Macromodels of the Romanian transition economy, Second edition

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Romanian Academy

April 1998

ROMANIAN ACADEMY
THE NATIONAL INSTITUTE OF ECONOMIC RESEARCH

Macromodels of the Romanian Transition Economy

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The Expert Publishing House

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Foreword

1) This book develops the main lines of thought contained in "Macromodels of the Romanian transition economy", edited in 1996 by the "Expert Publishing House".

1.1) As I mentioned then, my visit at the Hoover Institution had a very positive role in the finalising of the 1996 operational macromodel of the Romanian economy. On this occasion, I had the opportunity to discuss the transition and modelling problems with specialists, such as J. Raisian, J. Taylor, I. Adelman, E. Lazear, R. Soussa and M. Bernstam. I was impressed by the complexity of Stanford and Berkeley Universities' research. The transition processes are examined on both economic and socio-political planes, this approach being the most productive from the scientific point of view. Previous commentaries of M. Lord (Boye-Lord International Ltd., Washington D.C.) and F. Barry (University College Dublin), who analysed some preliminary versions of my model, have also been useful.

1.2) The 1997 version of the macromodel (Dobrescu 1997 b) has included some changes, the following being the most important:

- the introduction of the special block for demographic variables (population, labour force, retired people);
- the connection of the annual indicators with a monthly block dedicated to the evolution of export and exchange rate;
- the aggregation of the previous five sectors in the following three: a) industry, construction and agriculture; b) transport, communication, trade, banking and other services; c) public services;
- the re-estimation of the econometric functions on the basis of updated statistical series (including the provisional data for 1996).

The 1997 version took into account valuable suggestions by prof. W. Charemza (Leicester University), prof. S. Hall (Imperial College and London Business School), and dr. J. W. Velthuijsen (University of Amsterdam).

This version of the macromodel has been used by the National Bank of Romania for macroeconomic analyses and forecast estimations.

1.3) The 1998 version of the macromodel, presented in this book, contains new improvements:

- a more relevant determination of the expected disposable income of households, firms, and general consolidated budget;
- the delimitation of the main consequences of the budget deficits;
- a more detailed elaboration of the possible scenarios of the future evolution of the Romanian economy.

In the 1998 version of the macromodel the interesting suggestions formulated by prof. J. Bradley (Economic and Social Research Institute of Dublin) have been taken into account.

2) The present book tries to define the features of the weakly structured economy from an institutional perspective. The institutional framework is studied from three points of view: a) the main components (property rights, rules of human interaction, the amplitude and ways of the discretionary intervention of public authorities in the economic life); b) the degree of specification of these components (clearly and uncontradictorily defined, ambiguously defined); c) social validation (formal or informal). Starting from the possible combinations of these elements, two types of economic systems can be distinguished: the first implies a high expected stability and is denoted as a structured economy and the second is characterised by a relatively low expected stability, being considered a weakly structured economy.

The transition economy, at least in the case of Romania, is defined as weakly structured: the property rights are not yet clearly delimited; the economic life is marked by the mixture of old and new rules and organisations involved in human interaction; discretionary intervention of the public authorities is very large and submitted to random political interests; the formal institutions are incomplete and soft, but the informal ones have an important role in economy and society. On this theoretical basis, the main macroeconomic implications are analysed: a) chronically inefficient utilisation of the production factors; b) persistence of inter-enterprise arrears and of disturbing form of “dollarization”; c) large share of non-accounted economy; d) monetary distortion and asymmetry of liquidities.

The weakly structured economy is characterised by congenital instability and, therefore, the modelling problems are especially complicated. The notion “econometric model” is used in the following meaning: as a set of interdependent equations (from which at least one is econometric) approximating a particular given class of statistical data in accordance with

the modeller's image about functional relations among respective series. If the model reflects a "given class of statistical data", it is evident that it can be used only for the analysis of this information; forecasts are acceptable exclusively in the proximity of the respective time interval. On the other hand, the "image" represents a mixture of theoretical assumptions adopted (explicitly or implicitly) by the modeller, and also of his beliefs, intuitions, attitudes and desires concerning the studied process. Consequently, for every economic system a large variety of models are possible depending on the conceptual premises of their creators. Maybe, this relativism is intellectually uncomfortable, but it is inherently implied in econometric modelling, especially when a weakly structured economy is approached.

The most difficult problem is the stationarity of statistical data. In order to obtain an overview about this question, 76 annual and 14 monthly series have been exposed to Augmented Dickey-Fuller Test. The basic series and their natural logarithms are stationary only in 34% of the cases for annual data; the monthly data are better situated (68%), but they are relevant for very few correlations. The general opinion about frequent stationarity of the first and second differences are confirmed. Instead, the indices and the corresponding rates are less stationary. The best performance is registered by the first difference of indices and their variation. Under these conditions, two modelling approaches are possible: a) to use, partially at least, the basic unstationary series, the stability of macromodel usually being higher than the stability of separate functions as a result of the interactions among them and the accounting identities (a similar solution has been adopted for the 1996 version of the macromodel); b) to use only stationary series, that is preponderantly derived indicators with supplementary problems (in forecasts) generated by their translation in basic ones (the 1997 and 1998 versions are built on this principle).

The appendices of the book contain a set of the most relevant macroeconomic indicators of Romania for 1980-1996 (annual data) and January 1991 - December 1996 (monthly data), the detailed presentation of the econometric functions, the main scenarios of the Romanian eco-nomy for 1998-2000, a selected bibliography and thematic index.

3) The following main contributions have to be mentioned:

- the programming of the economic block on Quattro Pro: mat. P. Fomin;
- the correlation with LINK models and the programming of demographic block on LBS - Modeller: dr. C. Ciupagea;

- the elaboration of the demographic block: dr. D. Jula;
- the updating of the statistical series: I. Dragulin, dr. C. Scutaru, drd. M. Dogaru, dr. L. Andrei, S. Rosentuller, dr. E. Pelinescu, A. Petrean, dr. C. Ungureanu, dr. F. Tanase, M. Panaite, E. Andrei, drd. M. Unguru, M. Groza;
- econometric and mathematical analyses: mat. P. Fomin, dr. C. Ciupagea, dr. C. Scutaru, drd. G. Turlea, drd. A.. Agapie, mat. M. Regep;
- text processing: R. Stanciu, M. Buneci, C. Saman, C. Prohanca.

The elaboration of the macromodel would not have been possible without the informational assistance of the Ministry of Finances, the National Commission for Statistics, and the National Commission for Forecast. We are especially grateful to the National Bank of Romania for its very important support.

I must mention, also, the remarkable efforts of "EXPERT Publishing House", headed by dr. V. Ioan-Franc, to sustain the macroeconomic modelling activity.

The debates organised during the recent years by the Romanian National Institute for Economic Research, the Academy for Economic Studies, Bucharest University, the General Association of Romanian Economists, the Romanian Economic Society have constituted a motiva- ting environment for my investigations.

I am thankful to dr. K. Schields (Leicester University), and to my colleagues dr. C. Ciupagea, drd. G. Turlea, dr. C. Popa, for valuable assistance concerning the final editing of the text.

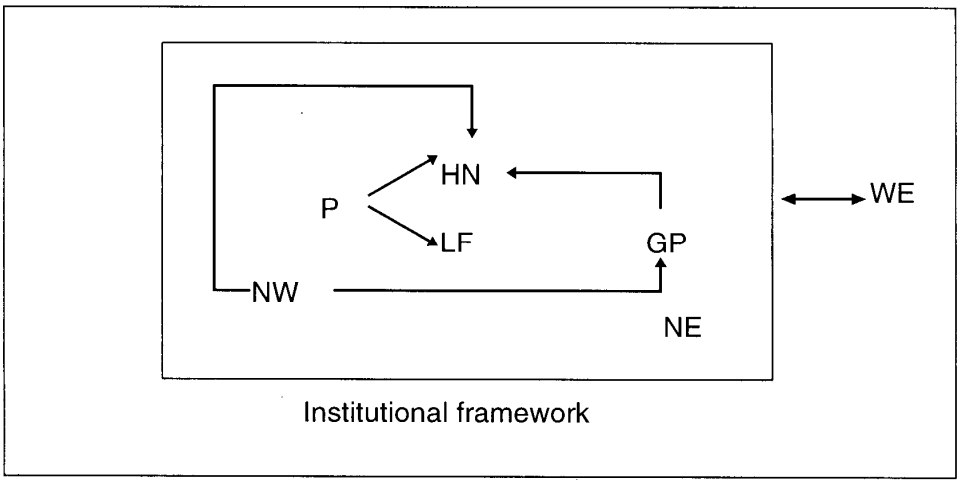
Bucharest, February 1998

Prof. Emilian Dobrescu

Transition economy - a weakly structured system (the case of Romania)

1) In order to define the notion used in the title of the present chapter, some terminological explanations are necessary.

1.1) The economic system is understood in its institutional sense, i.e. "From the richest to the poorest, every nation faces the same economic dilemma: how to satisfy people's unlimited wants with its limited economic resources. Each society must decide which products and services to produce, how to produce them, and for whom to produce them; in other words, it must establish an economic system. Basically, an **economic system** is a set of what, how, and for whom to produce" (Rohlf, p.34). The simplest framework incorporated by an economic system is as follows:



where: P - population; HN - human needs; LF - labour force; GP - production of goods and services; NW - national wealth; WE - world economy; NE - national economy. The population has a double implication because it provides the labour force whilst also motivating production. This is also conditioned by national wealth (machines and equipment, infrastructures, natural resources, informational stock). Each national economy interacts with the other by commercial, capital and cultural, informational flows. These complex connections are intermediated by a very diversified network of economic institutions (rules and organisations that allow and influence human relations concerning the production, distribution, circulation and utilisation of goods and services).

1.2) The underlying economic theory has approached this problem differently. The classical economics, as well as the neo-classical, have insisted on the logical consequences resulting from a given institutional framework (private property, free market mechanisms, perfect competition and so on), usually represented by a set of initial assumptions. Other economic doctrines - Marxism, historical school, institutionalism and neoinstitutionalism - have concentrated their attention on the causes and ways the economic system has evolved as an institutional framework.

Concerning this question, North remarked: “By applying neo-classical theory to history, economic historians were able to focus upon choices and constraints, which were certainly all of the good. That is, we could look at what the constraints were that defined and limited the set of choices of human beings. The constraints, however, were not imposed by the limitations of human organization, but only those of technology and income. And even technology, at least in the neo-classical framework, was always an exogenous factor and thus never really fit into the theory... The exception was the work of Karl Marx, who attempted to integrate technological change with institutional change. Marx’s early elaboration of the productive forces (by which he usually **meant** the state of technology) with the relations of production (by which he **meant** aspects of human organisation and particularly property rights) was a pione-ering effort to integrate the limits and constraints of the technology with those of human organization” (North, p.132). For the historical school [Roscher, Hildebrand, Schmoller, Brentano, Bücher, Sombart] the empirical research has had priority. The institutionalism [Veblen, Commons,

Mitchell, Clark, Hobson] has insisted on the real economic phenomenon as well, but at the same time it has emphasised the conceptualisation of the transaction problems. The neo-institutionalism [Coase, Knight, North, Williamson, Buchanan, Tullock, Wallis] has consequently developed this tendency. Despite its limits (mentioned by Williamson, p.390-393), the institutional approach remains an **unsubstitu table** methodological tool for the investigation of the economic systems.

2) The present analysis interprets the institutional framework in the widest possible sense: legislation, organisation, contracts, standards, fiscality, monetary system, behaviours of the economic agents (households, firms, public authorities), channels and means of communication among them; traditions, beliefs, customs, codes of conduct, attitudes, values, taboos, and so on. Their common feature (from the point of view discussed here) is the fact that they intermediate and influence human relations involved in the production, distribution, circulation and utilisation of goods and services, i.e. the structure of human interactions (North, p.25). The institutional framework can be exa- mined from different perspectives. Three of them seem to be essential.

2.1) First, it is necessary to identify the most significant institutional attributes of economic life. The sociological and economic literature have presented many classifications of these attributes. I consider particularly relevant the conceptualisation resulting from the comparative analysis of the 20-th century's economic systems, developed in the last decades (Eckstein, Montias, Buck, Gardner, Schnitzer, Gregory and Stuart, Baumol and Blinder, Stiglitz). "Economic systems are **multidimensional,** a feature that can be conveniently formalised in the following manner:

$$ES = f\left(A_1, A_2 \ldots A_n\right)$$

We shall focus on four general (and often overlapping) attributes (n=4) that are critical in differentiating economic systems:

1. Organisation of decision - making arrangements
2. Mechanisms for the provision of information and for co-ordination: market and plan

3. Property rights: control and income
4. Mechanisms for setting goals and for inducing people to act: incentives

These four characteristics have been chosen because we expect economic systems to differ among them. They have also been chosen because they affect economic outcomes. We do not list features that are relatively uniform across systems - for example, the organisation of production in factory units" (Gregory and Stuart, p. 16-17).

The main alternative options available for each attribute are represented in the following figure (Gregory and Stuart, p. 23):

Attributes of economic system

Attribute	Option
Organisation of decision making	Centralisation Mixed Decentralisation
Provision of information and coordination	Market Mixed Plan
Property rights	Private Cooperative Mixed Public
Incentive system	Moral Mixed Material

On the basis of this matrix, the main economic systems have been delimited, as well as their possible mixtures. An important literature is dedicated to the peculiarities of the same system in different countries.

For our discussion, it would be useful to operate within a simplified scheme of the institutional framework components. The nature of the economic system (in institutional approach) depends first of all on:

a) the configuration of the property rights (as "socially enforced right to select uses of an economic good", Alchian, p.594);
b) the rules regarding human interaction, including the organisations resulted from them or created on their basis;
c) the amplitude and ways of discretionary intervention (as power) of the public authorities in economic life.

2.2) The institutional framework is differentiated by the degree of specification of its main components:

a) these can be clearly and uncontradictorily defined;
b) or, conversely, they are ambiguously defined; in this category is also included the non-institutionalised part of human interactions (that is the interactions for which it is impossible to distinguish certain repetitive rules).

2.3) The institutional framework of economy can benefit, from a social point of view, of formal or informal validation. The formal segment constitutes the rules (including rights and obligations) determined officially by public authorities (central or local) or derived from them and the organisations functioning in accordance to these rules. Informal institutions - rules, behaviours, coalitions and so on - are not a result (direct or indirect) of state activity; they reflect historical traditions of the respective community, its experience and spirituality (in the largest sense, including religion etc.).

In both formal and informal cases, it is necessary to distinguish the strength (force) of the involved institutions, that is their social acceptability and their effectiveness (observability). The strength factor depends on the measure by which the corresponding institutions are assimilated by the people and are sustained by accessible (low cost) and credible enforcement. From this point of view, it is reasonable to delimit hard institutions (i.e. those with a high frequency, that is the institutions that are usually observed) and soft ones (those only occasionally observed). For the definition of the economic system, this classification is relevant in the case of formal institutions; soft informal institutions can practically be considered as non-functional and non-existent.

The formal and informal institutions permanently interact; they are partially compatible, partially not and a mutual influence is observed to exist

between them. Social psychology and institutional research has identified some interesting features of this dynamic interaction:

- the informal institutions are characterised by a strong sluggishness (i.e. changes taking place during a relatively long period); the formal ones are more flexible as a result of their dependence on state activity (marked by political circumstances); "creating a system of effective enforcement and moral constraints on behaviour is a long, slow process that requires time to develop if it is to evolve" (North, p. 60);
- when formal institutions contradict the informal ones (especially under conditions of the soft strength of the former), the latter becomes dominant.

Therefore, from the point of view of the social validation, institutional framework can be:

a) formal hard (including here compatible formal - informal institutions, too);
b) formal soft (including here contradictory formal-informal institutions, too); and
c) informal;

3) Summarising the given considerations, we obtain a simplified representation of the economic system as an institutional framework of human interactions concerning the production, distribution, circulation and utilisation of the goods and services:

Institutional framework

Main components (C)	Specification degree (S)	Social validation (V)
Property rights (C1) Rules of human interactions (C2) Amplitude and ways of the discretionary intervention of the public authorities in the economic life (C3)	Clearly and uncontradictorily defined (S1) Ambiguously defined (including undefined zone, too) (S2)	Formal hard (V1) Formal soft (V2) Informal (V3)

4) Starting from this scheme, it is not difficult to distinguish two types of economic systems.

4.1) The first is characterised by a high expected stability, corresponding to the following combination of the mentioned features:

[C1, C2, C3]; S1; [V1, V3]

This can be termed to be structured economy.

a) In the case of the modern capitalist system, the high expected stability is perceivable even on microeconomic level, that is, on the level of the economic agents as autonomous entities. One of the most relevant expressions of this state can be considered, in my opinion, the plausibility of the forward-looking theory of consumption (the permanent - income theory of Milton Friedman and the life-cycle theory of Franco Modigliani), and of the paradigm of rational expectations. This paradigm "holds that each individual forms expectations of the future on the basis of a correct model of the economy" (Arrow, p. 205); it would be inconsistent without clearly defined and stable components of the institutional framework (property rights, rules of human interaction, limits of the state intervention in the economic life). "The concept of rational expectations asserts that outcomes do not differ systematically (i.e., regularly or predictably) from what people expected to be... It does not deny that people often make forecasting errors, but it does suggest that errors will not persistently occur on one side or the other" (Sargent, p. 155).

b) In the case of a state socialist system, the main characteristic of the structured economy - its relatively high expected stability - must be identifiable at least on the macroeconomic level. From this point of view, such an expression can be considered as a "rational centralised planning", or a situation where the differences between planned and statistical indicators systematically do not exceed reasonable limits. I do not discuss here the performance of this system, or its capacity to avoid structural degeneration, given that there is a huge literature dedicated to these problems. My remarks

concern only the representative attribute of the state socialist economy as a structured system.

4.2) In contrast, the weakly structured economy is characterised by the combination:

[C1, C2, C3]; S2; [V2, V3]

the presence of S2 and [V2, V3] being considered as predominant (not exclusive). Due to the ambiguous definition of the main components of the institutional framework and the domination of the soft formal validation ,the expected stability of the corresponding economic systems is relatively low. In the case of Romania, we notice similar symptoms, even under conditions of a socialist regime. For instance, during the 1980's the discrepancy between the national plan and reality was flagrant. In other words, from the institutional perspective discussed here, the Romanian economy became weakly structured before 1989; this state - of course, in substantially modified forms - continued in the transition to market mechanisms. The goal of the present study is the modelling of the Romanian transition economy as a weakly structured system.

5) The study concerns the main components of institutional framework, their degree of specification and their social validation.

5.1) Each component registers some peculiarities.

a) In the case of state owned commercial companies the ownership attributes are diffuse. In the enterprises privatised by vouchers, effective corporate governance does not exist. Only in the emer-ging private sector, ownership rights are more clearly established, but even here there are many uncertainties.
b) The economic life is marked by the mixture of old and new rules and organisations involved in the human interactions.
c) Discretionary intervention of the public authorities is very large. Consequently, the political factor and its associate criteria interfere with economic processes, including the allocation decisions.

5.2) The property rights, the rules and organisations for human interactions, and the economic implication of the public authorities are characterised by ambiguities, contradictions. A great part of economic activities does not dispose of an adequate institutional framework.

5.3) The transition from the command to the market economy implies a global change of the formal institutions. These are assimilated by society throughout a long period and, therefore, their short-run effectiveness is limited. In other words, the formal institutional framework is not only incomplete, but it is soft, too. In contrast, the informal institutions of the economic and social life have a very important role, in any case essentially more so than in the structured economies. They reflect both the behavioural traditions of the Romanian people (Blaga, Draghicescu, Radulescu Motru, Vulcanescu) and the influence of recent changes in the social, political and economic environment (Mungiu, Munteanu-Gurgu, Pasti).

6) The problems of weakly structured economy are very complicated and insufficiently investigated. They have been introduced only as a starting point for a more relevant discussion concerning macromodelling of the Romanian transition economy. From this perspective, I think the following implications are the most significant:

- chronically inefficient utilisation of the production factors;
- persistence of inter-enterprise arrears and of disturbing form of "dollarization";
- large share of the non-accounted economy; and
- monetary distortion and asymmetry of liquidities.

These implications will be examined in the context of the Romanian transition economy.

2 Macroeconomic implications

A) Chronically inefficient utilisation of the production factors

The weakly structured economy is less efficient than any structured economy that can derive from it. The economic efficiency is fluctuating as well. In other words, the dependence of outcomes on production factors is atrophied. This has deep causes.

1) The experience of the former socialist countries, including Romania, shows a specific typology of economic agents in the transition period.

a) A great part of economy is dominated, for a longer or shorter period, by the majority of state owned and recently privatised by vouchers enterprises. They are not submitted to real corporate governance and benefit - explicitly (subsidies) or implicitly (bad loans, arrears) - by soft budget constraints. Their objective function is the "maximisation (preponderantly on short term) of insider utility (management and employees) and not the maximisation of profits" (Popa, p. 100).

b) There are private, relatively powerful companies (holdings) whose main shareholders are linked with central and local bureaucracy. Having easy access to information concerning the intentions of government agencies and benefiting by their direct or indirect support, these companies dispose of important conjunctural advantages.

c) The sector of small and medium sized private enterprises is also developing. In fact, they act autonomously, being self-reliant without or with negligible assistance from government institutions. The access of this sector to larger amounts of financial capital is limited. Due to their weak positions on the market, the small and medium

sized firms, despite their orientation to profitable activity, cannot substantially influence the global efficiency of the national economy.

d) There are numerous personal and family firms - especially in agriculture, small industries, trade, and services. Many have modest financial possibilities and precarious positions on the market. Most of them are obliged to be content with subsistence incomes.

e) The penetration of foreign capital has - at least in the case of Romania - contradictory effects. On one hand, it generates new and performant enterprises which have a beneficial influence on the general economic environment. On the other hand, it is unquestionably the preference of many foreign firms, especially from less developed countries, to invest few resources in trade and services in order to obtain profits in the short-run without perceivable positive consequences for the general efficiency of the Romanian economy.

2) The above sketched typology of economic agents and their objective functions translates into a similar picture of their financial situation. Empirical research has identified, for Romania, the following groups (Dobrescu, 1997):

a) minimal solvability (they provide the negotiated salaries of employees and payment of direct imports);

b) intermediate solvability (which adds to the previous case the partial payment of domestic suppliers, bank interest and credits, and commitment to the general consolidated budget);

c) full but unprofitable solvability (provide full payment of employees, domestic and foreign suppliers, banks, general consolidated budget whilst giving up profit and the creation of the amortisation fund);

d) full and partially profitable solvability (which, in addition to the preceding case, ensures the creation of amortisation fund and a minimum profit);

e) full and highly profitable solvability.

At the same time, the objective functions are achieved by the combination of:

a) changes in the real economy (output, quality, costs),

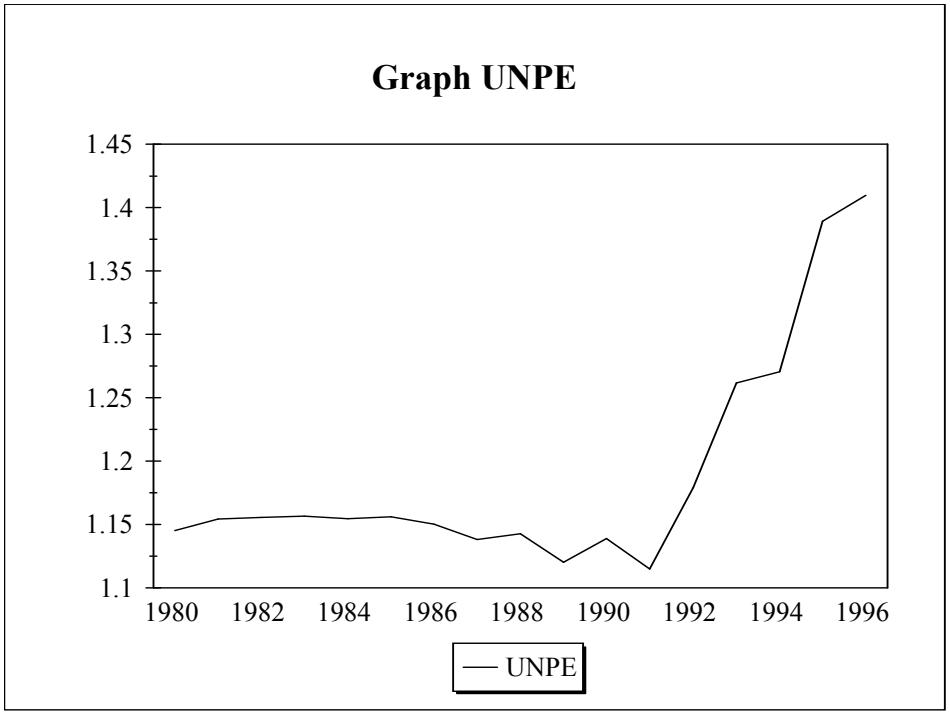
b) growth of prices, and

c) appropriation of state property,

the proportion of these tools depending on the market positions of the economic agents and their connections with government bureaucracy.

3) The economic environment is highly uncertain due to the instability of the institutional framework. The greatest share of economic agents act under conditions of informational penury, and therefore the transaction costs increase. The privatisation process and other institutional reorganisations, the formation and development of capital markets, permanently change the actual and expected situation of economic agents.

In addition, the production sector must support an "oversized social charge". The **ratio between the unemployed population and employed labour force** (noted **UNPE**) is presented in the Graph UNPE.

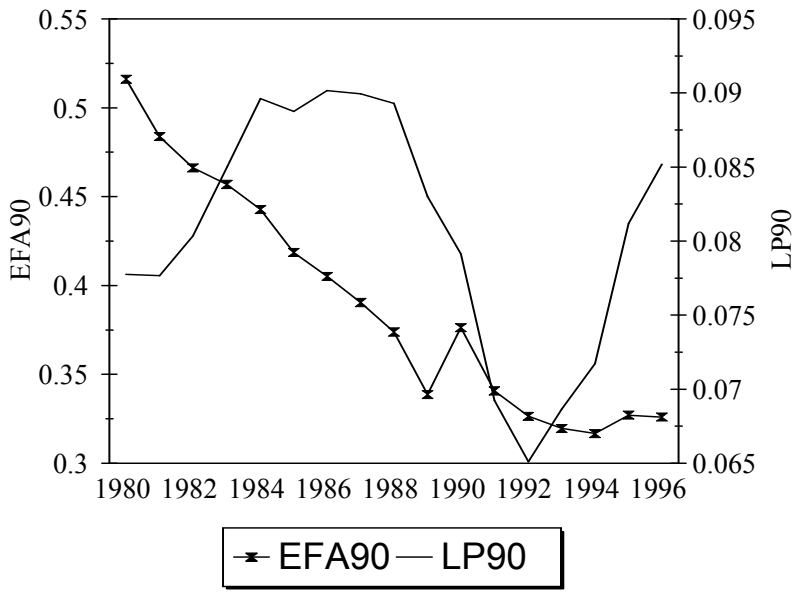


Obviously, the social charge is considered "oversized" in the relative sense. Although the social incomes (pensions, unemployment benefits, social assistance etc.) are modest per capita, their share in overall dispo-

sable income is very high for a poorly working economy. This involves a relatively high fiscality.

4) Consequently, the production sector chronically functions under its potential output, and moreover, the global efficiency of the national economy continuously fluctuates. These tendencies became evident, in the case of Romania, at the end of 1980's and especially during 1990's. The evolution of fixed assets efficiency (i.e. the **ratio between gross domestic product and fixed assets**, both in 1990 prices, noted **EFA90**) and labour productivity (**gross domestic product**, the same prices, **per employed person**, mill. ROL, noted **LP90**) is presented in Graph EFALP90.

Graph EFALP90



5) This atrophied dependence of the real output on production factors in the sense of their chronically inefficient utilisation, poses new difficulties for macromodelling research. The classical production functions - based on capital, labour force and eventually technological changes - become less relevant. Instead, the demand and some financial factors (especially degree of capitalisation of economic agents, direct and indirect fiscality) play an essential role. We shall discuss these problems, more concretely, in the chapter dedicated to the econometric functions of the macromodel of the Romanian transition economy.

B) Persistence of inter-enterprise arrears and of disturbing form of "dollarization"

1) From the point of view of the debtor (in arrears) and of the creditor (with overdue returns), this double notion expresses the same phenomenon. It concerns the overdue payments between economic agents: firms, banks, government institutions, and households. "Overdue" is considered to be the payment not honoured, through a proper transfer of money, by contractual date and according to the legal framework concerning the payments between economic agents. Clearly, this is not a new phenomenon, the capitalist economy being aware of this since the beginning, certainly on a limited scale and with a fluctuating evolution, depending on the conjunctural cycle.

The overdue payments were naturally integrated in the command system, in which the flows of the real economy, regulated through physical indicators and planned distribution, had priority. These technical and material flows took place even if the financial situation of some of the involved enterprises could not guarantee the corresponding monetary flows in return. This is why, from time to time, regularization through the state budget and banking credit channels were inevitable.

The engine of this mechanism was destroyed to a large extent when the transition process started (i.e. the elimination of the centralised planning activity, autonomous administration of the enterprises etc.). Because of the new restrictions and determinations (implied by the changed economic environment and objective functions of the firms in this period), the arrears (overdue returns) phenomenon has re-appeared and even ampli-

fied. Its sluggishness has been enhanced because the economic agents face a phenomenon "already familiar".

This problem has been analysed in many studies which are mentioned in the bibliography. A synthesis of the conclusions of these studies was made by E.V. Clifton and M.S. Khan: "Many reasons have been advanced to explain the phenomenon of enterprise arrears in the transforming economies. They range from financial underdevelopment and credit market failures, which cause enterprises to assume banking-type functions [Begg and Portes (1992), Ickes and Ryterman (1993)]; tight credit policies, which create a liquidity crunch [Calvo and Coricelli (1992)]; lack of credibility of the government's reform program [Rostowski (1992)]; and the particular structure of industry in a command economy, which is based on chain links between enterprises [Daianu (1993)]. It is clear that no explanation dominates, and it would be fair to say that interenterprise arrears are due to a combination of factors, the relative weights of which vary from country to country" [Clifton and Khan, p. 681]. Still, L.Croitoru insists upon the reform inconsistencies: "the arrears can be seen as an effect of incomplete liberalisation. Incomplete from two points of view. First, because some economic policy measures while dismantling old mechanisms have put nothing instead. Second, because some liberalisation where in fact only partial ones, leaving the economy without essential mechanisms and institutions (stock market, commercial credit etc.)..." (Croitoru, p.36)

2) Taking into account the achievements of these studies, I shall try to build a conceptual restructuring of this phenomenon using the matrix analysis.

2.1) The transactions are viewed as a matrix, noting i its rows (i=1 for the first and i=n for the last row) and j, its columns (j=1 for the first and j=n for the last column). Sales distribution is plotted on the rows and purchasing on the columns. The flows are expressed in monetary units, thus reflecting both reciprocal deliveries of goods and services (real economy) and the corresponding prices (nominal economy). The notation used is as follows:

X_i - sales volume for economic agent i;

X_j - purchasing volume for economic agent j;

$\overline{X_i}$ - returns volume;

$\overline{X_j}$ - the corresponding payments volume;

x_{ij} - economic agent i selling to economic agent j, equivalently, to the latter purchasing from the former. Since we are conceived with transactions between pairs of different agents, the main diagonal of the matrix defined by i= j has zero elements.

$\overline{x_{ij}}$ - economic agents i return, respectively the economic agent j payment for delivery x_{ij}; as $\overline{x_{ij}} \le x_{ij}$ we admit - for simplicity - that $x_{ij} - \overline{x_{ij}}$ are the overdue payments.

a_{ij} - the cashing payment coefficient, defined by the ratio $\frac{\overline{x_{ij}}}{x_{ij}}$; clearly $0 \le a_{ij} \le 1$.

2.2) Thus, we can formulate the main accounting relations:

$$X_i = \sum_j x_{ij} \quad \text{(for fixed i)}$$

$$X_j = \sum_i x_{ij} \quad \text{(for fixed j)}$$

$$\overline{X}_i = \sum_j a_{ij} \cdot x_{ij} \quad \text{(for fixed i)}$$

$$\overline{X}_j = \sum_i a_{ij} \cdot x_{ij} \quad \text{(for fixed j)}$$

$$\sum_i X_i = \sum_j X_j \quad \text{and} \quad \sum_i \overline{X}_i = \sum_j \overline{X_j}$$

2.3) For each economic agent, as well as for the whole national economy, the arrears and overdue returns can be defined in two ways.

a) The overdue returns volume for economic agent i is expressed by:

$$CR_i = X_i - \overline{X_i} = \sum_j (1 - a_{ij}) \cdot x_{ij} \quad \text{(for fixed i)}$$

and the arrears for economic agent j by:

$$A_j = X_j - \overline{X_j} = \sum_i (1 - a_{ij}) \cdot x_{ij} \quad \text{(for fixed j)}$$

For i = j, the difference CR_i - A_j , if it is positive, represents the net overdue returns and, if it is negative, the net arrears for the respective economic agent.

b) With respect to the national economy, the gross overdue returns (CR) and the gross arrears (A) are the sum of the corresponding indicators for all economic agents:

$$CR = \sum_i CR_i \quad \text{and} \quad A = \sum_j A_j$$

Since by definition CR = A , we cannot determine the net values using the difference of the gross ones. Considering the difference CR_i - A_j for i = j the economic agents can be classified in three categories, as follows:

- net debtors, those having net arrears;
- net creditors, those having net overdue returns;
- economic agents with a zero balance.

At the national economy level, the net overdue returns (CRN) equal the total of the corresponding values for the net creditors, and the net arrears (AN), equal those for the net debtors. Obviously, the two sums are equal (CRN = AN)

c) There is a certain relationship between the gross and net arrears, as well as between the gross and the net overdue returns. To define the intensity of this relation, the multiplier CA is introduced, that is:

$$CA = \frac{CR - CRN}{CR} = \frac{A - AN}{A}$$

This multiplier takes values between 0 and 1.

2.4) Both for each economic agent and for the whole national economy, the overdue returns and arrears - gross and net - are expressed as current values (corresponding to the studied period of time) and as cumulated ones (for an interval including several time periods of economic activity).

2.5) The overdue returns and arrears arise from effective transactions, therefore being impossible to dissociate them from goods and services flows, on the one hand, and from monetary evaluations (prices) used at a specific moment in the economy, on the other hand. This is essential for the understanding of their involvement in the real and nominal eco-nomy.

3) The monetary approach of this question implies to identify - besides the accounting money velocity (v) corresponding to the usual ratio between GDP and money supply - the operational money velocity (v^*) representing the volume of transactions in GDP equivalent (including also the normal commercial credit) which effectively relates to the monetary unit (Dobrescu 1993b, 1994a,b). In this sense, the money velocity - even if not constant, as asserted by quantitative theory - is still not arbitrary, but varies between certain limits in each period, in accordance with economic, financial, technical, and behavioural reasons.

If the money supply (M) multiplied by operational velocity (v^*) must be equal to the sum of transactions intermediated by money, that is $\sum_i X_i$, the arrears (and, although not mentioned each time, the overdue returns as well) cannot exist, since $M \cdot v^* = \sum_i X_i$ automatically assumes the identity: $\sum_i X_i = \sum_i \overline{X}_i$. Why? Because this relation means $\sum_{ij} x_{ij} = \sum_{ij} a_{ij} \cdot x_{ij}$ which is possible in only two cases:

- if some coefficients a_{ij} are less than 1, then others must be over 1, so contradicting the condition mentioned above $0 \le a_{ij} \le 1$;
- if none of the coefficient a_{ij} are larger than 1, then equality is true only when all coefficients are equal to 1, and so there are no arrears.

The existence of arrears forces us to accept - instead of the formula $M \cdot v^* = PQ$, where PQ is the equivalent of $\sum_i X_i$, - the inequality $M \cdot v^* \le PQ$, that characterises the peculiarities of a weakly structured economy, represented by a softer relation between money supply, on the one hand, and real output and prices, on the other.

4) The inequality $M \cdot v^* < \sum_i X_i$ can happen under three typical circumstances.

4.1) If the volume of the transactions ($\sum_i X_i$) is maintained, then either broad money or the money velocity will decrease.

4.2) $M \cdot v^*$ remains constant, but $\sum_i X_i$ is growing because of the increase in prices or/and of the flows in real terms.

4.3) The most frequent case is the one where both sides of the relation are altered, but with different rates.

5) If we start from the equilibrium point $X_i = X_j$ for i = j, the $M \cdot v^* < \sum_i X_i$ condition is enough to generate gross overdue returns and arrears, but not the net ones. If all coefficients a_{ij} are smaller than unity and equal, for all transactions, let's say to α, then relations CR_i and A_j become:

$$CR_i = X_i - a \cdot \sum_j x_{ij} = X_i - a \cdot X_j$$

and

$$A_j = X_j - a \cdot \sum_i x_{ij} = X_j - a \cdot X_i$$

Because $\alpha < 1$, and $X_i = X_j$ for i = j, both CR_i and A_j are positive, but, the difference $CR_i - A_j$ is null; so, neither net overdue returns or net arrears will appear. For these to form it is necessary to have non-zero difference between returns and payments for at least one economic agent. If $X_i = X_j$ (for i = j), it is obvious that CR_i cannot differ from A_j unless $\sum_j a_{ij} \cdot x_{ij}$ (for fixed i) is different from $\sum_j a_{ij} \cdot x_{ij}$ (for fixed j).

The inequality $M \cdot v^* < \sum_i X_i$ can be considered as a macroeconomic condition for overdue returns and arrears to exist.

5.1) But what is the microeconomic explanation?

a) As supplier, the economic agent must chose from the following two possibilities to obtain almost the same liquidity:
- to reduce the sales volume (and so the production, with the corresponding personnel cut) down to the level where the $\alpha_{ij} = 1$ coefficient can be imposed;
- to slightly decrease the sales volume or, on the contrary, to maintain or even increase its level, but accepting α_{ij} coefficients less than 1.

Experience shows that most suppliers prefer the second choice. They hope to cover - at least partially - their overdue returns that have been created and the arrears are sometimes considered to be expected money (Bernstam). Moreover, the disadvantages of being a creditor are to some extent compensated by similar advantages of being a debtor (when buying the necessary inputs). All things considered, they are more able to deal with the social pressure.

b) The economic agent's behaviour, when viewed as a buyer, is essentially determined by two circumstances. To sustain his activity and so to provide jobs for its labour force, he needs the physical deliveries from the suppliers. But its capacity to push the prices downward - through an eventual contraction of its own demand - is very limited, given the weak competition on markets in a weakly structured economy.

So, the economic agent can only choose one of the following:

- to achieve full solvability with the costs of restructuring its economic activity (by dropping inefficient capacities, personnel cuts, etc.);
- to maintain or even extend his production without restructuring his activity and so become liable himself to the suppliers, with the knowledge that the arrears are deeply eroded in real terms, due to inflation.

5.2) In my opinion, the microeconomic analysis needs to be based on three conceptual premises.

a) Each economic agent has its own objective function that motivates its management and also its attitude concerning the level of returns and their ratio relative to payments. This diversity of objective functions discussed in the paragraph A has, of course, dif-ferent effects upon the arrears and the overdue returns mechanism.

We can also talk about a propensity to plunge into debts characterising each economic agent. It has been said that, “in the absence of interest, the optimal volume of arrears tends to infinity. This is a very important observation, because in an environment with weak budgetary constraints this is permanently fuelling the demand for arrears” (Lazea, p.3). But statistical series do not confirm this presumption. My observations show that most economic agents are not joining the difficult endless race of arrears, but instead are concerned that their financial obligations do not exceed certain limits considered by them to be acceptable.

The decodification of the factors conditioning these limits would require another study. We can assume that the propensity to plunge into debts is decreasing as the probability for arrears to become normal debts (carrying interest and generating penalties if not paid in time) increases and vice versa. Moreover, the weaker the corporate governance and the more unstable the position of the managerial team the higher is the propensity to plunge into debts.

c) A similar analysis can be conducted when the economic agent is seen as a supplier. Here, too, a specific propensity to accept overdue returns seems to exist. Because of the risks involved by their retrieval, they tend to increase asymptotically toward a ceiling. Exceeding of this value brings a risk that cannot be assumed. This propensity, in its determination, is complex and among its causal factors are the budget restrictions specific to each agent, the social pressure's intensity (to maintain, to operate limited constrictions or even to extend its economic activity), the agent's position on the market and so on.

5.3) The three concepts described above - the objective function, the propensity to plunge into debts and the propensity to accept overdue returns - are "translated" into the next system of restrictions (being either formulated like this by economic agents, or only intuitively respected):

- the minimum difference between the current payments and returns, noted ΔM_i (which, obviously can also take negative values) is given by $DM_i \le \sum_j a_{ij} x_{ij} - \sum_i a_{ij} \cdot x_{ij}$;
- the maximum level for all the arrears that the economic agent can commit to, is given by AM_i ; $\sum_t A_{it} \le AM_i$;
- the maximum level for all the overdue returns which the economic agent can afford, is CRM_i; $\sum_t CR_{it} \le CRM_i$; and
- the maximum difference between the cumulated overdue returns and arrears, is DCA_i ; $DCA_i \ge CRM_i - AM_i$.

Starting from these parameters and from the information he has concerning his partners, the economic agent builds his own expectations for the line and column vectors of the involved payment-cash coefficients, with higher probabilities for potential transactions.

6) Hence, a double matrix α_{ij} is formed. One describes the economic agents behaviour as sellers (noted $\bar{a}_{ij}$). The other one describes them as

buyers (noted $\tilde{a}_{ij}$). Experience suggests that some minimum levels of α^{x}_{ij} exist, below which the returns rates can not fall.

6.1) The convergence of transactions supposes that $a^{x}_{ij} \le \bar{a}_{ij} \le \tilde{a}_{ij}$. It is interesting to observe that this holds if the volume of the transactions is either increased, maintained or reduced. These possible cases will be illustrated by a conventional numeric example (Appendix VI, Tables No. Ap.1-Ap 4).

6.2) Can any reduction in $M \cdot v^{*}$ be compensated by accumulation of arrears and overdue returns?

The answer is definitely NO! At a certain time, the balance between current returns and payments can be less than ΔM_i for at least one economic agent. If this economic agent is not eliminated (for technological, financial or social reasons) the economic system finally is blocked. Still, we must keep in mind that, even if such a purge might be possible, the formation of arrears and overdue returns will face the AM_i and CRM_i barriers.

Even if other economic agents are eliminated (if taking limit values for cumulated overdue returns, cumulated arrears or their balance), at certain point the process would stop. This comes immediately from the assumption that each economic agent has a specific objective function and some specific propensities to plunge into debts and to accept overdue returns, from where the four restrictions presented above are emanate. The experiences, at least of Romania, confirm this conclusion.

7) The problem can also be brought back to macroeconomic terms, considering that both the aggregate supply *(YS)* and the aggregate demand (YD) depend on the average ratio of cashing-payment (α *)*. Both YD and YS are in current prices.

The following hypotheses seem plausible:

- the aggregate supply is null for α =0*,* and increases as α increases, reaching its maximum (noted B) for α =1*;*
- the aggregate demand is minimum for α =1 (equal to $M \cdot v^{*}$), and amplifies as α falls, reaching the maximum (that is B*)* for α = 0.

A simple formalisation is as follows:

$$YS = \alpha \cdot B$$

$$YD = M \cdot v^* + (1 - \alpha) \cdot (B - M \cdot v^*)$$

where $0 \le \alpha < 1$.

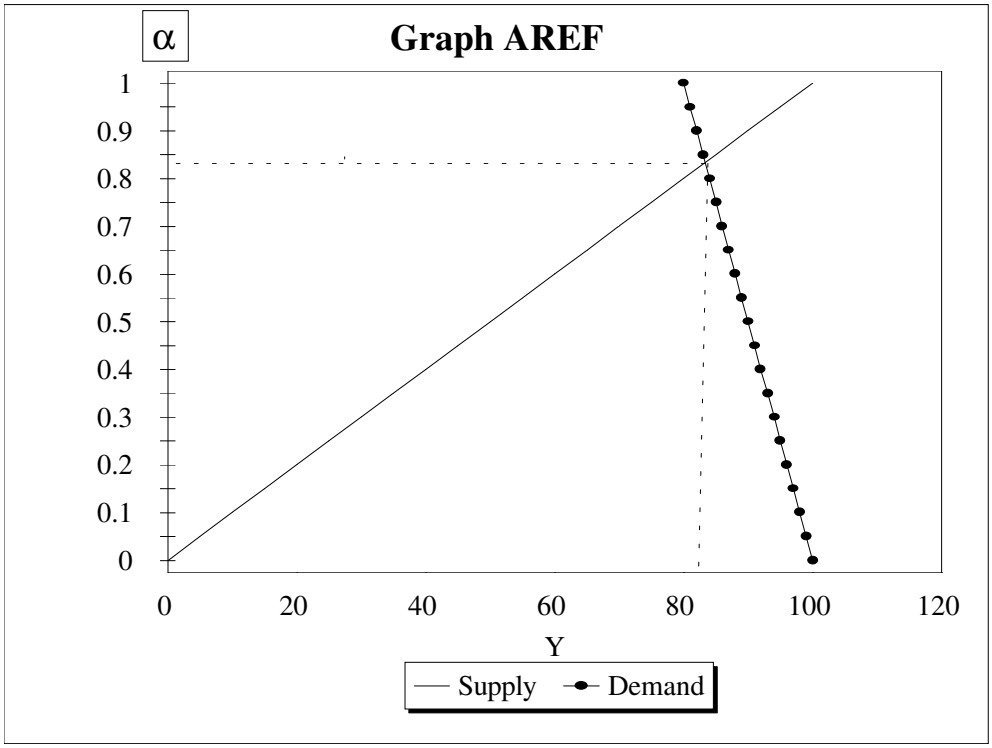
The equilibrium YS = YD, that is actual Y, is reached for

$$\alpha = \left[2 - \frac{M \cdot v^*}{B} \right]^{-1}$$

from where

$$Y = B \cdot \left[2 - \frac{M \cdot v^*}{B} \right]^{-1}$$

Graph AREF is an oversimplified presentation of these correlations.



The difference Y - M· v^* is the excess output generated by arrears as compared to the minimum level M· v^*. The difference (B-Y) shows the loss of output due to the inequality discussed under points 3 and 4. Once again the values are expressed in current prices.

The relation YS = α·B refers to current transactions. There is no doubt that the supply is influenced by the cumulated arrears, noted CUMA, that is:

$$YS = [\alpha - a \cdot CUMA] \cdot B$$

in which $a > 0$. The maximum level *B* implies already not only that α = 1, but CUMA = O as well. Increasing CUMA shifts the equilibrium point to the minimum level of M·v^*.

8) From studying the formation and spreading of arrears we can also define the main ways to compress them.

8.1) On short term basis, the problem can be seen in two manners.

a) The gross volume of arrears and, correspondingly, of overdue returns can be diminished, without decreasing the net respective values, by reducing the multiplier CA as an effect of compensating operations between two or more economic agents (Appendix VI, Tables No. Ap.5 - Ap.7).

The experience shows that bilateral compensation - the reciprocal payment of returns and arrears being natural - is an extended practice. The multilateral compensation cannot be automatically operated, because behavioural parameters are not identical for the different partners and transactions. Thus, we cannot be sure that an agent will be willing to give up his own returns to another agent in exchange for cancelling his debt to a third one. So, even if theoretically possible, cancellation of CA multiplier only by multilateral compensation of arrears and returns is not practically feasible.

b) As for net arrears, their short-term reduction can be realised in several ways:

- by stimulating debtors to provide themselves with payment means by releasing some immobilised resources (sale of goods or assets, exchange into national currency of some foreign currency de- posits);
- by transforming arrears in bonds for the creditors advantage;

- by the bankruptcy of debtors with the usual regulation in such cases of debts (the maximum recuperations of damages and co- vering by creditors of the differences);
- by offering budgetary subsidies or convenient credits for debtors; in Romania this solution was used both for certain groups of economic agents (included in several surveillance and restructuring programmes) and for the whole economy at the end of 1991 in a global compensating action for the overdue payments.

