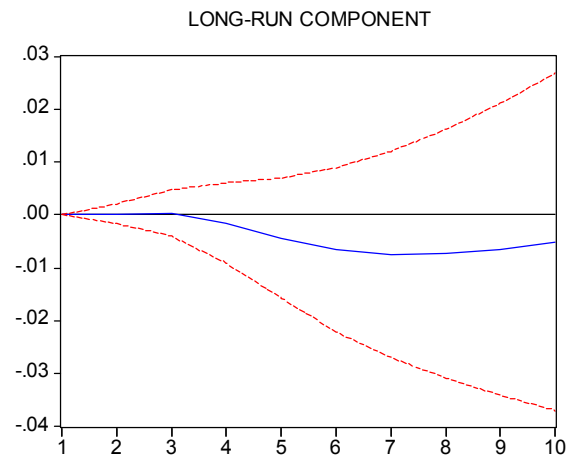
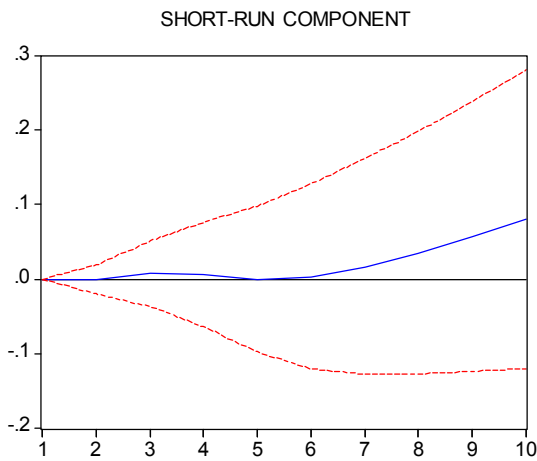
BFX



The Case of OMX (OMX COPENHAGEN 20)

	Coefficient	Std. Error	z-Statistic	Prob.
$\sqrt{\text{garch}}$	-0.162164	0.030725	-5.277846	0.0000
Variance Equation				
C(2)	0.595082	0.150985	3.941327	0.0001
C(3)	0.994264	0.004604	215.9339	0.0000
C(4)	0.011522	0.008478	1.359005	0.1741
C(5)	0.127708	0.026843	4.757528	0.0000
C(6)	-0.162042	0.011261	-14.38979	0.0000
C(7)	0.806190	0.055520	14.52065	0.0000
GED PARAMETER	1.347773	0.085033	15.84998	0.0000
R-squared	-0.005810	Mean dependent var	-0.079795	
Adjusted R-squared	-0.014064	S.D. dependent var	1.049019	
S.E. of regression	1.056370	Akaike info criterion	2.674223	
Sum squared resid	951.8777	Schwarz criterion	2.718433	
Log likelihood	-1143.253	Durbin-Watson stat	1.938935	

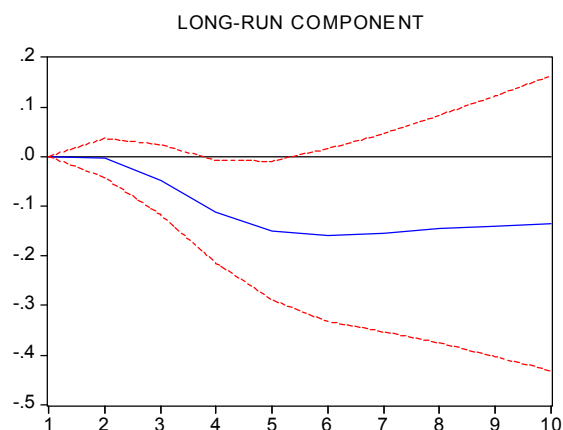
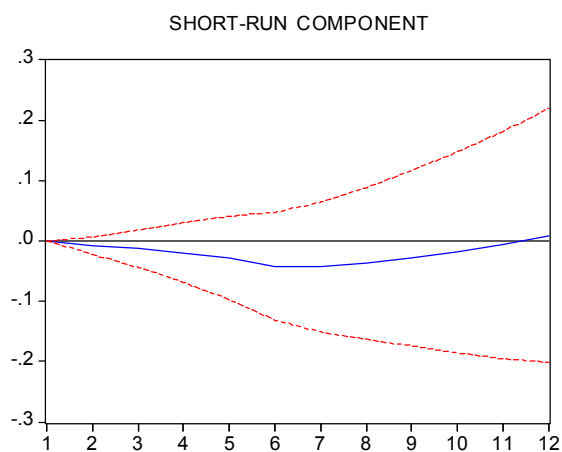
OMX