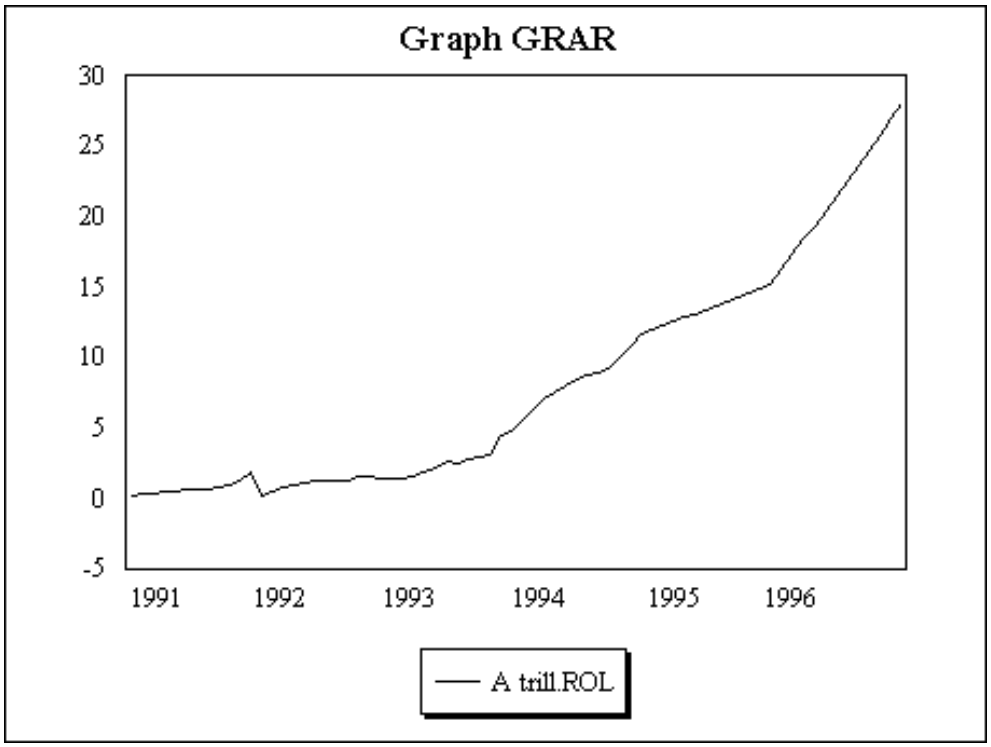
It is important to keep in mind that, no matter the solution chosen, as long as in the real economy there are no adequate behavioural and structural changes, the risk for another cycle of arrears to form is very high.

8.2) On a long-term basis, solving this problem assumes a generalisation of the modern forms of commercial credit; an improvement of the activity of banking system; implementation of a hard budget constraint (including bankruptcy) for all economic agents; and the normalisation of their degree of capitalisation (working capital). It is essential to "correct" creditors' behaviour because, ultimately, they decide if the deliveries take place or not, independently of the debtors' solvency.

9) This analysis shows that the arrears and overdue returns exercise many functions, one of which is the role of substituting money. Hence, apart from their net and gross values, it is also useful to determine their monetary equivalent, denoted N. I suggest that, in this term, we can have a monetary injection, in the M2 sense, which should be pumped in to the economy for the instantaneous elimination of the arrears and overdue returns (Dobrescu 1994a,b). Theoretically, N is below the net arrears volume, because of the assumption that the turnover of the money needed to cancel them is greater than 1, even if at a lower level relative to the general velocity of money.

For the Romanian economy, all the data for the net arrears volume was not available and therefore only their gross level was estimated. Graph GRAR reflects the **gross arrears** (noted **A**), monthly evolution, between

1991-1996.



The break that can be noticed in January 1992 was determined by the global compensation operated at the end of 1991.

Because of informational constraints, we are obliged to evaluate N starting not from the net arrears volume (which is more relevant), but from their gross values. So, $N = A \cdot m$, where m is gross arrears transformation coefficient in M2 equivalent.

Usually, in the banking estimations, the coefficient m is situated between 0.2 and 0.35. This problem can also be approached econometrically, but only after analysing the "dollarization phenomenon" and the non-accounted economy.

10) After 1989, the monetary effect of the inter-enterprise arrears interacted with the disturbing form of the "dollarization".

10.1) The notion of "dollarization" is used in two interpretations.

One refers to the broad money structure controlled by the Central Bank. As well known, at the M2 level, the broad money comprises:

- currency outside the banking system;
- demand deposits of economic agents;
- the households deposits, the time and restricted deposits;
- forex deposits of residents, evaluated at the Central Bank exchange rate.

In its first interpretation, the" dollarization" is assimilated with the share of the last position in the total M2.

The second sense refers to:

- utilisation (explicit or implicit) of the forex deposits in domestic transactions at exchange rates higher than that of the Central Bank;
- undertaking of some domestic transactions using foreign currency available directly in the households and in the hands of the economic agents (outside the banking system).

So, in this case, "dollarization" is considered as a parallel phenomenon of the monetary circuits controlled by the Central Bank. The present study (as well as the others done by the author) assumes the second interpretation, which can be defined as the disturbing form of the "dollarization".

10.2) Noted GZ, this is defined by:

$$GZ = H1 \cdot \left(ER^* - ER \right) + H2 \cdot ER^*$$

where:

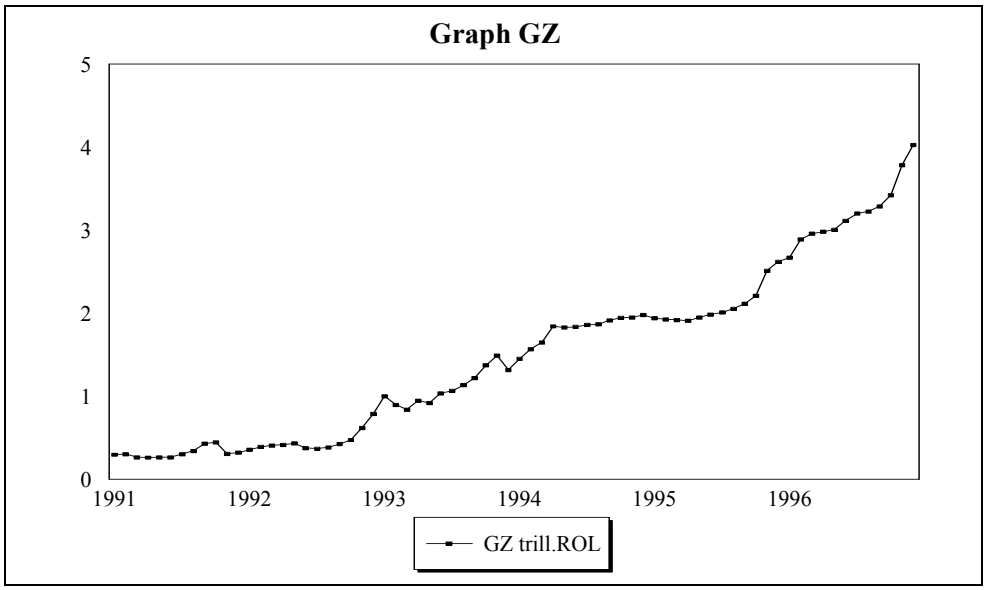
H1 - forex deposits of residents in the banking system, in USD;

ER^* - the effectively used (explicitly or implicitly) exchange rate for domestic transactions, ROL per USD; it assumes that $ER^* > ER$;

ER - the exchange rate of the Central Bank, in ROL per USD, with which are evaluated, within M2, the forex deposits of residents;

H2 - the amount of foreign currency held by firms and households outside the banking system and used for carrying out domestic transactions, in USD.

Graph GZ shows the evolution in Romania of the **disturbing form of the "dollarization"** (noted **GZ**) based on monthly estimations for 1991-1996.



There are many microeconomic causes for the disturbing form of "dollarization". In the case of an overvaluation (compared to economic agents' expectations) of the Central Bank's reference exchange rate, the utilisation (explicit or implicit) of forex deposits from the banking system at exchange rates superior to the official one extends, as well as a tendency of households and some firms to hold foreign currency. Such a tendency will intensify if the exchange system is not stable and functional, and we expect a reversed tendency in the opposite case.

10.3) Similar to arrears, the disturbing form of "dollarization" represents a substitute of the national currency. Its monetary equivalent, expressed at M2 level, is noted Z:

$$Z = GZ \cdot h$$

where h is the corresponding transformation coefficient.

In formal estimations, it is often asserted that h=1. A possible econometric determination for h, in the case of Romania, will be presented in paragraph D of this chapter.

C) The large share of the non-accounted economy

The macroeconomic aggregates fluctuate around the gross domestic product indicator (on which the definition of gross national product is based). In its turn, it is connected to another essential concept of economic theory: goods and services. In principle, these have a double determination. According to the first - no matter their concrete form, nor the moment or time interval in which they appear - they are identifiable entities. The second determination, purely economic, includes the goods and services within the sphere of utilities (use values) for consumption or production, which are relevant to the definition of property rights.

But monitoring the goods and services in the national accounts implies more than just theoretically defining them. It is necessary to specify the list of identification and the primary sources of data and to provide the logistic for their collecting and processing operations (information carriers, computing equipment, specialists). For different reasons, methodological or technical, the goods and services group included in the national accounts is more restricted than the one usually admitted in theory and, probably, significant for economic analysis and forecasting. Consequently, there is a statistically omitted production quantity.

Many terms have been considered (see Pestieau, Roubaud and Seruzier; Traimond; Pyle; Gaertner and Wenning; Smith): unofficial, underground, unstructured, sinker, black, hidden, invisible, blanked out, parallel, marginal, alternative, secondary, illegal, illicit, peripheral, shadow, unrecorded, dual, occult, phantom, dissimulated, not institutionalised, unlocated, forbidden, not declared, secret, anti-economy etc. The diversity of points of view for this matter is obvious: the institutionalisation degree, the lawfulness, the morality, the inclusion in official records, etc. For the present analysis, the last criteria is sufficient, so we shall use the non-accounted economy notion (that is not included in the national accounts) in antithesis with the accounted one (included in these accounts).

Between the two parts of the economy there are a number of communication channels, and the implications can be noticed at different levels, i.e. the primary repartition and the redistribution of incomes, the general efficiency and the cyclical character of economic activity and macroeconomic policies. The goal of the models developed so far has been to decode (conceptually, at first) these connections.

C1) Accounted economy

Romania's national accounting has been structured following the European System of Integrated Economic Accounts (ESA), starting in 1990 (Capanu, Wagner and Mihut; Romania's national accounts for 1989-1992). Between 1980 - 1989, the computations of gross domestic product and related indicators were based on the data used in the Material Production System, to which only strictly necessary corrections were performed.

1) According to national accounting definitions, the institutional sector groups the resident units which - because of their functions within the economy and their income sources - are characterised by behavioural similarities.

Usually six resident unit sectors are used - non financial societies and quasi- societies, credit institutions, insurance companies, public administration, private administration, households - to which the seventh is added - "the rest of the world" (operations between resident and non - resident units).

2) Gross domestic product is conceived in four representations.

2.1) With regard to the evaluation system of goods and services flow adopted by ESA, the gross domestic product is equal to the sum of gross value added, the tax on value added (or other similar taxes) and custom taxes, from which the product subsidies are subtracted. This definition takes into account the production criterion.

2.2) To determine the gross domestic product using the income method, three categories of disposable incomes are defined.

a) Disposable income of households is the difference between their gross income (income from labour, social assistance, interests, dividends, other non wage incomes of population, production for self-consumption) and payments to general consolidated budget (taxes on wages and contributions to social security paid by employees, other taxes collected from population).

b) In the case of firms, considering the totality of producers of goods and services, the gross operating surplus is the primary source (the gross domestic product plus the subsidies, from which are subtracted the incomes from labour, the value added tax and other similar taxes, custom taxes). The disposable income of firms is determined by subtracting from the gross operating surplus the following components: interests, dividends and other non-wage in-

comes paid to population, production for self- consumption, tax on profit, non- fiscal incomes of the general consolidated budget, other direct taxes paid by firms, their contributions to social security.

c) The disposable income of the general consolidated budget is the difference between its total incomes and the direct transfers toward:

- households (pensions, unemployment benefits and social assistance) and
- firms (product subsidies, that is the payments from the budget meant to cover the differences of prices and tariffs, as well as exploitation subsidies, represented by budget allowances to cover losses).

Therefore, the disposable income of the general consolidated budget is meant to support education, health care, culture, municipality services, national defence and public order, other public expenses, inclu-ding economic ones (except for subsidies).

As presented above, the sum of these 3 categories of disposable incomes - of households, of firms and of general consolidated budget - is equal to the gross domestic product determined using the production method.

2.3) From the point of view of utilisation of resources, the gross domestic product is calculated as the sum of the final consumption of households, of the final consumption of public and private administration, of gross capital formation and of net export (foreign trade balance).

2.4) Finally, the gross domestic product can be expressed using the broad money and the money velocity. In this case, we operate with its second definition, named accounting velocity and defined as the ratio between the gross domestic product and M2. The accounting money velocity has not been constant in Romania. Its values ranged between 2.2 - 2.5 from 1985 to 1988, and between 1.8 - 2 in the period 1989 - 1990. Since then it jumped to 7.2 in 1994 and a slight decrease has been recorded in 1995 and 1996.

C2) Non-accounted economy

The evaluation of the non-accounted economy arouses great interest not only among specialists, but also for the authorities and public opinion. Before discussing the procedures proposed for this purpose, a more detailed presentation of the subject would be helpful.

1) For economic analysis, and moreover for modelling purposes, one of the most important issues seems to be the estimation of the GDP created in the non-accounted economy and noted UND.

Exciting, as well as controversial, is the coefficient *s*:

$$s = \frac{GDP}{GDP + UND}$$

where the GDP is the gross national product of the accounted economy. Usually, comments refer to (1 - s), that is the non-accounted economy share, which has three components.

1.1) The first is represented by the production omitted even by the official statistics, which has already been mentioned.

1.2) Another part of production, compatible with legal framework and viewed by ESA methodologies, is missing from the official estimations because the economic agents generating it:

a) avoid fiscal obligations toward the state budget, local budgets, social security etc.;

b) tend to minimise their extra-fiscal costs involved by turning their activity official (through complete bureaucratic formalities, "rewarding" of corrupt public employees etc.).

This is referred to as fraudulent production.

1.3) The delinquent economy offers forbidden goods (due to national security, ecology, public morality reasons). Its size depends on many factors, including the degree of social and institutional stability and the authorities' capacity to discover and destroy the networks operating in this area.

2) The non-accounted economy is also present in the formation of income and in the utilisation of resources, as an extension of the production sphere processes, but also with additional determinants.

In this second case, the most significant phenomenon is the income redistribution through forbidden channels, i.e. rewarding the lack of loyalty and misuse of influence, illegal speculations, blackmail incomes, cheating,

theft, etc. Without changing the gross domestic product, these transfers affect economic behaviour, the propensities to consume and save and investment processes.

3) However, for economic analysis, the most important is the non-accounted production, with its three components. Several evaluation methods have been proposed:

a) direct ones (utilisation of sociological research) or indirect ones (focusing the phenomenon through its propagated effects);
b) partial ones (referring to one or several segments of the non-accounted economy) or global ones (that attempt to encompass it as a total);
c) static (aiming to evaluate its dimensions, as a volume or share in the whole economy, at a given moment) and dynamic (evaluating the changes from one period to another).

The theoretical foundations and the results obtained by using different methods are presented in Adair, Albu, Alessandrini and Dallago, Chadeau and Roy, Eck and Kazemier, Flood and Klevmarken, Gaertner and Wennig, Pestieau, Smith. The following formalisation takes into account the conclusions of these studies, as well as those of the debates of the seminar "Underground Economy" co-ordinated at the Romanian National Institute for Economic Research during 1992-1993 by the author.

3.1) The simplest way is to identify the differences between the estimations of the macroeconomic aggregates within the national accounting, itself.

Thus, based on different sources and algorithms, the gross domestic product determined using production, income or utilisation method is not the same. The differences can be considered as reflecting the non-accounted economy (certainly, only partially, because they can also result from purely statistical causes).

From a similar reason, when computing input-output tables, certain differences appear between the sum of suppliers' data and, respectively, of buyers' with regard to production of the same branch.

At the international symposium organised by the Romanian National Commission for Statistics (in June 1994), it was observed that certain incompatibilities were also found within the data referring to institutional sectors. In the case of Romania, for example, the labour productivity can be found to be systematically lower in the private sector than in other sectors. However, this seems unlikely in the present economic circumstances. The

difference might also reveal the presence of the non-accounted economy (not necessarily in the private sector only, but also in the other sectors).

3.2) The monetary approach (Gutman, Feige, Tanzi) considers either the weight of cash within the broad money, or the money velocity itself. In the first case it is assumed that the transactions in the non-accounted economy are preferentially performed in cash and, in the latter one, that the part of the broad money absorbed by this economy appears as a diminished ratio between the gross domestic product and the broad money officially recorded. Certainly, the change of the cash weight, as well as of the money velocity is also determined by factors other than the evolution of the non-accounted economy, mainly being persistent inflation conditions. However, it cannot be denied that the above mentioned changes are influenced by this phenomenon. The monetary circulation seems to be the most relevant domain where these two main components of the economy intersect.

3.3) Usually, the fiscal approach is based on the Laffer curve. The econometric coefficients of a similar curve can provide some information regarding the extent of the taxable share of the non-accounted economy.

3.4) Among the direct methods, the following can be mentioned: the family households' surveys, the financial control and other investigations of this type (performed by specialised inspections, police, law courts); sociological investigations regarding income sources, black labour, housing construction, economic activities within households, etc.

3.5) It's easy to notice that the investigation areas of the above mentioned methods are different, so that using them simultaneously leads to a completion of the general picture. The development of complex econometric models further complements these approaches.

4) Estimations for Romania are different: from 9-10% based on national accounts to a 38- 40% based on the generalised model of the Laffer curve (Albu). Assuming that labour productivity in the private sector is equal to that in other sectors, then the non-accounted gross domestic product share will be around 15-20 % in the previous years. Using the global model of labour supply, Albu also obtained evaluations ranging between widespread limits.

My opinion is that we do not have methods to acceptably calculate (say, with a tolerance of +/- 5%) the gross domestic product created in the non-accounted economy, at least not in the present state of Romania. This is why this segment of the economic life would be involved in the analysis

only in extreme cases, where neglecting it may essentially alter our conclusions; one of them is the money velocity. Even then, algorithms that estimate not the dimension (volume, share in total) of the non-accounted economy, but rather its dynamics and trend are preferred, the margin for error in this case being smaller.

5) Such an approach may mix several estimation procedures, according to the economic situation in every time interval. For instance, in the case of Romania, for the 1985-1990 period the monetary method can be accepted, which in turn becomes completely irrelevant after 1990 because of hyperinflation. The efficiency of energy method, of no use before 1989 (because fluctuations were due to causes coming from the accounted economy), is useful for 1991- 1995.

6) Utilisation of the monetary method to evaluate the nonaccounted economy is based on the following relation between the operational (v^*) and the accounting (v*)* money velocities:

$$v = v^* \cdot \beta \cdot s$$

The β coefficient measures the monetary distortion induced by arrears and the disturbing form of the "dollarization":

$$\beta = \frac{M2 + MD}{M2}$$

where MD is the monetary effect of the inter-enterprise arrears and of the disturbing form of the "dollarization", both in M2 equivalently:

$$MD = N + Z$$

6.1) The operational money velocity has a relatively objective component, determined by the effective rotation of capital (investment, manufacturing and trading of products cycles, materials stocks, the production capacities utilisation degree, the payment instruments used etc.). This component is very sluggish.

Much more dynamic is the psychological component of the operational velocity of money - the liquidity preference of economic agents. A large variation of the population's trust in the national currency could be observed in the Romanian economy.

6.2) Concerning the monetary distortion problem, there are reasons to assume $\beta=1$ during 1985-1990:

- the disturbing form of the "dollarization" was limited because of the restrictions imposed to the utilisation of foreign currencies before 1990; and
- periodical financial regularisation (explicit or implicit) had counter-weighted arrears.

6.3) Admitting that $\beta = 1$ for 1985 - 1990, means that - if estimating the evolution of v^* - we could evaluate s/s(-1). We can assume that in the above mentioned period v^* was influenced mainly by processes in the real economy, synthetically expressed in the capital rotation. This is because neither the liquidity preference nor the monetary base structure had recorded essential changes. As compared to 1985, the ratio between material inventories and investments in progress, on the one hand, and the gross domestic product, on the other, represented 1.250656 in 1990 (computed based on Statistical Yearbooks of Romania for 1991 and 1994). This corresponds to a 1.04575 annual index. We shall assume that v^* decreased in the same proportion. If $\beta = 1$, then $s = v / v^*$. From the data for the accounting money velocity, we obtain the annual index for *s*, denoted *Is*; it is equal to 1.033495 in 1986, to 0.992016 in 1987, to 0.989105 in 1988, to 0.902938 in 1989 and to 0.955047 in 1990.

7) After 1990 the monetary method becomes inadequate. However, a "strange" change has been observed in the efficiency of the used energy, determined by the ratio of accounted gross domestic product (GDP), in constant prices, to the primary energy consumption (in conventional fuel tons - (cft)):

Table No. 1

Year	Gross domestic product,1990 prices , million ROL/cft		
	National economy	Industry and construction	Rest of the economy
1990	9.13797	6.092411	18.23056
1991	9.54979	6.338806	16.33091
1992	9.63861	6.619637	15.01209
1993	10.60996	6.661467	17.77811
1994	11.60041	7.503938	18.87846
1995	12.07814	7.876537	19.81762
1996	11.98584	8.47453	18.54946

Explanations: for the gross domestic product the split into the two sectors has been operated proportionally with their corresponding shares in the gross value added, and for the primary energy proportionally with their corresponding shares in the primary energy consumption (data of National Commission for Statistics and National Commission for Forecast).

With regard to global efficiency evolution, there are no special problems. There is a similar situation in industry and construction. But, through accounted economy processes, the sudden large decrease (with almost 20% in two years) of the efficiency for the rest of the branches cannot be explained. The household increase recorded after 1989 has already taken place in 1990 and, moreover, many new economic activities were organised at home in this period. It thus seems hard to dispute the assumption that the decrease of the efficiency of used energy of the second sector signifies a spreading of the non-accounted economy. This is especially since it gathers many less energo-intensive branches and the increase in the fuel prices could only favour their extension in this sector. Recognising, as a minimal supposition, that between 1991 - 1996 the efficiency level was the same as in 1990, we get the following diffe- rences in the gross domestic product, in billions ROL, in 1990 prices (noted DUND90).

Table No. 2

	DUND90 bill. ROL
1990	-
1991	47.7412
1992	81.8052
1993	10.6221
1994	- 14.7971
1995	- 36.4048
1996	- 7.4090

The negative sign in the last years can be seen as an expression of "legalisation" of some economic activities not recorded previously. It should be emphasised once more, that the above values are nothing else but changes relative to 1990. If Is(t*)* represents the chain index for *s* and Is85(t) its index with a 1985 base year, we can build the system:

$$Is85(t) = Is85(t-1) \cdot Is(t)$$

$$Is(t) = \frac{GDP90(t)}{GDP90(t) + UND90(t)} : \frac{GDP90(t-1)}{GDP90(t-1) + UND90(t-1)}$$

$$UND90(t) = GDP90(t) \cdot \left(\frac{1}{x \cdot Is85(t-1)} - 1 \right) + DUND90(t)$$

where GDP and UND are also in 1990 prices, x represents the s level in 1985; for t = 1991 the level of Is85(t-1) is the one computed in 1990, from series Is, through the monetary method. Table No. 3 presents the computations for x = 0.95... 0.75 (a fully representative interval):

Table No. 3

	Is for the following levels of x				
	0.95000	0.90000	0.85000	0.80000	0.75000
1991	0.94957	0.95210	0.95464	0.95719	0.95976
1992	0.91344	0.91742	0.92146	0.92555	0.92970
1993	0.98920	0.98954	0.99005	0.99056	0.99108
1994	1.01491	1.01422	1.01352	1.01281	1.01210
1995	1.03536	1.03368	1.03198	1.03025	1.02851
1996	1.00699	1.00666	1.00632	1.00598	1.00563

The differences between the five cases are not significant. A more complicated computation has been attempted by adding to the previous system the following:

$$TG(t) = GDP90(t) + UND90(t) = \frac{GDP90(t)}{x \cdot Is85(t)}$$

$$AL = \sum_{t=0}^{11} TG(t) / 12$$

where t = 0 for 1985 and t = 11 for 1996.

We introduce the following objective function:

$$\sum_{i=0}^{11}\left(TG(t)-AL\right)^2=\min$$

which corresponds to the basic hypothesis of the theory of non-accounted economy as a complement of the accounted one, the transfers between them diminishing the fluctuations for the entire economy. Taking into account $s(t) = x \cdot Is85(t)$, the x value has been determined with respect to $s(t) < 1$ (case A, in which x=0.96759) and $s(t) < 0.95$ (case B, in which x=0.919211). The two cases look as follows:

Table No. 4

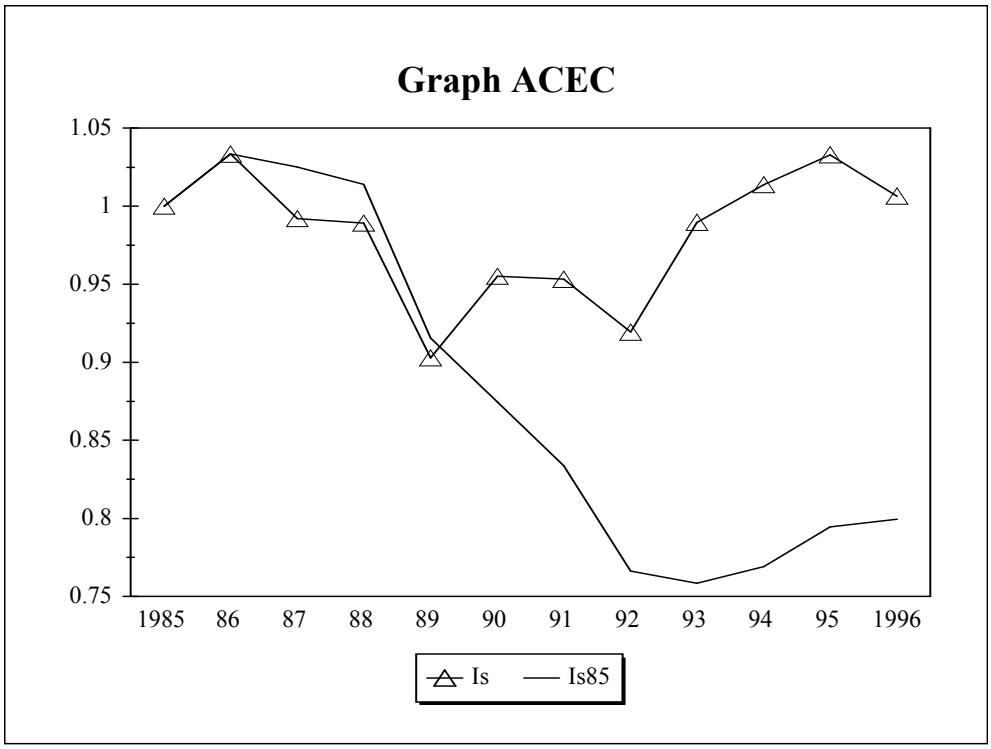
	Is(t) in the variants:	
	A(x = 0.967590)	B(x = 0.919211)
1991	0.948686	0.951126
1992	0.912057	0.915888
1993	0.988688	0.989348
1994	1.015147	1.014485
1995	1.035958	1.034332
1996	1.007110	1.006787

This time, the changes are not significant. Practically, any of the seven presented variants can be used. We have adopted their average. Standard deviations in all the cases are far below 1%.

8). Finally, the series presented in Appendix I have been retained. The **annual indices** of the share of accounted economy in total gross domestic product (created in accounted and non-accounted sectors) noted **Is**, and the same **indices against 1985** noted **Is85** are plotted in Graph ACEC.

The shape of the curve is normal. Beginning early last decade, the non-accounted economy expansion intensified after 1988. This extension has been favoured by the initial conditions of the transition from command

to market system (the absence of a clear institutional framework, the weakness of new legal authorities etc.). The new legal framework implemented, including the last years' measures (now amplified) towards fighting fiscal evasion and a general strengthening of lawfulness, has mitigated this tendency.



D) Monetary distortion and asymmetry of liquidities

1) The relation between the accounting (v) and operational (v*) money velocities can be presented as follows:

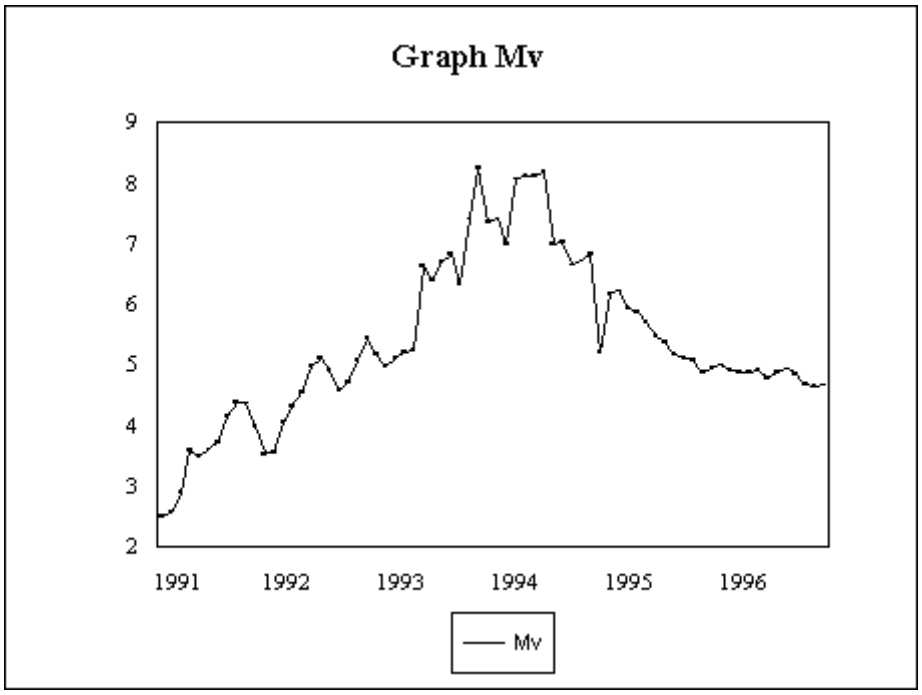
$$v = v^* \cdot \left[\frac{M2 + m \cdot A + h \cdot GZ}{M2} \right] \cdot s$$

However, the informational conditions are unfavourable. Recorded statistical data are available only for v (and this is only on annual basis) and M2 (monthly and annual).

We have estimates only for A and GZ, and in the case of s we can rely on Is evaluations deduced in the previous paragraph. The longest series (monthly) refer to M2, A and GZ.

In order to approximate the monthly data for money velocity at the M2 level, it would be necessary to determine the monthly annualised gross domestic product (noted MGDP). This is estimated by extrapolating the performances recorded in the reference month regarding real economy output and inflation, to the whole year.

The author has already developed such a methodology (during 1992 - 1993) together with specialists from The Monetary Policy and Studies Department of the National Bank of Romania and from National Commission for Statistics. **Monthly money velocity** (noted **Mv**) is presented in Graph Mv.



Monthly estimates for s and v^* cannot be made at this moment even if allowing for large tolerances. If operating with monthly indices of the money velocity, it is plausible to assume that the influence of s is negligible, and in the case of v^* variation, the psychological component appears to be of great importance, particularly being influenced by the inflation and interest rate.

2) The first attempt to econometrically evaluate m and h - for Romania - has been undertaken (Dobrescu 1994a and 1994b), on the basis of series from January 1991 to March 1994 and of a relatively complicated function. I return to this approach using a simplified function:

$$\mathrm{Mv} = \mathrm{Mv}(-1)\cdot\left[\frac{\mathrm{MM2} + \mathrm{a1}\cdot\mathrm{A} + \mathrm{a2}\cdot\mathrm{GZ}}{\mathrm{MM2}(-1) + \mathrm{a1}\cdot\mathrm{A}(-1) + \mathrm{a2}\cdot\mathrm{GZ}(-1)}\right]\cdot\frac{\mathrm{MM2}(-1)}{\mathrm{MM2}}\cdot\mathrm{MCPI}^{\mathrm{a3}}\cdot(1+\mathrm{IRM})^{\mathrm{a4}}$$

where MM2 represents monthly broad money, MCPI - monthly consumer price index, and IRM - monthly reference interest rate of National Bank of

Romania; A and GZ have been already explained. The regression results (sample January 1991 - December 1995) are the following:

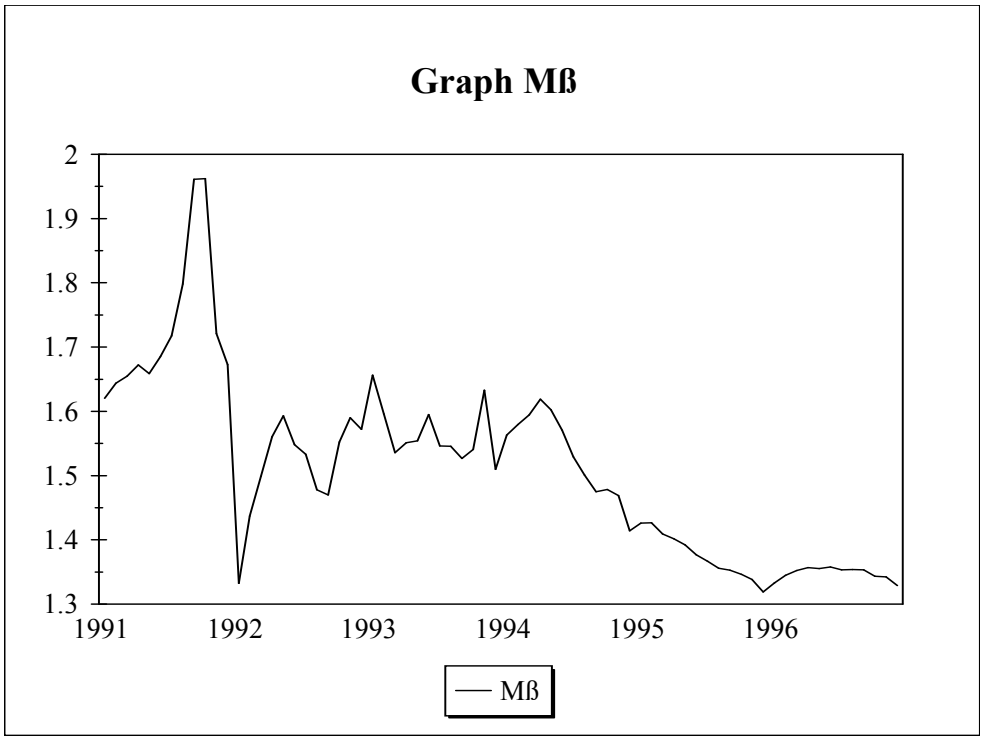
a1 = 0.222464
a2 = 0.925917
a3 = 0.610630
a4 = - 0.060095

where a1 is an approximation for m and a2 for h; the signs for a3 and a4 are normal.

3) Based on the values for m and h determined as above we can build the **monthly monetary distortion coefficient** (noted **Mβ**). It is plotted in the Graph Mβ.

Although decreasing in recent years, the monetary distortion coefficient is still at a significant level.

4) Until now, the Romanian transition economy has been characterised by a double asymmetry of the monetary liquidity: a structural one and a temporal one. In the first case, we are dealing with a simultaneous combination of hyper and hypo liquidity. An important part of the disposable resources (both in ROL and foreign currency) cannot be invested in enough attractive businesses in the real economy - which is excessively undercapitalised. Hyperliquidity should be understood in a relative mea-ning because it exists in a general shortage of working capital. Moreover, the money velocity has a value higher than the level considered normal for the present Romanian economy.



4.1) The undercapitalisation phenomenon of the real economy, especially in the state sector, is generally known. This is not only as a result of the initial situation (which concerns the way the working capital was formed in the socialist enterprises). The inflation erosion of the available money, the re-evaluation of inventories that drew to the state budget a considerable share of positive differences, as well as the functioning in inefficient conditions, are also causes for the undercapitalisation of the real economy.

As for the structure of monetary asymmetry, an approximate but generally real image can be suggested by analysing the internal liabilities of commercial banks shown in Table No. 5.

Table No. 5

Data for the end of period	Total internal liabilities bill.ROL	Households deposits		Economic agents deposits		Public deposits		Other positions of internal liabilities	
		bill.ROL	share	bill.ROL	share	bill.ROL	share	bill.ROL	share
1991	2152.884	311.889	0.14487	500.045	0.23227	125.223	0.05817	1215.727	0.56469
1992	3760.648	569.132	0.15134	674.911	0.17947	357.609	0.09509	2158.996	0.57410
1993	9128.515	1281.926	0.14044	1759.135	0.19270	885.413	0.09699	5202.041	0.56987
1994	19201.985	4656.226	0.24249	3024.951	0.15753	1302.936	0.06785	10217.872	0.53213
1995	30380.504	8776.436	0.28888	4791.135	0.15771	1813.950	0.05971	14998.983	0.49370
1996	51132.345	15062.43	0.29458	8345.056	0.16320	2240.379	0.04382	25484.48	0.49840

Source: National Bank of Romania.

1991 is chosen as a reference year because during this year the economy has already incorporated the consequences of the law regarding commercial societies and autonomous regies, as well as the first phase of price liberalisation. A tendency to reduce the share of economic agents is obvious (within them the ratio between the resources of the state sector and of the private sector decreasing from 7.5:1 in 1991 to 0.85:1 in 1995). The mentioned asymmetry would be, for sure, more evident if the structure of holders of national or foreign currency outside the banking system is also considered.

4.2) Monetary liquidity - generated by the transition's redistribution processes - was not attracted toward the real economy opportunities, except for a small part. State sector asset privatisation has been mainly carried out through a free or quasi-free transfer of property (the ownership certificates, nominative coupons, MEBO method for enterprise privatisation, selling of houses for low prices). The investment environment was not favourable because of the high level of economic uncertainty, the high rate of interest for credit, and breaking of links between implied activities (i.e. designing and execution of constructions, providing production equipment, financial assistance etc.). The capital market is in its early days; it has to overcome not only the obstacles raised by the weak structure of the institutional system, but also the restrictions arising from the real economy performances. Table No.6 shows the distribution of Romanian firms in accordance with their profitability.

Table No. 6

Firms grouped according to the profit rate (ratio between profit and turnover)	Share of the group for the following indicators			
	number of firms	turnover	number of persons employed	exports
over 0.2	0.3544	0.0868	0.0861	0.1252
between 0.1 and 0.2	0.1072	0.1400	0.1579	0.1520
between 0.05 and 0.1	0.1278	0.1674	0.1487	0.1171
between 0.005 and 0.05	0.2083	0.3387	0.2747	0.3627

Firms grouped according to the profit rate (ratio between profit and turnover)	Share of the group for the following indicators			
	number of firms	turnover	number of persons employed	exports
between - 0.005 and 0.005	0.0539	0.1363	0.1149	0.1214
between - 0.05 and - 0.005	0.0525	0.0401	0.0379	0.0278
between- 0.1 and - 0.05	0.0241	0.0347	0.0410	0.0093
between- 0.2 and - 0.1	0.0230	0.0222	0.0235	0.0376
under - 0.2	0.0488	0.0338	0.1153	0.0469

Source: Balance sheets for 1995 (coming from 382,708 firms), data processed by Cematt-Bucharest.

Although almost 80% of all the firms record a positive profit (first four groups), with a share of 73,3% in the total sales and 75,7% in exports, many of them, however, encounter financial stresses because of undercapitalisation.

4.3) Through its short-term consequences, the structural asymmetry of the monetary liquidity seems to have an evolving positive feed-back. The hyperliquidity exerts a pressure toward depreciation of the exchange rate. Restrictive monetary policies amplify the undercapitalisation effects, reducing further the opportunities offered by the real economy. The attempts to overcome this difficulties by extending the arrears will only deepen the disfunctionalities between the real and nominal economies. Furthermore the accumulated effect of the structural asymmetry of the monetary liquidity is the stimulation of inflation whilst simultaneously increasing the difficulties in improving the real economy, based only on rational criteria. We can go deeper with this analysis by examining the detailed structure of the money supply in a wider sense (M3 and M4*).*

5) Sociological research has confirmed the strong expectations of inflation from the households, firms, banking system behaviour. In order to minimise the potential losses induced by inflation, the economic agents ex-

ert considerable pressure toward increasing their nominal disposable incomes. A certain trend can be noticed in their evolution, namely that called the temporal asymmetry of monetary liquidity. Table No. 7 contains the annual rate of the total disposable income (RR) and its variation index; to be comparable, 1993 was "cleaned" from the disturbance produced by the introduction of the value added tax.

Table No. 7

	RR	RR/RR(-1)
1992	1.7357	-
1993	1.7713	1.0205
1994	1.4834	0.8375
1995	0.4509	0.3040
1996	0.5093	1.1295

Thus, the elections year as well as the year after are characterised by a high level of the rate of increase in nominal incomes. Instead, the second and the third years after the general elections, show a clear attenuation of the nominal incomes dynamics. The reference period is yet too short to imply an authentic electoral cycle in the economic sphere, but there are symptoms of its possible formation. The temporal asymmetry of the monetary liquidity makes even more difficult the relationship between nominal and real flows.

3 Some modelling problems

1) The weakly structured economy is characterised by congenital instability and, therefore, the modelling problems are especially complicated. In order to avoid possible misunderstandings, it is necessary to define, from the beginning, the notion of "econometric model" used in this book. I shall adopt the following interpretation: a set of interdependent equations (from which at least one is econometric) approximating a particular, **given class** of statistical data in accordance with the modeller's **image** of functional relations among respective series.

1.1) From the first feature of this definition a very important consequence follows. Therefore, if the model reflects a "given class of statistical data", it is obvious that we can use it only for the analysis of this information. Forecasts are acceptable exclusively in the proximity of the time interval covering the used series, that is for short-run estimations.

Even in this case, it is compulsory to compensate the overlooked factors and influences by choosing adequate exogenous variables.

1.2) The psychological characteristic of the model emerges from its dependence on the modeller's image about the represented economic process. The same "image" is considered in the generally accepted sense by the modern social psychology (Moscovici). This image is a mixture of theoretical assumptions adopted (explicitly or implicitly) by the modeller and, at the same time, of his beliefs, intuitive representations, attitudes and even desires concerning the system.

The image can be understood in two stages. The first one motivates the initial form of the econometric functions included in the model and its general structure. The simulations operated with this preliminary version can reveal some unexpected implications. Subsequently, he corrects his own initial visions and this derived image can be different relative to the

former one. The comparison of model's estimations with the corresponding empirical information can oblige the modeller to change his view; the comparison mentioned here is interpreted, of course, in the sense developed by Friedman in his famous "Essays in positive economics" (Hausman). In other words, the econometric model can be considered as a psycho-cognitive construction. Consequently, for every economic system a large variety of models are possible depending on the conceptual premises of their creators. This relativism although possibly intellectually uncomfortable, is nevertheless a natural implication in econometric modelling.

2) The data relevance is an extremely difficult problem. It is present even in the consolidated market economies: "the following facts broadly characterise economic change. 1) Individual commodity prices and quantities fluctuate with irregular period and amplitude. 2) Aggregate indexes representing the economy as a whole likewise exhibit irregular fluctuations. 3) Economic growth does not follow a smooth trend, but rather one with fluctuating rates of change. 4) Economic activity follows overlapping waves of consumption, technology, and organisation. 5) Aggregate economic development is an explosively unstable phenomenon when mea-sured on a bio-astronomical time-scale. Putting all these together we arrive at a corollary fact of monumental importance for the construction of economic science: **there is little if any evidence that economic data converge to stationary steady, to steady growth or to periodic cycles.** Such evidence as there is would appear to be of a temporary kind; that is, stationary or steady states and regular cyclical behaviour are only occasionally approximated and such types of change appear always to be interrupted" (Day, p.3-4).

3) The mentioned difficulties are aggravated in the case of a weakly structured economy.

3.1) One of the most complicated data problem is the delimitation of the time interval (for samples). It is evident that any period cannot be perfectly homogenous and some conventions are inherent. By qualitative analysis and empirical research these conventions can by reduced to a reasonable minimum. In the case of Romania, the interval 1980-1996 seems to be acceptable because of weakly structured state of economy. It is necessary to underline again that the criterion differentiating the eco-

nomic systems in structured and weakly structured refers exclusively to their expected stability. It does not concern the social and other consistent characteristics of them. In the case of Romania, the last stage of the socialist regime, the initial phases of dismantling of the centralised planning and the first macrostabilization programmes present the main symptoms of the weakly structured economy. The corresponding macroeconomic implications are also distinguishable.

a) The atrophied dependence of the real output on production factors became perceptible as far back as in the 1980-s. The 1990-s have maintained this tendency.

b) The inter-enterprise arrears have been a "functional mechanism" of the Romanian economy not only before 1989, but subsequently, too. The dichotomy between the real economy and the nominal one became statistically manifest after 1989, although previously present in latent form. Its main attribute - inflation - defined both intervals: in the 1980-s in a repressed form and in subsequent years as an explosive one.

c) The non-accounted economy started to exercise an increasingly important role even in the conditions of the socialist regime (especially during its last phase). The transition has considerably extended it.

In conclusion, despite the significant differences between ante-1989 and post - 1989 evolutions, the statistical series 1980-1996 have a common feature: they reflect the evolution of a weakly structured economy. Their econometric analysis implies, unquestionably, the homogenisation of data from the informational point of view and re-estimating all the series corresponding to national accounts method. Generally, this operation has been achieved, and Appendix I presents the re-calculated macroeconomic indicators.

3.2) The shortness of the relevant statistical series is another complication. Longer series are difficult to compose even using an extensive interpretation of the principle of self-similarity developed by fractal mathematics (Chiarella; Mandelbrot; Pesaran and Potter; Peters). According to this interpretation, for some phenomena it is possible to consider the quarterly or monthly data as a satisfactory approximation of the correlations valid for annual ones. A similar solution has been used by the author for the examination of money velocity in Romania (using the annualised monthly gross

domestic product and the monthly level of broad money). Undoubtedly, the structural similarity of temporal series with different time-scale characterises only a restricted class of phenomena, so the method must be used cautiously.

3.3) The most difficult problem is the stationarity of statistical series. In order to obtain an overview about this issue, 76 annual indicators (1980-1996) and 14 monthly ones (January 1991- December 1996) have been exposed to the Augmented Dickey - Fuller Test. The attempts have been done for a maximum of 12 combinations formed by three possible specifications (without intercept and trend, with intercept but without trend, with intercept and trend) and four time intervals (without lag, with one, two or three lags). Generally, each statistical series has been considered stationary I(O) when a critical value 1% or 5% was used; only in few cases (about 8%) the 10% level has been accepted. The results are presented in the Appendix II, in which the stationarity I (O) is marked with sign + and its absence with sign – . This Appendix contains the main macroeconomic indicators of Romania and, therefore, can be considered relevant. It reveals that the basic series (x) and their natural logarithms (ln x) of the annual data are stationary in 34% cases and non-stationary in 66%; this proportion is converse for monthly ones (68% against 32%). The general opinion about frequent stationarity of the first [x - x (-1)] and second [(x - x(-1)) - (x (-1) -x (-2))] differences of basic series is confirmed (95%). Instead, the indices $\left[\frac{x}{x(-1)}\right]$ and the corresponding rates $\left[\frac{x}{x(-1)}-1\right]$ are less stationary (approximately one third). The best performance is registered by the first difference of indices $\left[\frac{x}{x(-1)}-\frac{x(-1)}{x(-2)}\right]$ and their variation $\left[\frac{x}{x(-1)}:\frac{x(-1)}{x(-2)}\right]$: from 180 cases only 2 are non-stationary.

4) Under these conditions different modelling approaches are possible.

If we limit ourselves to short run prediction - an entirely reasonable goal for a weakly structured economy - the use of non-stationary series cannot be rejected because the stability of macromodel is usually higher

than the stability of separate econometric functions due to the effect of the interactions among these functions and the accounting identities (Dobrescu 1996a). A similar solution has been adopted for the 1996 version of the macromodel of the Romanian transition economy. It is necessary to note that, despite the non-stationarity of some statistical series, the selected functions were characterised by limited variation of respective econometric coefficients for three samples (1980 - 1993, 1980 - 1994 and 1980 - 1995).

The second solution remains consistent with the stationarity principle. In this case, the basic series of annual data (with few exceptions) are completely inadequate. The derived indicators thus need to be used. The 1997 and 1998 versions of the macromodel of the Romanian transition economy are based on this approach, although its consequences for model stability are not sufficiently studied.

5) It would be useful to outline the "image" of a weakly structured economy, capable of guiding the macroeconomic activity. In my opinion, this "image" can be drafted using some essential assumptions.

5.1) The monetary distortion induced by inter-enterprise arrears and the disturbing form of "dollarization" is significant. At the same time, the share of the non-accounted economy is considerable and fluctuating. Both these processes have many consequences. However, among them one is crucial: the influence on money velocity, which, if ignored, can not lead to a correct understanding of the functioning of the economy as a whole.

5.2) The diversity of microeconomic objective functions, the possibility of many agents to achieve them not only by changes in technologies and management, but first of all by growth of prices and appropriation of state ownership, whereby the unequal development of main markets (goods and services, capital, labour) disarticulate the real output and production factors. The estimation of the real output thus implies specific approaches for different sectors.

5.3) The state intervention in allocative decisions is strong and often unpredictable (or predictable only at certain degree) because of its random political motivations. In addition, it is exercised in a great measure by administrative tools. Under these conditions, the performance of the macromodel depends on the accurate proportion between endogenous and ex-

ogenous variables. The latter variables have, in the case of weakly structured economies, an important weight (more so than the usual models of the structured economies).

5.4) The budget expenditures are "oversized" in comparison with the effective output of the national economy. Implying an excessive fiscality, on a relatively small share of accounted economy, they are not only unable to stimulate economic growth, but also negatively influence it.

5.5) Inflationary expectations are strong. The economic agents tend to limit potential losses from inflation by increasing nominal revenues. They exert an important and continuous pressure in this direction. Firms speculate incoherences of the institutional framework and weaknesses of the competitive markets, and trade unions operate through a great lobbying force. The state bureaucracy disposes of a large discretionary power, and, in any case due to electoral reasons, the political parties are inclined to promote populist slogans. As a result, the probability of the nominal expected disposable incomes to be achieved is relatively high.

6) The accounted economy can be examined from two perspectives:

a) as an autonomous sector, in this case the interdependencies among its main indicators having priority (AC curve);

b) in correlation with the non-accounted sector (NC curve).

For the first approach, it is difficult to apply the classical IS - LM model. The economy does not revolve around the investment - saving correlation, because of the uncertainty of the business environment, the atrophied dependence (in negative sense) of the output on production factors; the asymmetry of the liquidities is a conclusive proof in this field. A careful analysis of the Romanian experience shows, instead, that the connection of the real economy with the foreign financial constraint is more relevant. Due to its sectorial structure, output and exports are conditioned in a great measure by imports, especially of raw materials and energy resources. The domestic aggregate demand substantially tends to exceed the gross domestic product. The tendency to deficits of the foreign trade balance is chronic. At the same time, the possibilities to cover them by loans are limited. Consequently, the economy revolves around the following correlation:

$$\mathrm{GDP} - \mathrm{DAD} = \mathrm{NX} \cdot \mathrm{ER}$$

in which GDP - gross domestic product; DAD - domestic aggregate demand (equal to domestic aggregate absorption), NX - foreign trade balance in convertible currencies (for instance, US dollars) and ER - exchange rate of the national currency. Being undercapitalised, the accounted economy positively reacts to the money supply (of course, if the monetary distortion is limited). The dependence of the last one on the interest rate is relatively weak. As a matter of fact, the Romanian experience has showed (at least until now) that the money supply can be influenced more effectively by manipulating the monetary basis than through the change of the interest rate (obviously, the impact of this factor cannot be ignored, but it was not predominant).

The AC curve can be illustrated by the following elementary system:

$$\mathrm{RGDP} = \mathrm{a1} \cdot \mathrm{RDAD} + \mathrm{a2} \cdot \mathrm{XGSD} + \mathrm{a3} \cdot \mathrm{v} + \mathrm{a4} \cdot \mathrm{gcbe}$$

$$\mathrm{XGSD} = \mathrm{a5} \cdot \mathrm{RGDP} + \frac{\mathrm{a6} \cdot \mathrm{ER}}{\mathrm{GDPD}}$$

$$\mathrm{v} = \frac{\mathrm{GDP}}{\mathrm{MB}}$$

$$\mathrm{MGSD} = \mathrm{XGSD} - \frac{\mathrm{rnx} \cdot \mathrm{GDP}}{\mathrm{ER}}$$

$$\mathrm{rnx} = \mathrm{a7} \cdot \left[\mathrm{gcbr} - \mathrm{gcbe}\right] + \mathrm{a8} \cdot \frac{\mathrm{ER}}{\mathrm{ER}(-1) \cdot \mathrm{GDPD}} + \mathrm{a9}$$

$$\mathrm{GDPD} = \frac{\mathrm{GDP}}{\mathrm{RGDP}}$$

$$\mathrm{ER} = \mathrm{ER}(-1) \cdot \mathrm{GDPD} \cdot \mathrm{ERP}$$

$$\mathrm{NX} = \mathrm{XGSD} - \mathrm{MGSD}$$

$$\mathrm{RDAD} = \mathrm{RGDP} - \frac{\mathrm{NX} \cdot \mathrm{ER}}{\mathrm{GDPD}}$$

$$\left(\mathrm{GDP} - \mathrm{EXTDR}\right)^2 = \min$$

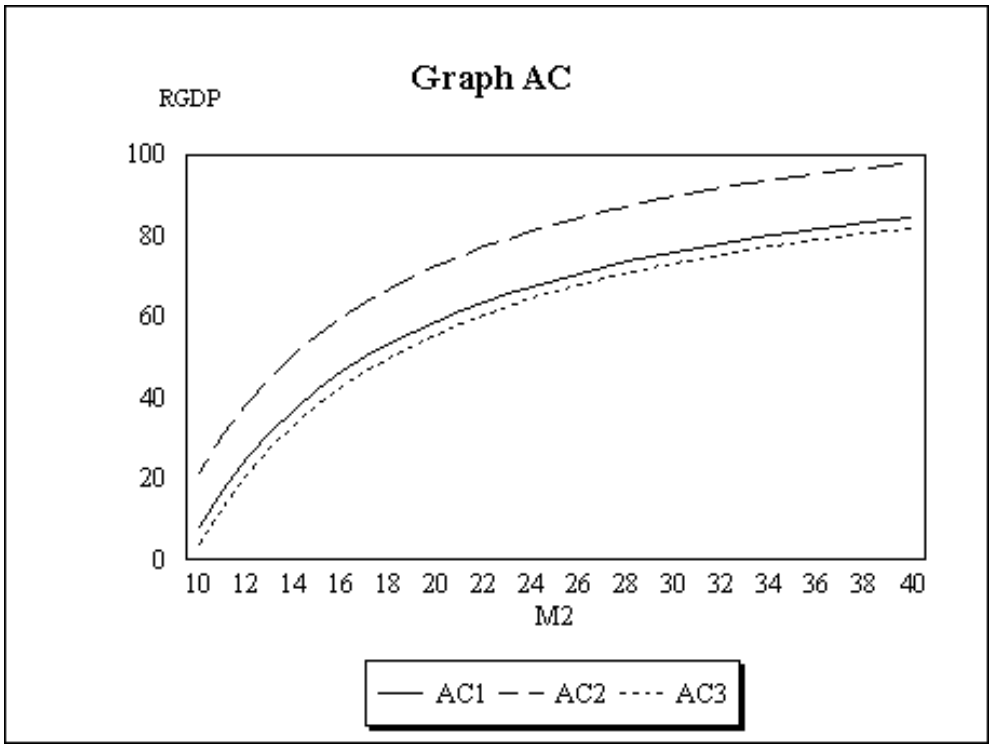
in which: RGDP - gross domestic product in previous period's prices; RDAD - domestic aggregate demand in previous period's prices; XGSD and MGSD - exports and correspondingly imports in USD; v - money velocity; GDPD - gross domestic product deflator; MB - money supply; gcbe - share of the budget expenditures in the gross domestic product; gcbr - share of the budget revenues in the gross domestic product; ERP - exchange rate policy; EXTDR - total expected disposable income. The symbols GDP, NX and ER have already been explained. Of course, all these symbols relate to the accounted economy.

The objective function reflects the high probability of the expected disposable income to be achieved. According to the above mentioned assumptions, the coefficients a1, a2, a5, a6, and a7 are positive, while the coefficients a3, a4, and a8 are negative; taking into account the Romanian experience, a9 is also negative. There are five exogenous: EXTDR, gcbe, gcbr, ERP and MB; for ER(-1) the statistical data are used.

For a numerical example:

a1= 0.141494	a5 = 0.064749	a9 = -0.01
a2 = 7.107793	a6 = 3.754063	EXTDR = 100
a3 = - 4	a7 = 1.1	gcbr = 0.32
a4 = - 30	a8 = - 0.1	ER(-1) = 2

The money supply changes from 10 to 40. The three curves are plotted: AC1 with gcbe = 0.34 and ERP = 1; AC2 with gcbe = 0.34 and ERP = 1.1; AC3 with gcbe = 0.4 and ERP = 1.



The equilibrium is achieved with increasing real output for increasing money supply. There is an asymptote that can be interpreted as a limited effect of the "re-monetisation" of the undercapitalised economy. This correlation is valid if we examine the accounted economy as an autonomous sector.

7) The inclusion of the non-accounted sector in the analysis substantially changes the conditions.

The money demand is influenced by the share of this sector in the whole economy. A possible illustrative system is:

$$MB = \frac{GDP}{v}$$

$$v = \frac{\beta \cdot s \cdot a10}{IR}$$

$$s = a11 \cdot RGDP + \frac{a12 \cdot AP}{E}$$

$$\left(GDP - EXTDR\right)^2 = \min$$

where: β - monetary distortion coefficient; s - share of the accounted economy in the total gross domestic product (created in both accounted and non-accounted sectors); IR - interest rate; AP - population over 15 years and E - employment.

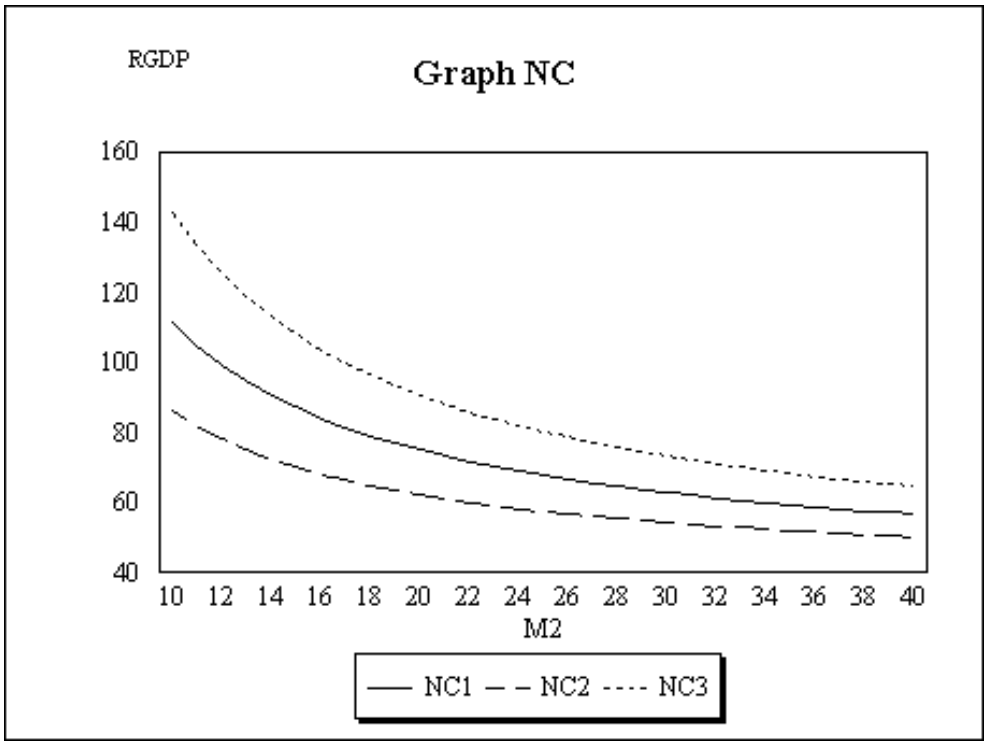
The relation between v, on the one hand, and β and s, on the other, has been examined. The ratio a10/IR can be interpreted as an estimation of v^*; the coefficient a10 is positive.

Concerning s, it is generally accepted that a decline of the accounted economy is associated with an extension of the share of the non-accounted one. Conversely, the development of the accounted economy discourages the non-accounted sector because of natural interest of the labour force to have legally protected jobs. At the same time, it is very probable that an eventual increase of the ratio AP/E may stimulate the extension of the non-accounted economy, the effect being symmetrical when this ratio decreases. Therefore, the coefficient a11 is positive, while the coefficient a12 is negative.

The exogenous: EXTDR, β, IR, AP, E and MB. The money demand depends on GDP and money velocity. For a numerical example:

a10 = 1.7949	a12 = – 0.45	AP = 17.5
a11= 0.0205	EXTDR = 100	E = 10

Similarly to the preceding case, the money supply changes from 10 to 40. The following three curves are plotted: NC1 with β = 1.3 and IR = 0.35; NC2 with β = 2 and IR = 0.35; NC3 with β = 1.3 and IR = 0.5



The equilibrium is achieved with decreasing real output for increasing money supply. We must remind that RGDP relates only to the accounted sector. It can be represented by:

$$\mathrm{RGDP} = \frac{\mathrm{GDP}\cdot\mathrm{IR}}{\mathrm{MB}\cdot\mathrm{b}\cdot\mathrm{a10}\cdot\mathrm{a11}} - \frac{\mathrm{a12}\cdot\mathrm{AP}}{\mathrm{a11}\cdot\mathrm{E}}$$

from which results that, for constant of GDP, the growth of money supply implies a diminution of the real output of the accounted economy simultaneously with an extension of the non-accounted one. In this case, an asymptote is present, too. It means that after a certain point, the money supply does not influence the real output of the accounted sector.

8**)** The systems AC and NC can be combined:

$$RGDP = a1\cdot RDAD + a2\cdot XGSD + a3\cdot v + a4\cdot gcbe$$

$$XGSD = a5 \cdot RGDP + \frac{a6 \cdot ER}{GDPD}$$

$$MGSD = XGSD - \frac{rnx \cdot GDP}{ER}$$

$$rnx = a7 \cdot [gcbr - gcbe] + a8 \cdot \frac{ER}{ER(-1) \cdot GDPD} + a9$$

$$GDPD = \frac{GDP}{RGDP}$$

$$ER = ER(-1) \cdot GDPD \cdot ERP$$

$$NX = XGSD - MGSD$$

$$RDAD = RGDP - \frac{NX \cdot ER}{GDPD}$$

$$MB = \frac{GDP}{v}$$

$$v = \frac{b \cdot s \cdot a10}{IR}$$

$$s = a11 \cdot RGDP + \frac{a12 \cdot AP}{E}$$

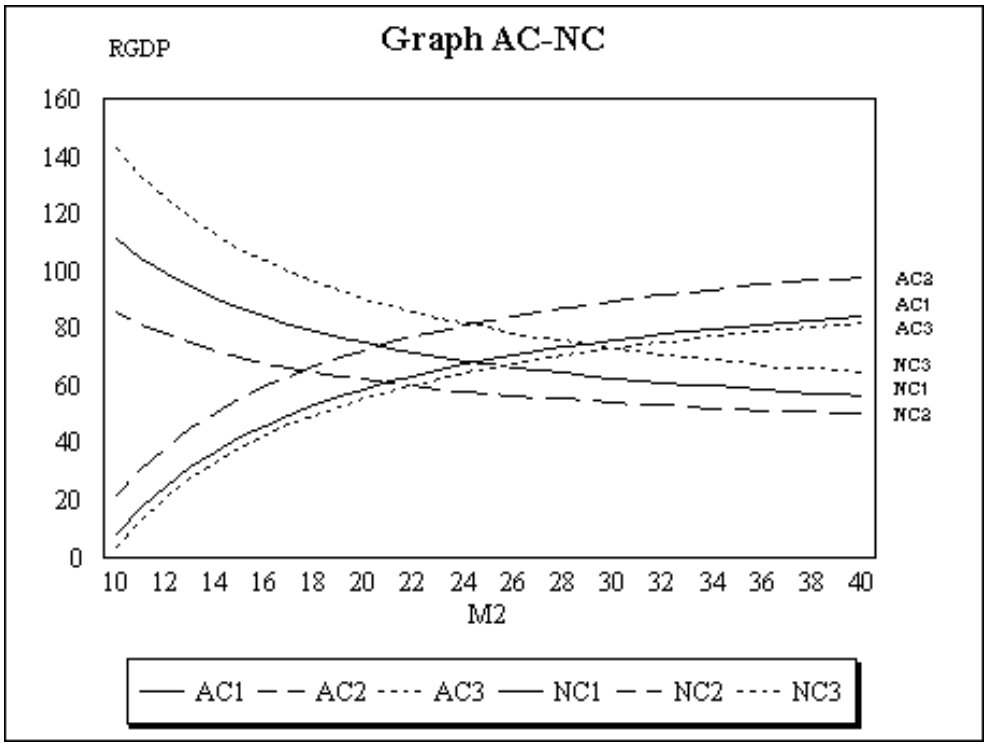
$$(GDP - EXTDR)^2 = \min$$

In this system gcbe, gcbr, ERP, β, IR, AP, E, EXTDR are exogenous; the statistical data are used for ER(-1). There are 12 endogenous variables (including MB*)* with the same number of relations. The above presented combinations is solved with the following results:

Table No. 8

Variant	Characteristics			Solution		
	gcbe	ERP	β	IR	RGDP	MB
AC1NC1	0.34	1	1.3	0.35	68.334	24.456
AC1NC2	0.34	1	2	0.35	61.193	20.880
AC1NC3	0.34	1	1.3	0.5	74.665	28.835
AC2NC1	0.34	1.1	1.3	0.35	74.029	20.546
AC2NC2	0.34	1.1	2	0.35	65.528	17.542
AC2NC3	0.34	1.1	1.3	0.5	81.566	24.224
AC3NC1	0.4	1	1.3	0.35	67.084	25.522
AC3NC2	0.4	1	2	0.35	60.190	21.842
AC3NC3	0.4	1	1.3	0.5	73.225	30.028

Both AC and NC curves are combined in the Graph AC - NC.



Obviously, this represents an oversimplified model. We must cautiously interpret it. In any case, this significance is circumscribed in the correlation between the accounted and non-accounted sectors. Together with the above developed considerations, this model can help us to better understand the functioning of a weakly structured economy.

x x x

The above sketched assumptions will be used for elaboration of the econometric functions and of the macromodel itself. It goes without saying that they reflect preponderantly the Romanian experience as perceived by the author. Supplementary research certainly will complete or amend the presented picture, and furthermore other weakly structured economies can be distinguished by substantial differences.

4 Economic and demographic indicators: symbols and definitions

A. Preliminary remarks

In order to go more deeply into the modelling problems, I shall describe the system of demographic and economic indicators. Annual and monthly data based on national accounts adopted by Romanian Statistics are used.

For macroeconomic analysis and forecasts the following demographic indicators are indispensable: population; population over 15 years; labour force; employment; salaried (wage paid) employees; peasants and other non-salaried employed people; retired people receiving state social insurance (excluding farmers); other retired people. Being less significant, the migration has not been taken into account.

For the Romanian economy I felt necessary to operate with an ad-hoc social category, conventionally named “quasi-employees”; it includes the salaried employees, the registered unemployment and the state social insurance retired people (the common feature being the fact that their revenues are conditioned by a present or former labour contract). All of these groups change frequently. These modifications are contradictory, so that the whole category seems to be more stable than its components.

The estimation of the real output of accounted economy as a whole is more than doubtful because of behavioural diversity of economic agents. On the other hand, a very desegregated structure becomes too labile. Consequently, five branches have been set out: a) industry and construction; b) agriculture, silviculture, forestry, hunting and fishing; c) transport, post and communications; d) trade, financial, banking and insurance activities, real estate and other services; e) public services. The 1996 version of the Romanian macromodel contained four econometric functions for the

branches a, c, d, and e, the agriculture's output being estimated separately (using traditional procedures). The 1997 and 1998 versions operate with three sectors combining a + b and c + d.

Households final consumption (including private non-profit institutions serving households), general government final consumption, and gross capital formation have been characterised by many structural breaks. There are included in the global indicator - domestic aggregate demand; it is equivalent to domestic absorption.

The fixed assets are determined in connection with investments and normal depreciation rate (interpreted not only as a financial, but also as a real process), and restructuring depreciation rate.

The government budget is considered in a full context, including: the state budget, local budgets, social insurance budget and similar funds. Consequently, it is named a general consolidated budget.

The disposable incomes of households, firms and general consolidated budget are defined on the basis of the Romanian national accounts, taking into consideration the equality of their sum with the gross domestic product in current prices.

Monetary processes are estimated using broad money (M2), which is considered to be the most relevant for the actual situation of the Romanian economy; it includes currency outside banks, demand deposits of economic agents, household deposits, time and restricted deposits, forex deposits of residents.

International relations are represented only by foreign trade: exports and imports of goods and services.

The symbols of derived indicators are presented after which the necessary elements have been explained. The indicators used in the 1998 version of the macromodel and in the Appendices are defined here.

The indicators will be systematised in the same structure as the macromodel, that is in seven blocks:

- output of the economy;
- production factors;
- factor prices;
- demographics and labour supply;
- disposable income;
- absorption, and
- monetary variables.

The symbols refer to the annual data. The monthly indicators are especially mentioned.

B. Output of the economy

GDP — Gross domestic product, current prices, trillion ROL

$$IGDP = \frac{GDP}{GDP(-1)}$$

$$IIGDP = \frac{IGDP}{IGDP(-1)}$$

GDPD — Current gross domestic product deflator, previous year=1

$$IGDPD = \frac{GDPD}{GDPD(-1)}$$

GDPD90 — GDP price index, 1990 = 1

$$GDP90 = \frac{GDP}{GDPD90}$$

$$DGDP90 = GDP90 - GDP90(-1)$$

$$IGDP90 = \frac{GDP90}{GDP90(-1)}$$

$$RIG90 = IGDP90 - 1$$

$$DIGDP90 = IGDP90 - IGDP90(-1)$$

GVAIC — Gross value added in industry and construction, current prices, trillion ROL

$$GVAIC90 = \frac{GVAIC}{GDPD90}$$

GVAA — Gross value added in agriculture (including silviculture, forestry, hunting and fishing), current prices, trillion ROL

$$GVAA90 = \frac{GVAA}{GDPD90}$$

GVAICA — Gross value added in industry, construction and agriculture (including silviculture, forestry, hunting and fishing), current prices, trillion ROL

$$GVAICA = GVAIC + GVAA$$

$$GVAICA90 = \frac{GVAICA}{GDPD90}$$

$$IGVICA90 = \frac{GVAICA90}{GVAICA90(-1)}$$

$$RICA90 = IGVICA90 - 1$$

GVAT — Gross value added in transport, post and communications, current prices, trillion ROL

$$GVAT90 = \frac{GVAT}{GDPD90}$$

GVAO — Gross value added in trade, financial, banking and insurance activities, real estate and other services, current prices, trillion ROL

$$GVAO90 = \frac{GVAO}{GDPD90}$$

GVATO — Gross value added in transport, post and communications, trade, financial, banking and insurance activities, real estate and other services, current prices, trillion ROL

$$GVATO = GVAT + GVAO$$

$$GVATO90 = \frac{GVATO}{GDPD90}$$

$$IGVATO90 = \frac{GVATO90}{GVATO90(-1)}$$

$$RITO90 = IGVATO90 - 1$$

GVAPS — Gross value added in public services, current prices, trillion ROL

$$GVAPS90 = \frac{GVAPS}{GDPD90}$$

$$IGVAPS = \frac{GVAPS}{GVAPS(-1)}$$

GVA — Total gross value added, current prices, trillion ROL

$$GVA90 = \frac{GVA}{GDPD90}$$

$$DGVA90 = GVA90 - GVA90(-1)$$

$$IGVA90 = \frac{GVA90}{GVA90(-1)}$$

$$RIGVA90 = IGVA90 - 1$$

MGDP — Annualised monthly gross domestic product, current prices, trill. ROL

C. Production factors

E — Employment, million persons

$$IE = \frac{E}{E(-1)}$$

$$RIE = IE - 1$$

E1 — Salaried (wage paid) employees, million persons

E2 — Peasants and other non-salaried employed people, million persons

QE — Quasi-employees (salaried employees, registered unemployed people and state social insurance retired people), million persons

LP — Labour productivity, current prices (gross domestic product per employed person), million ROL

$$LP = \frac{GDP}{E}$$

$$LP90 = \frac{LP}{GDPD90}$$

$$ILP90 = \frac{LP90}{LP90(-1)}$$

$$RILP90 = ILP90 - 1$$

FA90 — Fixed assets, 1990 prices, trillion ROL

$$IFA90 = \frac{FA90}{FA90(-1)}$$

$$RIFA90 = IFA90 - 1$$

$$EFA90 = \frac{GDP90}{FA90}$$

$$FA90E = \frac{FA90}{E}$$

dfa — Normal rate of fixed assets depreciation

resd — Restructuring fixed assets depreciation rate

D. Factor prices

GLE — Labour income, current prices, million ROL per employed person

$$GLE90 = \frac{GLE}{GDPD90}$$

$$IGLE90 = \frac{GLE90}{GLE90(-1)}$$

GLEE — Total labour income, current prices, trillion ROL

$$GLEE90 = \frac{GLEE}{GDPD90}$$

$$IGLEE90 = \frac{GLEE90}{GLEE90(-1)}$$

$$RIGLEE90 = IGLEE90 - 1$$

$$ler = \frac{GLEE}{GVA}$$

$$lrr = \frac{GLEE}{GDP}$$

eqler — Equilibrium level of ler

$$Deler = ler - eqler$$

GW1 — Nominal gross wage, million ROL per salaried employee

GW2 — Nominal net labour income of peasants and other non-salaried employed people, million ROL per person

CPI — Current consumer price index, previous year=1

$$ICPI = \frac{CPI}{CPI(-1)}$$

CPI90	Consumer price index, 1990 = 1
IND	Wage indexation coefficient
GOS	Gross operating surplus, trillion ROL

E. Demographics and labour supply

$P_x^{m,f}$	(x=0,1...100) Population, age x and sex m or f, million persons; P_0 = live-births; m - male and f-female
$p_x^{m,f}$	Probability of survival from age x to age x + 1
$PAG_g^{m,f}$	Population by age group, million persons; g - five years age group (g = 0,1....19)
F_g	Age group specific fertility rates
pm	Male ratio at birth
pf	Female ratio at birth
P	Population, million persons
AP	Population over 15 years, million persons

$$IAP = \frac{AP}{AP(-1)}$$

$$RIAP = IAP - 1$$

$$qe = \frac{QE}{AP}$$

$$Dqe = qe - qe(-1)$$

$$IAPIE = \frac{IAP}{IE}$$

$$RIAPIE = IAPIE - 1$$

LF	Labour force, million persons
lfp	Labour force participation ratio; $lfp_g^{m,f}$ - labour force participation ratio by age group
UN	Unemployment, million persons

PV — Population over 60 years of age for male and over 55 years of age for female, million persons

rs — State social insurance retired people rate

rt — Other retired people rate

RP1 — Retired people receiving state social insurance (excluding farmers), million persons

RP2 — Other retired people, million persons

RP — Total retired people receiving social benefits, million persons

F. Disposable income

NR — Revenues from net wages, social insurance pensions, unemployment benefits, social assistance, dividends and other non-salary incomes of households, current prices, trill. ROL

$$\mathrm{NR90} = \frac{\mathrm{NR}}{\mathrm{CPI90}}$$

$$\mathrm{DNR90} = \mathrm{NR90} - \mathrm{NR90}(-1)$$

MNR(i) — Monthly revenues from wages, social insurance pensions, unemployment benefits, social assistance, dividends and other non-salary incomes of households, current prices, trill. ROL

$$\mathrm{IMNR(i)} = \frac{\mathrm{MNR(i)}}{\mathrm{MNR(i-1)}}$$

$$\mathrm{RIMNR(i)} = \mathrm{IMNR(i)} - 1$$

$$\mathrm{SDMNR} = \sum_{\mathrm{i=01}}^{12} \frac{\mathrm{MNR(i)}}{\mathrm{DCPI(i)}}$$

i = 01, 02...12

rrnr(i) — Monthly rate of real revenues from wages, social insurance pensions, unemployment benefits, social

assistance, dividends and other non-salary incomes of households; i=01, 02. . . 12

nrrnr(i) Normalised monthly rate of real revenues from wages, social insurance pensions, unemployment benefits, social assistance, dividends and other non-salary incomes of households;

$$\sum_{i=01}^{12} \text{nrrnr(i)} = 1$$

i = 01, 02...12

TRE Total social insurance pensions, trillion ROL

RE Nominal pension of social insurance retired people, million ROL per person

$$\text{re} = \frac{\text{RE}}{\text{GLE}}$$

TUNA Total unemployment benefits, trillion ROL

UNA Nominal unemployment benefits, million ROL per person

SA Social assistance expenditures (pensions and financial assistance for invalids, orphans and widows from war, military and other persons; allowances and other financial assistance for children; other social expenditures), trillion ROL

OE Dividends and other non-salary incomes of households, trillion ROL.

$$\text{oe} = \frac{\text{OE}}{\text{GOS}}$$

GRP Nominal gross income of households, trillion ROL.

DRP Disposable income of households, trillion ROL

DRF Disposable income of the firms, trillion ROL.

GCBR Revenues of the general consolidated budget, trillion ROL

$$\text{gcbr} = \frac{\text{GCBR}}{\text{GDP}}$$

TPN — Profit taxes, nonfiscal revenues of the general consolidated budget, other direct taxes on firms, trillion ROL

$$\text{tpn} = \frac{\text{TPN}}{\text{GOS}}$$

SCF — Contributions for social insurance borne by firms, trillion ROL

$$\text{scf} = \frac{\text{SCF}}{\text{E1} \cdot \text{GW1}}$$

WST — Wage taxes and contributions for social insurance borne by salaried employees, trillion ROL

$$\text{wst} = \frac{\text{WST}}{\text{E1} \cdot \text{GW1}}$$

$$\text{gw2} = \frac{\text{GW2}}{\text{GW1} \cdot (1 - \text{wst})}$$

$$\text{una} = \frac{\text{UNA}}{\text{GW1} \cdot (1 - \text{wst})}$$

VAT — Value added tax and other indirect taxes, trillion ROL

$$\text{vat} = \frac{\text{VAT}}{\text{GDP}}$$

CD — Custom duties, trillion ROL

OTP — Other taxes borne by households, trillion ROL

$$\text{otp} = \frac{\text{OTP}}{\text{GRP}}$$

OBR — Income from “privatisation” and other resources, trillion ROL

$$\text{obr} = \frac{\text{OBR}}{\text{GCBR}}$$

GCBE — Expenditures of the general consolidated budget, trillion ROL

$$\text{gcbe} = \frac{\text{GCBE}}{\text{GDP}}$$

$$\text{DRGCBE} = \text{gcbe} - \text{gcbe}(-1)$$

$$\text{GCBE90} = \frac{\text{GCBE}}{\text{GDPD90}}$$

$$\text{IGCBE90} = \frac{\text{GCBE90}}{\text{GCBE90}(-1)}$$

$$\text{RIBE90} = \text{IGCBE90} - 1$$

$$\text{RPSBE} = \frac{\text{GVAPS}}{\text{GCBE}}$$

$$\text{DRPSBE} = \text{RPSBE} - \text{RPSBE}(-1)$$

$$\text{sa} = \frac{\text{SA}}{\text{GCBE}}$$

EHCMS — Budget expenditures for education, health, culture and municipal services, trillion ROL

$$\text{ehcms} = \frac{\text{EHCMS} \cdot \text{P}(-1)}{\text{EHCMS}(-1) \cdot \text{P} \cdot \text{GDPD}}$$

NDPO — Budget expenditures for national defence and public order, trillion ROL

$$\text{ndpo} = \frac{\text{NDPO}}{\text{NDPO}(-1) \cdot \text{GDPD}}$$

EAB — Budget expenditures for economic activity, trillion ROL

$$\text{eab} = \frac{\text{EAB}}{\text{GDP}}$$

SUB — Budget subsidies for firms, trillion ROL

$$\text{sub} = \frac{\text{SUB}}{\text{EAB}}$$

SUBP — Budget subsidies on goods, trillion ROL

$$\text{subp} = \frac{\text{SUBP}}{\text{SUB}}$$

OBE — Other expenditures of the general consolidated budget, trillion ROL

$$\text{obe} = \frac{\text{OBE}}{\text{GCBE}}$$

GCBB — Surplus (+) or deficit (-) of the general consolidated budget, trillion ROL

$$\text{GCBB} = \text{GCBR} - \text{GCBE}$$

NINF — Non-inflationary financing of the budget deficit, trillion ROL

$$\text{gcbb} = \frac{\text{GCBB}}{\text{GDP}}$$

$$\text{ninf} = \frac{\text{NINF}}{\text{GDP}}$$

$$\text{btp} = \frac{\text{WST} + \text{OTP}}{\text{GRP}}$$

$$\text{gcpep} = \frac{\text{TRE} + \text{TUNA} + \text{SA} + \text{SUBP}}{\text{GCBR}}$$

$$\text{gosp} = \frac{\text{OE} + \text{SC}}{\text{GOS}}$$

$$\text{gosb} = \frac{\text{TPN} + \text{SCF}}{\text{GOS}}$$

$$\text{vatcd} = \frac{\text{VAT} + \text{CD}}{\text{GDP}}$$

DRB — Disposable income of the general consolidated budget, trillion ROL

BC — Budget policy parameter; for revenues it is BCR for expenditures BCE

DISC — Discrepancy coefficient between the estimations of the gross domestic product as an output of economy and as a sum of disposable incomes

$$\text{DISC} = \frac{\text{VAT} + \text{CD}}{\text{GDP} - \text{GVA}} - 1$$

TDR — Total disposable income of the households, firms and general consolidated budget, trillion ROL

G. Absorption

GS — Volume of retail trade and commercial services rendered to the population, current prices, trillion ROL

$$\text{GS90} = \frac{\text{GS}}{\text{CPI90}}$$

$$\text{DGS90} = \text{GS90} - \text{GS90}(-1)$$

MGS(i) — Monthly volume of retail trade and commercial services rendered to the population, current prices, trillion ROL; i=01, 02 . . . 12

rgsr(i) — Monthly rate of the real retail trade and commercial services rendered to the population; i=01, 02 . . . 12

nrgsr(i) — Normalised monthly rate of the real retail trade and commercial services rendered to the population

$$\sum_{\text{i=01}}^{12} \text{nrgsr(i)} = 1$$

i=01,02...12

SC — Production for self - consumption, current prices, trillion ROL

$$SC90 = \frac{SC}{GDPD90}$$

$$DSC90 = SC90 - SC90(-1)$$

GCF — Gross capital formation, trill. ROL

gcf — Capital formation rate (share of gross capital formation in gross domestic product)

I — Investments in fixed assets, current prices, trillion ROL

CFPI — Current gross capital formation price index, previous year=1

$$ICFPI = \frac{CFPI}{CFPI(-1)}$$

CFPI90 — Gross capital formation price index, 1990 = 1

$$I90 = \frac{I}{CFPI90}$$

$$II90 = \frac{I90}{I90(-1)}$$

$$RII90 = II90 - 1$$

DAD — Domestic aggregate demand, current prices, trillion ROL

$$DAD90 = \frac{DAD}{GDPD90}$$

$$DDAD90 = DAD90 - DAD90(-1)$$

$$IDAD90 = \frac{DAD90}{DAD90(-1)}$$

$$RID90 = IDAD90 - 1$$

$$Id = \frac{I}{DAD}$$

XGSD — Exports of goods and services, current prices, billion USD

$$IXGSD = \frac{XGSD}{XGSD(-1)}$$

$$RIX = IXGSD - 1$$

xgdp90 — Real export to GDP ratio

$$xgdp90 = \frac{XGSD \cdot ER90}{GDP90}$$

ER — Exchange rate, thousand ROL per USD

$$ERCPI90 = \frac{ER}{CPI90}$$

$$DER90 = \frac{ERCPI90}{ER90} - 1$$

$$XG = XGSD \cdot ER$$

ERP — Exchange rate policy parameter

ERM(i) — Monthly exchange rate, thousand ROL per USD

$$IERM(i) = \frac{ERM(i)}{ERM(i-1)}$$

$$RIERM(i) = IERM(i) - 1$$

$$IAERM(i) = \frac{ERM(i)}{ERM(i-12)}$$

i = 01, 02...12

FOIMI(i) — Monthly foreign impact (on exchange rate) index; i=01,02...12

a(i)	Monthly share of the transactions in USD in total foreign trade of Romania; i=01, 02...12
ak(i)	Monthly share of the transactions in foreign currency k in total foreign trade of Romania; i = 01, 02...12
IERDK(i)	Monthly index of the exchange rate of currency k to USD; i=01, 02...12
USCPI(i)	Monthly consumer price index in USA; i = 01, 02...12
MXGSD(i)	Monthly exports of goods and services, billion USD; i=01,02...12
MGSD	Imports of goods and services, current prices, billion USD

$$MG = MGSD \cdot ER$$

$$cd = \frac{CD}{MGSD \cdot ER}$$

$$MX = \frac{MGSD}{XGSD}$$

$$DMX = MX - MX(-1)$$

$$DMGSD = MGSD - MGSD(-1)$$

$$IMGSD = \frac{MGSD}{MGSD(-1)}$$

$$RIMGSD = IMGSD - 1$$

$$FTD = XGSD + MGSD$$

$$NX = XGSD - MGSD$$

$$rnx = \frac{NX \cdot ER}{GDP}$$

XMC	Foreign trade policy parameter; for exports it is XMCX and for imports XMCM
INVD	Direct foreign investments, billion USD;

$$\text{rinvd} = \frac{\text{INVD} \cdot \text{ER}}{\text{GDP}}$$

$$\text{Drnxbb} = \text{rnx} - (\text{gcbb} + \text{rinvd})$$

MMGSD(i) Monthly imports of goods and services, current prices, billion USD

$$\text{MFTD(i)} = \text{MXGSD(i)} + \text{MMGSD(i)}$$

$$\text{MMX(i)} = \frac{\text{MMGSD(i)} + \text{MMGSD(i-1)}}{\text{MXGSD(i)} + \text{MXGSD(i-1)}}$$

i = 01,02...12

mgsdr(i) Monthly rate of imports; i = 01, 02...12

nmgsdr(i) Normalised monthly rate of imports

$$\sum_{\text{i=01}}^{12} \text{nmgsdr(i)} = 1$$

$$\text{IAMMGSD(i)} = \frac{\text{MMGSD(i)}}{\text{MMGSD(i-12)}}$$

i = 01, 02...12

MCPI(i) Monthly consumer price index, previous month=1; i=01,02...12

AMCPI Average monthly consumer price index

$$\text{IMCPI(i)} = \frac{\text{MCPI(i)}}{\text{AMCPI}}$$

i= 01, 02...12

DCPI(i) Monthly consumer price index, as compared to December of previous year; i=01,02...12

$$\text{CPIMO(i)} = \frac{\text{DCPI12}(-1) \cdot \text{DCPI(i)}}{\text{DCPI(i)}(-1)}$$

$$RMCPI = \sum_{i=01}^{12} CPIMO(i) \cdot nrgsr(i)$$

i = 01, 02...12

NIMCPI(i) Normalised ratio between monthly consumer price index and average monthly price index; I=01,02...12

H. Monetary variables

M2 Broad money, trillion ROL

$$IM2 = \frac{M2}{M2(-1)}$$

$$GDPDIM2 = \frac{GDPD}{IM2}$$

$$RIM = GDPDIM2 - 1$$

MM2(i) Monthly broad money; i = 01, 02...12

$$IMM2(i) = \frac{MM2(i)}{MM2(i-1)}$$

$$RIMM2(i) = IMM2(i) - 1$$

i = 01, 02...12

v Velocity of broad money (accounting determination)

$$v = \frac{GDP}{M2}$$

$$Iv = \frac{v}{v(-1)}$$

$$RIv = Iv - 1$$

Mv(i) Monthly velocity of broad money (accounting determination)

$$Mv = \frac{MGDP(i)}{MM2(i)}$$

i = 01. 02...12

GZ — Estimation of the disturbing form of "dollarization", trillion ROL

Z — M2 equivalent of the disturbing form of the “dollarization”, trillion ROL

A — Gross arrears, trillion ROL

N — M2 equivalent of the inter-enterprise arrears, trillion ROL

β — Monetary distortion coefficient

$$\beta = \frac{M2 + Z + N}{M2}$$

$$IMD = \frac{\beta}{\beta(-1)}$$

Mβ — Monthly monetary distortion coefficient

UND — Gross domestic product of the non-accounted economy, current prices, trillion ROL

$$UND90 = \frac{UND}{GDPD90}$$

s — Share of accounted economy in total gross domestic product (created in accounted and non-accounted sectors)

$$s = \frac{GDP}{GDP + UND}$$

$$Is = \frac{s}{s(-1)}$$

$$RIs = Is - 1$$

$$Is85 = \frac{s}{s1985}$$

IR — Reference interest rate of National Bank of Romania

$$dir = IR + 1 - GDPD$$

$$IRIR = \frac{1 + IR}{GDPD} : \frac{1 + IR(-1)}{GDPD(-1)}$$

$$RIIR = \frac{1 + IR}{1 + IR(-1)} - 1$$

IRM(i) — Monthly reference interest rate of National Bank of Romania; i=01, 02 . . . 12

T — Time:1980=1, 1981=2, ..., 1996=17

EX — Prefix for the expected value

5 The structure of the 1998 version of the macromodel

The macromodel has the main goal of estimating the short-run implications of income policies, fiscality, monetary measures, restructuring processes, commercial policies.

A. General framework

The macromodel combines behavioural and accounting relations taking into consideration not only the standard assumptions, but also the peculiarities of the Romanian transition economy as a weakly structured system. This kind of approach imposed many specific solutions. For instance, a great role is assigned to the expected disposable income of households, firms and general consolidated budget. Also, the output of economy has a double determination: the first is based on production factors (GDP90F), while the second (denoted GDP90T) includes some significant features of the transition environment (the undercapitalisation, first of all). The exports are defined not only as a historical trend, but also as a result of the emerging market conditions. These modelling adjustments will be discussed together with the presentation of the main blocks of the macromodel. In principle, its structure is characterised by the following interdependencies and restrictions:

$$GDP = f(GDP90, GDPD)$$

GDP - gross domestic product, current prices, trillion ROL
GDP90 - gross domestic product, 1990 prices, trillion ROL
GDPD - current gross domestic product deflator, previous year = 1

$$GDP90F = f(E(-1), LP90)$$

GDP90F - estimation of the gross domestic product based on production function, 1990 prices, trillion ROL
E - employment, mill. persons
LP90 - labour productivity (gross domestic product per employed person), 1990 prices, million ROL

$$LP90 = f(FA90, GLEE90, t)$$

FA90 - fixed assets, 1990 prices, trillion ROL
GLEE90 - total labour income, 1990 prices, trillion ROL

$$GDP90T = f(DAD90, XGSD, M2, GDPD, gcbe)$$

GDP90T - estimation of the gross domestic product correlated with the specific transition conditions, 1990 prices, trillion ROL
DAD90 - domestic aggregate demand, 1990 prices, trillion ROL
XGSD - exports of goods and services, current prices, billion USD
M2 - broad money, trillion ROL
gcbe - share of the general consolidated budget expenditures in gross domestic product

$$GDP90T \leq GDP90F$$

This relation reflects the atrophied dependence of the real output on production factors

$$GDP90 = GDP90T$$

$$DAD90 = f(DAD, GDPD)$$

DAD - domestic aggregate demand, current prices, trillion ROL

$$DAD = GDP - ER \cdot \cdot (XGSD - MGSD)$$

ER - exchange rate, current prices, thousand ROL per USD
MGSD - imports of goods and services,

	current prices, billion USD
$FA90 = f(I90, dfa, resd)$	I90 - investments in fixed assets, 1990 prices, trillion ROL dfa - normal rate of fixed assets depreciation resd - restructuring fixed assets depreciation rate
$I90 = f(GDP90, XGSD, IR, INVD)$	IR - reference interest rate of National Bank of Romania INVD - direct foreign investments, billion USD
$XGSD = f(GDP90, MGSD, ER)$	
$MGSD = f(rnx)$	rnx - share of the foreign trade balance in gross domestic product
$rnx = f(gcbb, ER, INVD)$	gcbb - share of surplus (+) or deficit (-) of the general consolidated budget in gross domestic product
$ER = f(CPI, M2, FOIMI)$	CPI - current consumer price index, previous year = 1 FOIMI - monthly foreign impact (on exchange rate) index
$CPI = f(GDPD)$	
$M2 = f(GDP, v)$	v - velocity of broad money
$v = f(b, Is, IR)$	β - monetary distortion coefficient Is - index (previous year = 1) of the share of accounted economy in total gross domestic product (created in accounted and non-accounted sectors)
$(GDP - EXTDR)^2 = \min$	EXTDR - total expected disposable income of the households, firms and general consolidated budget, trillion ROL

This configuration is compatible with the above described implications of the Romanian transition economy as a weakly structured system (the third chapter, point No. 5). As I have mentioned, the present version of the macromodel can be divided into seven blocks.

B. Output of the economy

1) The production function $Y = f(K, L, t, c)$ or, using the adopted symbols, $GDP90F = f(FA90, E, t, c)$ is not relevant due to a weak correlation between annual indices of gross domestic product in constant prices (IGDP90*)* and of employment (IE): the coefficient is close to zero (-0,05). This relation has been extended by including the labour income in constant prices (GLEE90):

$$GDP90F = f(FA90, E, GLEE90, t, c)$$

Attempts to define this econometric function have been unsuccessful because of the relative constancy of the employment under conditions of a large variation of the gross domestic product in constant prices. It is interesting to mention that the average annual parabolic index of E, denoted APIE and determined by the formula:

$$\sum_{i=1}^{16} APIE^{i} = \frac{\sum_{j=1981}^{1996} E(j)}{E1980}$$

is practically equal to unity (more exactly 1.000 692). Consequently, if we use annual indices (IGDP90, IFA90, IE, and IGLEE90*),* the above presented function can be translated into the following labour productivity function:

$$ILP90 = f(IFA90, IGLEE90, t, c)$$

in which ILP90 represents the annual index of labour productivity. It is important to underline that the correlation between IGDP90 and ILP90 is very good (coefficient 0.948172).

In order to use only statistical series satisfying ADF test, this relation has been transformed substituting annual indices by the corresponding rates of labour productivity (RILP90*),* fixed assets (RIFA90), and labour real incomes (RIGLEE90*).* The following function was retained for the macromodel:

$$RILP90 = c9 \cdot RIFA90 + c10 \cdot RIGLEE90 + c11 \cdot T + c12$$

fin which (sample 1980-1996):

c 9 = 1.0229812

c10 = 0.2472262

c11 = 0.0077621

c12 = - 0.0991113

This modified function can be interpreted as a consequence of the atrophied dependence of the real output on production factors.

It would be useful to examine the variation of RILP90:

$$\mathrm{DRILP90} = \mathrm{RILP90} - \mathrm{RILP90}(-1)$$

$$\mathrm{DRIFA90} = \mathrm{RIFA90} - \mathrm{RIFA90}(-1)$$

$$\mathrm{DRIGLEE90} = \mathrm{RIGLEE90} - \mathrm{RIGLEE90}(-1)$$

$$\mathrm{DRILP90} = \mathrm{c9} \cdot \mathrm{DRIFA90} + \mathrm{c10} \cdot \mathrm{DRIGLEE90} + \mathrm{c11}$$

The positive trend is insignificant. Instead (c9 + c10) = 1.2702074, which can not have a technological explanation. More plausible is the fact that the Romanian economy is characterised by overstaffing (before 1990 from an ideological motivation, and after 1990 as a result of the trade unions' opposition and manager objectives).