The Case of DAX (Deutsche Aktien Xchange)

	Coefficient	Std. Error	z-Statistic	Prob.
$\sqrt{\text{garch}}$	0.088815	0.028970	3.065708	0.0022
Variance Equation				
C(2)	3.581319	3.576939	1.001225	0.3167
C(3)	0.992887	0.006742	147.2716	0.0000
C(4)	0.171492	0.077173	2.222176	0.0263
C(5)	-0.141443	0.073253	-1.930876	0.0535
C(6)	0.094102	0.027747	3.391380	0.0007
C(7)	1.082719	0.076369	14.17743	0.0000
GED PARAMETER	1.444706	0.092123	15.68235	0.0000
R-squared	0.000203	Mean dependent var	0.071868	
Adjusted R-squared	-0.007634	S.D. dependent var	1.313106	
S.E. of regression	1.318109	Akaike info criterion	3.022086	
Sum squared resid	1551.508	Schwarz criterion	3.064736	
Log likelihood	-1353.450	Durbin-Watson stat	2.087684	

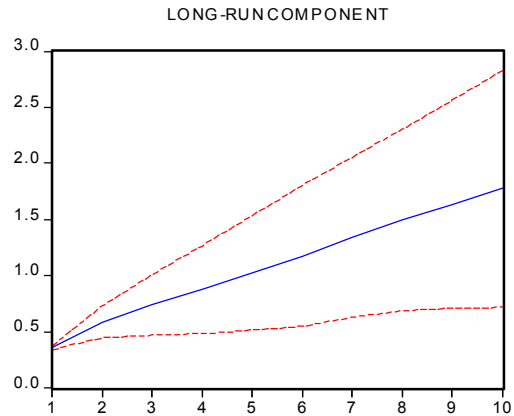
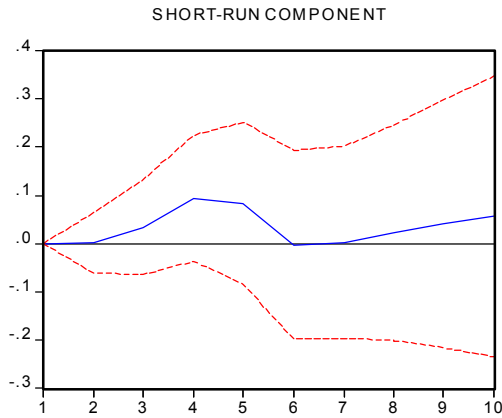
DAX



The Case of AEX (The Amsterdam Exchanges)

	Coefficient	Std. Error	z-Statistic	Prob.
$\sqrt{\text{garch}}$	0.094237	0.032220	2.924826	0.0034
Variance Equation				
C(2)	1.181826	0.545456	2.166676	0.0303
C(3)	0.986315	0.009709	101.5885	0.0000
C(4)	0.087962	0.017550	5.012185	0.0000
C(5)	-0.040193	0.074433	-0.539987	0.5892
C(6)	-0.050729	0.083916	-0.604516	0.5455
C(7)	0.024453	0.565893	0.043211	0.9655
GED PARAMETER	1.522064	0.104818	14.52097	0.0000
R-squared	-0.003341	Mean dependent variable		0.028157
Adjusted R-squared	-0.011223	S.D. dependent variable		1.278208
S.E. of regression	1.285361	Akaike info criterion		2.822076
Sum squared residuals	1472.068	Schwarz criterion		2.864802
Log likelihood	-1260.523	Durbin-Watson stat		2.045761