Using labour productivity function, and existing employment the output of economy is:

$$\mathrm{GDP90F} = \mathrm{E}(-1) \cdot \mathrm{LP90}(-1) \cdot \left(1 + \mathrm{RILP90}\right)$$

2) The above presented approach is not sufficient. The activity of an important part of the economic agents is submitted to supplementary restrictions - shortage of working capital, low domestic or non-domestic demand, bad performance, relatively high interest rates and fiscality - under fragile market mechanisms. It is necessary to estimate a new possible level of the real output, specific for transition conditions, denoted *GDP90T.*

From this point of view, the national economy is divided into three sectors, having some similarities in the behavioural sense. This approach develops the considerations adopted by the preceding version of the macromodel.

2.1) The first sector includes, predominantly, the economic agents with lower profitability and longer production cycles than the average level.

Moreover, they are significantly undercapitalised (their working capital covers only a small share of the necessities). The largest part of this type of economic agents are present in industry, construction, agriculture.

Their activity depends, of course, on domestic aggregate demand and exports. At the same time, they are characterised by a high sensibility to money market conditions and to the budget policy. The money market conditions are expressed by the ratio between gross domestic product deflator and the broad money index. The budget policy is represented by the share of the general consolidated budget expenditures in the gross domestic product reflecting the influence on real output of the fiscality (direct and indirect) and of the nature of the budget deficit (inflationary or non - inflationary sources). All these factors - demand, money market conditions and general fiscality - need to be involved in the estimation of the real output of the first sector.

The annual rate of the gross value added in industry, construction and agriculture in constant prices (RICA90*)* is defined depending on the annual rates of:

- domestic aggregate demand in constant prices (RID90),
- exports (RIX),
- gap between inflation and broad money index (RIM), and
- annual variation of the share of the general consolidated budget expenditures in the gross domestic product (DRGCBE). The econometric function:

$$\mathrm{RICA90} = \mathrm{c1} \cdot \mathrm{RID90} + \mathrm{c2} \cdot \mathrm{RIX} + \mathrm{c3} \cdot \mathrm{RIM} + \mathrm{c4} \cdot \mathrm{DRGCBE}$$

whit the coefficients determined for 1980-1996 sample:

c1 = 0.3596134
c2 = 0.0941387
c3 = - 0.0903477
c4 = - 0.3664485

Signs of these coefficients correspond to the adopted assumptions concerning the behaviour of the first sector. Its output in constant prices (GVAICA90*)* will be estimated as follows:

$$\mathrm{GVAICA90} = \mathrm{GVAICA90}(-1) \cdot \left(1 + \mathrm{RICA90}\right)$$

2.2) The second sector depends also on the demand (domestic and non-domestic), but its sensitivity to the money market conditions and general fiscality is lower than in the case of the first sector. The economic

agents included in the second sector are more capitalised and their production cycles are shorter in comparison with the previous category; in addition, profitability is higher. Generally, this sector includes different services (excluding, of course, the public ones): transport, post and communications, trade, financial, banking and insurance activities, real estate and other services.

In this case, the econometric function of the output can be limited to the demand - side factors (domestic and non-domestic demand).

Consequently the annual rate of the gross value added of the second sector in constant prices (RITO90*)* is correlated with the annual rates of:

- domestic aggregate demand in constant prices (RID90*),* and
- exports (RIX):

$$\mathrm{RITO90} = c5 \cdot \mathrm{RID90} + c6 \cdot \mathrm{RIX}$$

with the coefficients (sample 1980-1996):

c5 = 0.2874108

c6 = 0.3764494

The dependence on exports is more accentuated than in the case of the first sector. The real output of the second sector:

$$\mathrm{GVATO90} = \mathrm{GVATO90}(-1) \cdot \left(1 + \mathrm{RITO90}\right)$$

2.3) The third sector is represented by public services. It is obvious that its output depends on the budget expenditures. The annual variation of the ratio between gross value added in public services and the total expenditures of the general consolidated budget (DRPSBE) is correlated with the annual rate of these expenditures in real terms (RIBE90):

$$\mathrm{DRPSBE} = c7 \cdot \mathrm{RIBE90}$$

in which c7= - 0.1289503 (for the same sample).

This means that, in real terms, the public services are less elastic than the general consolidated budget expenditures. In constant prices, the output of this sector is the following:

$$\mathrm{GVAPS90} = \frac{\mathrm{GVAPS}}{\mathrm{GDPD90}}$$

$$\mathrm{GVAPS} = \mathrm{RPSBE} \cdot \mathrm{GCBE}$$

$$RPSBE = RPSBE(-1) + DRPSBE$$

2.4) By summing up the econometric functions of the above mentioned sectors we can define the total gross value added (GVA90):

$$GVA90 = GVAICA90 + GVATO90 + GVAPS90$$

But the gross domestic product, as the output of economy, is relatively larger, and the estimation of this difference becomes possible by using a simple linear relation between annual variations of the gross domestic product in constant prices (DGDP90*)* and of the gross value added in the same prices (DGVA90):

$$DGVA90 = GVA90 - GVA90(-1)$$

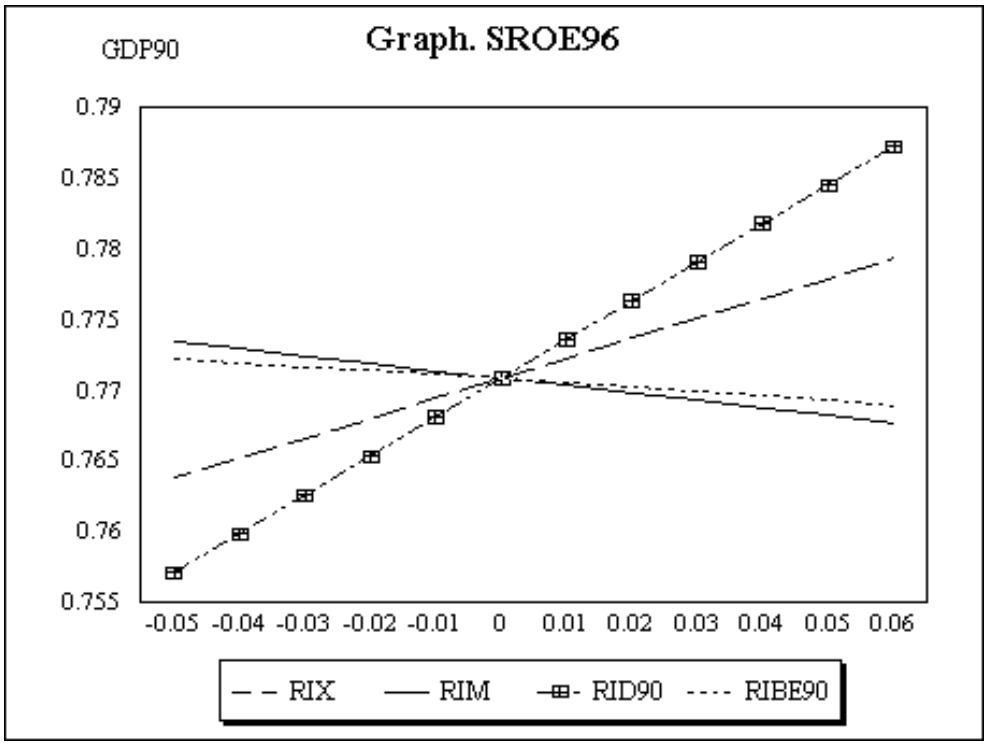
$$DGDP90 = c8 \cdot DGVA90$$

in which c8 = 1.1246528 (for the sample 1980-1996).

Finally, the real output specific for the transition conditions is obtained as follows:

$$GDP90T = GDP90(-1) + DGDP90$$

2.5) On the basis of the above commented econometric functions, the **level of the real output** (**GDP90T**) has been determined using the statistical data for 1996, under conditions of the separate variation of **RID90**, **RIX**, **RIM** and **RIBE90** from - 0,05 to 0,06 (in each case, unmodified factors are considered equal to zero). The results are presented in the Graph SROE96.



The increasing domestic and non-domestic demand stimulates economic growth. Conversely, the "de-monetisation" of the economy (inflation is higher than the broad money index) and amplifying budget burden limit it.

3) There are reasons to suppose that, in the case of the Romanian transition economy, the following relations are valid:

$$GDP90T \leq GDP90F$$
$$GDP90 = GDP90T$$

These relations represent another expression of the atrophied dependence of the real output on production factors.

4) The output of economy in current prices (GVA and GDP) is defined using the corresponding gross domestic product deflators (GDPD90(-1*)* and GDPD*):*

$$GVA = GVA90 \cdot GDPD90$$
$$GDP = GDP90 \cdot GDPD90$$

$$GDPD90 = GDPD90(-1) \cdot GDPD$$

The current gross domestic product deflator (GDPD) results from the whole macromodel, the following relation having a special role:

$$(GDP - EXTDR)^2 = \min$$

in which EXTDR represents the disposable income expected by households, firms and budget. This objective function translates into modelling language the high probability of the expected disposable income to be achieved (see AC-NC model).

C. Production factors

In what concerns the employment, two contradictory tendencies are distinguishable. On the one hand, the trade-unions and other social forces act for an employment at least at the previous level (denoted ESTAT). On the other hand, the economic mechanisms tend to condition it by the productivity labour function (EECO). In principle,

$$ESTAT = E(-1)$$

$$EECO = \frac{GDP90}{LP90(-1) \cdot (1 + RILP90)}$$

The real employment results from the weighted combination of these determinations:

$$E = esh \cdot ESTAT + (1 - esh) \cdot EECO$$

in which $O \le esh \le 1$. Consequently,

$$UN = LF - E$$

2) The number of salaried (wage paid) employees (E1*)* is deduced from the estimations concerning quasi-employees (QE), retired people receiving state social insurance (RP1)*,* unemployment (UN), and population over 15 years (AP*).* The following relations are implied:

$$E1 = QE - UN - RP1$$

$$QE = AP \cdot (qe(-1) + Dqe)$$

Annual variation of the share of quasi-employees in the population over 15 years (Dqe*)* is determined in a relatively simple manner:

$$Dqe = c26 \cdot RIAP + c27 \cdot RIG90$$

in which (sample 1980-1996):

c26 = 0.4701178

c27 = -0.2873056.

and

$$IAP = \frac{AP}{AP(-1)}$$

$$RIAP = IAP - 1$$

It stands to reason that the variation of AP significantly influences the labour market. It seems also normal to expect an increasing social pressure for obtaining the quasi-employee status (revenue security) when the real gross domestic product diminishes. Its increase takes place especially in the personal and family firms sector; consequently, a part of salaried employees and persons registered as unemployed migrate to this sector.

The number of peasants and other employed people (E2) results from the accounting relation:

$$E2 = E - E1$$

3) The fixed assets in constant prices (FA90) depend, on one hand, on the normal (dfa) and restructuring (resd) depreciation rates, and on the other, on investments in constant prices (I90):

$$FA90 = FA90(-1) \cdot (1 - dfa - resd) + I90$$

The normal depreciation rate *(dfa)* is influenced by the variation of annual index of gross domestic product in constant prices (denoted DIGDP90):

$$dfa = c22 + c23 \cdot DIGDP90$$

in which (for the same sample)

c22 = 0.0485303

c23 = - 0.2448170

If DIGDP90 = 0, the depreciation rate tends to 4-5%, a normal level for the real structure of the fixed assets of the Romania. When the economic activity was expanding, the tendency to eliminate old fashioned equipment was weaker. The converse behaviour took place when national

production was declining. Therefore, the negative sign of c24 seems to be normal.

The restructuring depreciation rate is an exogenous variable depending on the intensity of global restructuring processes promoted by macroeconomic policies.

D. Factor prices

1) The labour incomes (GLEE) result from an econometric estimation of their share in the gross value added (ler*).* The last version of the macromodel assumes that it tends to an equilibrium point (eqler), around which the concrete levels of this share are oscillating. In order to approximate eqler, the regression $\mathrm{ler} = \mathrm{a1} \cdot \mathrm{ler}(-1) + \mathrm{a2}$ has been calculated (sample 1980-1996 with dummy variable for 1990) obtaining a1 = 0.679367 and a2 = 0,113149 ($\overline{R}^2$ = 0.953 and DW = 1,842). Implying the constancy of ler, the equilibrium point eqler results from a2 / (1-a1) = 0.3528925. The variations of actual ler against eqler have been determined:

$$\mathrm{ler} = \mathrm{eqler} + \mathrm{Deler}$$

$$\mathrm{Deler} = \mathrm{c13} \cdot \left[\mathrm{Deler}(-1) + \mathrm{Deler}(-2)\right] + \mathrm{c14} \cdot \mathrm{RIGVA90}$$

in which (sample 1980-1996):

c13 = 0. 2440652

c14 = -0.2152492.

The lags can be considered normal in this case. A possible explanation of the sign of c14 is the fact that the nominal labour income established for the future period are more stable than the real output of economy.

2) The labour income per employed person (GLE), the nominal gross wage per salaried employee (GW1*),* and the nominal net labour income of peasants and other non-salaried employed people per person (GW2*)* are determined by the following relations:

$$\mathrm{GLEE} = \mathrm{ler} \cdot \mathrm{GVA}$$

$$\mathrm{GLEE90} = \frac{\mathrm{GLEE}}{\mathrm{GDPD90}}$$

$$GLE = \frac{GLEE}{E}$$

$$GLE90 = \frac{GLEE90}{E}$$

$$GW1 = \frac{GLEE - E2 \cdot GW2}{E1}$$

$$GW2 = GW1 \cdot (1 - wst) \cdot gw2$$

where *wst* and gw2 are exogenous variables.

3) The wage indexation coefficient (IND) reflects the relation between the evolution of wage and consumer price index (CPI*):*

$$IND = \frac{GW1 - GW1(-1)}{GW1(-1) \cdot (CPI - 1))}$$

The variation of consumer price index (ICPI) is correlated with the variation of gross domestic product deflator (IGDPD)*:*

$$CPI = CPI(-1) \cdot ICPI$$

$$ICPI = c28 \cdot IGDPD$$

with c28 = 1.0036813. Therefore, the consumer price index seems to be more elastic than the gross domestic product deflator. This reflects the discrepancies registered until now in the liberalisation of prices on different markets.

Consumer price index CPI90 is obtained as follows:

$$CPI90 = CPI90(-1) \cdot CPI$$

4) The gross operating surplus (GOS) is defined in its widest sense, taking into account all the activities generating value added:

$$GOS = GVA - GLEE + SUB \cdot (1 - subp)$$

in which subp is an exogenous variable.

E. Demographics and labour supply

This block contains the usual relations among demographic variables, including labour force rates. It offers estimations concerning population (P), population over 15 years (AP), labour force (LF), retired people receiving state social insurance (RP1), other retired people (RP2).

$$P_{x+1}^{m,f} = p_x^{m,f} \cdot P_x^{m,f}(-1) \text{ , x= 0,1...99}$$

$$PAG_g^{m,f} = \sum_{x=5g}^{5g+4} P_x^{m,f} \text{ , g= 0,1...18}$$

$$PAG_{19}^{m,f} = \sum_{x=95}^{100} P_x^{m,f}$$

$$P_0 = \sum_{g=3}^{9} PAG_g^f \cdot F_g$$

For the third group, the age specific fertility rates are used.

$$P_0^m = pm \cdot P_0$$

$$P_o^f = pf \cdot P_0$$

$$pm + pf = 1$$

$$P^{m,f} = \sum_{x=0}^{100} P_x^{m,f}$$

$$P = P^m + P^f$$

$$AP = \sum_{x=15}^{100} \left[P_x^m + P_x^f \right]$$

$$PV = \sum_{x=60}^{100} P_x^m + \sum_{x=55}^{100} P_x^f$$

$$LF_g^{m,f} = PAG_g^{m,f} \cdot lfp_g^{m,f}$$

$$LF^{m,f} = \sum_{g=2}^{17} LF_g^{m,f}$$

For the second group, the specific age labour force rates are used.

$$LF = LF^m + LF^f$$

$$RP1 = rs \cdot PV$$

$$RP2 = rt \cdot PV$$

$$RP = RP1 + RP2$$

Demographic and labour supply block uses the following exogenous variables: p_x, F_g, pm, pf, lfp, rs, and rt.

F. Disposable income

This block estimates disposable income of households (DRP), of firms (DRF), and of the general consolidated budget (DRB).

1) The disposable incomes of households take into account their gross income (GRP*)* and their payments to the budget (WST and OTP):

$$DRP = GRP - [WST + OTP]$$

$$GRP = GLEE + TRE + TUNA + SA + OE + SC + SUBP$$

All the components are defined in other blocks excepting

$$OE = oe \cdot GOS$$

in which *oe* is an exogenous variable.

2) The disposable incomes of firms are defined by accounting relation:

$$DRF = GOS - [OE + SC + TPN + SCF]$$

3) The revenues of the general consolidated budget (GCBR) are classified in seven categories: profit taxes, nonfiscal revenues of the budget, other direct taxes on firms (TPN*)*; contributions for social insurance borne by firms (SCF); value added tax and other indirect taxes (VAT); custom duties (CD); wage taxes and contributions for social insu-rance borne

by salaried employees (WST); other taxes borne by households (OTP); and income from "privatisation" and other resources (OBR).

$$GCBR = TPN + SCF + VAT + CD + WST + OTP + OBR$$

$$TPN = tpn \cdot GOS$$

$$SCF = scf \cdot E1 \cdot GW1$$

$$VAT = vat \cdot GDP$$

$$CD = cd \cdot MG$$

$$WST = wst \cdot E1 \cdot GW1$$

$$OTP = otp \cdot GRP$$

$$OBR = obr \cdot GCBR$$

In what concerns the expenditures of the general consolidated budget (GCBE), the macromodel also operates with seven categories: social insurance pensions (TRE); unemployment benefits (TUNA); other social assistance expenditures as pensions and financial assistance for invalids, orphans and widows from war, allowances for children etc. (SA); expenditures for education, health, culture and municipal services (EHCMS); expenditures for national defence and public order (NDPO); expenditures for economic activity (EAB) including subsidies; and a residual position (OBE).

$$GCBE = TRE + TUNA + SA + EHCMS + NDPO + EAB + OBE$$

$$TRE = re \cdot GLE \cdot RP$$

$$TUNA = una \cdot GW1 \cdot (1 - wst) \cdot UN$$

$$SA = sa \cdot GCBE$$

$$EHCMS = \frac{ehcms \cdot EHCMS(-1) \cdot P \cdot GDPD}{P(-1)}$$

$$NDPO = ndpo \cdot NDPO(-1) \cdot GDPD$$

$$EAB = eab \cdot GDP$$

$$OBE = obe \cdot GCBE$$

$$SUB = sub \cdot EAB$$

$$SUBP = subp \cdot SUB$$

All the coefficients denoted with small letters are exogenous variables, reflecting budgetary policy. Its eventual future change can be expressed by supplementary exogenous parameters BCR (for revenues) and BCE for expenditures). Finally, we obtain:

$$DRB = GCBR - \left[TRE + TUNA + SA + SUB\right]$$

4) The relation between the total of disposable incomes (TDR) and the gross domestic product in current prices (GDP*)* is intermediated by the discrepancy coefficient (DISC). This reflects the differences existing in the estimations of the same indicator as an output of the economy and as a sum of disposable incomes.

$$TDR = DRP + DRF + DRB - DISC \cdot \left[GDP - GVA\right]$$

$$DISC = \frac{VAT + CD}{GDP - GVA} - 1$$

$$GDP = TDR$$

G. Absorption

1) The volume of retail trade and commercial services rendered to the population (GS) is determined in correlation with nominal incomes from net wages, social insurance pensions, unemployment benefits, social assistance, dividends and other non-salary incomes of households (NR*)* and interest rate (IR) as follows:

$$NR = E1 \cdot GW1 \cdot (1 - wst) + TRE + TUNA + SA + OE$$

$$NR90 = \frac{NR}{CPI90}$$

$$DNR90 = NR90 - NR90(-1)$$

$$GS = GS90 \cdot CPI90$$

$$GS90 = GS90(-1) + DGS90$$

$$IRIR = \frac{(1 + IR)}{GDPD} : \frac{(1 + IR(-1)}{GDPD(-1)}$$

$$DGS90 = c24 \cdot DNR90 \cdot [1 + c25 \cdot IRIR]$$

in which (for the sample 1980-1996) c24 = 0.6047156 and c25 = -0.4518962. The signs are normal. The Romanian experience shows a relatively high sensitivity of household behaviour to the real interest rate. Therefore, the dimension of coefficient c25 does not surprise.

2) The production for self-consumption officially estimated (SC) represents an important share of gross domestic product (approximately 13-14% in previous years). Its annual variation in constant prices (DSC90) is correlated with the similar variations of the domestic aggregate demand (DDAD90*)* and of the volume of retail trade and commercial services rendered to the population (DGS90):

$$SC = SC90 \cdot GDPD90$$

$$SC90 = SC90(-1) + DSC90$$

$$DSC90 = c31 \cdot \left[DDAD90 - DGS90\right] + c32 \cdot \left[DDAD90(-1) - DGS90(-1)\right]$$

in which (1980-1996 sample):

c31 = 0.1753265

c32 = -0.2800272

The opposite signs of the econometric coefficients cannot be easily explained. In my opinion, we can distinguish between two contradictory tendencies in household behaviour. On the one hand, the growth of the real income obtained in the extra-household activities extends the possibilities for self - consumption production (for the acquisition of the necessary inputs). On the other hand, the same growth of the real income obtained in the extra-household jobs reduces the incentive to develop the production for self-consumption, the households having more resources to buy marketable goods and services. This explanation can be accepted symmetrically. DSC90 registers different evolutions (increasing, decreasing, oscillating), depending on the signs and proportions of DDAD90 and DGS90.

3) Regarding investments, the macromodel distinguishes two parts. The first comes from domestic resources: its annual rate in real terms (RII90*)* is correlated with the rate of gross domestic product in constant prices (RIG90*)*, the rate of exports (RIX), and the variation of the interest rate $(RIIR = (1 + IR)/(1 + IR(-1)) - 1)$.

The second is represented by direct foreign investment (INVD*).*

$$I90 = \frac{I}{CFPI90}$$

$$I = I90(-1) \cdot (1 + RII90) \cdot CFPI90 + ER \cdot INVD$$

$$RII90 = RIG90 + c20 \cdot RIIR + c21 \cdot RIX$$

in which (the same sample):

c20 = -0.411282

c21 = 0.2020399

The gross capital formation index (CFPI) is estimated like CPI, that is as being dependent on gross domestic product deflator:

$$CFPI90 = CFPI90(-1) \cdot CFPI$$

$$CFPI = CFPI(-1) \cdot ICFPI$$

$$ICFPI = c29 \cdot IGDPD + c30$$

in which c29 = 0. 9261944 and c30 = 0. 0653901.

The historical trend does not comprise direct foreign investment, these being a recent phenomenon. Consequently, in the present version of the macromodel, they are considered as exogenous variable, added to the overall volume of investments.

4) There are many difficulties to define a consistent econometric function for the domestic aggregate demand (DAD) as a global indicator or for the difference between it and the already presented components (GS, SC,I). This is why the 1998 version of the macromodel estimates the domestic aggregate demand from the equilibrium relation:

$$DAD = GDP - ER \cdot NX$$

$$NX = \frac{rnx \cdot GDP}{ER}$$

5) In what concerns exports (XGSD), the 1998 version introduces some essential changes inspired by the author's most recent research.

5.1) The determination of the export component using its rate, that is xgdp90*,* is maintained. The econometric function is improved by including of the influence of variation of ratio between imports and exports (DMX):

$$xgdp90 = c15 + c16 \cdot RIG90(-1) + c17 \cdot DMX(-1)$$

with the coefficients (for 1980-1996 sample):

c15 = 0.2267100
c16 = 0.5435156
c17 = -0.0656843

The substantial influence of RIG90 was expected due to a strong interdependence existing between the real output and the export. In contrast, the relation with DMX is not so obvious. At least in the case of the Romanian economy, the tendency of DMX can perhaps be interpreted as an expression of the evolution of the competitiveness on international markets. When DMX >0*,* thus means that competitiveness decreases, with a negative influence on the export of the next interval; an improvement of the foreign trade balance (when DMX < 0) implies a converse relation. Consequently, the sign of c17 seems to be plausible.

The presented econometric function suggests that - under stationary conditions, when RIG90 = 0 and DMX = 0 - the share of export in the real output tends to a stable level of 22 - 23%. It reflects a weak integration of Romania in the European and world economy. However, the coefficient c16 (sign and size) reveals a strong connection between economic growth and exports.

The determination of the export by xgdp90 function can be considered as historical trend, being consistent as long as the relatively limited development of the market is maintained. This estimation is named XGSDA:

$$\mathrm{XGSDA} = \frac{\mathrm{xgsdp90} \cdot \mathrm{GDP90}}{\mathrm{ER90}}$$

5.2) The transition generates new mechanisms with a growing influence on exports and imports. Thus, annual series do not reveal a consistent connection of either exports or imports with the exchange rate. But the monthly ones become increasingly significant from this point of view. The present version of the macromodel contains a second definition of the export component, based on monthly statistical series (January 1991 - December 1996) and named XGSDB. This represents the sum of monthly exports (MXGSD(i)), estimated on the base of:

- monthly exchange rate index (IAERM(i)), and
- previous evolution of imports (IAMMGSD (i)).

$$\mathrm{XGSDB} = \sum_{\mathrm{i}=01}^{12} \mathrm{MXGSD(i)}$$

$$\mathrm{MXGSD(i)} = \mathrm{MXGSD(i-12)} \cdot \mathrm{IAERM(i-1)}^{\mathrm{c36}} \cdot \mathrm{IAMMGSD(i-1)}^{\mathrm{c37}}$$

$$\mathrm{IAMMGSD(i)} = \frac{\mathrm{MMGSD(i)}}{\mathrm{MMGSD(i-12)}}$$

$$\mathrm{IAERM(i)} \frac{\mathrm{ERM(i)}}{\mathrm{ERM(i-12)}}$$

$$\mathrm{ERM(i)} = \mathrm{IERM(i)} \cdot \mathrm{ERM(i-1)}$$

$$\mathrm{IERM(i)} = \left[\mathrm{c38} \cdot \mathrm{MCPI(i-1)} + \mathrm{c39} \cdot \mathrm{IMM2(i)}\right] \cdot \mathrm{ERP} \cdot \mathrm{FOIMI(i)}$$

i= 01, 02...12

with econometric coefficients (January 1991 - December 1996 sample):

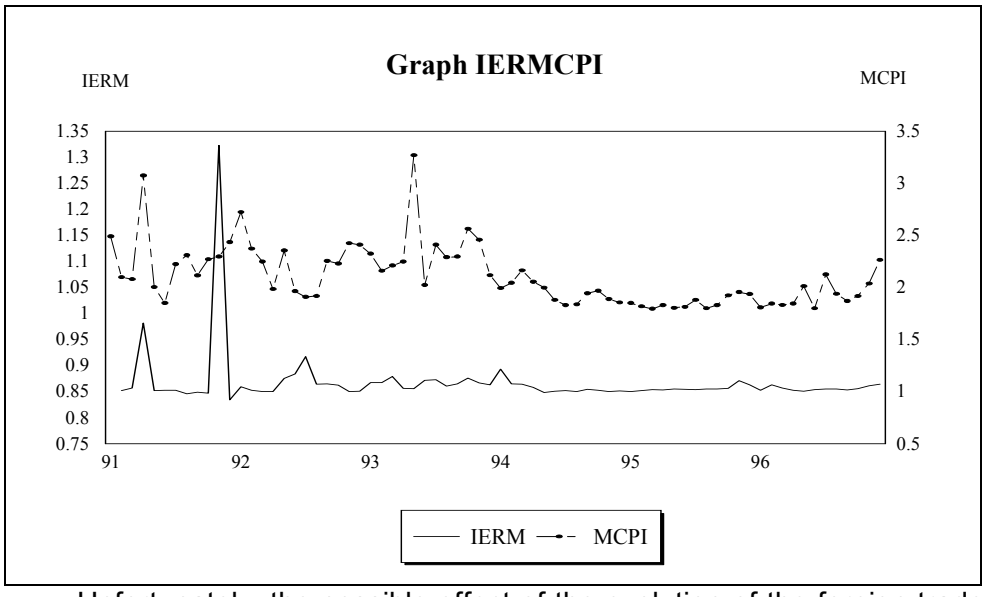
c36 = 0.0954949

c37 = 0.4028993
c38 = 0.6100990
c39 = 0.3740291

The low level of c36 is due to the devaluation of the exchange rate. The coefficient c37 indicates the great dependence of exports on imports. The industries having a significant share in the Romanian exports are based on imported raw materials and energy resources; moreover, a great part of the exports represents re-exported commodities. The possible correction induced by the exchange rate policy (real evaluation or devaluation) is defined by the exogenous parameter *ERP*.

This determination of the exports can be considered as a market one (or in any case closer to it).

5.3) In the evolution of the exchange rate (**indices IERM(i)**) , it is undoubtedly that the **monthly inflation** (**MCPI(i)**) has an essential role; this influence could be dissimulated by administrative interventions only for very short time hence, statistical series being relevant from this point of view (Graph IERMCPI).



Unfortunately, the possible effect of the evolution of the foreign trade balance and of the reserve foreign assets in the banking system were not significantly revealed.

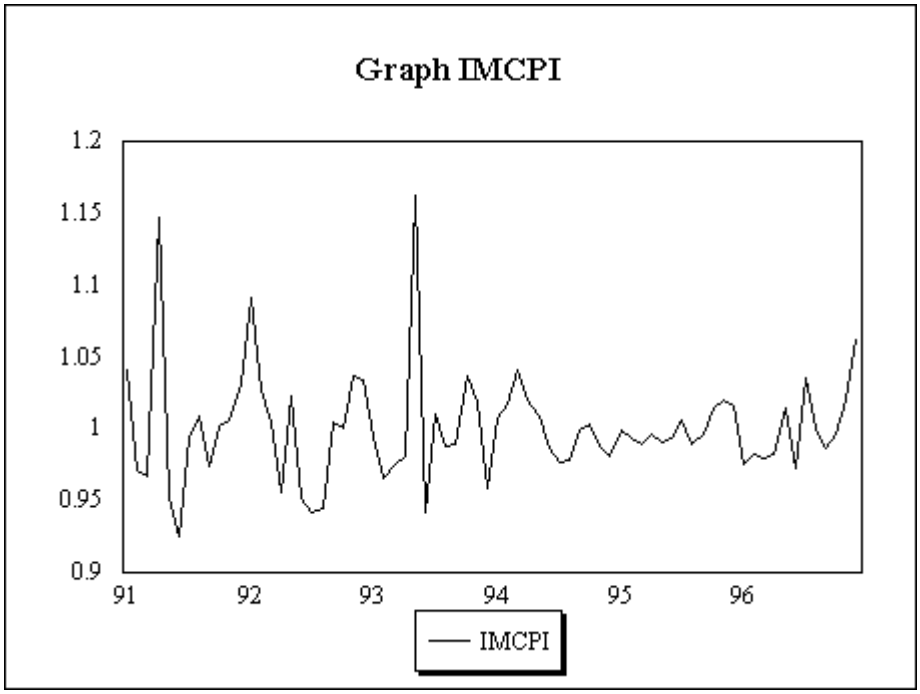
a) Before the examination of the monthly consumer price indices (involved in the estimation of the exchange rate), it is necessary to explain two series of monthly normalised rates (NIMCPI(i) and nrgsr(i)).

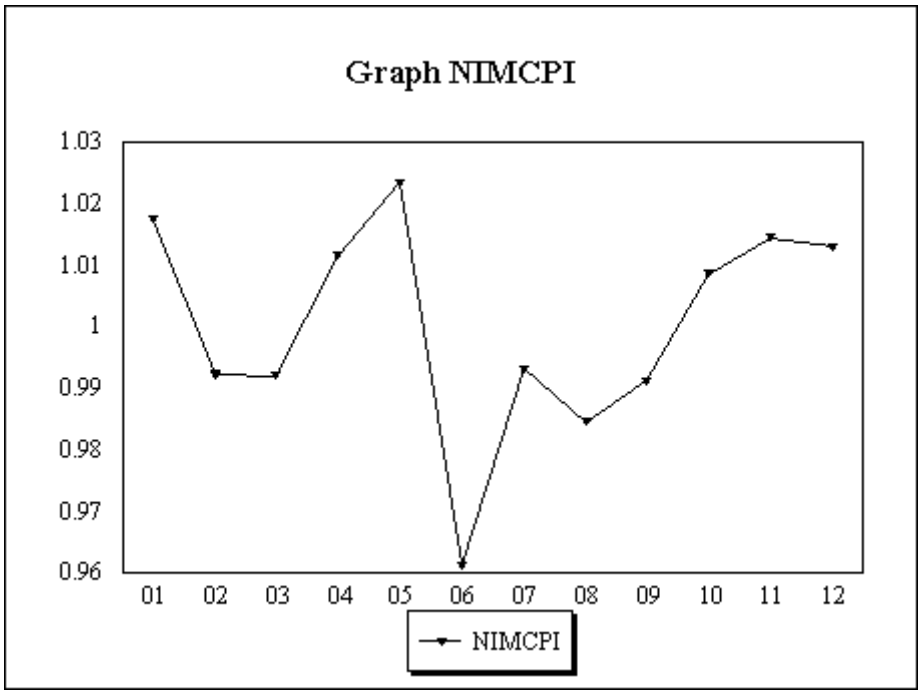
The first concerns the ratio between the monthly consumer price indices (MCPI(i)) and their average level (AMCPI*)*. **Statistical data are denoted IMCP(i)** and the **normalised ones NIMCPI(i).** Normally, the average monthly inflation is deduced from the index December to December (DCPI 12).

$$\mathrm{NIMCPI(i)} = \left[\prod_{i=1991}^{1996} \mathrm{IMCPI(i,t)} \right]^{1/6}$$

i=01,02...12

IMCPI(i) and NIMCPI(i) are presented in the following graphs.





The series NIMCPI(i) is based on the assumption that the ratio between the monthly consumer price indices and their average level has a certain seasonal intensity. Perhaps this hypothesis is disputable, but the existing statistical data do not allow, at least now, to elaborate a more relevant solution.

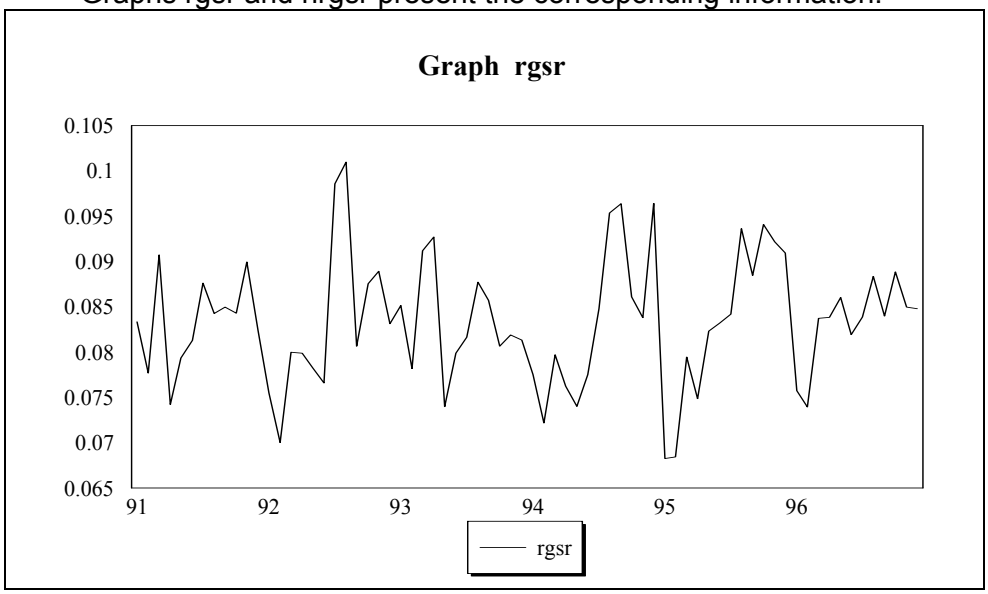
The second serie concerns the monthly weights of the real retail trade and commercial services rendered to the population in their annual volume. In this case, **statistical data are denoted rgsr(i)** and the **normalised ones nrgsr(i).**

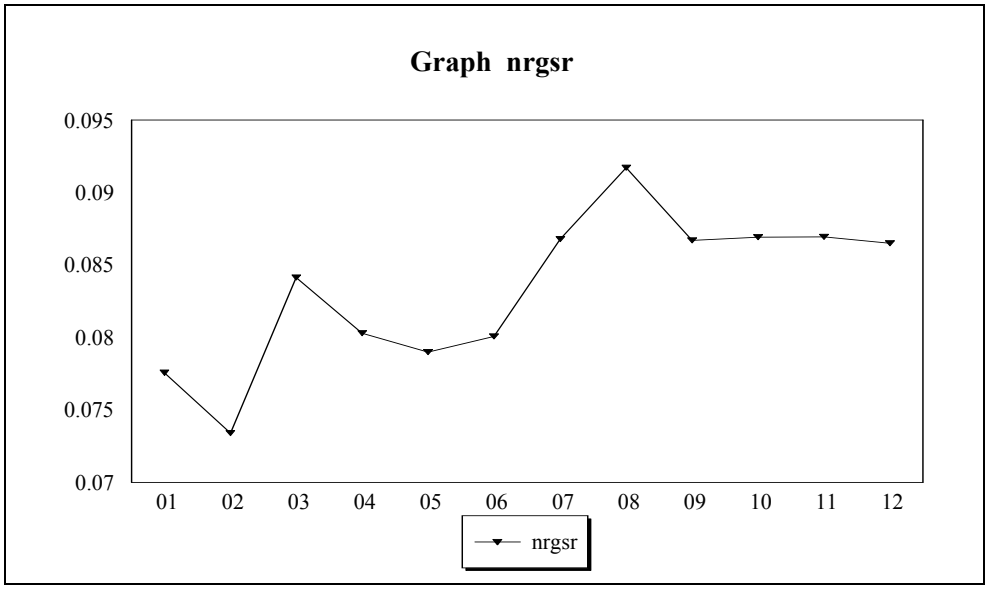
$$\mathrm{nrgsr(i)} = \frac{\sum_{t=1991}^{1996} \mathrm{rgsr(i,t)}}{6}$$

$$\sum_{i=01}^{12} \mathrm{nrgsr(i)} = 1$$

i = 01,02...12

Graphs rgsr and nrgsr present the corresponding information.





Graph nrgsr shows that the monthly normalised rates vary in a relatively narrow band. This circumstance signifies that the real consumption can not register spectacular changes from month to month.

b) An interesting relation between CPI and RMCPI has been revealed:

$$\mathrm{CPI} = \mathrm{c43} \cdot \mathrm{RMCPI}$$

in which c43 = 0,984308 (for 1992-1996 sample, because of which this function is not presented in Appendices III-IV).

The annual econometric determination of CPI (see section D of the present chapter) is considered to be dominant because it results from the entire macromodel. Consequently, the mentioned relation has been used in order to estimate (trough RMCPI) the monthly consumer price indices as follows:

$$\mathrm{RMCPI} = \sum_{\mathrm{i=01}}^{12} \mathrm{CPIMO(i)} \cdot \mathrm{nrgsr(i)}$$

$$\mathrm{CPIMO(i)} = \frac{\mathrm{DCPI12(-1)} \cdot \mathrm{DCPI(i)}}{\mathrm{DCPI(i)(-1)}}$$

$$\mathrm{DCPI(i)} = \prod_{\mathrm{r=01}}^{\mathrm{i}} \mathrm{MCPI(r)}$$

$$\mathrm{MCPI(i)} = \mathrm{AMCPI} \cdot \mathrm{NIMCP(i)}$$

$$\mathrm{i} = 01,\ 02.....12$$

This algorithm allowed us to aggregate the annual and monthly determination of the inflation in a coherent system.

5.4) Coming back to the expression of IERM(i), the inflation is one of the causal factors; the role of the broad money index (IMM2(i)) seems to be also important (Hall and Ciupagea). The Romanian experience has confirmed the possibility to influence the exchange rate through the supply of the national currency.

The Central Bank can also act with the same goal buying or selling the foreign currencies. This factor is represented in the formula of IERM(i) by the exogenous variable ERP.

5.5) The evolution of the exchange rate is also influenced by the foreign impact index (FOIMI(i)). It synthesises the changes on international markets and is estimated taking into consideration:

- monthly share of the transactions in USD in total foreign trade of Romania (a(i));
- monthly share of the transactions in foreign currency k in total foreign trade of Romania (ak(i));
- monthly index of the exchange rate of currency k to USD (IERDK(i));
- monthly consumer price index in United States of America (USCPI(i)).

The foreign impact index is determined as follows:

$$FOIMI(i) = \frac{a(i) + \sum_{k} ak(i) \cdot IERDK(i)}{USCPI(i)}$$

$$i = 01,02...12$$

Due to the absence of the necessary data, the regression for IERM(i) was calculated under assumption FOIMI(i) = 1. This simplification could not significantly modify the econometric coefficients for domestic inflation. The random series have confirmed this supposition. Two random series have been generated: the first between 0.99-1.01 with c38 = 0.586792 and the second between 0.98-1.02 with c38 = 0.548655.

5.6) The monthly imports (involved in the estimation of the monthly exports) are estimated using their normalised rates (nmgsdr(i)):

$$MMGSD(i) = nmgsdr(i) \cdot MGSD$$

$$i=01,02...12$$

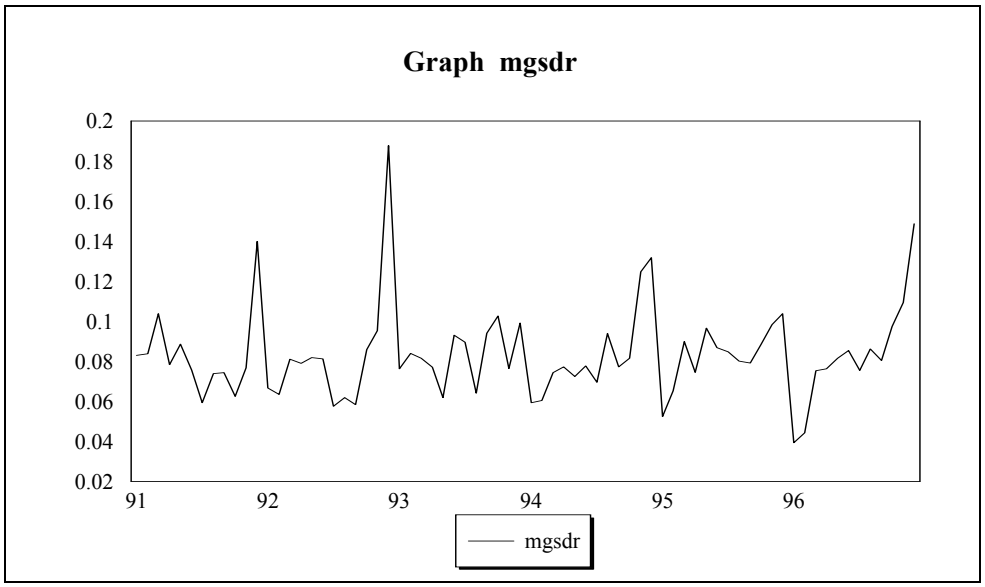
in which **nmgsdr(i) represents an average of the corresponding monthly data**, that is **mgsdr(i):**

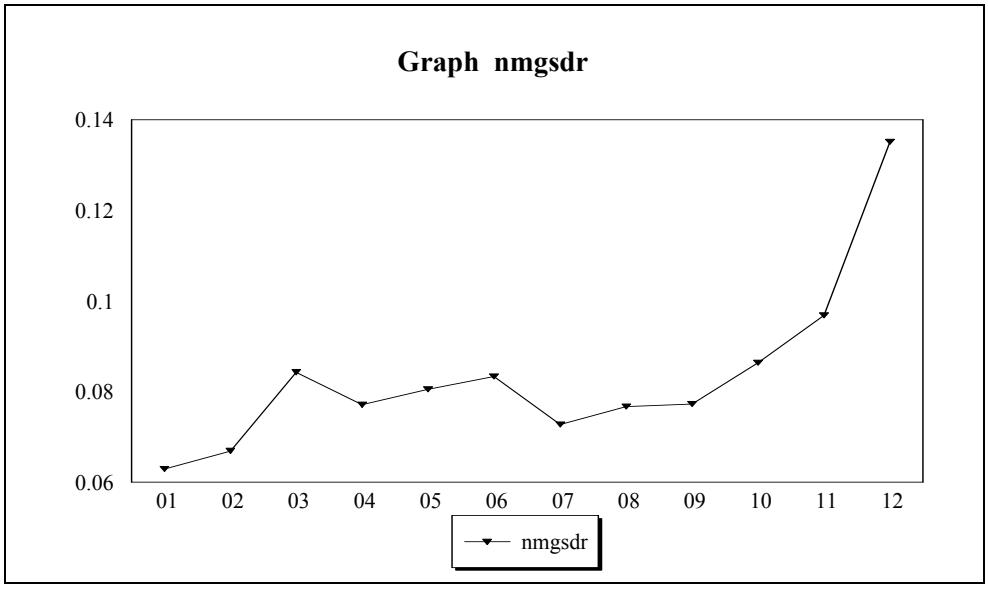
$$nmgsdr(i) = \frac{\sum_{t=1991}^{1996} mgsdr(i,t)}{6}$$

$$\sum_{i=01}^{12} nmgsdr(i) = 1$$

$$i = 01, 02...12$$

The series mgsdr(i) and nmgsdr(i) are presented in the corresponding graphs.





The import of the primary energy resources for winter explains the weight of November and December.

The annual imports (MGSD*)* are determined from rnx as follows:

$$\mathrm{MGSD} = \mathrm{XGSD} - \frac{\mathrm{rnx} \cdot \mathrm{GDP}}{\mathrm{ER}}$$

$$\mathrm{rnx} = \mathrm{gcbb} + \mathrm{Drnxbb} + \mathrm{rinvd}$$

$$\mathrm{Drnxbb} = \mathrm{c18} \cdot \mathrm{DER90} + \mathrm{c19}$$

$$\mathrm{DER90} = \frac{\mathrm{ERCPI90}}{\mathrm{ER90}} - 1$$

$$\mathrm{ERCPI90} = \frac{\mathrm{ER}}{\mathrm{CPI90}}$$

$$\mathrm{rinvd} = \frac{\mathrm{INVD} \cdot \mathrm{ER}}{\mathrm{GDP}}$$

in which (for sample 1980-1996):

c18 = -0.0478092

c19 = -0.0166644

The sign of the coefficient c18 means that the real devaluation of the national currency can improve the foreign financial deficit and vice versa. The sign of the coefficient c19 is also normal (at least until now) for the Romanian economy. Of course, rinvd is an exogenous variable.

If the commercial policy intends to adopt measures able to correct the econometric determination of imports, these can be influenced by supplementary exogenous parameter XMCM.

5.7) The present functioning of the Romanian economy is such that we do not have sufficient evidence to support either sluggish adjustment (historical trend) or market determination of exports. There are some reasons to suggest that it is now a mixed result of both determinations. The following relation is based on this assumption:

$$\mathrm{XGSD} = \mathrm{xsh} \cdot \mathrm{XGSDA} + (1 - \mathrm{xsh}) \cdot \mathrm{XGSDB}$$

in which the coefficient $0 \leq \mathrm{xsh} \leq 1$, as the weight parameter, can be approximated only through expert estimations. Normally, this “dirty” solution is acceptable for transition conditions. It could be a methodological support for the econometric approach of other transition processes (the determina-

tion of E was a similar example). For exports it is also possible to use a supplementary exogenous parameter XMCM, as an expression of the future changes of the commercial policy.

6) The annual exchange rate (ER) is obtained from the monthly estimations weighted with the corresponding volumes of the foreign transactions (MXGSD(i) and MMGSD(i)). Obviously, the monthly exports are beforehand re-calculated.

$$\mathrm{REMXGSD(i)} = \frac{\mathrm{MXGSD(i)} \cdot \mathrm{XGSD}}{\mathrm{XGSDB}}$$

$$\mathrm{ER} = \frac{\sum_{\mathrm{i=01}}^{12} \mathrm{ERM(i)} \cdot \left[\mathrm{REMXGSD(i)} + \mathrm{MMGDS(i)}\right]}{\mathrm{XGSD} + \mathrm{MGSD}}$$

$$\mathrm{i} = 01, 02 \ldots 12$$

H. Monetary variables

1) The monetary problems are not any simpler, given the recent emergence and development of the money market. The annual money supply (M2) is an exogenous variable. However the National Bank of Romania succeeded to maintain the broad money into the desired limits acting preponderantly on the monetary base.