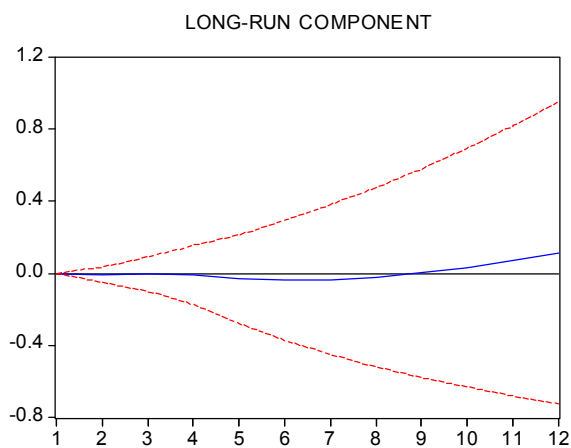
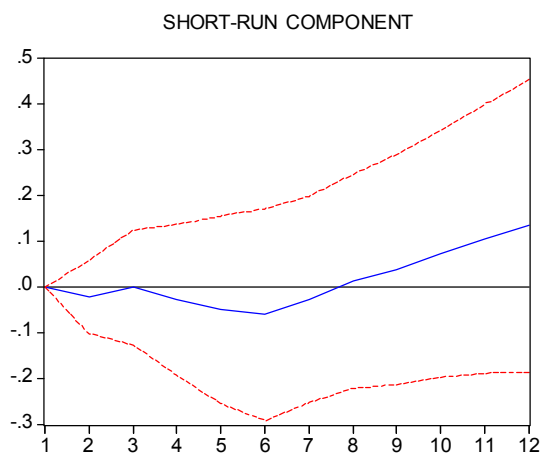
AEX



The Case of OSE (Oslo Stock Exchange)

	Coefficient	Std. Error	z-Statistic	Prob.
\sqrt{garch}	0.204385	0.033457	6.108924	0.0000
Variance Equation				
C(2)	1.078120	0.130922	8.234803	0.0000
C(3)	0.930807	0.034439	27.02735	0.0000
C(4)	0.073864	0.029334	2.517989	0.0118
C(5)	-0.063869	0.063949	-0.998749	0.3179
C(6)	0.175132	0.079329	2.207659	0.0273
C(7)	0.141616	0.267168	0.530065	0.5961
GED PARAMETER	1.551812	0.095634	16.22661	0.0000
R-squared	-0.011170	Mean dependent var		0.151908
Adjusted R-squared	-0.019497	S.D. dependent var		1.172814
S.E. of regression	1.184192	Akaike info criterion		2.938867
Sum squared resid	1191.964	Schwarz criterion		2.983199
Log likelihood	-1252.774	Durbin-Watson stat		1.988475

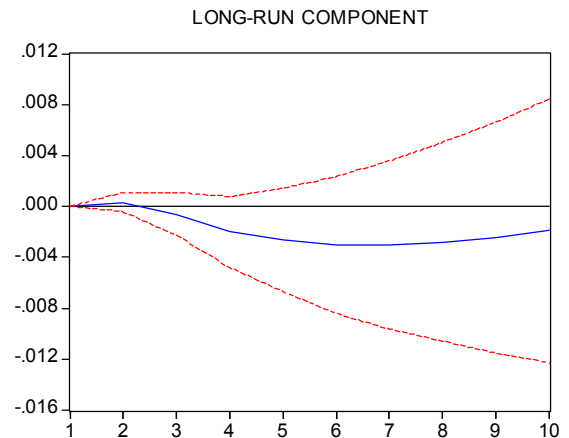
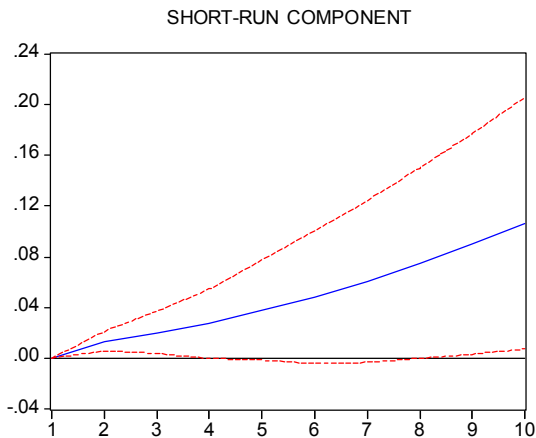
OSE



The Case of IGBM (The Madrid Stock Exchange General Index)