The money demand can be econometrically defined using a function for the money velocity (v). In its determination the interest rate (IR), the monetary distortion (β) and the evolution of the non-accounted economy (Is*)* are considered:

$$\mathrm{GDP} = \mathrm{M2} \cdot \mathrm{v}$$

$$\mathrm{v} = \mathrm{v}(-1) \cdot \left(1 + \mathrm{RIv}\right)$$

$$\mathrm{IMD} = \frac{\beta}{\beta(-1)}$$

$$\mathrm{RIv} = \mathrm{IMD} - 1 + \mathrm{RIs} + \mathrm{c35} \cdot \mathrm{dir}$$

with c35 = - 0.2513041, and

$$RIs = c33 \cdot RIG90 + c34 \cdot RIAPIE$$

in which c33 = 0.6544255 and c34 = - 0,4009181 (for 1985-1996 sample).

It seems normal to assume that if the gross domestic product of the accounted economy increases, a part of the labour force, employed in the non-accounted economy, migrates to the accounted one, and vice versa. The dimension and sign of the coefficient c35 can be explained by the structural asymmetry of the liquidities.

Normally, resulting from the whole system, IMD is submitted to the restriction

$$IMD \geq \frac{1}{\beta(-1)}$$

2) The interest rate is defined by

$$IR = GDPD - 1 + dir$$

in which dir is an exogenous variable reflecting the monetary policy of the central bank. Practically, dir represents real interest rate.

3) The monthly exchange rate includes the influence of the monthly index of the broad money (IMM2(i)).

3.1) The January 1991 - December 1996 statistical series emphasise a clear dependence of this index on:

- its previous evolution (IMM2(i-1)), the monetary processes having a certain sluggish behaviour;
- the monthly index of the nominal income of households (IMNR(i)), especially linked with the size of the monetary base;
- the recent evolution of the exchange rate, by which the forex deposits are estimated.

The following relations are implied:

$$IMM2(i) = \left[1 + RIMM2(i)\right] \cdot M2C$$

$$RIMM2(i) = c40 \cdot RIMNR(i) + c41 \cdot RIMM2(i-1) + c42 \cdot RIERM(i-1)$$

$$RIMNR(i) = IMNR(i) - 1$$

$$RIERM(i) = IERM(i) - 1$$

i= 01, 02...12

in which:

c40=0.2160755

c41=0.4998106
c42=0.0480446

3.2) The corrective coefficient M2C results from the accounting identities:

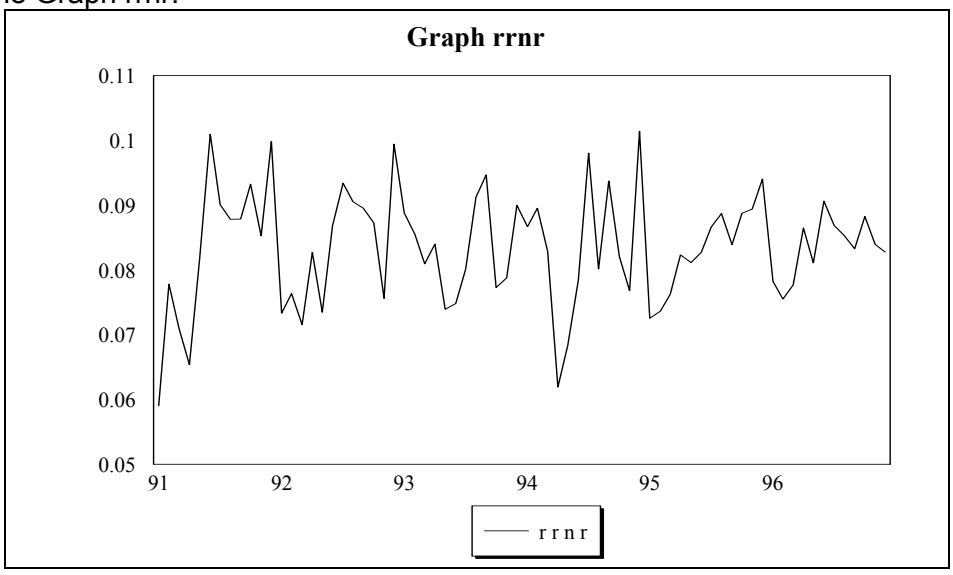
$$MM2(i) = MM2(i-1) \cdot IMM2(i)$$

$$M2 = \frac{\sum_{i=01}^{12} MM2(i)}{12}$$

i = 01, 02...12

the annual broad money being dominant.

3.3) The determination of the monthly nominal income of households (MNR(i)) is based on their normalised rates. Estimated in real terms (DCPI(i)), the **monthly shares in the annual level (rrnr(i))** are showed in the Graph rrnr.



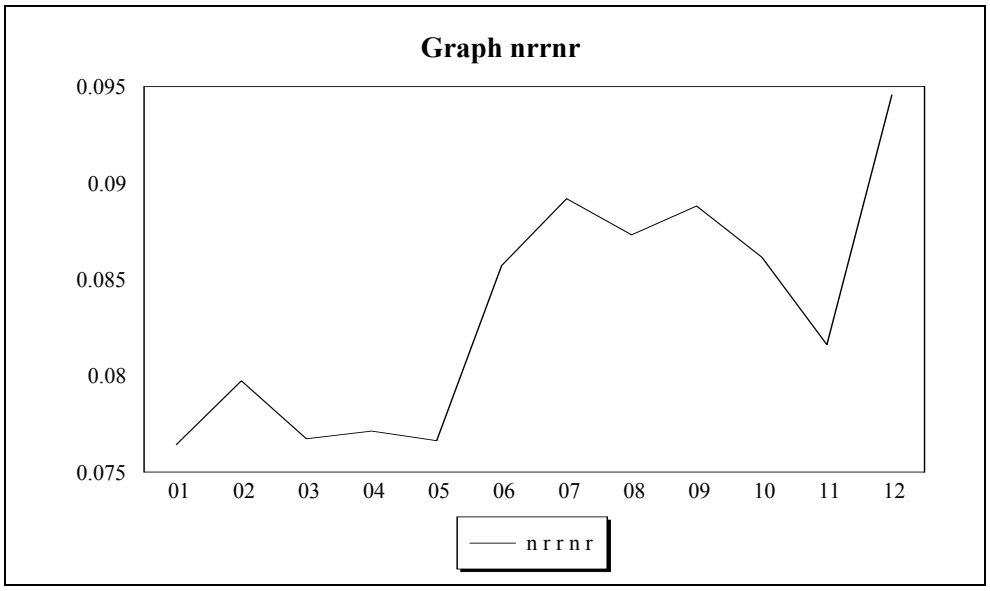
The **normalised rates (nrrnr(i))** are approximated by

$$nrrnr(i) = \frac{\sum_{t=1991}^{1996} rrnr(i,t)}{6}$$

$$\sum_{i=01}^{12} \text{nrrnr}(i) = 1$$

i = 01, 02...12

and are represented in the Graph nrrnr.



The Graph nrrnr correctly reflects the Romanian experience in this field: relatively low indexation of the nominal income in the first months, spring negotiations of new wages, high level of December. The normalised rates nrrnr(i) are used as follows: $\text{IMNR}(i) = \dfrac{\text{MNR}(i)}{\text{MNR}(i-1)}$

$$\text{MNR}(i) = \text{DCPI}(i) \cdot \text{SDMNR} \cdot \text{nrrnr}(i)$$

$$\text{NR} = \sum_{i=01}^{12} \text{MNR}(i)$$

i = 01, 02...12

the annual level (NR) being also dominant.

I. Final comments

1) During the elaboration of the previous experimental and operational versions of the macromodel, many econometric functions have been tested.

The present version, as it has been shown, retains:

a) for annual indicators 17 functions concerning:

- gross value added in industry, construction and agriculture (RICA90);
- gross value added in transport, post and communications, trade, financial, banking and insurance activities, real estate and other services (RITO90);
- gross value added in public services (DRPSBE);
- gross domestic product (DGDP90);
- labour productivity (RILP90);
- labour income rate (Deler);
- foreign financial deficit rate (Drnxbb);
- export rate (xgdp90);
- investments (RII90);
- normal fixed assets depreciation rate (dfa);
- retail trade and commercial services rendered to the population (DGS90);
- quasi-employees rate (Dqe);
- consumer price index (ICPI);
- gross capital formation price index (ICFPI);
- production for self-consumption (DSC90);
- share of the accounted economy (RIs);
- money velocity (Riv), and

b) for monthly indicators four functions concerning:

- export (MXGSD(i));
- exchange rate (IERM(i));
- broad money (RIMM2(i)), and
- the ratio between CPI and RMCPI.

The correlation of annual and monthly estimations has implied the determination of normalised monthly distributions for:

- real retail trade and commercial services rendered to the population (nrgsr(i));
- imports (nmgsdr(i));
- the ratio between monthly consumer price index and average monthly index (NIMCPI(i)), and

- the revenues from net wages, social insurance pensions, unemployment benefits, social assistance, dividends and other non-salary income of households (nrrnr(i)).

2) This selection has been guided by some methodological considerations.

a) First, only those functions have been adopted which can be explained using generally accepted theoretical assumptions amended by the presented specific features of the Romanian transition economy as a weakly structured system. The VAR method has been applied only as a preliminary analysis, with the goal to identify the significant connection among macroeconomic indicators.

b) Second, taking into account that the statistical series are short, and from some important points of view uncertain, the author has avoided to use too sophisticated algorithms for the estimation of the econometric coefficients, because these imply cumulative computing conventions. Consequently, the iterative least squares method has been adopted.

c) Third, this version of the macromodel has been elaborated using statistical series satisfying the Augmented Dickey-Fuller Test. Consequently, some econometric functions have been adapted in order to reflect the time variations of respective indicators. Thus, the short-run nature of the macromodel is more explicitly expressed.

The Appendices III and IV contain a detailed presentation of the econometric functions selected for the 1998 version of the macromodel.

6 Test and simulations on 1996 statistical data

A) Basic version

1) The macromodel has been tested for 1996 using as exogenous the corresponding statistical data, esh = 0 and xsh = 0.5. As a performance indicator, the D1 ex post deviation (Dobrescu 1996a) is determined. It measures the differences between the model estimations and the statistical ones for a reduced number of essential variables of relatively equal (or in any case close) importance:

- total output, expressed by the gross domestic product in constant prices, as an indicator of the real economy;
- the gross domestic product deflator, as an indicator of the nominal economy, and
- the structure of the utilisation of resources.

Such a suggestion can be formalised as follows:

$$G = \left[\frac{\overline{GDP} \cdot GDPD}{GDP \cdot \overline{GDPD}} - 1 \right]^2$$

$$g = \left[\frac{\overline{GDPD}}{GDPD} - 1 \right]^2$$

$$u = \frac{DAD}{DAD + XG} \cdot \left[\frac{\overline{DAD}}{DAD} - 1 \right]^2 + \frac{XG}{DAD + XG} \cdot \left[\frac{\overline{XG}}{XG} - 1 \right]^2$$

$$D_1 = \left[\frac{G + g + u}{3} \right]^{0.5}$$

where the barred indicators are obtained from the model, whilst the unbarred ones are statistical values.

The results are presented in the Table No. 9.

Table No. 9

Indicators	Model	Statistics	Deviation (%)
GDP (trill. ROL.)	109.5154	109.5154	-
GDP90 (trill. ROL.)	0.7831	0.7990	-1.98%
DAD (trill. ROL.)	115.9550	118.3162	-2.00%
DAD90 (trill. ROL.)	0.8292	0.8632	-3.94%
XGSD (bill. USD)	9.4252	9.6480	-2.31%
MGSD (bill. USD)	11.6360	12.5030	-6.93%
I90 (trill. ROL.)	0.1777	0.1966	-9.63%
gcbb	-0.0422	-0.0392	-
rnx	-0.0588	-0.804	-
UN (mill. pers.)	0.7900	0.6576	20.14%
GDPD	1.4856	1.4561	2.03%
β	1.2156	1.3201	-7.91%

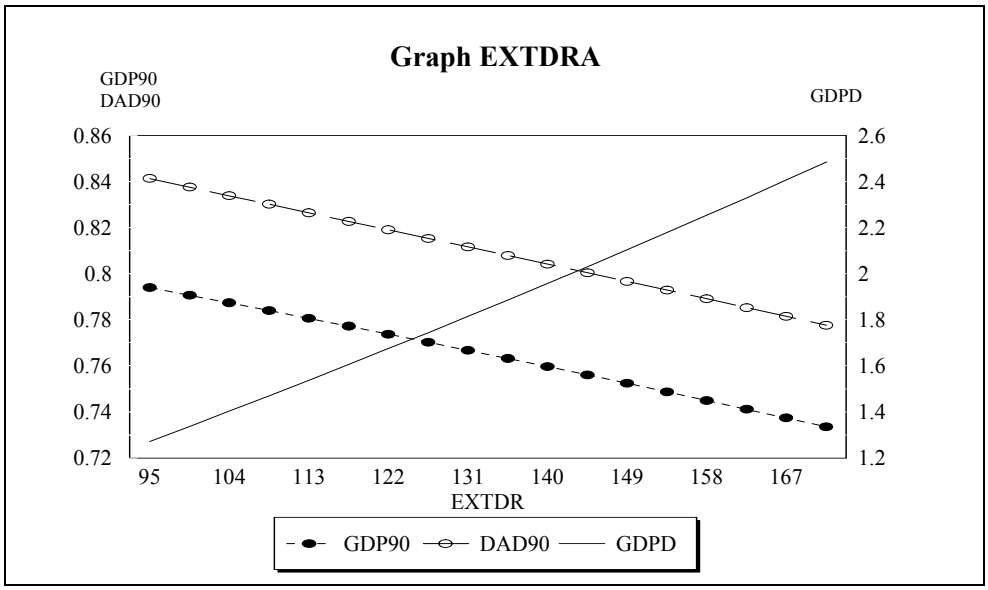
In this case, D1 coefficient represents 2.78%.

There are different methods to reveal the behavioural features of the macromodel. One of the simplest is to establish the main implications induced by the change of different variables. The analysis of EXTDR, dir, M2, xsh, ERP, Is, and esh, seems to be the most interesting.

The attention will be focused on:

- the correlation between the real economy (GDP90 and DAD90) and the nominal one (GDPD), represented in the graphs A;
- the consequences on main financial equilibria (gcbb and rnx), represented in the graphs B.

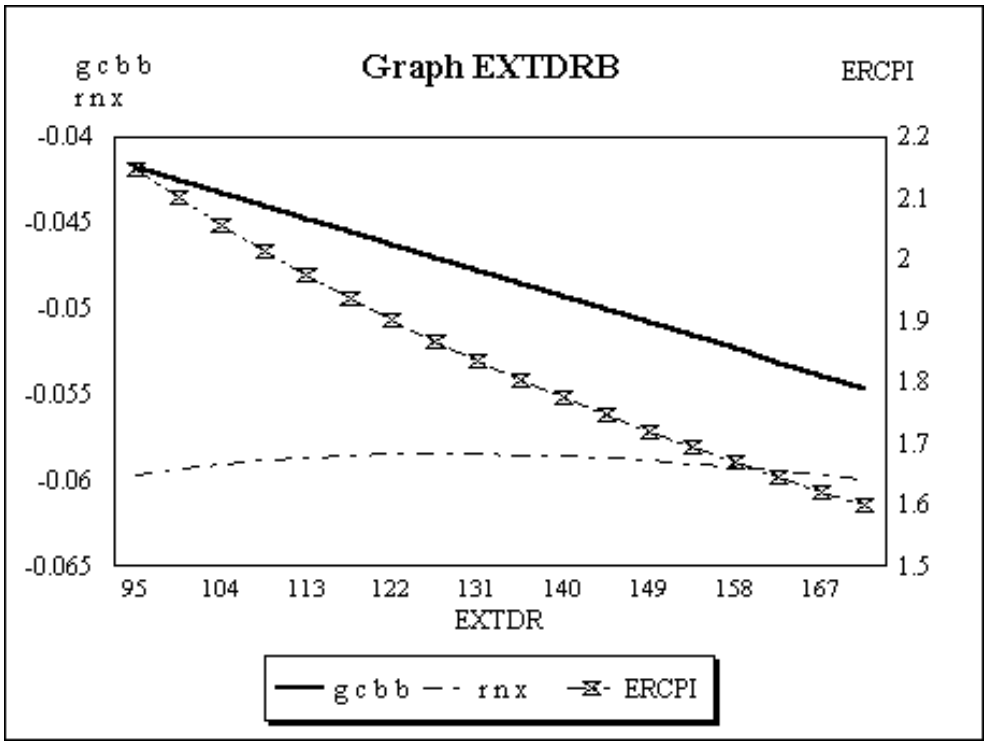
2) We shall begin the simulations with the variation of the **expected disposable income (EXTDR).**



The contradictory evolution of the nominal economy and of the real one is striking. It is not difficult to understand the increasing inflation simultaneously with the growing EXTDR.

However, why is the gross domestic product, in constant prices, declining when the disposable revenues is increasing? This is explainable due to the stability of the broad money (i.e. M2 does not change); the expanding GDPD generates a similar tendency of RIM with the reduction of the real output in the undercapitalised segment of the economy. Under the mentioned conditions DRGCBE increases with an additional negative influence on the real output. Also, a positive feed-back forms between the declining GDP90 and the declining DAD90.

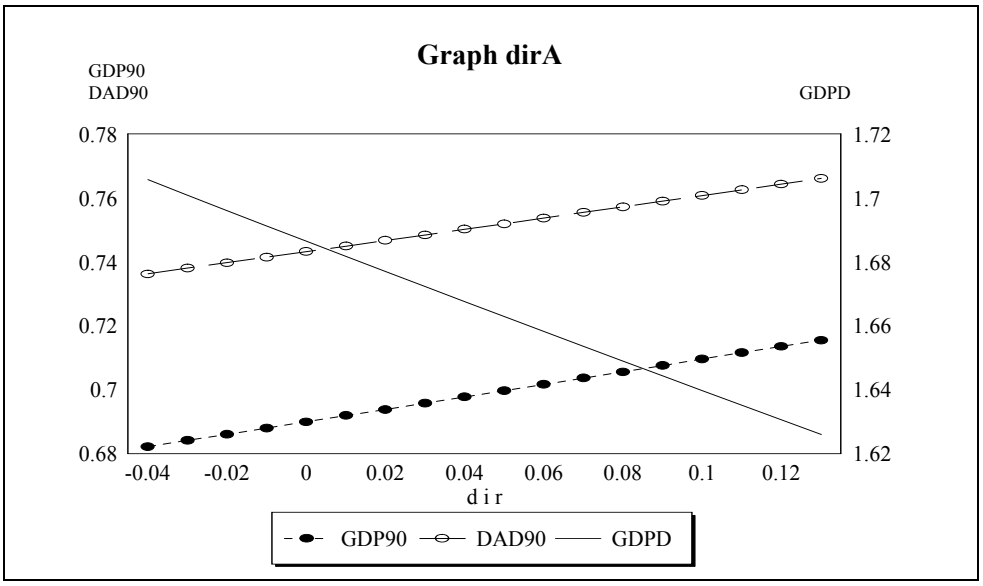
Broad money being constant, the real-nominal dichotomy drives back into rapidly extending monetary distortion: IMD represents 0.75 for EXTDR = 95 trill. ROL and 1.44 for the highest simulated level of EXTDR - 171.5 trill. ROL.



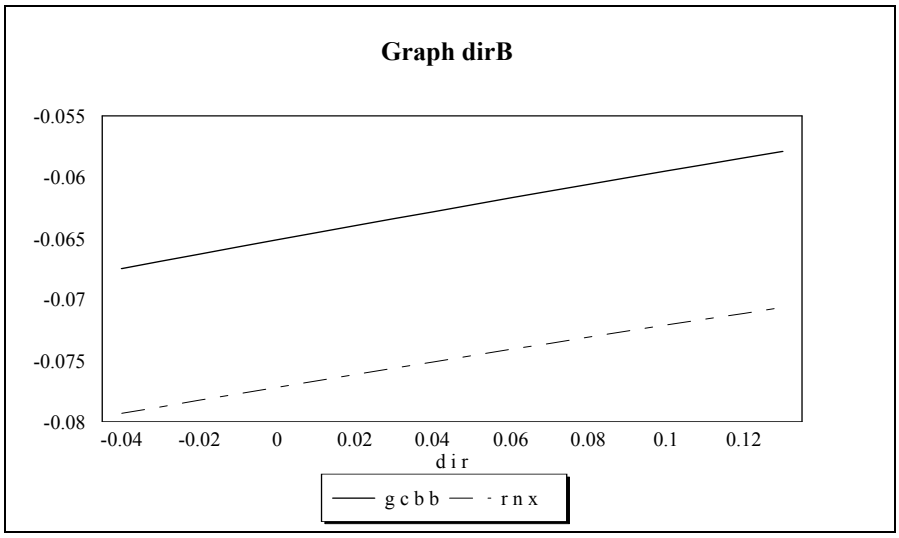
The budget deficit rate is permanently worsening. The foreign trade deficit, in USD, is growing too, from 2.1208 bill. USD for EXTDR = 95 to 2.6498 bill. USD for EXTDR = 171.5. As a rate (rnx) this tendency is distorted by the evolution of the real exchange rate (the ratio ER/CPI noted ERCPI in the Graph EXTDRB).

3) The variation of **dir** does not modify practically the rest of indicators except for one - the index of the monetary distortion. This is not surprising, because the main influence of the interest rate is exerted on the money velocity, in which IMD represents a balance factor. The macromodel is built on the assumption, confirmed by the Romanian experience (at least until now), that a restricted access to credit concomitantly with developing inflation, is significantly compensated by the extension of the inter-enterprise arrears and the disturbing form of "dollarization". This is why the sound functioning of the economy involves a drastic limitation of the monetary distortion by institutional and financial means (discussed in the second

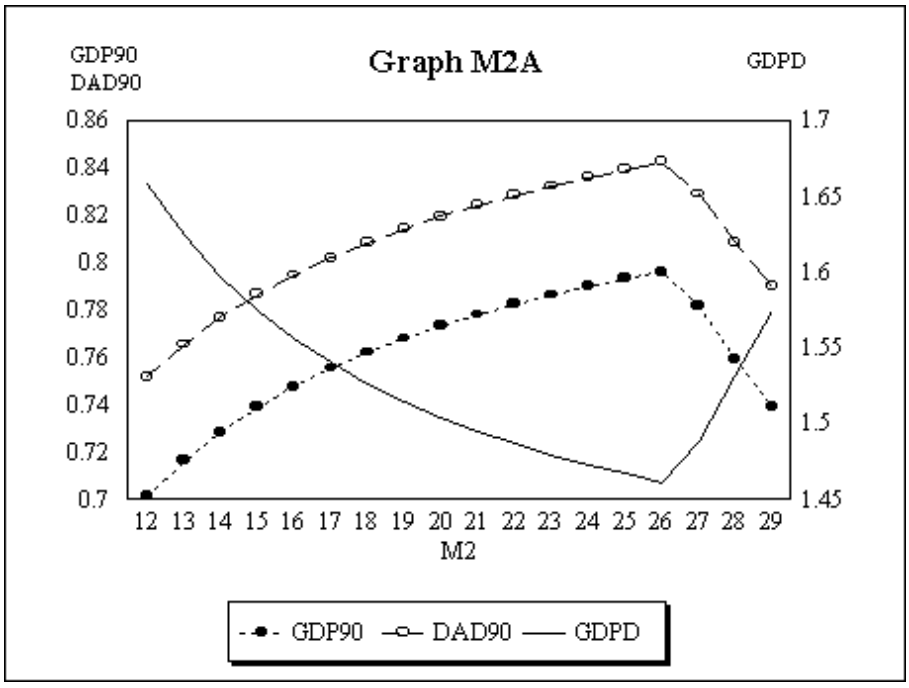
chapter). If monetary distortion is restrained, incorporating in the macro-model the condition β=1, then the influence of the **interest rate** becomes evident.



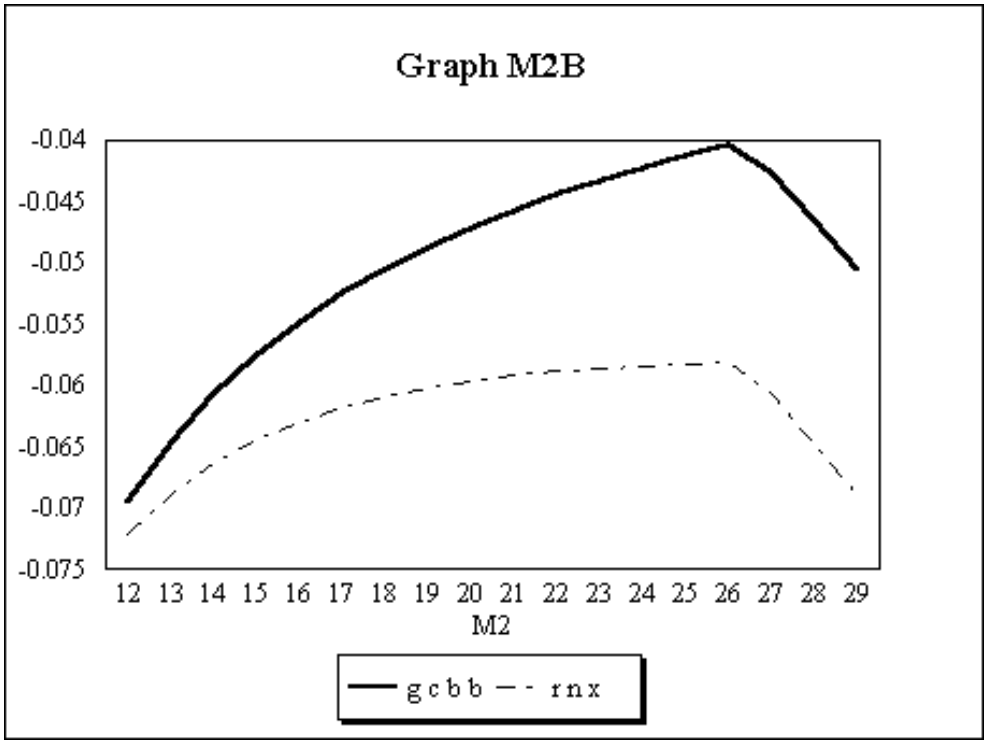
The Graph dirA shows a clear dependence of inflation on the interest rate, with corresponding consequences on the real output and the domestic absorption. Consequently, the influence of the variation of dir is translated into the main financial equilibria - budget deficit and foreign trade balance (Graph dirB).



4) The change of the **broad money** (**M2**) is also correlated with the monetary distortion.



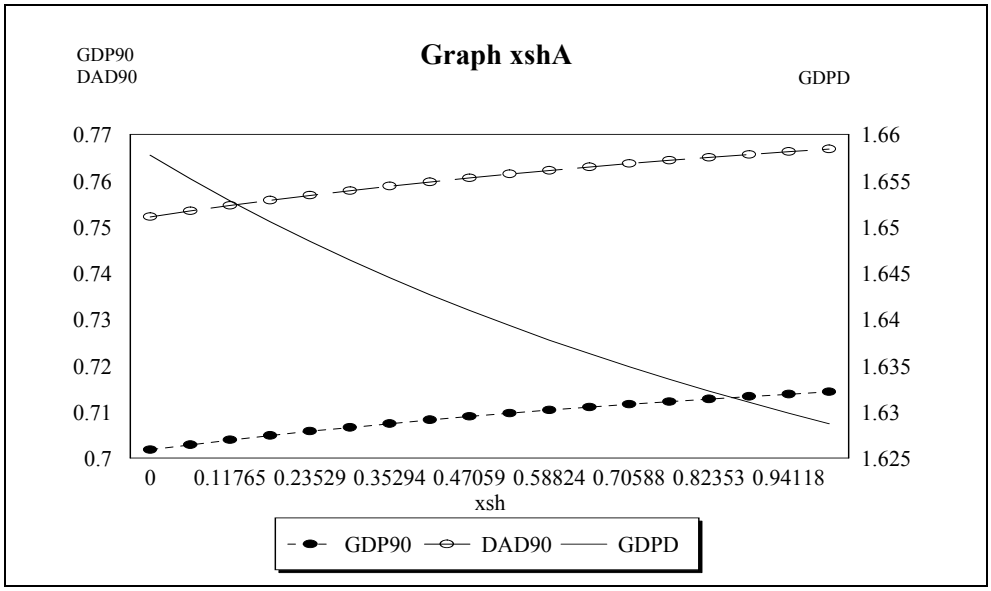
The increase in broad money means an easier access for the economic agents to credit. Being undercapitalised, the Romanian economy positively reacts to this development (obviously if the monetary distortion is reduced) and, in certain limits, real output grows and inflation rate diminishes, as well. But the effect of an increasing broad money does not end here. From the point where β=1, the extending broad money degenerates into an inflationary process, simultaneously with the decline of the real economy.



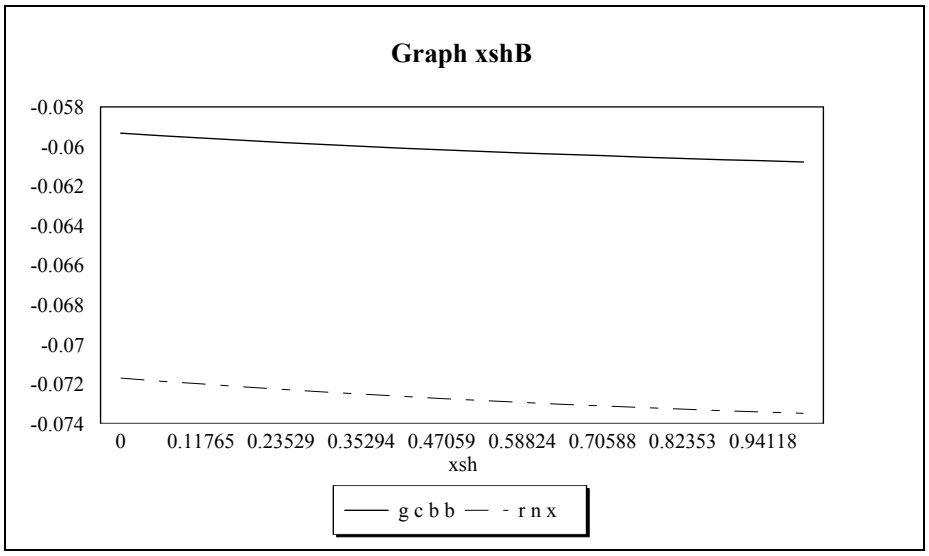
The budget deficit rate and the foreign financial rate show a similar trend, i. e. an improvement until β = 1 and a certain deterioration after this point.

Certainly, a possible desegregation of M2, using its main components, will allow a more relevant analysis of the monetary processes.

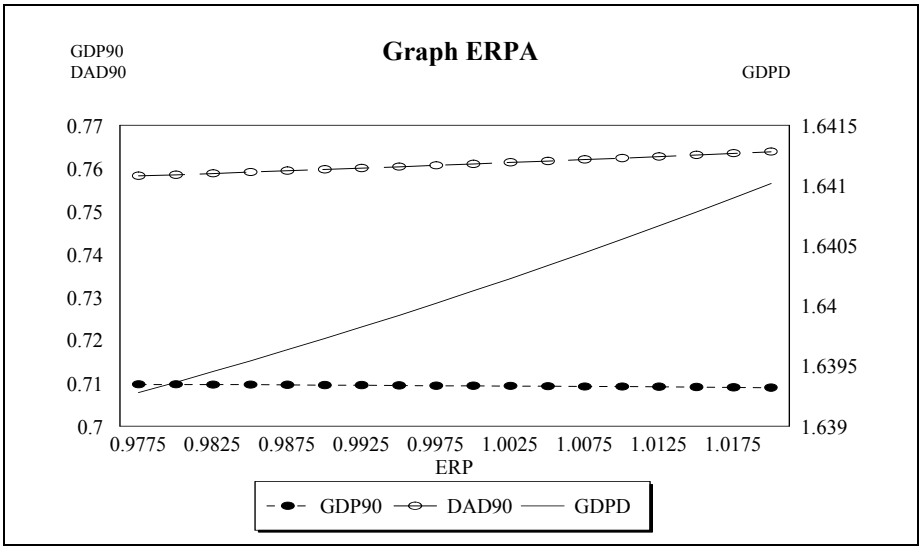
5) The change of the coefficient **xsh** has contradictory implications. Normally, its growth generates o diminution of both exports and imports. But, their rates are different. Consequently, the foreign trade deficit increases from 2.5368 bill. USD for xsh = 0 to 2.6261 bill. USD for xsh = 1. The corresponding rise of the real domestic absorption (DAD90) induces a growth of the real output (GDP90). Moreover, this stimulative effect (econometric coefficients c1 and c5) exceeds the negative influence of the reduction of the exports (econometric coefficients c2 and c6). These tendencies are described by the Graph xshA.



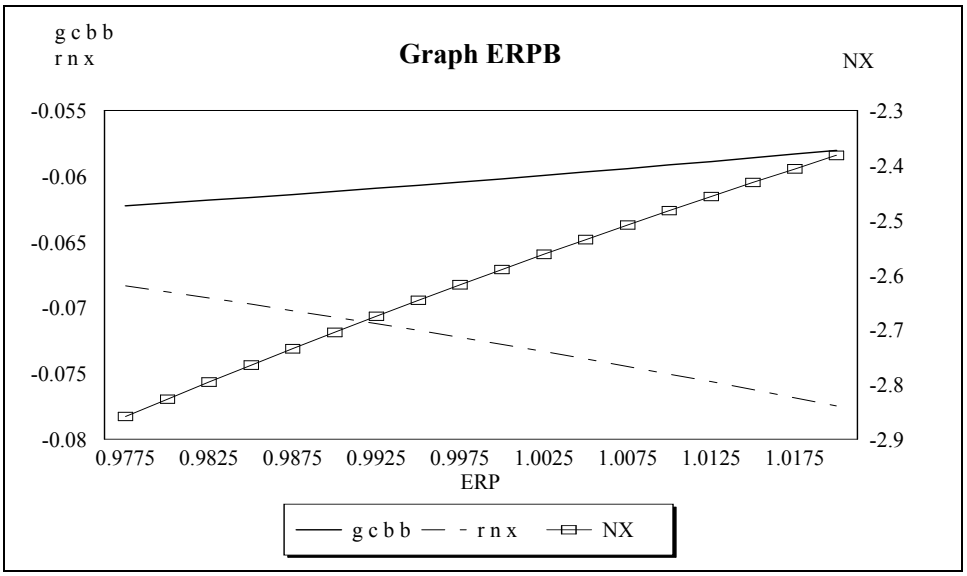
The rates gcbb and rns vary in a narrow band (Graph xshB).



6) The variation of the **exchange rate policy parameter (ERP)** has interesting effects. The real devaluation of the exchange rate (induced by the increasing ERP) ameliorates the foreign trade balance, without significant consequences upon the gross domestic product and the domestic absorption in constant prices. Its influence on inflation is limited, too.

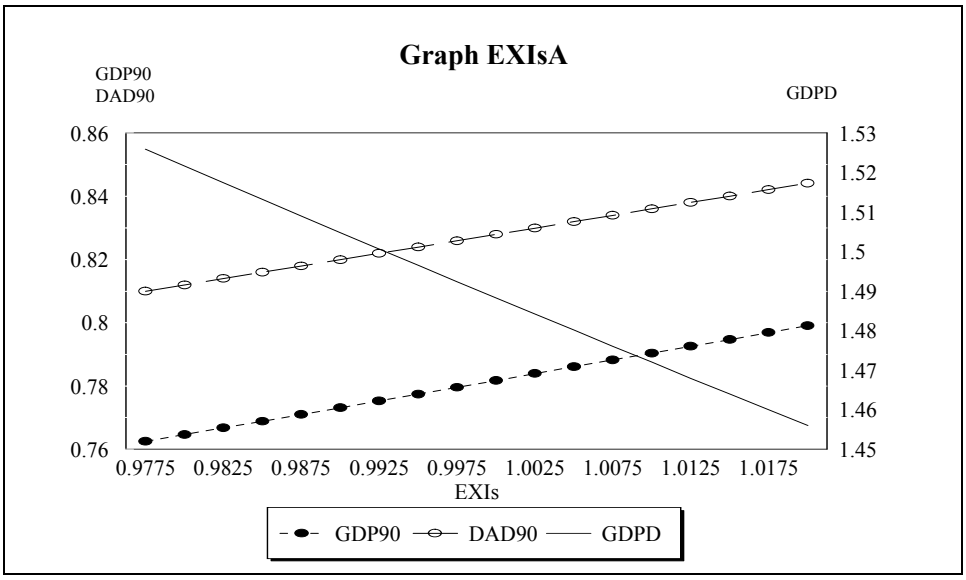


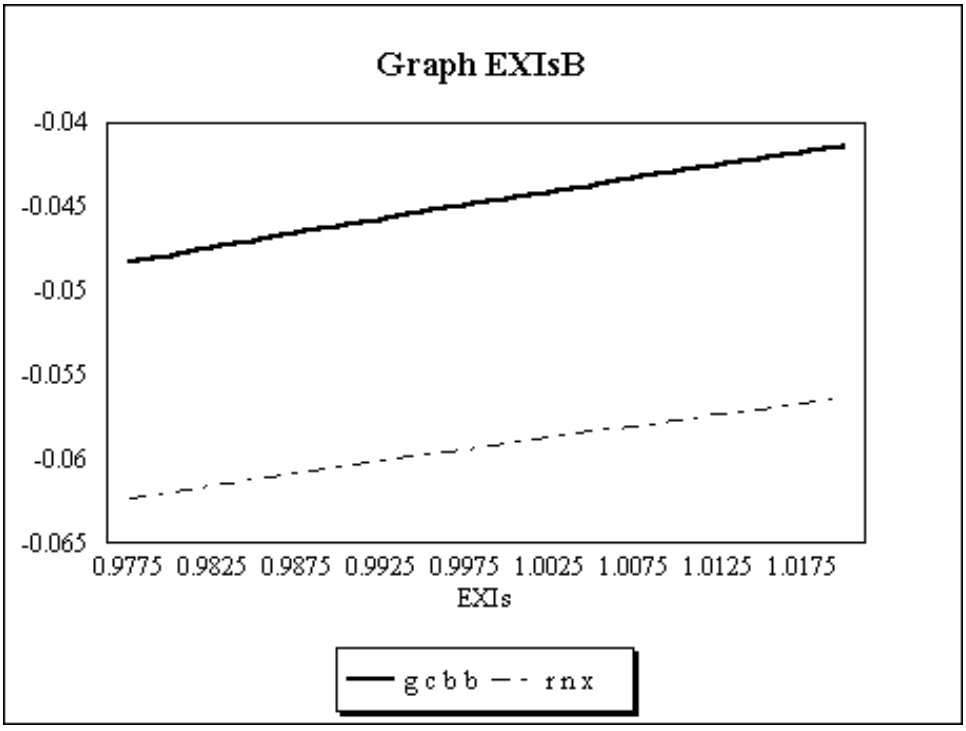
The budget deficit rate (gcbb) and the foreign financial rate (rnx) have divergent tendencies (Graph ERPB).



This is not a paradoxical result because the growth of ERP improves the foreign trade balance in USD concomitantly with its deterioration in national currency.

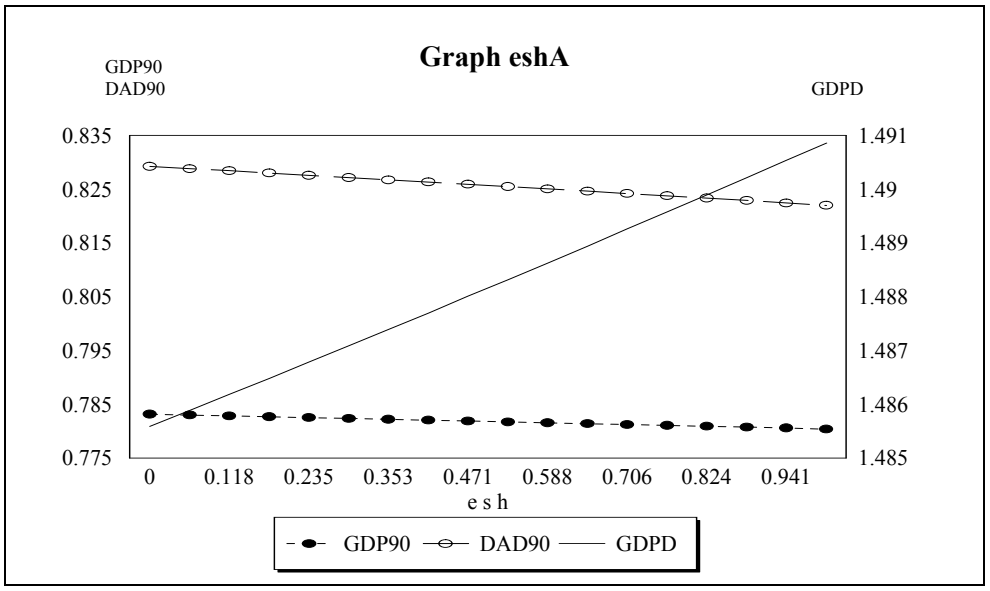
7) It would be necessary to see what happens if the **share of accounted economy in total gross domestic product** (created in accounted and non-accounted sectors) is changing. It is not a redundant question because this proportion depends on the economic environment, first of all on the institutional framework. For this purpose, Is is introduced as expected variable, that is EXIs. The estimation of GDP90 is correspondingly completed with endogenous variable AUND90, representing the part of non-accounted sector that begins to be registered in official national accounts. This transfer has implications not only for the numerical size of the accounted gross domestic product, but in what concerns other important processes, too: domestic absorption (including investments), foreign trade, budget incomes, money velocity, inflation and so on. The graphs EXIsA and EXIsB approximate them for a relatively large variation of examined factor.


Graph EXIsA
GDP90
DAD90
GDPD
0.86
0.84
0.82
0.8
0.78
0.76
1.53
1.52
1.51
1.5
1.49
1.48
1.47
1.46
1.45
0.9775 0.9825 0.9875 0.9925 0.9975 1.0025 1.0075 1.0125 1.0175
EXIs
GDP90 DAD90 GDPD


Graph EXIsB
-0.04
-0.045
-0.05
-0.055
-0.06
-0.065
0.9775 0.9825 0.9875 0.9925 0.9975 1.0025 1.0075 1.0125 1.0175
EXIs
gcbb rnx

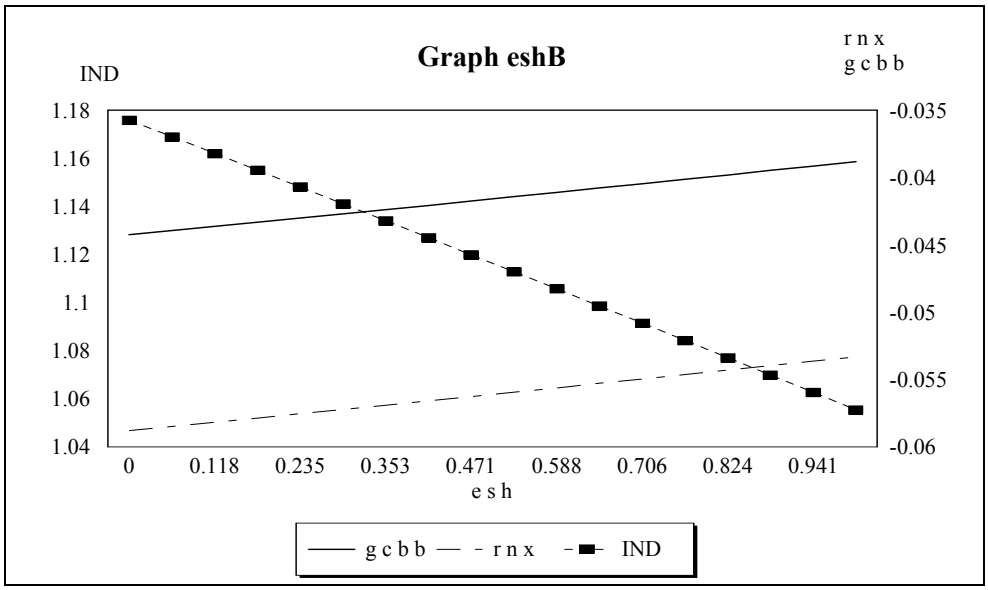
The positive influence of increasing weight of the accounted sector in the total real output is evident.

8) The following simulation refers to **esh parameter**, reflecting the characteristics and conditions of the labour market.



A decreasing esh ameliorates to a certain extent the main indicators (GDP90, XGSD). This limited positive effect is probably a corollary of the atrophied dependence of the real output on production factors.

The social burden, induced by the growth of the unemployment, cannot be sustained by improved economic performances. The gap between the domestic absorption and the domestic product increases, with the corresponding deterioration of both internal and external financial equilibria. These implications are linked with a decreasing esh.



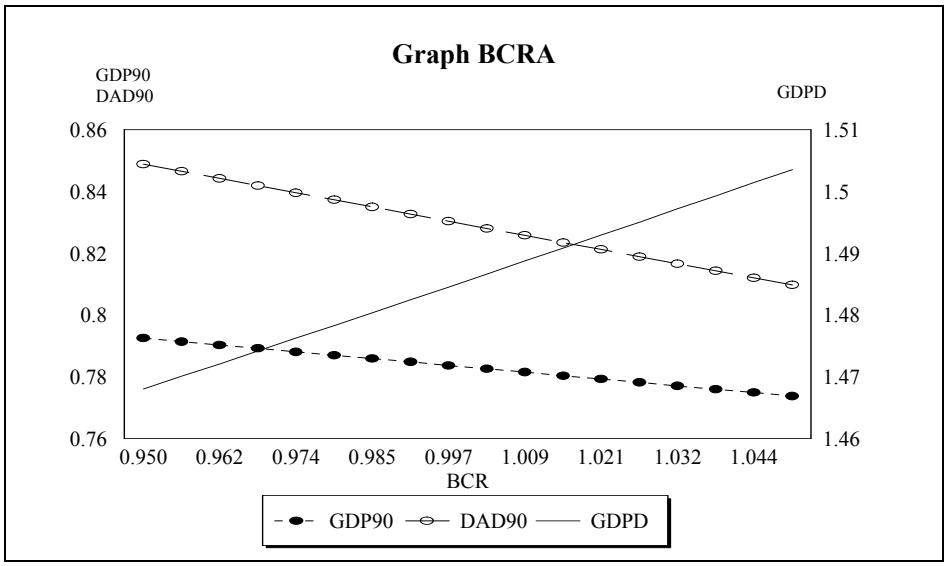
It is not superfluous to specify again that the macromodel is compatible with the short-run tendencies. The simulation is conceived under conditions of constancy of all the parameters defining structural transformation.

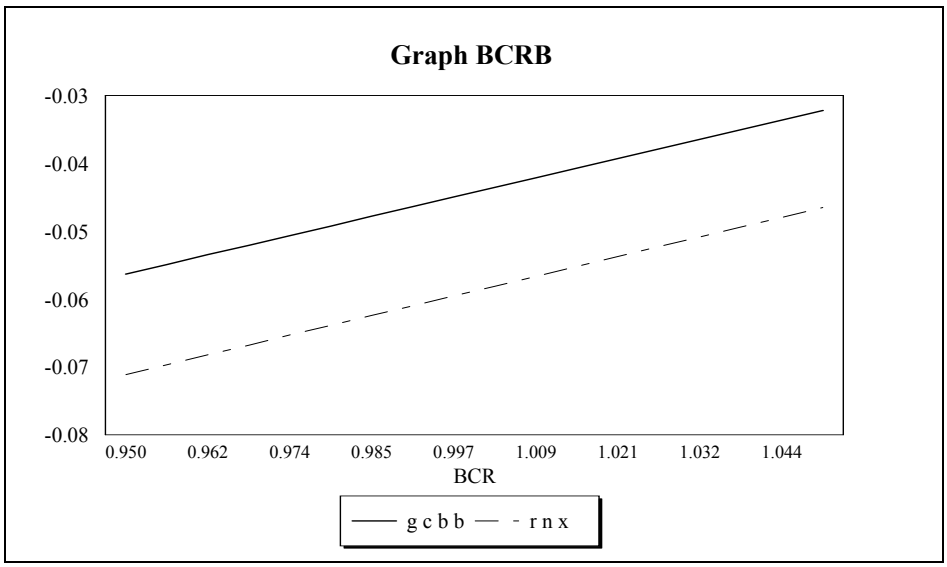
B) Insight of main financial equilibria (gcbb and rnx)

By introducing the policy parameters BC and XMC, the main financial equilibria (gcbb and rnx) can be examined from some relevant points of view.