	Coefficient	Std. Error	z-Statistic	Prob.
\sqrt{garch}	0.141727	0.030902	4.586348	0.0000
Variance Equation				
C(2)	0.381207	0.074769	5.098433	0.0000
C(3)	0.992247	0.005364	184.9716	0.0000
C(4)	0.008047	0.009611	0.837212	0.4025
C(5)	-0.046608	0.016707	-2.789792	0.0053
C(6)	0.129983	0.019281	6.741686	0.0000
C(7)	0.932535	0.009567	97.47504	0.0000
GED PARAMETER	1.532995	0.097864	15.66448	0.0000
R-squared	-0.002886	Mean dependent var		0.070252
Adjusted R-squared	-0.010854	S.D. dependent var		0.851327
S.E. of regression	0.855935	Akaike info criterion		2.287896
Sum squared resid	645.4421	Schwarz criterion		2.331002
Log likelihood	-1008.970	Durbin-Watson stat		2.027025

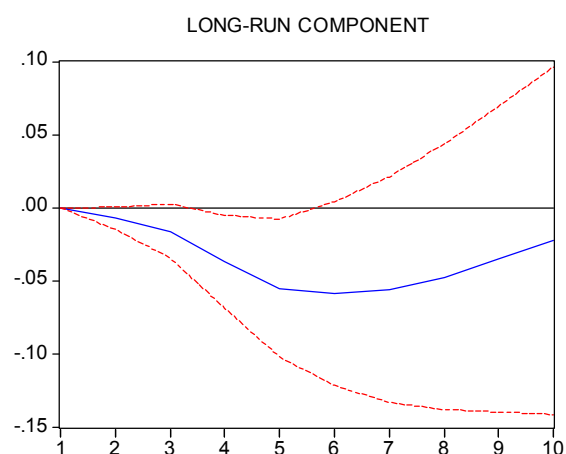
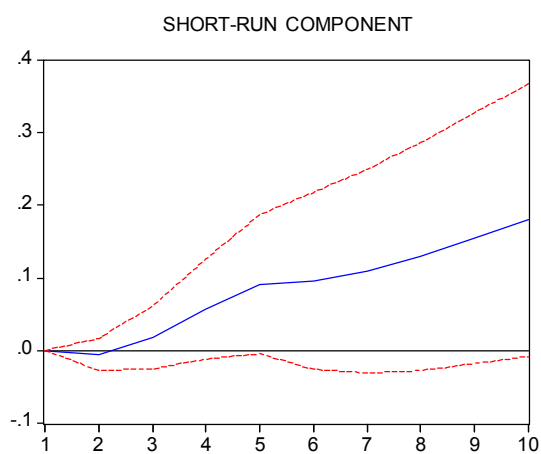
IGBM



The Case of FTSE 100 (Financial Times Stock Exchange)

	Coefficient	Std. Error	z-Statistic	Prob.
\sqrt{garch}	-0.096934	0.032318	-2.999391	0.0027
Variance Equation				
C(2)	0.501139	0.111541	4.492856	0.0000
C(3)	0.978090	0.005845	167.3477	0.0000
C(4)	0.069610	0.023143	3.007821	0.0026
C(5)	0.084744	0.045034	1.881786	0.0599
C(6)	-0.192435	0.043628	-4.410862	0.0000
C(7)	0.893319	0.067791	13.17754	0.0000
GED PARAMETER	1.761812	0.121420	14.51001	0.0000
R-squared	0.002098	Mean dependent var	-0.041497	
Adjusted R-squared	-0.005858	S.D. dependent var	0.869832	
S.E. of regression	0.872376	Akaike info criterion	2.232344	
Sum squared resid	668.1927	Schwarz criterion	2.275565	
Log likelihood	-980.9284	Durbin-Watson stat	2.241108	

FTSE



The Case of SMI (Swiss Market Index)

	Coefficient	Std. Error	z-Statistic	Prob.
\sqrt{garch}	-0.102711	0.032047	-3.205064	0.0014
Variance Equation				
C(2)	0.709582	0.225842	3.141936	0.0017
C(3)	0.976278	0.015874	61.50352	0.0000
C(4)	0.101367	0.030905	3.279940	0.0010
C(5)	-0.000868	0.053733	-0.016147	0.9871
C(6)	-0.129170	0.046771	-2.761752	0.0057
C(7)	0.905367	0.099910	9.061846	0.0000
GED PARAMETER	1.554861	0.073217	21.23646	0.0000
R-squared	-0.003030	Mean dependent var		-0.055335
Adjusted R-squared	-0.010999	S.D. dependent var		0.984761
S.E. of regression	0.990162	Akaike info criterion		2.489503
Sum squared resid	863.7512	Schwarz criterion		2.532608
Log likelihood	-1098.584	Durbin-Watson stat		1.994511

SMI