1) In the case of gcbb, it is possible to simulate the implications of the separate and simultaneous variation of the fiscality and budget expenditures.

1.1) If **BCR operates in a proportional manner for all the budget revenues**, the consequences are presented in the Graphs BCRA and BCRB.

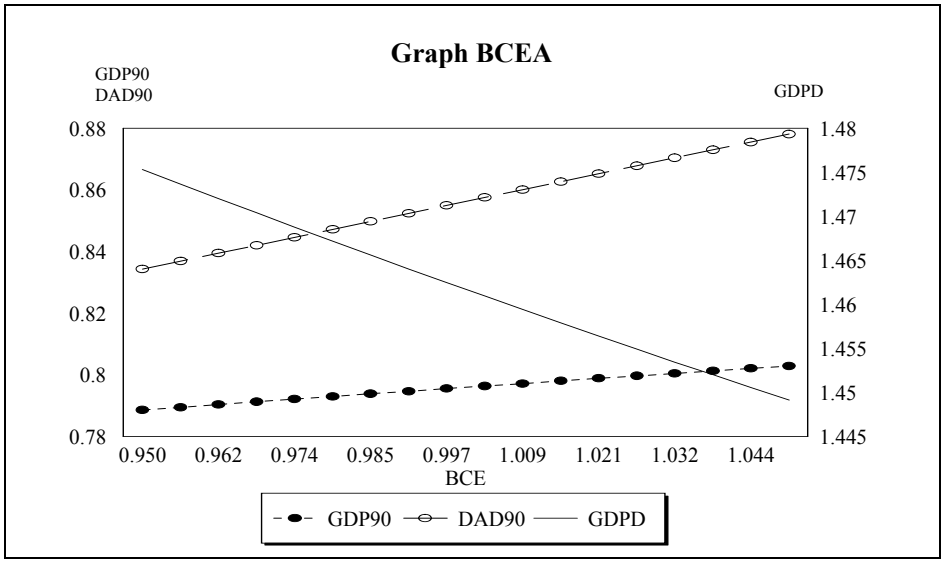


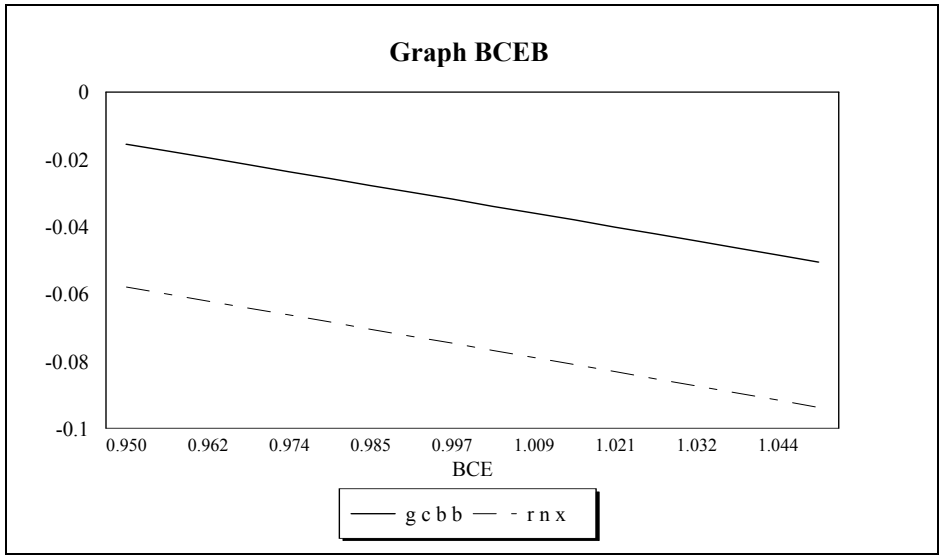


A reduction of the budget deficit can be expected under conditions of an intensifying fiscality. However, this is obtains with an unpleasant cost: a contraction of the real domestic absorption more severe than the decline of

the gross domestic product in constant prices. Unemployment increases. The inflation is also higher.

1.2) The tendencies are rather converse if **BCE operates in a similar way, affecting in the same proportion all the budget expenditures**.

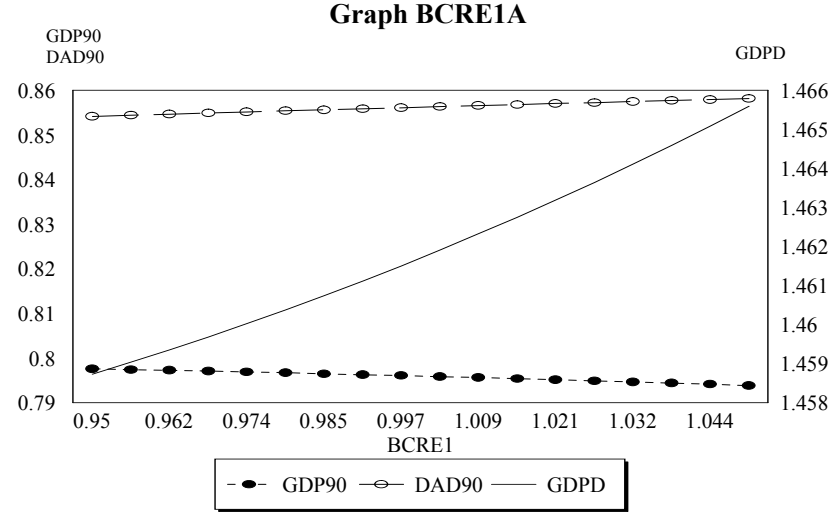




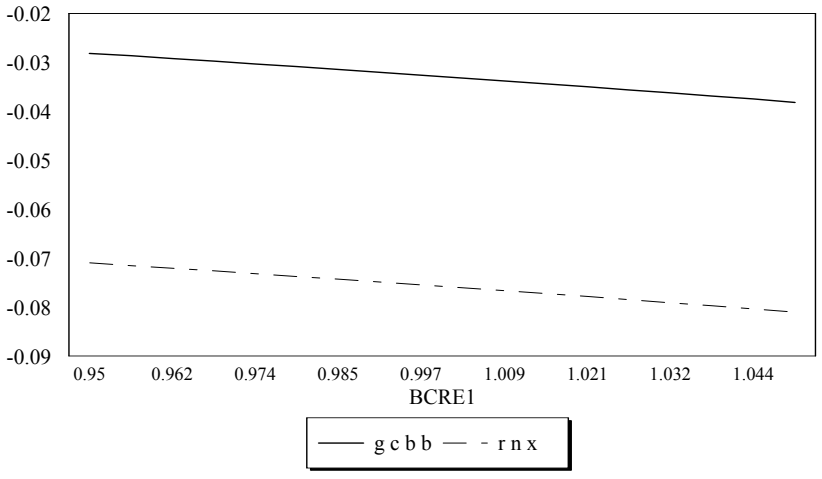
The main financial disequilibria amplify with the increase of BCE. Instead, the real output of economy and the inflation change positively.

1.3) The **simultaneous variation of the budget revenues and expenditures** is simulated in the Graphs BCRE1A and BCRE1B.

Graph BCRE1A

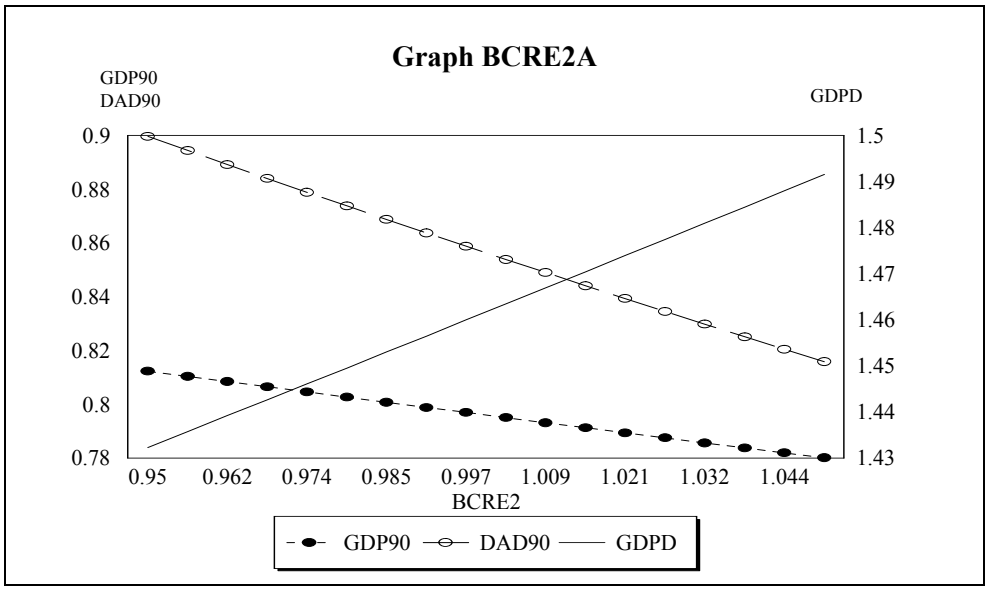


Graph BCRE1B

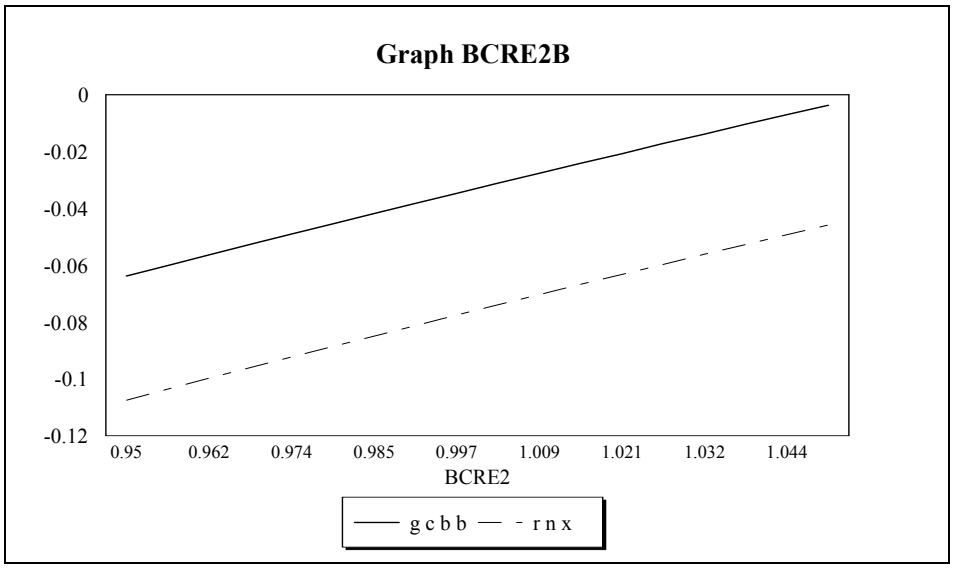


It is remarkable to establish that the negative effects of both anterior scenarios (BCR and BCE) are present. If the budget revenues and expenditures extend, the real output decreases concomitantly with the deterioration of the budget deficit rate and of the foreign trade deficit. The unemployment growths, too.

1.4) If the **influence of the budget policy parameter is direct for revenues** (these are multiplied by BCRE2) **and inverse for expenditures** (these are divided by BCRE2), the implications are more complicated.



The increase of BCRE2 (from 0.95 to 1.05) induces a significant reduction of the gross domestic product in constant prices. Consequently, the unemployment and inflation amplify. The contraction of the domestic absorption is so important that both deficit rates (gcbb and rnx) register impressive improvements.



In other words, a high fiscality and austere budget expenditures can determine a rapid diminishment of the main financial disequilibria, but only under conditions of a strong restrictive income policy and of a deep economic recession.

1.5) The following table contains the simulation's results for extremities of the chosen interval.

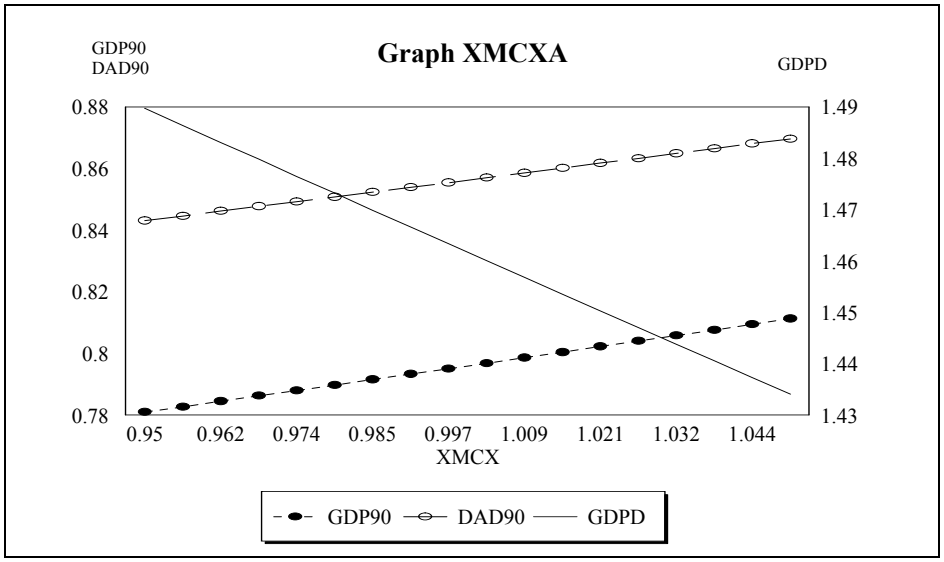
Table No. 10

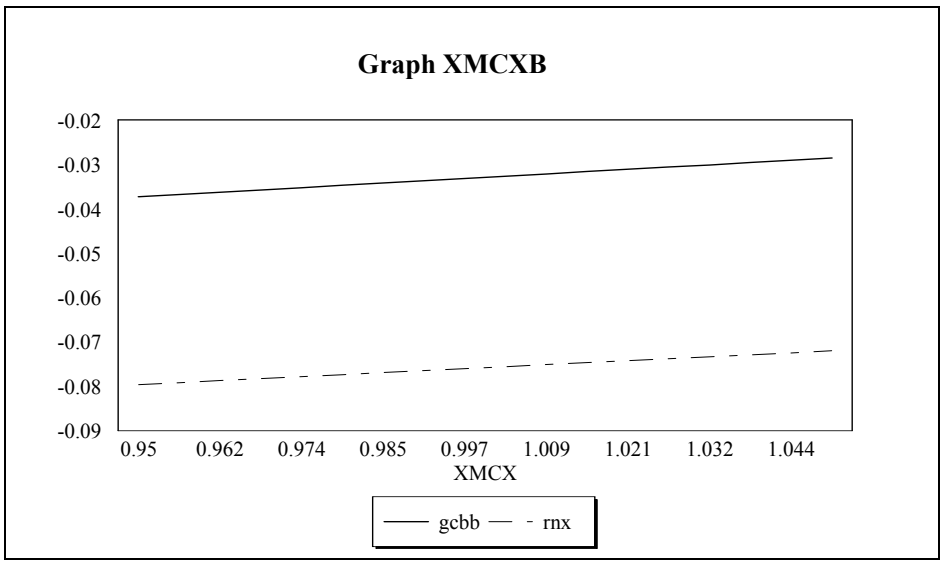
Simulation variant	BC = 0.95				BC = 1. 05			
	GDP90	gcbb	rnx	NX	GDP90	gcbb	rnx	NX
BCR	0.793	-0.056	-0.071	-2.691	0.774	-0.032	-0.047	-1.737
BCE	0.789	-0.016	-0.058	-1.363	0.803	-0.051	-0.094	-2.221
BCRE1	0.798	-0.028	-0.071	-1.679	0.794	-0.038	-0.081	-1.907
BCRE2	0.812	-0.064	-0.107	-2.562	0.780	-0.004	-0.046	-1.070

The policies oriented to the limitation of the centralised redistribution of the national income are characterised by low BC. The increase of this coefficient means a converse orientation, that is to the strengthening of the state intervention. Obviously, the BCRE2 strategy has intermediate position from the discussed here point of view.

2) The foreign trade balance lends itself to a similar analysis.

2.1) In the case of an **export oriented policy (the exports are multiplied by XMCX)**, the simulations are presented in the Graphs XMCXA and XMCXB.

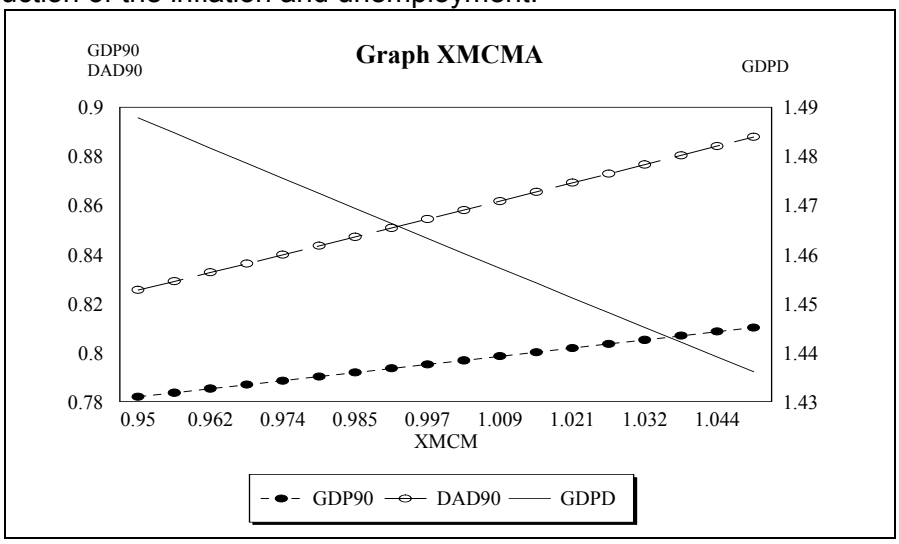




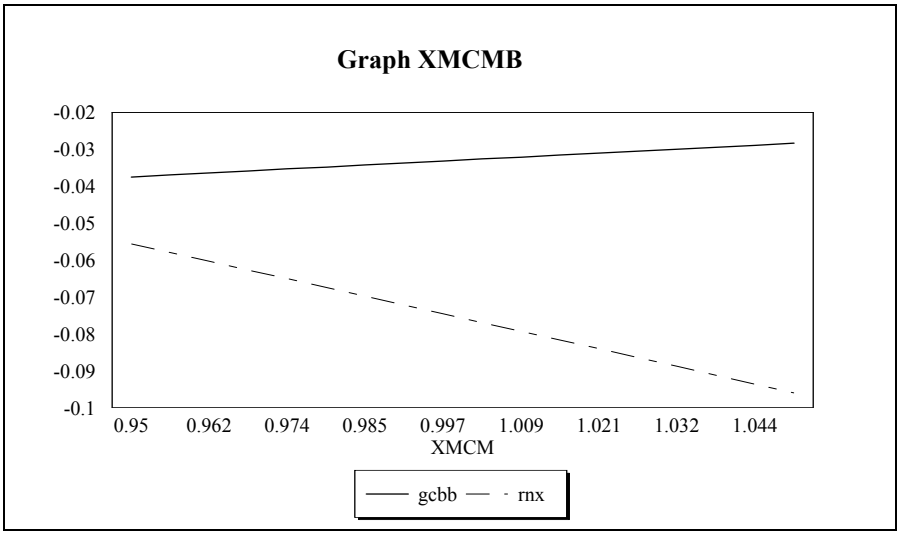
All the significant economic indicators register positive changes under growing XMCX: the real output and the exports increase; the inflation di-

minishes; both internal (gcbb) and external (rnx) equilibria improve; the unemployment restraints.

2.2) The **import oriented policy (the imports are multiplied by XMCM)** also stimulates the real output and exports, with the corresponding reduction of the inflation and unemployment.

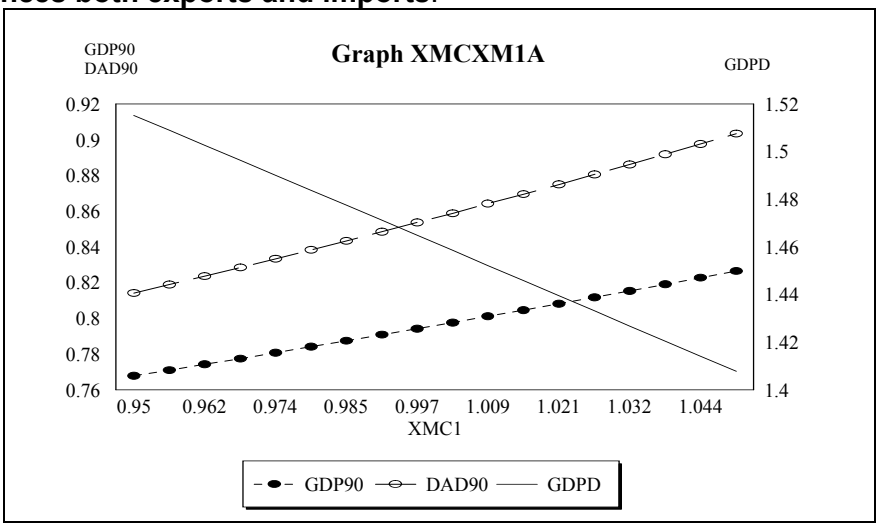


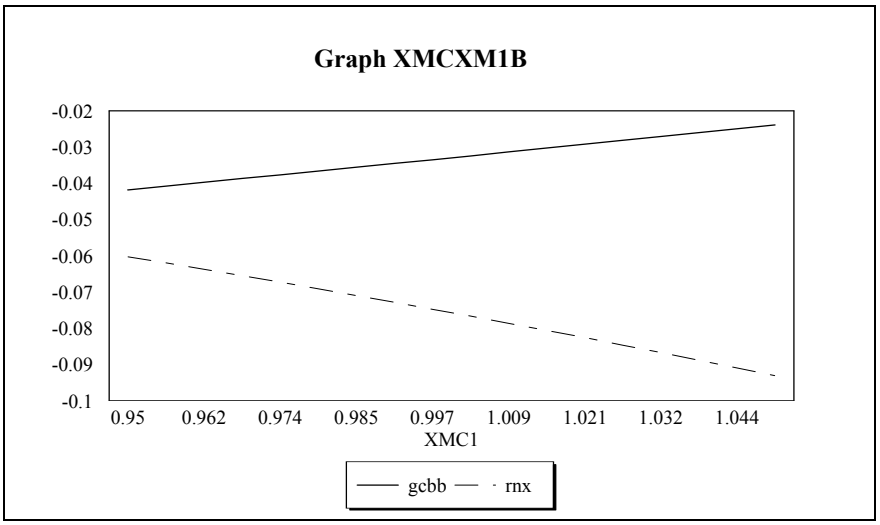
The budget deficit rate decreases.



But all the mentioned favourable effects involve an important deterioration of the foreign trade balance. Its deficit increases from 1.3 bill. USD for XMCM = 0.95 to 2.3 bill. USD for XMCM = 1.05. It is evident that a similar policy can be practised only for a short period because of foreign financial constraints.

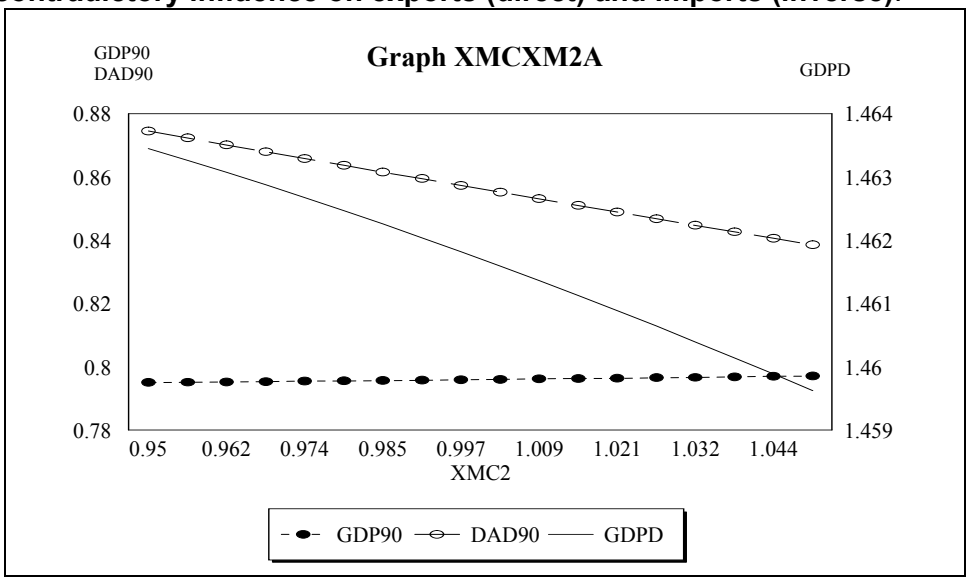
2.3) The consequences are similar if **XMC1 coefficient equally influences both exports and imports**.

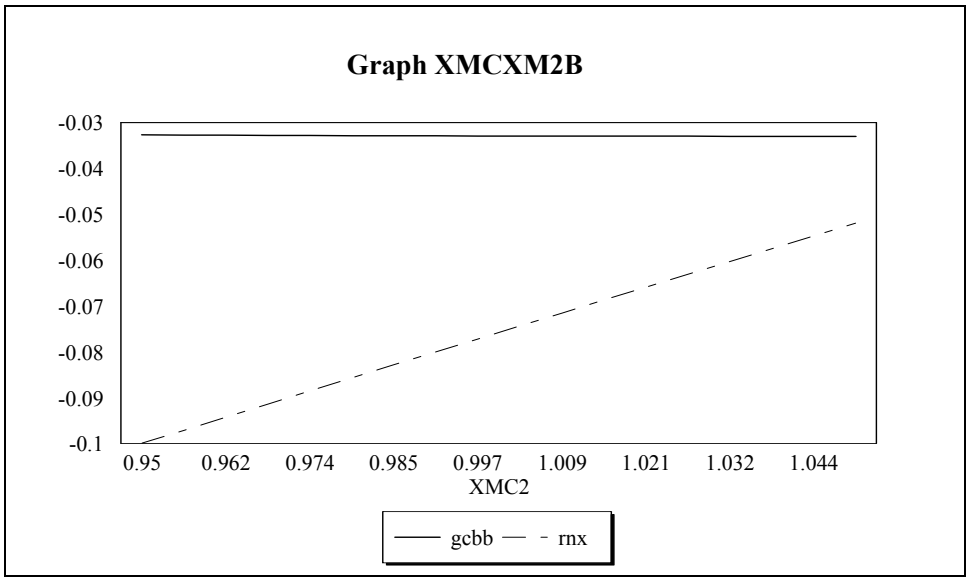




The real output, inflation, unemployment, and budget deficit rate improve, but the foreign trade balance registers a deterioration.

2.4) Of course, the **foreign trade policy parameter can exercise a contradictory influence on exports (direct) and imports (inverse)**.





The real output, unemployment, inflation, and budget deficit rate practically do not change, if the parameter XMC2 increases. Only the foreign trade balance registers an important improvement.

2.5) The results of the previous simulations are synthesised in the Table No. 11.

Table No. 11

Simulation variant	BC = 0.95				BC = 1. 05			
	GDP90	gcbb	rnx	NX	GDP90	gcbb	rnx	NX
XMXC	0.781	-0.037	-0.080	-1.857	0.811	-0.029	-0.072	-1.718
XMCM	0.782	-0.038	-0.056	-1.299	0.810	-0.028	-0.096	-2.288
XMCXM1	0.768	-0.042	-0.060	-1.394	0.826	-0.024	-0.093	-2.246
XMCXM2	0.795	-0.033	-0.100	-2.356	0.797	-0.033	-0.052	-1.228

It seems plausible to assert that the growing XMC corresponds to an open economy strategy, whilst the decreasing one reveals an orientation to a closed economy. The XMCXM2 variant is mixed, but their chances are reduced because of the foreign constraints.

3) If gcbb and rnx (separately or together) are considered as policy targets being exogenously given, the parameters BC and XMC (in any variant) become endogenous variables. In this case, they can be interpreted as a necessary modification of the macroeconomic policies in order to reach the expected gcbb or rnx. These possibilities have been illustrated by the 1996 and 1997 versions of the macromodel.

C) Going back to EXTDR

EXTDR and M2 have been considered until now as given global estimations. The 1998 version of the macromodel introduces some important changes in this respect.

1) EXTDR is decomposed into three parts.

1.1) It is possible to determine a reference level of the expected disposable income (noted REXTDR) starting from the nominal income reached at the end of the previous year. Usually, December nominal income (MNR12) is higher than the annual average. For instance, the ratio $12 \cdot MNR12/NR$ has had the following evolution:

1991	1.879
1992	1.832
1993	1.868

1994	1.437
1995	1.286
1996	1.281

Taking into account this ratio, the reference level of the expected disposable income can be estimated as follows:

$$\mathrm{REXTDR} = \mathrm{GDP}(-1) \cdot \frac{12 \cdot \mathrm{MNR12}(-1)}{\mathrm{NR}(-1)}$$

1.2) The proportion in which the reference level is amended depends on many institutional, social and political circumstances, generally on global environment in which the economy is developing. **All these influences will be aggregated into parameter crev**. Its estimation is possible using different methods. One of these is to consult a representative sample of competent and well informed specialists working in parliament commissions, government agencies, enterprises, banks, trade unions, academic institutions, economic publications etc.

Therefore, a questionnaire needs to be established in such manner as to allow the conversion of the obtained information to quantitative indicators usable in the determination of the disposable revenues of the households, firms, general consolidated budget.

It is possible to elaborate a special model based on the relations of the national accounts and some essential coefficients defining the macroeconomic environment (fiscal, commercial and monetary policies, social pressure etc.). For instance, DRP, GRP, GLEE, GCBR, GOS, DRF, GVA and DRB can be integrated in such a model. Considering that DISC = 0, these indicators are linked by the accounting relations:

$$\mathrm{DRP} = (1 - \mathrm{btp}) \cdot \mathrm{GRP}$$

$$\mathrm{GRP} = \mathrm{GLEE} + \mathrm{gcbep} \cdot \mathrm{GCBR} + \mathrm{gosp} \cdot \mathrm{GOS}$$

$$\mathrm{GCBR} = \mathrm{vatcd} \cdot \mathrm{TDR} + \mathrm{gosb} \cdot \mathrm{GOS} + \mathrm{btp} \cdot \mathrm{GRP}$$

$$\mathrm{DRF} = (1 - \mathrm{gosp} - \mathrm{gosb}) \cdot \mathrm{GOS}$$

$$\mathrm{GOS} = (1 + \mathrm{sub} \cdot \mathrm{eab}(1 - \mathrm{subp})) \cdot \mathrm{TDR} - (\mathrm{GLEE} + \mathrm{vatcd} \cdot \mathrm{TDR})$$

$$\mathrm{GVA} = (1 - \mathrm{vatcd}) \cdot \mathrm{TDR}$$

$$GLEE = ler \cdot GVA$$

$$DRB = GCBR - [gcbep \cdot GCBR + sub \cdot eab \cdot (1 - subp) \cdot TDR]$$

Solving this system, we determine the multipliers (denoted with suffix M):

$$DRPM = \frac{TDR}{DRP} = \frac{GRPM}{1 - btp}$$

$$GRPM = \frac{TDR}{GRP} = \frac{1}{lrr + \frac{gcbep}{GCBRM} + \frac{gosp}{GOSM}}$$

$$GCBRM = \frac{TDR}{GCBR} = \frac{1}{vatcd + \frac{gosb}{GOSM} + \frac{btp}{GRPM}}$$

$$DRFM = \frac{TDR}{DRF} = \frac{GOSM}{1 - gosp - gosb}$$

$$GOSM = \frac{TDR}{GOS} = \frac{1}{1 + sub \cdot eab \cdot (1 - subp) - vatcd - lrr}$$

$$GVAM = \frac{TDR}{GVA} = \frac{1}{1 - vatcd}$$

$$GLEEM = \frac{TDR}{GLEE} = \frac{GVAM}{ler}$$

$$DRBM = \frac{TDR}{DRB} = \frac{1}{\frac{1 - gcbep}{GCBRM} - sub \cdot eab \cdot (1 - subp)}$$

If the consulted sample comprises n specialists, i =1,2.....n, it is possible to calculate n estimations of SOTDR(i) (the usual symbol is completed with prefix SO accounting for sociological information). In order to define an average crev, these estimations are aggregated:

$$crev = \frac{\sum_{i=1}^{n} SOTDR(i)}{n \cdot GDP(-1)} : \frac{12 \cdot MNR12(-1)}{NR(-1)}$$

Obviously, these sociological investigations take place before the forecast time interval. Therefore, the estimations reflect the characteristics of the existing macroeconomic environment. Consequently, we can use the statistical coefficients (for the last period) btp, gcbep, gosp, gosb, vatcd, sub, eab, subp and ler. It is possible to adopt a prospective solution, including in the questionnaire the predictable changes (in 2-3 variants) of the fiscal, commercial, monetary policies etc. In this case, the system will be transformed substituting the statistical coefficients with provisional ones defining the macroeconomic environment, and with corresponding multipliers.

The individual estimations of the specialists participate in the global determination of crev with equal weights. If there are sufficient reasons, these weights can be differentiated, taking into account the professional credibility of the authors and their decision-making authority.

The parameter crev has registered the following evolution:

1992	1.456
1993	1.814
1994	1.330
1995	1.014
1996	1.174

The characteristics of the electoral cycle, discussed in the second chapter, can here found again in the series of crev.

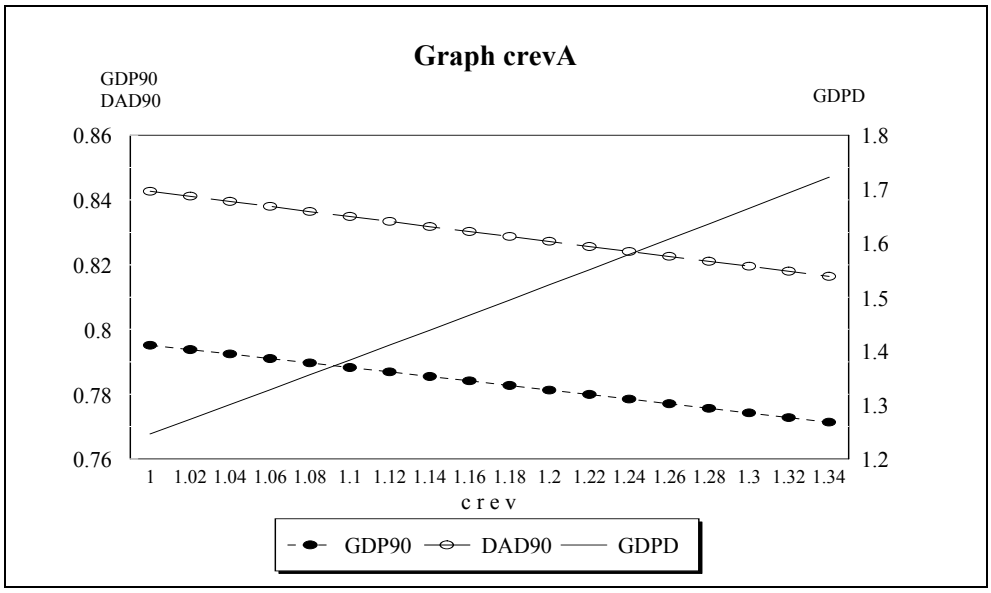
1.3) The presented algorithm estimates EXTDR under the assumption of non-inflationary budget deficit. If this deficit is partially financed by inflationary sources (direct or indirect money creation, arrears, etc.), EXTDR estimation must be corrected. Why? Because the households and firms, knowing the inflationary intention of the authorities, will try to compensate the potential losses by supplementary nominal income. The **coefficient EXninf**, as an exogenous variable, **represents the proportion in which the budget deficit is covered by non-inflationary sources**.

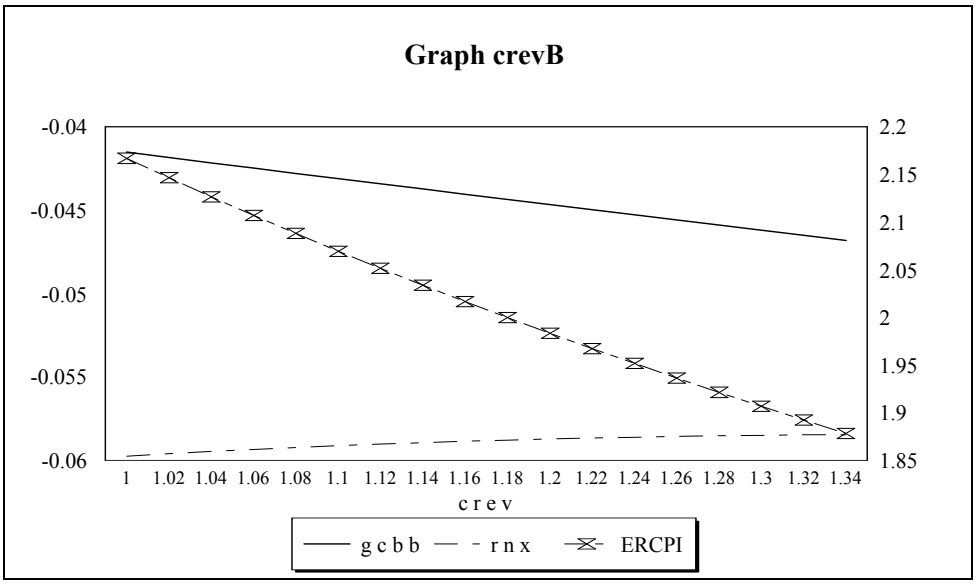
2) Finally, the 1998 version of the macromodel operates with the following determination of EXTDR:

$$\mathrm{EXTDR} = \mathrm{GDP}(-1)\cdot\frac{12\cdot\mathrm{MNR12}(-1)}{\mathrm{NR}(-1)}\cdot\mathrm{crev}\cdot\left[1-\mathrm{gcbb}\cdot\left(1-\mathrm{EXn\,inf}\right)\right]$$

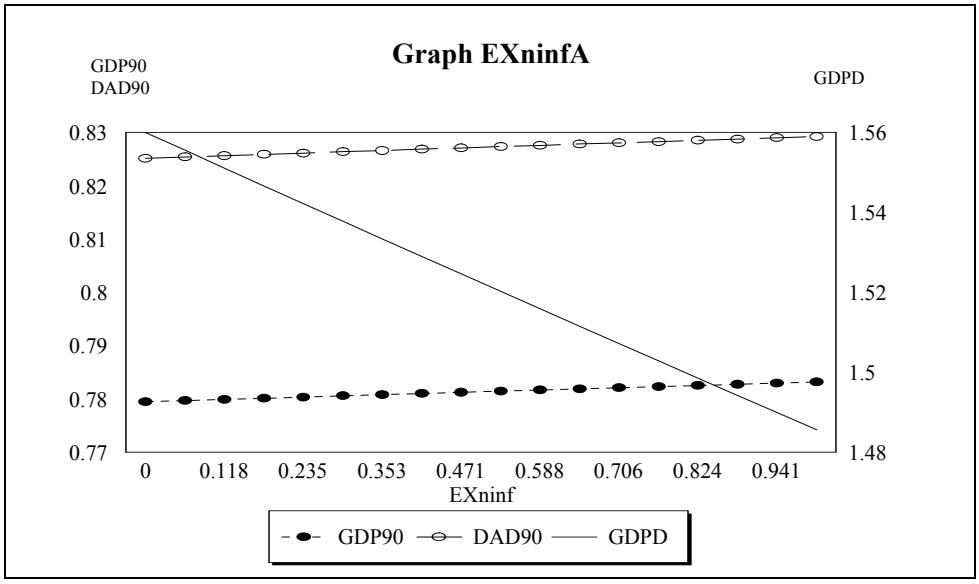
This determination can be considered as a better approximation of the present behaviour of the Romanian transition economy.

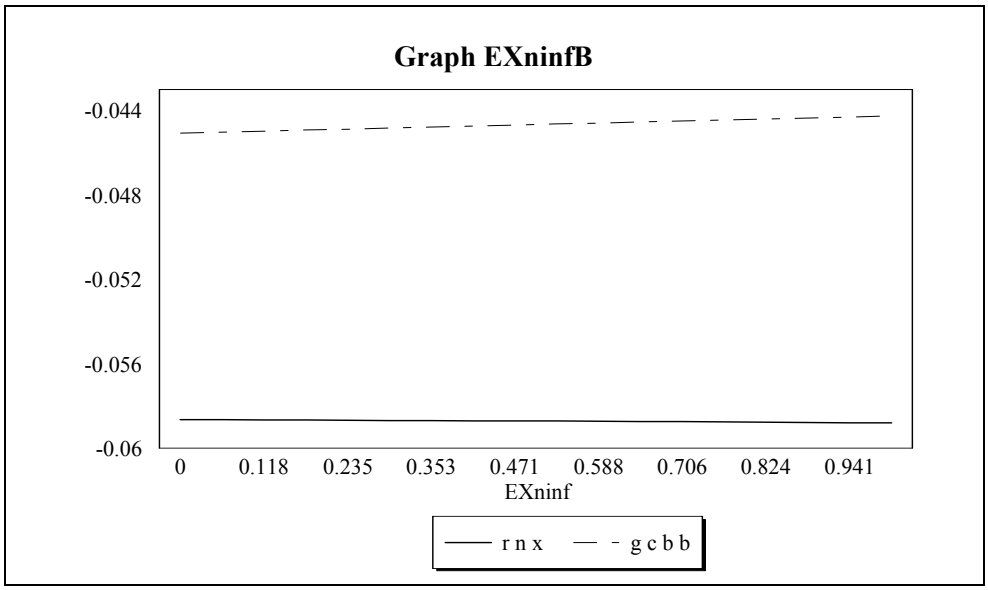
2.1) We can illustrate the implications of **crev** using the previous system, for 1996. The simulations concern a large interval of crev (from one to 1.34), under conditions when M2 is constant and EXninf = 1.





2.2) If crev and M2 are constant, the **effects of the variation of EXninf** (from zero to one) are presented in the Graphs EXninfA and EXninfB.



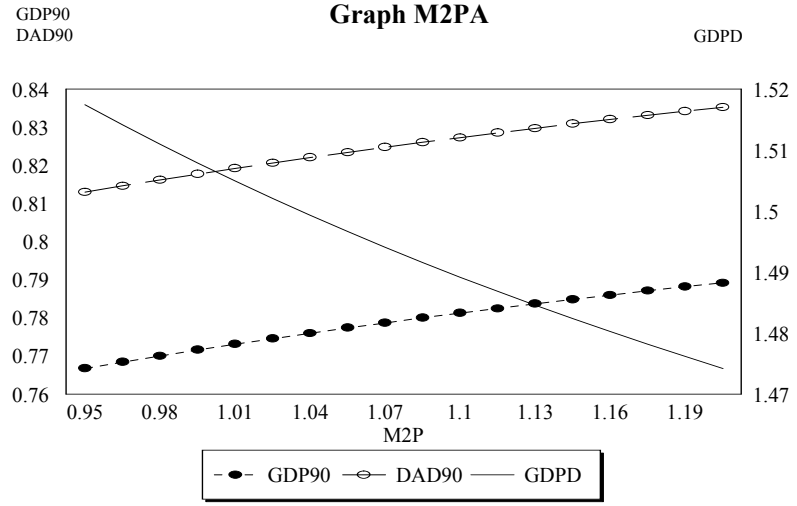


3) The last version of the macromodel links the broad money with the expected disposable income:

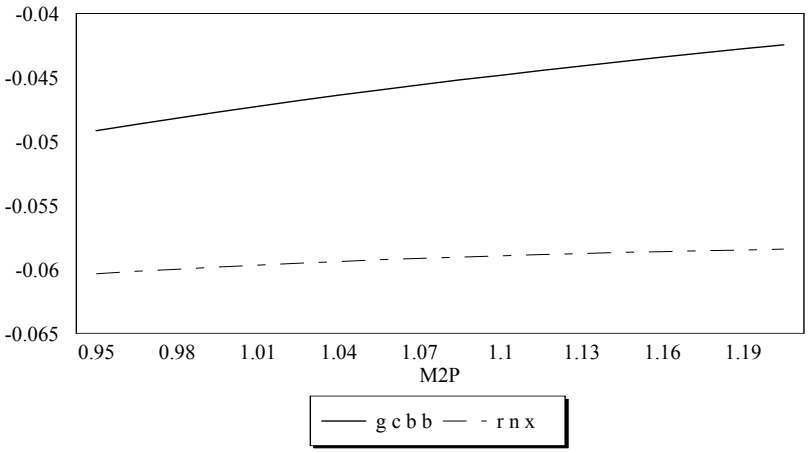
$$M2 = M2(-1) \cdot \frac{EXTDR}{GDP(-1)} \cdot M2P$$

in which **M2P** is an exogenous **parameter of the monetary policy**. It reflects the intentions of the Central Bank concerning the evolution of the money velocity. The Graphs M2PA and M2PB describe the possible consequences of the variation of M2P from 0.95 to 1.205.

Graph M2PA



Graph M2PB



x x x

The simulations presented in this chapter must be cautiously interpreted, taking into consideration the adopted in each case assumptions and, especially, the circumstance that usually only one exogenous was changed.

7 Forecast estimations for 1998-2000

As I have already underlined, it is difficult to predict with reasonable probability the long-run evolution of the Romanian economy because of its weakly structured system. However, the short-run forecasts are possible, the 1998 version of the macromodel offering many opportunities in this field.

1) The estimations, presented in this chapter, are based on the provisional statistical results for 1997. In what concerns the demographic indicators, the corresponding block of the macromodel generates the following levels:

	1998	1999	2000
Population, mill. pers. (P)	22.543	22.5	22.455
Population over 15 years of age, mill. pers. (AP)	18.211	18.241	18.298
Labour force, mill. pers. (LF)	10.102	10.154	10.183
Social insurance retired people, mill. pers. (RP)	5.5	5.469	5.492
State social insurance retired people (excluding farmers), mill. pers. (RP1)	3.8543	3.805	3.82

In order to simplify scenarios' construction, a great part of the exogenous variables are assumed to be constant in all years. These concern preponderantly the budget policy:

tpn	0.04282	otp	0.01603	eab	0.06916
scf	0.29157	tre	0.32125	sub	0.19924
wst	0.20153	una	0.36667	subp	0
vat	0.09248	sa	0.13798	obe	0.14699
cd	0.03119	ehcms	0.98	oe	0.01
obr	0.15774	ndpo	0.97826	gw2	0.6

These coefficients are based on the 1997 levels and preliminary budget estimations for 1998. Of course, their constancy for 1998-2000 is a disputable hypothesis. Nevertheless, it has been adopted because a better does not exist. Besides, this assumption does not distort the basic signification of the macromodel forecasts.

2) The possible scenarios for 1998-2000 are differentiated by the rest of the exogenous variables. They define three fundamental components of the macroeconomic environment:

a) income policy, characterised by crev, BCR, BCE, and EXninf;

b) monetary policy, described by M2P, dir, and ERP;

c) structural changes, reflected in xsh, esh, XMCX, XMCM, rinvd, resd, and EXIs.

The last category synthesises the consequences especially on the following transition processes: the intensity and sectorial orientation of the privatisation of the state ownership; the development degree of the markets (goods and services, labour, capital) and of their mechanisms; the stage and effectiveness of the introduction of corporate governance; the implications of the fiscality and of the general consolidated budget expenditures; the size of the monetary distortion; the evolution of the money supply and of the asymmetry of the liquidities; the nature of the commercial policies; the institutional, technological and behavioural adjustments involved by the progressive integration of Romania into European and world economy; the amplitude of the foreign capital investments; the social and political context; the proportion, objectives, and modalities of the government intervention into economic life; the efficiency of the fight against the corruption, monopolist positions, fiscal evasion.

The possible evolution of the variables defining the mentioned policies (income, monetary, and structural), including numerical illustrations for 1988-2000 are listed in the Table No 12.

Table No. 12

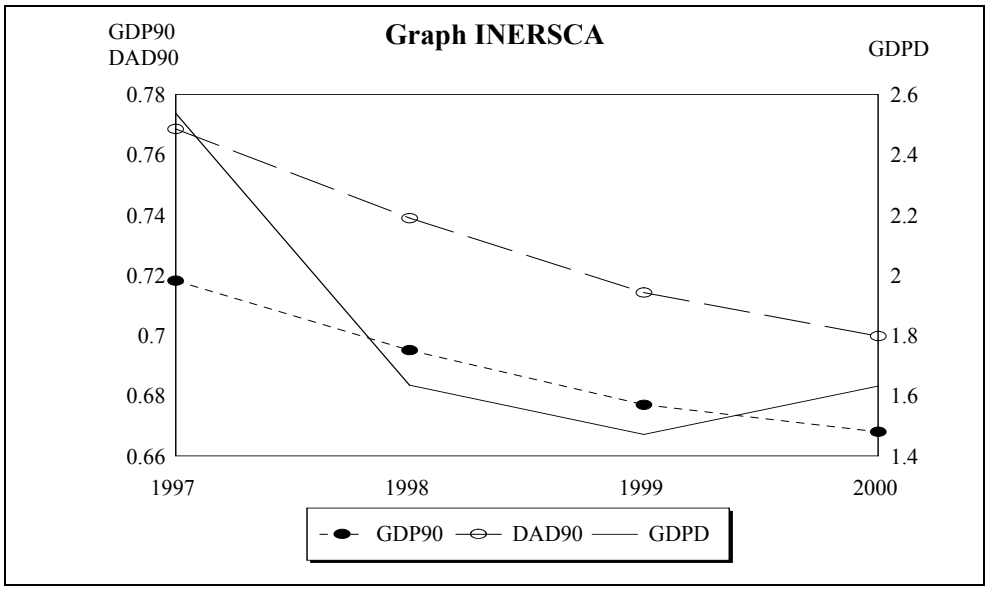
Exogenous variables differentiating the main scenarios of the Romanian transition economy

Variables	Possible tendencies and corresponding policies	Numerical illustrations		
		1998	1999	2000
crev	Conservation of the previous electoral cycle (crev1)	1.32972	1.0144	1.17358
	Lax income policy (crev2)	1.42	1.1	1.2
	Restrictive income policy (crev3)	1.2	1.0144	1.1
M2P	Re-monetisation of the Romanian economy (M2P1)	1.05	1.15	1.15
	Neutral monetary policy (M2P2)	1	1	1
	Restrictive monetary policy (M2P3)	0.95	0.95	0.95
dir	Real positive interest rate (dir1)	0.04	0.04	0.04
	Real zero interest rate (dir2)	0	0	0
	Real negative interest rate (dir3)	-0.04	-0.04	-0.04
ERP	Accelerated devaluation of the national currency (ERP1)	1.01	1.01	1.01
	Normal evolution of the exchange rate (ERP2)	1	1	1
	Revaluation of the national currency (ERP3)	0.99	0.99	0.99
xsh	Stationary share of the market determination of exports (xsh1)	0.35	0.35	0.35
	Active pro-market policy (xsh2)	0.05	0.05	0.05
esh	Employment oriented policy (esh1)	0.9	0.9	0.9
	Intensive productivity oriented policy (esh2)	0.4	0.4	0.4
BCR	Expansive fiscality (BCR1)	1.025	1.025	1.025
	Stationary fiscality (BCR2)	1	1	1
BCE	Restrictive general consolidated budget expenditures (BCE1)	0.975	0.975	0.975
	Stationary general consolidated budget expenditures (BCE2)	1	1	1
EXninf	Inflationary general consolidated budget deficit (EXninf1)	0	0	0
	Mixed financing of the general con-			

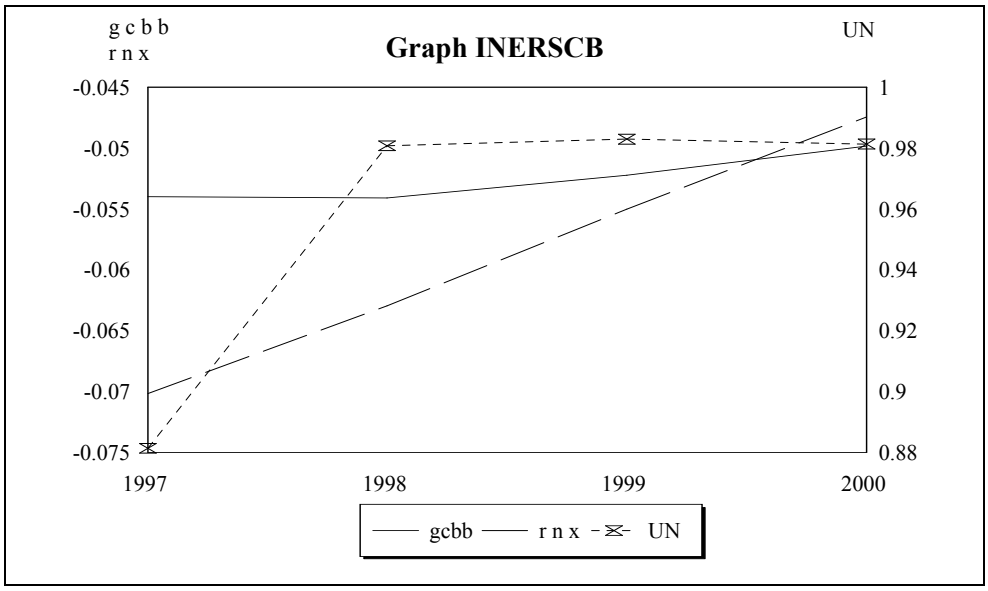
	solidated budget deficit (EXninf2)		0.5	0.5	0.5
	Non-inflationary general consolidated budget deficit (EXninf3)		1	1	1
XMCX and XMCM	Passive foreign trade policy (XMC1)	XMCX	1	1	1
		XMCM	1	1	1
	Export oriented policy (XMC2)	XMCX	1.01	1.02	1.03
		XMCM	1	1	1
	Import restrictive policy (XMC3)	XMCX	1	1	1
		XMCM	0.98.	0.98	0.98
rinvd	Ambiguous signals for the foreign capital (rinvd1)		0.005	0.005	0.005
	Attractive business environment for the foreign capital (rinvd2)		0.01	0.015	0.02
resd	Slow restructuring process (resd1)		0	0	0
	Intensive restructuring process (resd2)		0.03	0.03	0.03
EXIs	Passive policy concerning non-accounted economy (EXIs1)		The econometric functions are valid		
	Active policy against the fiscal evasion, corruption, etc. (EXIs2)		1.005	1.015	1.02

These variables can be combined in many ways, obtaining a large number of the possible trajectories of the Romanian transition economy. I propose to retain six of them, having a clear qualitative identification. They will be named: INERSC, EIEMSC, RIRMSC, EIRMSC, RIEMSC, RESSC.

3) The first (INERSC) is conceived on the main tendencies of the last years and can be considered as an inertial scenario. It combines the following variants of the exogenous variables listed in the Table No.12: crev1; M2P2; dir2; ERP2; xsh1; esh1; BCR2; BCE2; EXninf2; XMC1; rinvd1; resd1; and EXIs1.



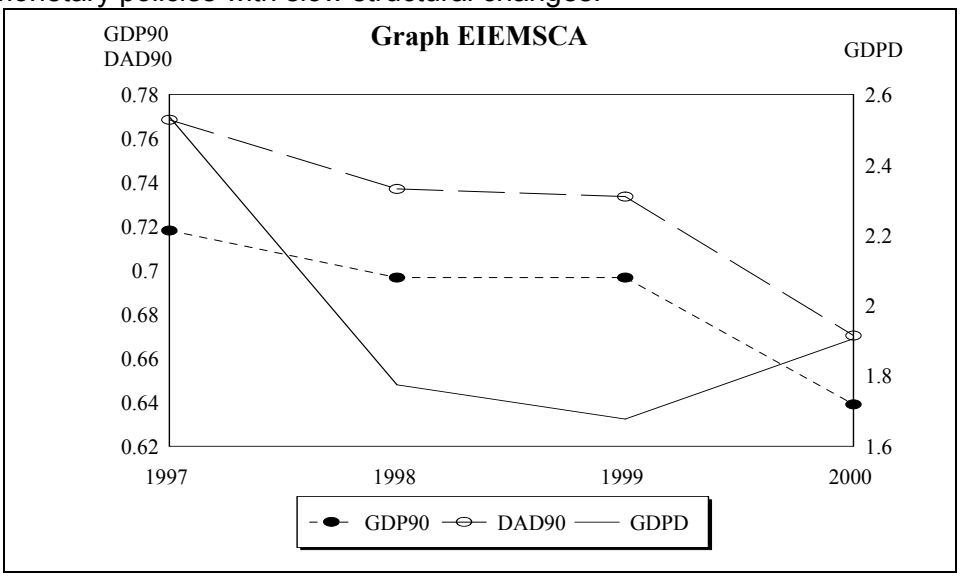
The decline of the real output continues, but with diminishing rates. Normally, the inflation remains high.



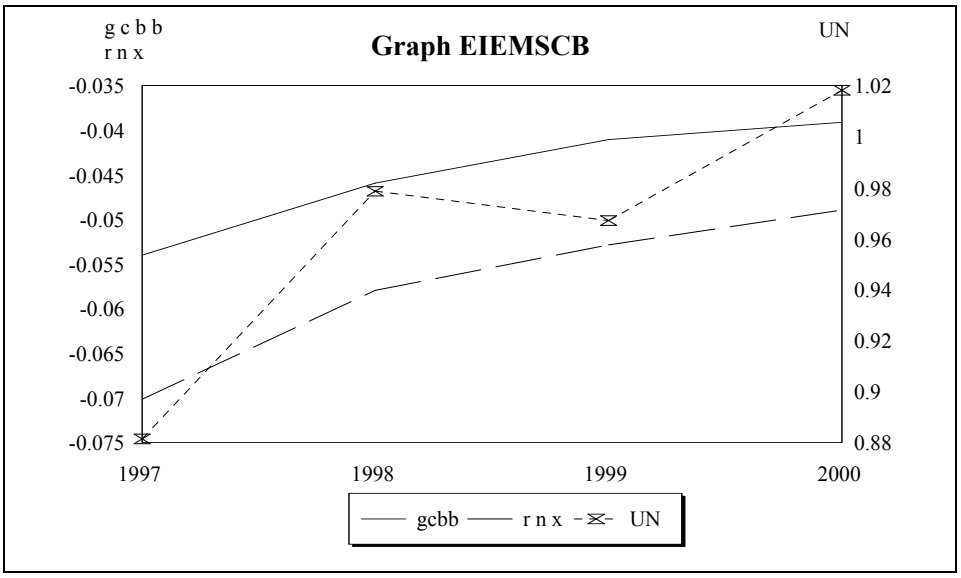
The budget deficit rate does not register significant changes. The improvement of the external financial equilibrium is only relative: the deficit of the foreign trade represents 2.8 bill. USD in 1998, almost 2.9 bill. USD in 1999 and approximately 3 bill. USD in 2000.

It is interesting to mention that monetary distortion does not decrease despite the global economic decline.

4) The next scenario (EIEMSC) is built on the components: crev2; M2P1; dir3; ERP1; xsh1; esh1; BCR1; BCE2; Exninf1; XMC1; rinvd1; resd1; and EXIs1. In other words, it combines the expansive income and monetary policies with slow structural changes.

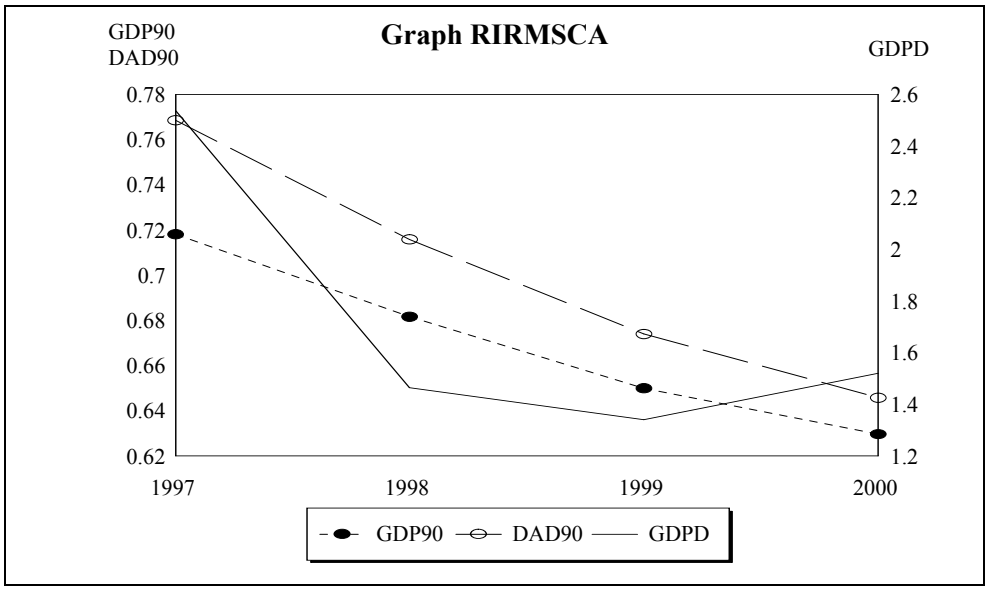


The simple examination of the Graph EIEMSCA is enough to understand that only the "cheap money" policy is not a viable solution. The rapid "re-monetisation", not accompanied by other necessary changes in the real economy, degenerates into hyperinflation.

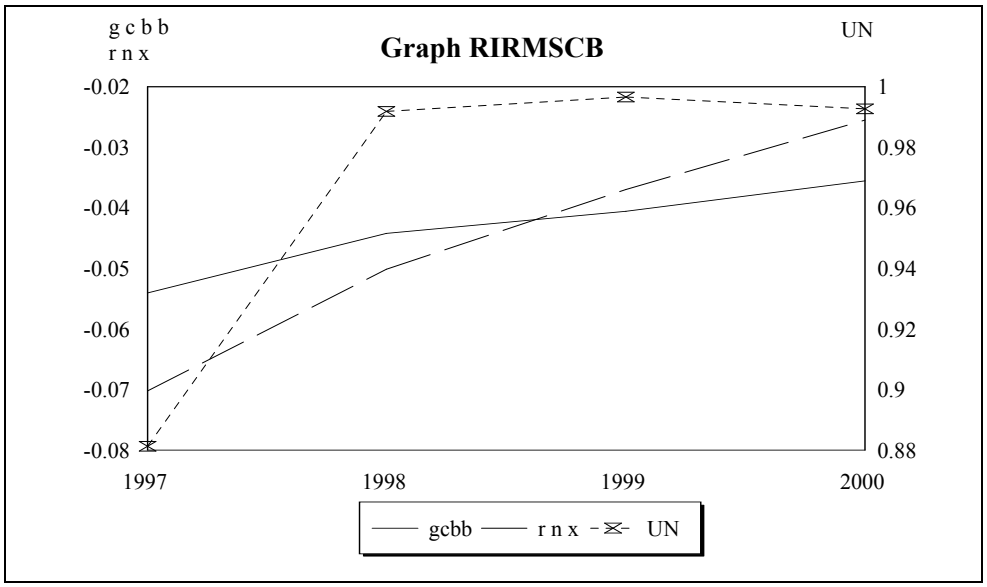


The improvement of the budget deficit rate is based on a drastic contraction of the real domestic absorption, including the investments. The devaluation of the national currency ameliorates the balance of the foreign trade in dollars (the deficit decreases to 2.4 bill. USD in 1998, almost 2.2 bill. USD in 1999 and 1.9 bill. USD in 2000). Due to the same devaluation of the national currency, the relative reduction of the foreign financial deficit (rnx) is limited.

5) The scenario RIRMSC can be considered as a mirror of the previous one. It combines: crev3; M2P3; dir1; ERP3; xsh1; esh1; BCR2; BCE1; Exninf3; XMC1; rinvd1; resd1; and EXIs1. Both income and monetary policies are restrictive, under conditions of slow structural transformations.

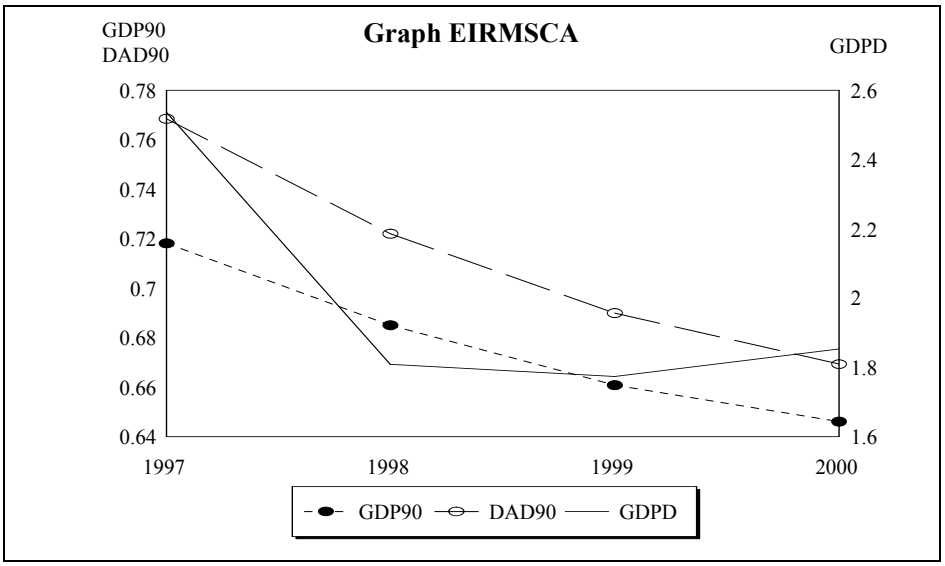


The negative rate of the real output is more accentuated than for the previous scenarios. The decline of the exports is dramatic (average rate -10.88%). Despite the restrictiveness of both income and monetary policies, the inflation is high. The explanation is the rapid growth of the monetary distortion (coefficient β increases from 1.32 in 1997 to 1.72 in 2000).

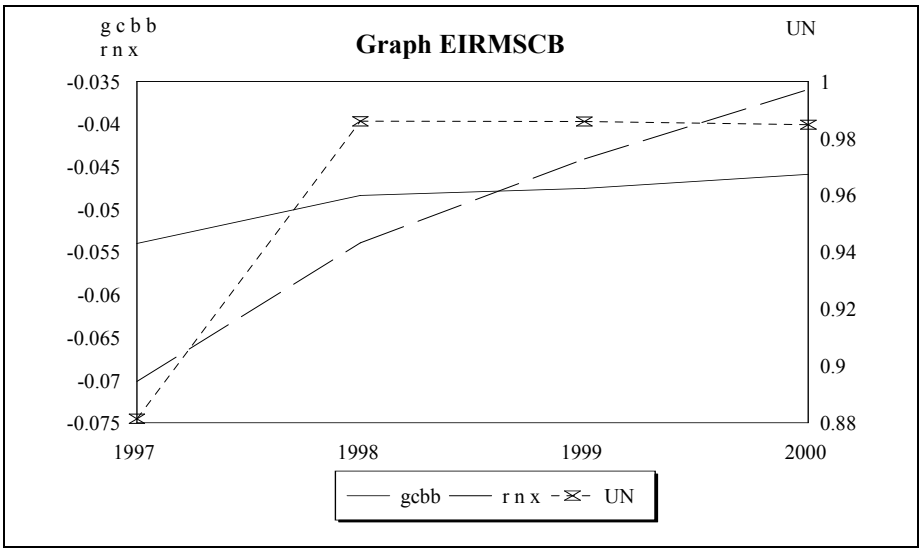


The severe contraction of the real domestic absorption reduces the budget deficit rate. The deficit of the foreign trade practically does not change (2.4 bill. USD in 1998 and 1999, and 2.2 bill. USD in 2000); the diminution of rnx is a result of the revaluation of the national currency.

6) The contradictory macroeconomic policies are not significantly better. For instance, the scenario EIRMSC is built on the following premises: crev2; M2P3; dir1; ERP3; xsh1; esh1; BCR1; BCE2; Exninf1; XMC1; rinvd1; resd1; and EXIs1. The income policy is lax whilst the monetary one is restrictive. The structural changes remain limited.

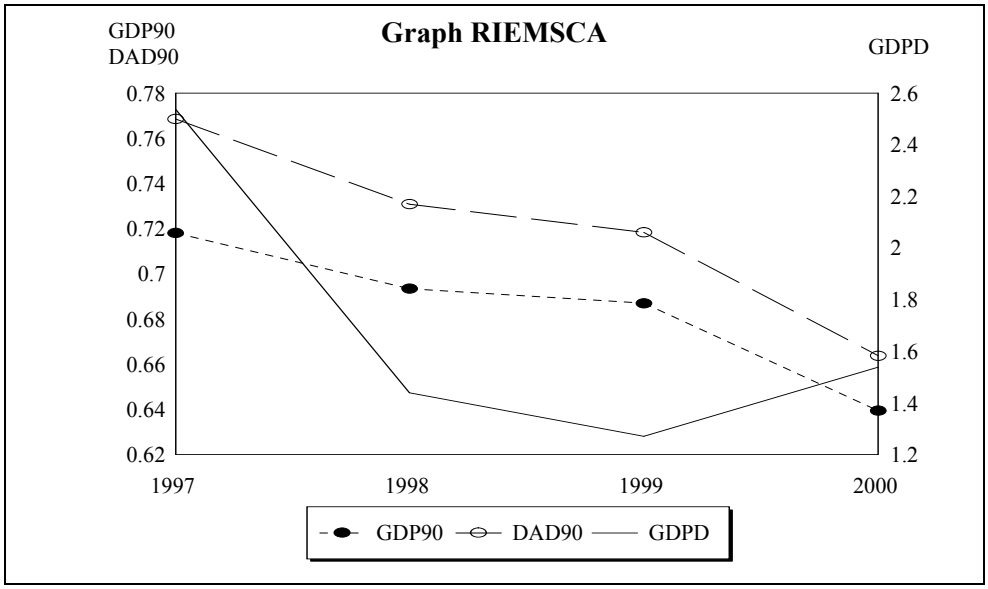


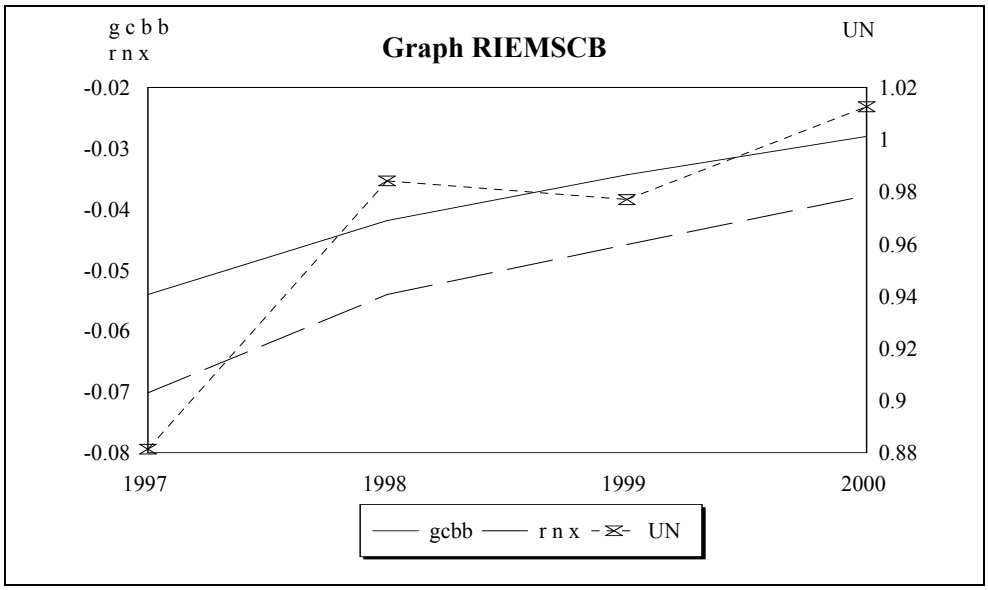
The negative evolution of the real economy does not stop. The lax income policy combined with an increasing monetary distortion determine a high level of the inflation. Therefore, the restrictive monetary policy cannot be efficient even in what concerns the evolution of the prices, in absence of the structural transformations.



The budget deficit rate does not change despite the reduction of the real domestic absorption. The diminution of rnx is an exclusive consequence of the revaluation of the national currency: in dollars, the deficit of the foreign trade increases from 2.6 bill. in 1998 to 3.2 bill. in 2000.

7) An opposite scenario is RIEMSC, combining: crev3; M2P1; dir3; ERP1;xsh1; esh1; BCR2; BCE1; Exninf3; XMC1; rinvd1; resd1; and EXIs1. Therefore, the income policy is restrictive concomitantly with a lax monetary policy, under conditions of slow structural transformation.





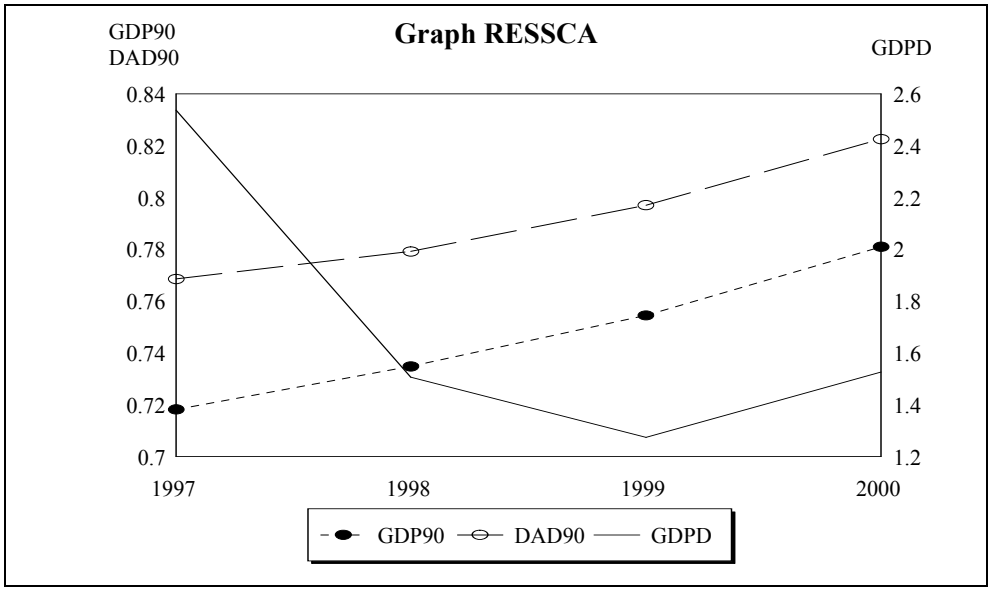
This scenario is not essentially different. Why? Because it is also built only on measures concerning the nominal economy. The generally accepted opinion that the income and monetary policies can have only short-run positive effects must be completed. For a medium or long horizon, these policies- if are not accompanied by structural changes - can have even negative consequences. If the economy remains a weakly structured system, it is practically impossible to determine a significant improvement of its performances.

8) The last scenario - RESSC - illustrates in a positive sense this conclusion. It is built taking into account radical measures in order to exceed the long and deep structural crisis of the Romanian economy. The most important of them will be mentioned:

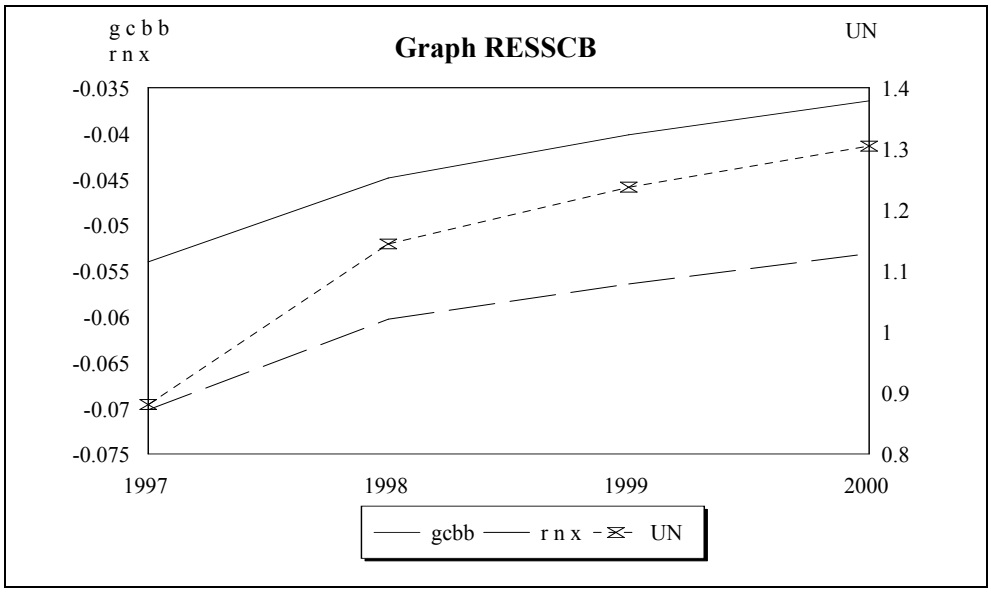
- the continuation of the privatisation process; the development of the market mechanisms including the capital market; the introduction of an effective corporate governance; generally, it is necessary to accelerate the institutional construction;
- the establishing of a possible social agreement concerning a rational evolution of the nominal incomes;
- the essential improvement of the state intervention, that must be more coherent, having clear and consequently promoted objectives;

- the creation of a stimulative economic environment (fiscality, bureaucratic procedures etc.) for domestic and foreign capital, the development of medium and small sized enterprises;
- the reduction of the monetary distortion and, on this basis, the gradual normalisation of the money velocity ("re-monetisation"); during this process a prudent monetary policy is necessary;
- the progressive integration of Romania in the European and world economy, the promotion of firmly export oriented policy;
- the achievement of an efficient fight against the corruption, monopolist tendencies, fiscal evasion.

These conditions and orientations are translated into modelling language combining the following components: crev1; M2P1; dir1; ERP2; xsh2; esh2; BCR2; BCE1; EXninf3; XMC1; rinvd2; resd2; and EXIs2.



The economic growth becomes positive. Moreover, the annual rates increase from 2.3% in 1998 to 2.7% in 1999 and 3.5% in 2000. The gross domestic product deflator, preserving electoral cycle trend, is limited. The monetary distortion is eliminated.



The rate of the budget deficit tends to reach normal dimension. The level of rnx reflects the increasing proportions of the foreign investments.

x x x

The Appendix V contains the main indicators of the above presented scenarios. The economic and political evolution of Romania at the end of 1997 and the beginning of 1998 does not allow to predict what scenario is the most probable. In any case, the chances of RESSC scenario, at least for 1998, seem to be reduced. For the future years the situation can change to a more favourable direction.

Appendix I

Macroeconomic Indicators
A. Annual Data

P (mill. pers)	AP (mill. pers)	LF (mill. pers)	lfp	E (mill. pers)	E1 (mill. pers)
22.2014008	16.2794008	10.3500996	0.4661913	10.3500996	7.3779998
22.3526001	16.3225999	10.3754997	0.4641742	10.3754997	7.4351001
22.4776993	16.4096994	10.4280996	0.4639309	10.4280996	7.5531998
22.5531006	16.7391005	10.4577999	0.4636968	10.4577999	7.6001000
22.6245003	16.9505005	10.4998999	0.4640942	10.4998999	7.5850000
22.8234997	17.2204995	10.5860996	0.4638246	10.5860996	7.6999998
22.9403992	17.3561492	10.6695004	0.4650965	10.6695004	7.7519002
23.0536003	17.4881005	10.7816000	0.4676753	10.7816000	7.7900000
23.1515999	17.6048498	10.8053999	0.4667237	10.8053999	7.8425999
23.2066994	17.6786995	10.9456997	0.4716612	10.9456997	7.9970999
23.1851006	17.7161007	10.8400000	0.4675416	10.8400000	8.1560001
22.8099995	17.2809997	11.1234400	0.4876563	10.7860000	7.5740000
22.7889996	17.6069994	11.3870190	0.4996717	10.4580000	6.8880000
22.7553005	17.8083005	11.2267050	0.4933666	10.0620000	6.6720000
22.7306000	17.7890002	11.2349250	0.4942643	10.0110000	6.4380000
22.6810000	17.7440000	10.4914320	0.4625648	9.4930000	6.1600000
22.6000000	17.6640000	10.0365640	0.4440958	9.3790000	5.8967000

Year	QE (mill. pers)	qe	RP (mill. pers)	GDP (trill. ROL)	GDP90 (trill. ROL)	GVA (trill. ROL)
1980	8.9841003	0.5518692	3.0535000	0.6169000	0.8049187	0.5883000
1981	9.0829000	0.5564616	3.0759400	0.6237000	0.8057338	0.5856000
1982	9.2660999	0.5646721	3.0983800	0.7274000	0.8378955	0.6624000
1983	9.3922005	0.5610935	3.1208200	0.7687000	0.8885792	0.6898000
1984	9.4789000	0.5592106	3.1432600	0.8161000	0.9409248	0.7279000
1985	9.6480999	0.5602683	3.1657000	0.8173000	0.9394899	0.7386000
1986	9.7707996	0.5629590	3.2084000	0.8386000	0.9620502	0.7545000
1987	9.8956003	0.5658476	3.2609000	0.8452000	0.9696219	0.7695000
1988	10.0225000	0.5693034	3.1136000	0.8570000	0.9648272	0.7870000
1989	10.2296000	0.5786398	3.3476000	0.8000000	0.9085600	0.7211000
1990	10.6513995	0.6012271	3.6037000	0.8579000	0.8579000	0.7881000
1991	10.9257395	0.6322400	4.0556000	2.2038999	0.7468315	2.0661000
1992	10.9434004	0.6215369	4.2167000	6.0292000	0.6810347	5.9152000
1993	11.0134050	0.6184422	4.3920000	20.0357000	0.6908284	18.5792000
1994	10.7873000	0.6064028	4.9170000	49.7676000	0.7179835	45.9490000
1995	10.7094000	0.6035505	5.1870000	72.5597000	0.7708386	67.4577000
1996	10.2233000	0.5787647	5.3345600	109.5154000	0.7990095	102.1174000

Year	GVA90 (trill. ROL)	GVAIC (trill. ROL)	GVAIC90 (trill. ROL)	GVAA (trill. ROL)	GVAA90 (trill. ROL)	GVAICA (trill. ROL)
1980	0.7676019	0.3533000	0.4609787	0.0826000	0.1077748	0.4359000
1981	0.7565139	0.3314000	0.4281228	0.0963000	0.1244062	0.4277000
1982	0.7630217	0.3654000	0.4209060	0.1320000	0.1520514	0.4974000
1983	0.7973747	0.4046000	0.4676976	0.1146000	0.1324719	0.5192000
1984	0.8392344	0.4332000	0.4994592	0.1214000	0.1399685	0.5546000
1985	0.8490239	0.4312000	0.4956663	0.1220000	0.1402395	0.5532000
1986	0.8655699	0.4535000	0.5202597	0.1155000	0.1325028	0.5690000
1987	0.8827781	0.4568000	0.5240455	0.1136000	0.1303231	0.5704000
1988	0.8860199	0.4607000	0.5186650	0.1224000	0.1378003	0.5831000
1989	0.8189533	0.4132000	0.4692712	0.1152000	0.1308326	0.5284000
1990	0.7881000	0.3936000	0.3936000	0.1871000	0.1871000	0.5807000
1991	0.7001355	0.9307000	0.3153846	0.4159000	0.1409353	1.3466000
1992	0.6681577	2.6011000	0.2938100	1.1679000	0.1319214	3.7690000
1993	0.6406084	7.8214000	0.2696809	4.2058000	0.1450154	12.0272000
1994	0.6628936	20.9052000	0.3015936	9.8636000	0.1422994	30.7688000
1995	0.7166375	29.8417000	0.3170236	14.4255000	0.1532494	44.2672000
1996	0.7450347	47.0373600	0.3431782	20.5000000	0.1495652	67.5373600

Year	GVAICA90 (trill. ROL)	GVAT (trill. ROL)	GVAT90 (trill. ROL)	GVAO (trill. ROL)	GVAO90 (trill. ROL)	GVATO (trill. ROL)
1980	0.5687535	0.0479000	0.0624990	0.0669000	0.0872898	0.1148000
1981	0.5525290	0.0484000	0.0625261	0.0688000	0.0888800	0.1172000
1982	0.5729574	0.0511000	0.0588623	0.0705000	0.0812093	0.1216000
1983	0.6001695	0.0497000	0.0574507	0.0768000	0.0887770	0.1265000
1984	0.6394277	0.0523000	0.0602994	0.0746000	0.0860103	0.1269000
1985	0.6359058	0.0540000	0.0620732	0.0781000	0.0897763	0.1321000
1986	0.6527625	0.0559000	0.0641290	0.0790000	0.0906296	0.1349000
1987	0.6543686	0.0678000	0.0777808	0.0805000	0.0923504	0.1483000
1988	0.6564653	0.0658000	0.0740789	0.0876000	0.0986218	0.1534000
1989	0.6001039	0.0538000	0.0611007	0.0871000	0.0989195	0.1409000
1990	0.5807000	0.0494000	0.0494000	0.0944000	0.0944000	0.1438000
1991	0.4563199	0.1471000	0.0498475	0.3931000	0.1332091	0.5402000
1992	0.4257314	0.4572000	0.0516435	1.2076000	0.1364057	1.6648000
1993	0.4146963	1.7593000	0.0606604	3.3193000	0.1144490	5.0786000
1994	0.4438930	3.3043000	0.0476702	8.0612000	0.1162967	11.3655000
1995	0.4702730	4.5212000	0.0480310	13.1113000	0.1392880	17.6325000
1996	0.4927434	6.7408000	0.0491800	19.5508000	0.1426400	26.2916000

Year	GVATO90 (trill. ROL)	GVAPS (trill. ROL)	GVAPS90 (trill. ROL)	LP (mill. ROL)	LP90 (mill. ROL)	FA90 (trill. ROL)
1980	0.1497887	0.0376000	0.0490597	0.0596033	0.0777692	1.5597660
1981	0.1514061	0.0407000	0.0525787	0.0601128	0.0776574	1.6651689
1982	0.1400716	0.0434000	0.0499927	0.0697538	0.0803498	1.7975540
1983	0.1462277	0.0441000	0.0509774	0.0735049	0.0849681	1.9451440
1984	0.1463097	0.0464000	0.0534970	0.0777245	0.0896127	2.1245811
1985	0.1518495	0.0533000	0.0612686	0.0772050	0.0887475	2.2445620
1986	0.1547586	0.0506000	0.0580488	0.0785979	0.0901683	2.3752371
1987	0.1701312	0.0508000	0.0582783	0.0783928	0.0899330	2.4837380
1988	0.1727007	0.0505000	0.0568539	0.0793122	0.0892912	2.5803701
1989	0.1600201	0.0518000	0.0588293	0.0730881	0.0830061	2.6828811
1990	0.1438000	0.0636000	0.0636000	0.0791421	0.0791421	2.2791599
1991	0.1830566	0.1793000	0.0607591	0.2043297	0.0692408	2.1909690
1992	0.1880492	0.4814000	0.0543770	0.5765156	0.0651209	2.0858359
1993	0.1751095	1.4736000	0.0508095	1.9912244	0.0686572	2.1610000
1994	0.1639669	3.8147000	0.0550336	4.9712916	0.0717195	2.2665000
1995	0.1873190	5.5580000	0.0590455	7.6434952	0.0812007	2.3561167
1996	0.1918200	8.2787000	0.0604003	11.6766606	0.0851913	2.4496200

Year	EFA90	dfa	FA90E (mill. ROL90 per pers)	DAD (trill. ROL)	DAD90 (trill. ROL)	SC (trill. ROL)
1980	0.5160509		0.1507006	0.6436327	0.8397989	0.0670000
1981	0.4838751	0.0666107	0.1604905	0.6206700	0.8018195	0.0740000
1982	0.4661309	0.0504543	0.1723760	0.7045250	0.8115457	0.1002000
1983	0.4568192	0.0462350	0.1859994	0.7312510	0.8452900	0.0820000
1984	0.4428755	0.0335517	0.2023430	0.7708980	0.8888091	0.0915000
1985	0.4185627	0.0594560	0.2120292	0.7862900	0.9038438	0.0804000
1986	0.4050334	0.0527163	0.2226193	0.8103928	0.9296907	0.0772000
1987	0.3903881	0.0576780	0.2303682	0.8103360	0.9296255	0.0893000
1988	0.3739104	0.0578032	0.2388038	0.7970160	0.8972961	0.0979000
1989	0.3386509	0.0528564	0.2451082	0.7672160	0.8713272	0.0957000
1990	0.3764106	0.2137706	0.2102546	0.9387377	0.9387377	0.1228000
1991	0.3408682	0.0896605	0.2031308	2.2990055	0.7790598	0.2679000
1992	0.3265044	0.1101998	0.1994488	6.5182246	0.7362730	0.9148000
1993	0.3196799	0.0272653	0.2147684	20.9804422	0.7234030	3.0127000
1994	0.3167807	0.0223611	0.2264010	50.7308624	0.7318802	6.0803000
1995	0.3271649	0.0391465	0.2481952	76.4269986	0.8119229	9.4264000
1996	0.3261769	0.0437640	0.2611814	118.3162230	0.8632192	13.9630000

Year	SC90 (trill. ROL)	GCF (trill. ROL)	gcf	I (trill. ROL)	I90 (trill. ROL)	Id
1980	0.0874202	0.2552327	0.4137343	0.2128000	0.2781733	0.3306233
1981	0.0955977	0.2089700	0.3350489	0.2093000	0.2583551	0.3372162
1982	0.1154208	0.2361250	0.3246151	0.2164000	0.2484829	0.3071573
1983	0.0947879	0.2676510	0.3481866	0.2307000	0.2547145	0.3154867
1984	0.1054952	0.2770980	0.3395393	0.2447000	0.2699019	0.3174220
1985	0.0924202	0.2943900	0.3601982	0.2463000	0.2741339	0.3132432
1986	0.0885646	0.3131928	0.3734710	0.2490000	0.2771390	0.3072584
1987	0.1024459	0.2934360	0.3471794	0.2455000	0.2732434	0.3029607
1988	0.1102177	0.2646160	0.3087701	0.2402000	0.2676121	0.3013741
1989	0.1086865	0.2033160	0.2541450	0.2389000	0.2632678	0.3113856
1990	0.1228000	0.2614001	0.3046977	0.1698000	0.1698000	0.1808812
1991	0.0907828	0.6310995	0.2863558	0.3170000	0.1161598	0.1378857
1992	0.1033322	1.8954476	0.3143780	1.1569000	0.1363113	0.1774870
1993	0.1038775	5.7649408	0.2877334	3.5837000	0.1320351	0.1708115
1994	0.0877188	12.8731311	0.2586649	9.8239000	0.1538224	0.1936474
1995	0.1001414	17.5572330	0.2419695	15.7294000	0.1783422	0.2058095
1996	0.1018722	27.1979071	0.2483478	25.4703000	0.1966116	0.2152731

Year	GLE (mill. ROL)	GLE90 (mill. ROL)	GLEE (trill. ROL)	GLEE90 (trill. ROL)	ler	lrr
1980	0.0193428	0.0252381	0.2002001	0.2612170	0.3403027	0.3245260
1981	0.0202070	0.0261046	0.2096573	0.2708481	0.3580214	0.3361509
1982	0.0222689	0.0256516	0.2322219	0.2674975	0.3505765	0.3192492
1983	0.0225941	0.0261176	0.2362843	0.2731329	0.3425403	0.3073816
1984	0.0239454	0.0276079	0.2514240	0.2898800	0.3454101	0.3080799
1985	0.0245090	0.0281732	0.2594550	0.2982447	0.3512795	0.3174538
1986	0.0245358	0.0281478	0.2617851	0.3003225	0.3469651	0.3121693
1987	0.0244707	0.0280730	0.2638334	0.3026723	0.3428634	0.3121550
1988	0.0248080	0.0279293	0.2680604	0.3017876	0.3406104	0.3127892
1989	0.0253988	0.0288455	0.2780082	0.3157339	0.3855335	0.3475102
1990	0.0418703	0.0418703	0.4538741	0.4538741	0.5759092	0.5290524
1991	0.0993347	0.0336614	1.0714242	0.3630716	0.5185732	0.4861492
1992	0.2592578	0.0292847	2.7113182	0.3062598	0.4583646	0.4496978
1993	0.7724133	0.0266327	7.7720229	0.2679784	0.4183185	0.3879087
1994	1.8405633	0.0265533	18.4258792	0.2658251	0.4010072	0.3702385
1995	2.6809000	0.0284806	25.4497837	0.2703660	0.3772703	0.3507427
1996	3.7720120	0.0275201	35.3777005	0.2581109	0.3464415	0.3230386

Year	NR (trill. ROL)	NR90 (trill. ROL)	GS (trill. ROL)	GS90 (trill. ROL)	XGSD (bill. USD)	MGSD (bill. USD)
1980	0.3030200	0.4320708	0.2557310	0.3646423	11.4010000	13.2010000
1981	0.3217422	0.4449724	0.2752023	0.3806073	11.1800000	10.9780000
1982	0.3404644	0.3997159	0.2946737	0.3459562	9.8480000	8.3230000
1983	0.3591866	0.4050878	0.3141450	0.3542902	9.8470000	7.6480000
1984	0.3779088	0.4215653	0.3292620	0.3672987	9.8980000	7.7290000
1985	0.3966310	0.4389388	0.3352620	0.3710237	10.1740000	8.4020000
1986	0.4097940	0.4490157	0.3445610	0.3775392	9.7630000	8.0840000
1987	0.4110080	0.4463289	0.3547930	0.3852830	10.4920000	8.3130000
1988	0.4233520	0.4498373	0.3615220	0.3841392	11.3920000	7.6430000
1989	0.4481940	0.4710519	0.3660040	0.3846702	10.4870000	8.4380000
1990	0.5493080	0.5493080	0.4295390	0.4295390	6.3850000	9.9890000
1991	0.8126800	0.3007698	0.8309000	0.3075130	4.9460000	6.1910000
1992	1.9554630	0.2331538	2.3165000	0.2762010	4.9950000	6.5830000
1993	5.9085200	0.1978334	6.3405000	0.2122973	5.6910000	6.9340000
1994	12.1970600	0.1725353	15.3424000	0.2170281	7.1950000	7.7770000
1995	22.7423000	0.2431629	20.6194000	0.2204646	9.4040000	11.3060000
1996	32.5288700	0.2505777	29.7368000	0.2290697	9.6480000	12.5030000

Year	FTD (bill. USD)	NX (bill. USD)	rnx	MX	xgdp90	ER (th.ROL/USD)
1980	24.6020000	-1.8000000	-0.0433339	1.1578809	0.3177022	0.0148515
1981	22.1580000	0.2020000	0.0048581	0.9819320	0.3112286	0.0150000
1982	18.1710000	1.5250000	0.0314476	0.8451462	0.2636255	0.0150000
1983	17.4950000	2.1990000	0.0487173	0.7766833	0.2485633	0.0170300
1984	17.6270000	2.1690000	0.0553878	0.7808648	0.2359510	0.0208400
1985	18.5760000	1.7720000	0.0379420	0.8258305	0.2429008	0.0175000
1986	17.8470000	1.6790000	0.0336361	0.8280242	0.2276223	0.0168000
1987	18.8050000	2.1790000	0.0412494	0.7923180	0.2427086	0.0160000
1988	19.0350000	3.7490000	0.0699930	0.6709094	0.2648376	0.0160000
1989	18.9250000	2.0490000	0.0409800	0.8046152	0.2588969	0.0160000
1990	16.3740000	-3.6040000	-0.0942274	1.5644479	0.1669373	0.0224300
1991	11.1370000	-1.2450000	-0.0431533	1.2517186	0.1485459	0.0763900
1992	11.5780000	-1.5880000	-0.0811094	1.3179179	0.1645112	0.3079500
1993	12.6250000	-1.2430000	-0.0471529	1.2184150	0.1847769	0.7600500
1994	14.9720000	-0.5820000	-0.0193552	1.0808895	0.2247738	1.6550900
1995	20.7100000	-1.9020000	-0.0532982	1.2022544	0.2736393	2.0332800
1996	22.1510000	-2.8550000	-0.0803615	1.2959163	0.2708411	3.0826000

Year	ERCPI90 (th.ROL/USD)	GDPD	GDPD90	CPI	CPI90	CFPI
1980	0.0211765	1.0000000	0.7664129	1.0000000	0.7013202	1.0000000
1981	0.0207451	1.0100000	0.7740770	1.0310000	0.7230611	1.0590000
1982	0.0176105	1.1215000	0.8681274	1.1780000	0.8517660	1.0750000
1983	0.0192063	0.9965000	0.8650889	1.0410000	0.8866884	1.0400000
1984	0.0232475	1.0026000	0.8673381	1.0110000	0.8964420	1.0010000
1985	0.0193667	1.0030000	0.8699401	1.0080000	0.9036135	0.9910000
1986	0.0184079	1.0020000	0.8716800	1.0100000	0.9126497	1.0000000
1987	0.0173750	1.0000000	0.8716800	1.0089999	0.9208634	1.0000000
1988	0.0170010	1.0190000	0.8882419	1.0220000	0.9411224	0.9990000
1989	0.0168160	0.9913000	0.8805142	1.0110000	0.9514748	1.0110000
1990	0.0224300	1.1357000	1.0000000	1.0510000	1.0000000	1.1020000
1991	0.0282717	2.9510000	2.9510000	2.7020000	2.7020000	2.7290001
1992	0.0367175	3.0000000	8.8530000	3.1040000	8.3870080	3.1099999
1993	0.0254486	3.2760000	29.0024280	3.5610000	29.8661355	3.1980000
1994	0.0234123	2.3900000	69.3158029	2.3670000	70.6931427	2.3530000
1995	0.0217400	1.3580000	94.1308604	1.3230000	93.5270278	1.3810000
1996	0.0237460	1.4561000	137.0639458	1.3880000	129.8155146	1.4688144

Year	CFPI90	IR	M2 (trill. ROL)	v	Is	ß
1980	0.7649908	0.0200000	0.2409766	2.5600000		
1981	0.8101253	0.0200000	0.2436328	2.5600000		
1982	0.8708847	0.0200000	0.2841406	2.5600000		
1983	0.9057201	0.0500000	0.3002734	2.5600000		
1984	0.9066258	0.0300000	0.3187891	2.5600000		
1985	0.8984662	0.0300000	0.3187980	2.5636923	1.0000000	1.0000000
1986	0.8984662	0.0300000	0.3439850	2.4378969	1.0334951	1.0000000
1987	0.8984662	0.0250000	0.3592060	2.3529674	0.9920159	1.0000000
1988	0.8975677	0.0250000	0.3959420	2.1644584	0.9891052	1.0000000
1989	0.9074410	0.0250000	0.4209140	1.9006258	0.9029383	1.0000000
1990	1.0000000	0.0500000	0.4780000	1.7947699	0.9550471	1.0000000
1991	2.7290001	0.1050000	0.6034660	3.6520697	0.9532970	1.7590320
1992	8.4871900	0.5050000	1.2389000	4.8665752	0.9193610	1.5314800
1993	27.1420336	0.7000000	2.7596200	7.2603112	0.9897840	1.5833160
1994	63.8652051	0.6530000	6.6376000	7.4978305	1.0138850	1.5179320
1995	88.1978482	0.3960000	13.0850000	5.5452579	1.0328690	1.3763370
1996	129.5462700	0.3500000	22.1848000	4.9365061	1.0064960	1.3200590

Year	GCBE (trill. ROL)	GCBR (trill. ROL)	gcbb	T
1980	0.2967873	0.2980042	0.0019726	1
1981	0.2718232	0.2803424	0.0136591	2
1982	0.2574563	0.2774076	0.0274282	3
1983	0.2367962	0.2593590	0.0293519	4
1984	0.2602072	0.3109376	0.0621620	5
1985	0.2819852	0.3001256	0.0221955	6
1986	0.3028797	0.3336743	0.0367214	7
1987	0.2814260	0.3346278	0.0629458	8
1988	0.2866860	0.3309679	0.0516708	9
1989	0.2884255	0.3484213	0.0749947	10
1990	0.3108626	0.3070655	-0.0044260	11
1991	0.8462000	0.9139000	0.0307183	12
1992	2.5058000	2.2268000	-0.0462748	13
1993	6.6920000	6.7267000	0.0017319	14
1994	16.4094000	15.8774000	-0.0106897	15
1995	25.3249000	23.1559138	-0.0298924	16
1996	36.8204000	32.5301000	-0.0391753	17

B. Monthly Data

Year: month	MGDP (trill. ROL)	MXGSD (bill. USD)	MMGSD (bill. USD)	mgsdr	nmgsdr	MFTD (bill. USD)
1991:01	1.3017640	0.3905100	0.5146500	0.0831289	0.0628618	0.9051600
1991:02	1.3929594	0.3046400	0.5187980	0.0837989	0.0669037	0.8234380
1991:03	1.4851356	0.4051900	0.6432900	0.1039075	0.0842921	1.0484800
1991:04	1.8792000	0.3978500	0.4851200	0.0783591	0.0771003	0.8829700
1991:05	1.9747917	0.4475200	0.5486300	0.0886175	0.0805336	0.9961500
1991:06	2.0131002	0.3976500	0.4680300	0.0755986	0.0833067	0.8656800
1991:07	2.2037100	0.4096000	0.3678100	0.0594106	0.0727106	0.7774100
1991:08	2.4507504	0.3779800	0.4576150	0.0739163	0.0766734	0.8355950
1991:09	2.6300891	0.3526700	0.4598400	0.0742757	0.0772757	0.8125100
1991:10	2.9030384	0.3669500	0.3869250	0.0624981	0.0863780	0.7538750
1991:11	3.2199948	0.4313100	0.4749080	0.0767096	0.0968085	0.9062180
1991:12	3.6609819	0.6641460	0.8653700	0.1397790	0.1351557	1.5295160
1992:01	3.7811036	0.2436000	0.4389320	0.0666767	0.0628618	0.6825320
1992:02	4.2444000	0.3276000	0.4188780	0.0636304	0.0669037	0.7464780
1992:03	4.6904725	0.3736000	0.5331350	0.0809868	0.0842921	0.9067350
1992:04	4.8953464	0.4026500	0.5205160	0.0790699	0.0771003	0.9231660
1992:05	5.4627364	0.3468500	0.5396890	0.0819824	0.0805336	0.8865390
1992:06	5.7512960	0.4848100	0.5341100	0.0811349	0.0833067	1.0189200
1992:07	5.8974748	0.4172700	0.3786700	0.0575225	0.0727106	0.7959400
1992:08	6.0794756	0.4329800	0.4067480	0.0617877	0.0766734	0.8397280

Year: month	MGDP (trill. ROL)	MXGSD (bill. USD)	MMGSD (bill. USD)	mgsdr	nmgsdr	MFTD (bill. USD)
1992:09	6.7202895	0.4667000	0.3844440	0.0583996	0.0772757	0.8511440
1992:10	7.3665152	0.4211500	0.5656120	0.0859202	0.0863780	0.9867620
1992:11	8.4015972	0.4109000	0.6270450	0.0952523	0.0968085	1.0379450
1992:12	9.3881538	0.6668300	1.2352100	0.1876366	0.1351557	1.9020400
1993:01	9.3732955	0.3972000	0.5292400	0.0763254	0.0628618	0.9264400
1993:02	9.9787842	0.3984000	0.5822300	0.0839674	0.0669037	0.9806300
1993:03	11.0949939	0.4517600	0.5653300	0.0815301	0.0842921	1.0170900
1993:04	12.1731205	0.4617000	0.5344800	0.0770810	0.0771003	0.9961800
1993:05	15.8573856	0.4522700	0.4292800	0.0619094	0.0805336	0.8815500
1993:06	16.7997947	0.4793500	0.6458000	0.0931353	0.0833067	1.1251500
1993:07	18.9399346	0.5716800	0.6210900	0.0895717	0.0727106	1.1927700
1993:08	21.0141750	0.4657600	0.4448100	0.0641491	0.0766734	0.9105700
1993:09	21.3315640	0.5448900	0.6523300	0.0940770	0.0772757	1.1972200
1993:10	26.8843999	0.4993900	0.7116500	0.1026320	0.0863780	1.2110400
1993:11	31.0913059	0.4267900	0.5303300	0.0764825	0.0968085	0.9571200
1993:12	32.9794776	0.5417700	0.6874300	0.0991390	0.1351557	1.2292000
1994:01	33.9207840	0.4363000	0.4604000	0.0592002	0.0628618	0.8967000
1994:02	34.6169205	0.4457000	0.4697000	0.0603960	0.0669037	0.9154000
1994:03	42.2483639	0.5539000	0.5778000	0.0742960	0.0842921	1.1317000
1994:04	44.5590000	0.5739000	0.6007000	0.0772406	0.0771003	1.1746000
1994:05	46.9110000	0.5309000	0.5634000	0.0724444	0.0805336	1.0943000

Year: month	MGDP (trill. ROL)	MXGSD (bill. USD)	MMGSD (bill. USD)	mgsdr	nmgsdr	MFTD (bill. USD)
1994:06	51.5100000	0.6104000	0.6049000	0.0777806	0.0833067	1.2153000
1994:07	48.4680000	0.6469000	0.5411000	0.0695770	0.0727106	1.1880000
1994:08	52.2310000	0.6477000	0.7296000	0.0938151	0.0766734	1.3773000
1994:09	53.5240000	0.6907000	0.6002000	0.0771763	0.0772757	1.2909000
1994:10	56.5430000	0.6868000	0.6349000	0.0816382	0.0863780	1.3217000
1994:11	61.2210000	0.6864000	0.9689000	0.1245853	0.0968085	1.6553000
1994:12	55.5080000	0.6854000	1.0254000	0.1318503	0.1351557	1.7108000
1995:01	64.6200000	0.5735000	0.5860100	0.0525003	0.0628618	1.1595100
1995:02	65.7330000	0.7232000	0.7286800	0.0652820	0.0669037	1.4518800
1995:03	66.4360000	0.6911000	1.0015900	0.0897318	0.0842921	1.6926900
1995:04	67.7440000	0.7114000	0.8321600	0.0745527	0.0771003	1.5435600
1995:05	68.6600000	0.8056000	1.0780800	0.0965845	0.0805336	1.8836800
1995:06	69.7580000	0.8199000	0.9689800	0.0868103	0.0833067	1.7888800
1995:07	71.9890000	0.8577000	0.9457100	0.0847256	0.0727106	1.8034100
1995:08	72.8740000	0.8225000	0.8954500	0.0802228	0.0766734	1.7179500
1995:09	74.3090000	0.8418000	0.8838000	0.0791791	0.0772757	1.7256000
1995:10	77.5080000	0.8246000	0.9839500	0.0881514	0.0863780	1.8085500
1995:11	81.4160000	0.8989000	1.0987500	0.0984363	0.0968085	1.9976500
1995:12	90.1590000	0.8338000	1.1588800	0.1038233	0.1351557	1.9926800
1996:01	91.3470000	0.4884934	0.4542517	0.0393394	0.0628618	0.9427451
1996:02	93.0830000	0.5792281	0.5120771	0.0443472	0.0669037	1.0913052

Year: month	MGDP (trill. ROL)	MXGSD (bill. USD)	MMGSD (bill. USD)	mgsdr	nmgsdr	MFTD (bill. USD)
1996:03	94.6860000	0.7438004	0.8694951	0.0753005	0.0842921	1.6132955
1996:04	96.5280000	0.7054992	0.8810178	0.0762984	0.0771003	1.5865170
1996:05	101.6820000	0.7864027	0.9429661	0.0816633	0.0805336	1.7293688
1996:06	102.7390000	0.8658724	0.9858858	0.0853803	0.0833067	1.8517582
1996:07	110.4440000	0.7270049	0.8712922	0.0754562	0.0727106	1.5982971
1996:08	114.6410000	0.9718663	0.9947658	0.0861493	0.0766734	1.9666321
1996:09	117.3920000	0.9574266	0.9300690	0.0805464	0.0772757	1.8874956
1996:10	121.3840000	0.7699148	1.1250050	0.0974283	0.0863780	1.8949198
1996:11	128.4240000	0.9622398	1.2630670	0.1093849	0.0968085	2.2253068
1996:12	141.6510000	1.0902514	1.7171070	0.1487059	0.1351557	2.8073584

Year: month	ERM (th.ROL/USD	MNR (trill. ROL)	rrnr	nrrnr	MGS (trill. ROL)	rgsr
1991:01	0.0341400	0.0267600	0.0590388	0.0764286	0.0397000	0.0833357
1991:02	0.0345300	0.0377290	0.0777935	0.0797253	0.0396000	0.0776876
1991:03	0.0358500	0.0367320	0.0710486	0.0767214	0.0493000	0.0907291
1991:04	0.0595300	0.0427740	0.0654034	0.0771318	0.0510000	0.0741958
1991:05	0.0601900	0.0562210	0.0817930	0.0766330	0.0573000	0.0793160
1991:06	0.0611400	0.0707770	0.1009507	0.0857237	0.0599000	0.0812892
1991:07	0.0621000	0.0691600	0.0900862	0.0891964	0.0707000	0.0876216
1991:08	0.0609500	0.0749520	0.0877974	0.0873056	0.0756000	0.0842576
1991:09	0.0606800	0.0804520	0.0878285	0.0888028	0.0818000	0.0849651
1991:10	0.0599400	0.0943000	0.0932484	0.0861476	0.0896000	0.0842998
1991:11	0.2017400	0.0955860	0.0852300	0.0816130	0.1060000	0.0899275
1991:12	0.1858500	0.1272370	0.0997817	0.0945707	0.1104000	0.0823750
1992:01	0.1949000	0.0878680	0.0733177	0.0764286	0.1077000	0.0754692
1992:02	0.1976000	0.1029580	0.0763635	0.0797253	0.1124000	0.0700112
1992:03	0.1980000	0.1061090	0.0715460	0.0767214	0.1413000	0.0800112
1992:04	0.1983000	0.1284960	0.0827515	0.0771318	0.1477000	0.0798808
1992:05	0.2236000	0.1279160	0.0734862	0.0766330	0.1622000	0.0782541
1992:06	0.2613200	0.1575930	0.0868027	0.0857237	0.1656000	0.0766006
1992:07	0.3493900	0.1750160	0.0934102	0.0891964	0.2199000	0.0985638
1992:08	0.3752400	0.1753940	0.0905338	0.0873056	0.2330000	0.1010015

Year: month	ERM (th.ROL/USD	MNR (trill. ROL)	rrnr	nrrnr	MGS (trill. ROL)	rgsr
1992:09	0.4041400	0.1909230	0.0895091	0.0888028	0.2048000	0.0806333
1992:10	0.4300000	0.2040740	0.0872943	0.0861476	0.2437000	0.0875446
1992:11	0.4300000	0.2005350	0.0755775	0.0816130	0.2809000	0.0889057
1992:12	0.4328600	0.2985810	0.0994073	0.0945707	0.2973000	0.0831240
1993:01	0.4701000	0.2558400	0.0887769	0.0764286	0.2654000	0.0851213
1993:02	0.5105000	0.2666500	0.0855157	0.0797253	0.2638000	0.0781960
1993:03	0.5860400	0.2755900	0.0809366	0.0767214	0.3359000	0.0911795
1993:04	0.6037100	0.3145100	0.0839698	0.0771318	0.3757000	0.0927120
1993:05	0.6214300	0.3609600	0.0739044	0.0766330	0.3910000	0.0739935
1993:06	0.6885000	0.3855300	0.0748199	0.0857237	0.4452000	0.0798582
1993:07	0.7685000	0.4677000	0.0801825	0.0891964	0.5154000	0.0816700
1993:08	0.8085900	0.5897000	0.0912439	0.0873056	0.6133000	0.0877105
1993:09	0.8700000	0.6783700	0.0946472	0.0888028	0.6646000	0.0857052
1993:10	0.9846000	0.6442200	0.0772851	0.0861476	0.7272000	0.0806345
1993:11	1.0678600	0.7496800	0.0787537	0.0816130	0.8433000	0.0818810
1993:12	1.1408000	0.9197700	0.0899643	0.0945707	0.8997000	0.0813382
1994:01	1.3871600	0.8090600	0.0866765	0.0764286	0.9046000	0.0775021
1994:02	1.4935000	0.8852300	0.0895531	0.0797253	0.8922000	0.0721810
1994:03	1.6013000	0.8870000	0.0828552	0.0767214	1.0671000	0.0797146
1994:04	1.6707100	0.7031600	0.0619063	0.0771318	1.0829000	0.0762440

Year: month	ERM (th.ROL/USD	MNR (trill. ROL)	rrnr	nrrnr	MGS (trill. ROL)	rgsr
1994:05	1.6572400	0.8154400	0.0683728	0.0766330	1.1039000	0.0740214
1994:06	1.6670900	0.9599200	0.0784475	0.0857237	1.1863000	0.0775309
1994:07	1.6857100	1.2190500	0.0980555	0.0891964	1.3180000	0.0847817
1994:08	1.6878300	1.0149000	0.0801911	0.0873056	1.5088000	0.0953390
1994:09	1.7270900	1.2322400	0.0937093	0.0888028	1.5848000	0.0963824
1994:10	1.7529500	1.1264600	0.0820545	0.0861476	1.4776000	0.0860756
1994:11	1.7565500	1.0837300	0.0767918	0.0816130	1.4788000	0.0837991
1994:12	1.7739000	1.4608700	0.1013863	0.0945707	1.7374000	0.0964282
1995:01	1.7760000	1.5011039	0.0725593	0.0764286	1.2787000	0.0682519
1995:02	1.7980000	1.5443268	0.0736179	0.0797253	1.3002000	0.0684413
1995:03	1.8325700	1.6144730	0.0762753	0.0767214	1.5230000	0.0794542
1995:04	1.8649500	1.7698537	0.0822994	0.0771318	1.4579000	0.0748602
1995:05	1.9112000	1.7646346	0.0811639	0.0766330	1.6208000	0.0823192
1995:06	1.9558200	1.8210124	0.0826821	0.0857237	1.6598000	0.0832182
1995:07	1.9942900	1.9566803	0.0865907	0.0891964	1.7228000	0.0841880
1995:08	2.0459100	2.0248043	0.0887183	0.0873056	1.9349000	0.0936165
1995:09	2.1000000	1.9450674	0.0838824	0.0888028	1.8580000	0.0884801
1995:10	2.1662000	2.1301915	0.0887594	0.0861476	2.0447000	0.0940783
1995:11	2.3952700	2.2328709	0.0893735	0.0816130	2.0853000	0.0921674
1995:12	2.5580000	2.4373690	0.0940779	0.0945707	2.1333000	0.0909248

Year: month	ERM (th.ROL/USD	MNR (trill. ROL)	rrnr	nrrnr	MGS (trill. ROL)	rgsr
1996:01	2.5992400	2.1186113	0.0782025	0.0764286	1.8727000	0.0757171
1996:02	2.7737100	2.0844854	0.0755081	0.0797253	1.8635400	0.0739419
1996:03	2.8726200	2.1805243	0.0776667	0.0767214	2.1456400	0.0837120
1996:04	2.9111400	2.4735271	0.0864602	0.0771318	2.1890200	0.0838120
1996:05	2.9304100	2.4424802	0.0810779	0.0766330	2.3660600	0.0860308
1996:06	2.9880000	2.7578194	0.0906392	0.0857237	2.2761400	0.0819418
1996:07	3.0632000	2.8408241	0.0868532	0.0891964	2.5044900	0.0838721
1996:08	3.1439000	2.8977080	0.0853491	0.0873056	2.7395800	0.0883863
1996:09	3.2011900	2.8939448	0.0832405	0.0888028	2.6655500	0.0839823
1996:10	3.2957400	3.1722103	0.0882441	0.0861476	2.9158600	0.0888479
1996:11	3.4781900	3.1929431	0.0839516	0.0816130	2.9502700	0.0849682
1996:12	3.7338900	3.4737942	0.0828069	0.0945707	3.2472300	0.0847876

Year: month	nrgsr	MCPI	IMCPI	NIMCPI	IRM	Mß
1991:01	0.0775662	1.1480000	1.0411474	1.0172956	0.0800000	1.6201896
1991:02	0.0734098	1.0700000	0.9704074	0.9921309	0.0800000	1.6440051
1991:03	0.0841334	1.0660000	0.9667797	0.9918802	0.0800000	1.6545930
1991:04	0.0802841	1.2650000	1.1472574	1.0114845	0.0900000	1.6719230
1991:05	0.0789892	1.0510000	0.9531759	1.0234489	0.0900000	1.6584123
1991:06	0.0800732	1.0200000	0.9250613	0.9611538	0.1025000	1.6851554
1991:07	0.0867829	1.0950000	0.9930805	0.9930902	0.1025000	1.7176762
1991:08	0.0917185	1.1120000	1.0084982	0.9843789	0.1250000	1.7981361
1991:09	0.0866914	1.0730000	0.9731282	0.9910868	0.1250000	1.9613495
1991:10	0.0869134	1.1040000	1.0012428	1.0085029	0.1800000	1.9618754
1991:11	0.0869415	1.1090000	1.0057774	1.0143260	0.1800000	1.7209169
1991:12	0.0864963	1.1370000	1.0311713	1.0129521	0.1800000	1.6726390
1992:01	0.0775662	1.1950000	1.0906081	1.0172956	0.2490000	1.3323521
1992:02	0.0734098	1.1250000	1.0267231	0.9921309	0.2460000	1.4366566
1992:03	0.0841334	1.1000000	1.0039071	0.9918802	0.2440000	1.4987805
1992:04	0.0802841	1.0470000	0.9555370	1.0114845	0.2460000	1.5610711
1992:05	0.0789892	1.1210000	1.0230726	1.0234489	0.5440000	1.5930146
1992:06	0.0800732	1.0430000	0.9518864	0.9611538	0.6070000	1.5482931
1992:07	0.0867829	1.0320000	0.9418474	0.9930902	0.6180000	1.5328742
1992:08	0.0917185	1.0340000	0.9436726	0.9843789	0.5950000	1.4779342

Year: month	nrgsr	MCPI	IMCPI	NIMCPI	IRM	Mß
1992:09	0.0866914	1.1010000	1.0048197	0.9910868	0.4050000	1.4698159
1992:10	0.0869134	1.0960000	1.0002565	1.0085029	0.3350000	1.5524540
1992:11	0.0869415	1.1350000	1.0358496	1.0143260	0.3220000	1.5898270
1992:12	0.0864963	1.1320000	1.0331116	1.0129521	0.3060000	1.5721282
1993:01	0.0775662	1.1150000	0.9942759	1.0172956	0.3845000	1.6562134
1993:02	0.0734098	1.0820000	0.9648489	0.9921309	0.3480000	1.5958777
1993:03	0.0841334	1.0920000	0.9737662	0.9918802	0.2870000	1.5355945
1993:04	0.0802841	1.1000000	0.9809000	1.0114845	0.2030000	1.5512712
1993:05	0.0789892	1.3040000	1.1628124	1.0234489	0.2434000	1.5540072
1993:06	0.0800732	1.0550000	0.9407723	0.9611538	0.4031000	1.5949687
1993:07	0.0867829	1.1320000	1.0094353	0.9930902	0.4930000	1.5460669
1993:08	0.0917185	1.1080000	0.9880338	0.9843789	0.5465000	1.5455188
1993:09	0.0866914	1.1090000	0.9889256	0.9910868	0.5910000	1.5268192
1993:10	0.0869134	1.1630000	1.0370788	1.0085029	0.9110000	1.5407480
1993:11	0.0869415	1.1420000	1.0183526	1.0143260	0.9240000	1.6328523
1993:12	0.0864963	1.0740000	0.9577151	1.0129521	1.2050000	1.5095757
1994:01	0.0775662	1.0490000	1.0077005	1.0172956	1.3630000	1.5627889
1994:02	0.0734098	1.0590000	1.0173068	0.9921309	1.3562000	1.5795007
1994:03	0.0841334	1.0830000	1.0403619	0.9918802	1.2900000	1.5942125
1994:04	0.0802841	1.0610000	1.0192280	1.0114845	1.1720000	1.6185189
1994:05	0.0789892	1.0500000	1.0086611	1.0234489	1.0870000	1.6023605

Year: month	nrgsr	MCPI	IMCPI	NIMCPI	IRM	Mß
1994:06	0.0800732	1.0260000	0.9856060	0.9611538	0.9758000	1.5703477
1994:07	0.0867829	1.0160000	0.9759997	0.9930902	0.7910000	1.5289356
1994:08	0.0917185	1.0180000	0.9779209	0.9843789	0.6910000	1.5002949
1994:09	0.0866914	1.0390000	0.9980942	0.9910868	0.6290000	1.4750670
1994:10	0.0869134	1.0440000	1.0028973	1.0085029	0.5890000	1.4783263
1994:11	0.0869415	1.0280000	0.9875272	1.0143260	0.6000000	1.4688437
1994:12	0.0864963	1.0210000	0.9808028	1.0129521	0.6240000	1.4143775
1995:01	0.0775662	1.0200000	0.9994027	1.0172956	0.5710000	1.4259329
1995:02	0.0734098	1.0140000	0.9935239	0.9921309	0.5290000	1.4267443
1995:03	0.0841334	1.0090000	0.9886248	0.9918802	0.4710000	1.4089412
1995:04	0.0802841	1.0160000	0.9954835	1.0114845	0.4220000	1.4018355
1995:05	0.0789892	1.0110000	0.9905844	1.0234489	0.4200000	1.3918553
1995:06	0.0800732	1.0130000	0.9925440	0.9611538	0.4190000	1.3767844
1995:07	0.0867829	1.0260000	1.0052815	0.9930902	0.4460000	1.3667986
1995:08	0.0917185	1.0100000	0.9896046	0.9843789	0.4140000	1.3555468
1995:09	0.0866914	1.0160000	0.9954835	0.9910868	0.4080000	1.3526026
1995:10	0.0869134	1.0350000	1.0140998	1.0085029	0.4120000	1.3463134
1995:11	0.0869415	1.0410000	1.0199786	1.0143260	0.4330000	1.3384571
1995:12	0.0864963	1.0370000	1.0160594	1.0129521	0.4720000	1.3186766
1996:01	0.0775662	1.0120000	0.9748174	1.0172956	0.4890000	1.3331127
1996:02	0.0734098	1.0190000	0.9815602	0.9921309	0.4970000	1.3447867

Year: month	nrgsr	MCPI	IMCPI	NIMCPI	IRM	Mß
1996:03	0.0841334	1.0170000	0.9796337	0.9918802	0.4750000	1.3520391
1996:04	0.0802841	1.0190000	0.9815602	1.0114845	0.4450000	1.3570987
1996:05	0.0789892	1.0530000	1.0143110	1.0234489	0.4300000	1.3549818
1996:06	0.0800732	1.0100000	0.9728908	0.9611538	0.4240000	1.3579049
1996:07	0.0867829	1.0750000	1.0355026	0.9930902	0.5540000	1.3531514
1996:08	0.0917185	1.0380000	0.9998621	0.9843789	0.3550000	1.3542514
1996:09	0.0866914	1.0240000	0.9863765	0.9910868	0.3670000	1.3533182
1996:10	0.0869134	1.0340000	0.9960090	1.0085029	0.3850000	1.3434139
1996:11	0.0869415	1.0580000	1.0191272	1.0143260	0.3940000	1.3428522
1996:12	0.0864963	1.1030000	1.0624739	1.0129521	0.4030000	1.3287783

Appendix II

Overview on stationarity of main statistical series (according to ADF test)

Indicators	Symbols	Basic series (x)	$x - x(-1)$	$[x - x(-1)] - [x(-1) - x(-2)]$	$\frac{x}{x(-1)}$	$\frac{x}{x(-1)} - 1$	$\frac{x}{x(-1)} - \frac{x(-1)}{x(-2)}$	$\frac{x}{x(-1)} : \frac{x(-1)}{x(-2)}$	lnx
		A) Annual data (1980 - 1996)							
Population	P	–	+	+	–	+	+	+	–
Population over 15 years	AP	+	+	+	+	+	+	+	+
Labour force	LF	–	+	+	+	+	+	+	–
Employment	E	+	+	+	+	+	+	+	+
Salaried (wage paid) employees	E1	–	+	+	–	+	+	+	–
Quasi-employees salaried employees, registered unemployment and state social insurance retired people)	QE	–	–	+	–	–	+	+	–
Total retired people receiving social benefits	RP	–	–	+	–	+	+	+	–
Labour force rate	lfp	+	+	+	+	+	+	+	+
Quasi-employees rate (ratio between quasi-employees and popula-	qe	–	+	+	–	+	+	+	–

Indicators	Symbols	Basic series (x)	$x -$ $-x(-1)$	$[x - x(-1)] -$ $-[x(-1) -$ $-x(-2)]$	$\frac{x}{x(-1)}$	$\frac{x}{x(-1)} - 1$	$\frac{x}{x(-1)} -$ $- \frac{x(-1)}{x(-2)}$	$\frac{x}{x(-1)} :$ $: \frac{x(-1)}{x(-2)}$	lnx
tion over 15 years)									
Gross value added in industry and construction, current prices	GVAIC	+	+	+	–	–	+	+	–
Gross value added in industry and construction, 1990 prices	GVAIC90	–	+	+	–	+	+	+	+
Gross value added in agriculture (including silviculture, forestry, hunting, and fishing), current prices	GVAA	–	–	+	–	–	+	+	–
Gross value added in agriculture (including silviculture, forestry, hunting and fishing), 1990 prices	GVAA90	+	+	+	+	+	+	+	+
Gross value added in industry, construction, and agriculture, current prices	GVAICA	+	+	+	_	_	+	–	–
Gross value added in industry, construction, and	GVAICA								

Indicators	Symbols	Basic series (x)	$x-x(-1)$	$[x-x(-1)]-[x(-1)-x(-2)]$	$\frac{x}{x(-1)}$	$\frac{x}{x(-1)}-1$	$\frac{x}{x(-1)}-\frac{x(-1)}{x(-2)}$	$\frac{x}{x(-1)}:\frac{x(-1)}{x(-2)}$	lnx
agriculture, 1990 prices	90	–	+	+	–	+	+	+	–
Gross value added in transport, post and communications, current prices	GVAT	–	–	+	+	+	+	+	–
Gross value added in transport, post and communications, 1990 prices	GVAT90	–	+	+	+	+	+	+	–
Gross value added in trade, financial, banking and insurance activities, real estate, and other services, current prices	GVAO	+	+	+	–	–	+	+	–
Gross value added in trade, financial, banking and insurance activities, real estate, and other services, 1990 prices	GVAO90	–	+	+	+	+	+	+	+
Gross value added in transport, post and									

Indicators	Symbols	Basic series (x)	$x-$ $-x(-1)$	$[x-x(-1)]-$ $-[x(-1)-$ $-x(-2)]$	$\frac{x}{x(-1)}$	$\frac{x}{x(-1)}-1$	$\frac{x}{x(-1)}-$ $-\frac{x(-1)}{x(-2)}$	$\frac{x}{x(-1)}:$ $:\frac{x(-1)}{x(-2)}$	lnx
communications, trade, financial, banking and insurance activities, real estate, and other services, current prices	GVATO	–	–	+	–	–	+	+	–
Gross value added in transport, post and communications, trade, financial, banking and insurance activities, real estate and other services, 1990 prices	GVATO 90	+	+	+	+	+	+	+	+
Gross value added in public services, current prices	GVAPS	+	+	+	–	–	+	+	–
Gross value added in public services, 1990 prices	GVAPS 90	–	+	+	+	+	+	+	+
Ratio between gross value added in public									

Indicators	Symbols	Basic series (x)	$x-x(-1)$	$[x-x(-1)]-[x(-1)-x(-2)]$	$\frac{x}{x(-1)}$	$\frac{x}{x(-1)}-1$	$\frac{x}{x(-1)}-\frac{x(-1)}{x(-2)}$	$\frac{x}{x(-1)}:\frac{x(-1)}{x(-2)}$	lnx
services and expenditures of the general consolidated budget	RPSBE	–	+	+	+	+	+	+	+
Total gross value added, current prices	GVA	+	+	+	–	–	+	+	–
Total gross value added, 1990 prices	GVA90	+	+	+	–	+	+	+	+
Gross domestic product, current prices	GDP	+	+	+	–	–	+	+	–
Gross domestic product, 1990 prices	GDP90	–	+	+	–	+	+	+	–
Index (previous year = 1) of share of accounted economy in total gross domestic product (created in accounted and non-accounted sectors)	Is	–	+	+	+	+	+	+	+
Index (1985 = 1) of share of accounted economy in total gross domestic product (created in ac-	Is85	+	+	+	–	+	+	+	+

Indicators	Symbols	Basic series (x)	$x - x(-1)$	$[x - x(-1)] - [x(-1) - x(-2)]$	$\frac{x}{x(-1)}$	$\frac{x}{x(-1)} - 1$	$\frac{x}{x(-1)} - \frac{x(-1)}{x(-2)}$	$\frac{x}{x(-1)} : \frac{x(-1)}{x(-2)}$	lnx
counted and non-accounted sectors)									
Domestic aggregate demand, current prices	DAD	+	+	+	–	–	+	+	–
Domestic aggregate demand, 1990 prices	DAD90	–	+	+	+	+	+	+	–
Labour income per employed person, current prices	GLE	+	+	+	–	–	+	+	–
Labour income per employed person, 1990 prices	GLE90	–	+	+	+	+	+	+	–
Total labour income, current prices	GLEE	+	+	+	–	–	+	+	+
Total labour income, 1990 prices	GLEE90	–	+	+	+	+	+	+	–
Revenues from net wages, social insurance pensions, unemployment benefits, social assistance, dividends, and other non-salary incomes of households,	NR	+	+	+	+	+	+	–	+

Indicators	Symbols	Basic series (x)	$x-$ $-x(-1)$	$[x-x(-1)]-$ $-[x(-1)-$ $-x(-2)]$	$\frac{x}{x(-1)}$	$\frac{x}{x(-1)}-1$	$\frac{x}{x(-1)}-$ $-\frac{x(-1)}{x(-2)}$	$\frac{x}{x(-1)}:$ $:\frac{x(-1)}{x(-2)}$	lnx
current prices									
Revenues from net wages, social insurance pensions, unemployment benefits, social assistance, dividends, and other non-salary incomes of households, 1990 prices	NR90	–	+	+	+	+	+	+	–
Volume of retail trade and commercial services rendered to the population, current prices	GS	+	+	+	–	–	+	+	–
Volume of retail trade and commercial services rendered to the population, 1990 prices	GS90	–	+	+	+	–	+	+	–
Share of labour income in total gross value added	ler	–	+	+	+	+	+	+	–
Share of labour income in gross domestic prod-	lrr	–	+	+	+	+	+	+	–

Indicators	Symbols	Basic series (x)	$x - x(-1)$	$[x - x(-1)] - [x(-1) - x(-2)]$	$\frac{x}{x(-1)}$	$\frac{x}{x(-1)} - 1$	$\frac{x}{x(-1)} - \frac{x(-1)}{x(-2)}$	$\frac{x}{x(-1)} : \frac{x(-1)}{x(-2)}$	lnx
uct									
Production for self-consumption, current prices	SC	–	–	–	–	+	+	+	–
Production for self-consumption, 1990 prices	SC90	+	+	+	+	+	+	+	+
Investments in fixed assets, current prices	I	+	+	+	–	–	+	+	–
Investments in fixed assets, 1990 prices	I90	–	+	+	–	+	+	+	–
Investments rate (share of investments in domestic aggregate demand)	Id	–	+	+	+	+	+	+	–
Capital formation rate (share of gross capital formation in gross domestic product)	gcf	–	+	+	+	+	+	+	–
Fixed assets, 1990 prices	FA90	–	+	+	–	+	+	+	–
Normal rate of fixed as-									

Indicators	Symbols	Basic series (x)	$x - x(-1)$	$[x - x(-1)] - [x(-1) - x(-2)]$	$\frac{x}{x(-1)}$	$\frac{x}{x(-1)} - 1$	$\frac{x}{x(-1)} - \frac{x(-1)}{x(-2)}$	$\frac{x}{x(-1)} : \frac{x(-1)}{x(-2)}$	lnx
sets depreciation	dfa	+	+	+	+	+	+	+	–
Efficiency of fixed assets (ratio between gross domestic product and fixed assets)	EFA90	+	+	+	+	+	+	+	–
Fixed assets per employed person, 1990 prices	FA90E	–	+	+	–	+	+	+	+
Exports of goods and services, USD current prices	XGSD	–	+	+	+	+	+	+	+
Real export to GDP ratio	xgdp90	+	+	+	+	+	+	+	+
Imports of goods and services, USD current prices	MGSD	–	+	+	+	+	+	+	–
Foreign trade (exports and imports), USD current prices	FTD	+	+	+	+	+	+	+	–
Imports-exports ratio	MX	–	+	+	+	+	+	+	+
Labour productivity (gross domestic product									

Indicators	Symbols	Basic series (x)	$x - x(-1)$	$[x - x(-1)] - [x(-1) - x(-2)]$	$\frac{x}{x(-1)}$	$\frac{x}{x(-1)} - 1$	$\frac{x}{x(-1)} - \frac{x(-1)}{x(-2)}$	$\frac{x}{x(-1)} : \frac{x(-1)}{x(-2)}$	lnx
per employed person), current prices	LP	+	+	+	–	–	+	+	–
Labour productivity (gross domestic product per employed person), 1990 prices	LP90	+	+	+	–	+	+	+	+
Revenues of the general consolidated budget, current prices	GCBR	–	+	+	–	–	+	+	–
Revenues of the general consolidated budget, 1990 prices	GCBR90	+	+	+	+	+	+	+	+
Expenditures of the general consolidated budget, current prices	GCBE	+	+	+	–	–	+	+	–
Expenditures of the general consolidated budget, 1990 prices	GCBE90	–	+	+	+	+	+	+	–
Current gross domestic product deflator, previ-	GDPD	–	+	+	+	+	+	+	–

Indicators	Symbols	Basic series (x)	$x-x(-1)$	$[x-x(-1)]-[x(-1)-x(-2)]$	$\frac{x}{x(-1)}$	$\frac{x}{x(-1)}-1$	$\frac{x}{x(-1)}-\frac{x(-1)}{x(-2)}$	$\frac{x}{x(-1)}:\frac{x(-1)}{x(-2)}$	lnx
ous year =1									
GDP price index, 1990=1	GDPD90	–	+	+	–	–	+	+	–
Current consumer price index, previous year = 1	CPI	–	+	+	+	+	+	+	–
Consumer price index, 1990 =1	CPI90	–	–	+	–	–	+	+	–
Gross capital formation price index, previous year =1	CFPI	–	+	+	+	+	+	+	–
Gross capital formation price index, 1990 =1	CFPI90	–	–	+	–	–	+	+	–
Exchange rate, current prices	ER	+	+	+	–	–	+	+	–
Exchange rate, 1990 prices	ERCPI90	–	+	+	+	+	+	+	–
Broad money	M2	+	+	+	–	+	+	+	–
Reference interest rate of National Bank of Ro-	IR	–	+	+	+	+	+	+	–

Indicators	Symbols	Basic series (x)	$x - x(-1)$	$[x - x(-1)] - [x(-1) - x(-2)]$	$\frac{x}{x(-1)}$	$\frac{x}{x(-1)} - 1$	$\frac{x}{x(-1)} - \frac{x(-1)}{x(-2)}$	$\frac{x}{x(-1)} : \frac{x(-1)}{x(-2)}$	lnx
mania									
Ratio between current gross domestic product deflator and broad money index	GDPDIM2	–	+	+	+	+	+	+	+
Monetary distortion coefficient	β	–	+	+	+	+	+	+	–
Velocity of M2	v	–	+	+	–	+	+	+	–
	B) Monthly data (Jan. 1991 - Dec. 1996)								
Revenues from net wages, social insurance pensions, unemployment benefits, social assistance, dividends, and other non-salary incomes of households, current prices	MNR	–	+	+	+	+	+	+	+
Volume of retail trade and commercial services rendered to the population, current	MGS	–	+	+	+	+	+	+	+

Indicators	Symbols	Basic series (x)	$x - x(-1)$	$[x - x(-1)] - [x(-1) - x(-2)]$	$\frac{x}{x(-1)}$	$\frac{x}{x(-1)} - 1$	$\frac{x}{x(-1)} - \frac{x(-1)}{x(-2)}$	$\frac{x}{x(-1)} : \frac{x(-1)}{x(-2)}$	lnx
prices									
Exports of goods and services, USD current prices	MXGSD	+	+	+	+	+	+	+	+
Imports of goods and services, USD current prices	MMGSD	+	+	+	+	+	+	+	+
Foreign trade (exports and imports), USD current prices	MFTD	+	+	+	+	+	+	+	+
Consumer price index, previous month =1	MCPI	+	+	+	+	+	+	+	+
Exchange rate, current prices	ERM	–	+	+	+	+	+	+	+
Imports - exports ratio (for two successive months)	MMX	+	+	+	+	+	+	+	+
Broad money	MM2	–	+	+	+	+	+	+	–
Reference interest rate of National Bank of Romania	IRM	–	+	+	+	+	+	+	+
Annualised monthly									

Indicators	Symbols	Basic series (x)	$x-$ $-x(-1)$	$[x-x(-1)]-$ $-[x(-1)-$ $-x(-2)]$	$\frac{x}{x(-1)}$	$\frac{x}{x(-1)}-1$	$\frac{x}{x(-1)}-$ $-\frac{x(-1)}{x(-2)}$	$\frac{x}{x(-1)}:$ $:\frac{x(-1)}{x(-2)}$	lnx
gross domestic product, current prices	MGDP	–	+	+	+	+	+	+	+
Monetary distortion coef-ficient	Mβ	+	+	+	+	+	+	+	+
Velocity of broad money	Mv	–	+	+	+	+	+	+	+
Gross inter-enterprise arrears	A	–	+	+	+	+	+	+	+

The stationarity I (O) is marked with sign + and its absence with sign -.

Appendix III

Statistical series involved in econometric functions

Augmented Dickey-Fuller Test for Stationarity-Integrability

A) Annual indicators

RICA90

ADF Test Statistic	-2.305078	1% Critical Value*	-2.7411
		5% Critical Value	-1.9658
		10% Critical Value	-1.6277

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RICA90(-1)	-0.559560	0.242751	-2.305078	0.0370
R-squared	0.271906	Mean dependent var		0.005087
Adjusted R-squared	0.271906	S.D. dependent var		0.079154
S.E. of regression	0.067541	Akaike info criterion		-5.325704
Sum squared resid	0.063865	Schwarz criterion		-5.278501
Log likelihood	19.65871	Durbin-Watson stat		2.071931

RID90

ADF Test Statistic	-3.255657	1% Critical Value*	-2.7411
		5% Critical Value	-1.9658
		10% Critical Value	-1.6277

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RID90(-1)	-0.877665	0.269582	-3.255657	0.0057
R-squared	0.426695	Mean dependent var		0.007227
Adjusted R-squared	0.426695	S.D. dependent var		0.087256
S.E. of regression	0.066068	Akaike info criterion		-5.369808
Sum squared resid	0.061109	Schwarz criterion		-5.322605
Log likelihood	19.98948	Durbin-Watson stat		1.924222

RIX

ADF Test Statistic	-3.354364	1% Critical Value*	-2.7570

		5% Critical Value	-1.9677
		10% Critical Value	-1.6285

Sample(adjusted): 1983 1996
Included observations: 14 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RIX(-1)	-0.745273	0.222180	-3.354364	0.0057
D(RIX(-1))	0.698749	0.271159	2.576895	0.0242

R-squared	0.498888	Mean dependent var	0.010363
Adjusted R-squared	0.457128	S.D . dependent var	0.164487
S.E. of regression	0.121194	Akaike info criterion	-4.089169
Sum squared resid	0.176255	Schwarz criterion	-3.997875
Log likelihood	10.75904	F-statistic	11.94673
Durbin-Watson stat	2.061582	Prob(F-statistic)	0.004749

RIM

ADF Test Statistic	-2.492665	1% Critical Value*	-2.7411
		5% Critical Value	-1.9658
		10% Critical Value	-1.6277

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RIM(-1)	-0.618999	0.248328	-2.492665	0.0258

R-squared	0.307079	Mean dependent var	-0.009344
Adjusted R-squared	0.307079	S.D . dependent var	0.456831
S.E. of regression	0.380275	Akaike info criterion	-1.869383
Sum squared resid	2.024523	Schwarz criterion	-1.822179
Log likelihood	-6.263707	Durbin-Watson stat	2.029660

DRGCBE

ADF Test Statistic	-3.049403	1% Critical Value*	-2.7411
		5% Critical Value	-1.9658
		10% Critical Value	-1.6277

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DRGCBE(-1)	-0.752612	0.246806	-3.049403	0.0087

R-squared	0.397752	Mean dependent var	0.002164
Adjusted R-squared	0.397752	S.D . dependent var	0.047086
S.E. of regression	0.036541	Akaike info criterion	-6.554312
Sum squared resid	0.018693	Schwarz criterion	-6.507109
Log likelihood	28.87327	Durbin-Watson stat	1.913524

RITO90

ADF Test Statistic	-4.220504	1% Critical Value*	-2.7411
		5% Critical Value	-1.9658
		10% Critical Value	-1.6277

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RITO90(-1)	-1.121496	0.265725	-4.220504	0.0009

R-squared	0.559907	Mean dependent var	0.000882
Adjusted R-squared	0.559907	S.D . dependent var	0.149633
S.E. of regression	0.099266	Akaike info criterion	-4.555566
Sum squared resid	0.137952	Schwarz criterion	-4.508363
Log likelihood	13.88267	Durbin-Watson stat	2.042223

DRPSBE

ADF Test Statistic	-4.358129	1% Critical Value*	-2.7411
		5% Critical Value	-1.9658
		10% Critical Value	-1.6277

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DRPSBE(-1)	-1.088843	0.249842	-4.358129	0.0007

R-squared	0.574659	Mean dependent var	-0.001178
Adjusted R-squared	0.574659	S.D . dependent var	0.024963
S.E. of regression	0.016280	Akaike info criterion	-8.171236
Sum squared resid	0.003711	Schwarz criterion	-8.124033
Log likelihood	41.00019	Durbin-Watson stat	2.138733

RIBE90

ADF Test Statistic	-2.989115	1%	Critical Value*	-2.7411
		5%	Critical Value	-1.9658
		10%	Critical Value	-1.6277

Augmented Dickey-Fuller Test Equation

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RIBE90(-1)	-0.743361	0.248689	-2.989115	0.0098
R-squared	0.387671	Mean dependent var		0.006112
Adjusted R-squared	0.387671	S.D . dependent var		0.113312
S.E. of regression	0.088668	Akaike info criterion		-4.781362
Sum squared resid	0.110069	Schwarz criterion		-4.734159
Log likelihood	15.57614	Durbin-Watson stat		1.894946

DGDP90

ADF Test Statistic	-2.282767	1%	Critical Value*	-2.7760
		5%	Critical Value	-1.9699
		10%	Critical Value	-1.6295

Sample(adjusted): 1984 1996
Included observations: 13 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DGDP90(-1)	-0.574433	0.251639	-2.282767	0.0456
D(DGDP90(-1))	0.298182	0.287502	1.037148	0.3241
D(DGDP90(-2))	0.391145	0.292020	1.339447	0.2101
R-squared	0.344731	Mean dependent var		-0.001732
Adjusted R-squared	0.213678	S.D . dependent var		0.040285
S.E. of regression	0.035722	Akaike info criterion		-6.464785
Sum squared resid	0.012761	Schwarz criterion		-6.334413
Log likelihood	26.57491	F-statistic		2.630459
Durbin-Watson stat	2.124836	Prob(F-statistic)		0.120808

DGVA90

ADF Test Statistic	-1.880861	1%	Critical Value*	-2.7411
		5%	Critical Value	-1.9658
		10%	Critical Value	-1.6277

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DGVA90(-1)	-0.418327	0.222413	-1.880861	0.0810
R-squared	0.197371	Mean dependent var		0.002632
Adjusted R-squared	0.197371	S.D . dependent var		0.036930
S.E. of regression	0.033085	Akaike info criterion		-6.753010
Sum squared resid	0.015325	Schwarz criterion		-6.705806
Log likelihood	30.36349	Durbin-Watson stat		2.048580

RILP90

ADF Test Statistic	-1.869368	1% Critical Value*	-2.7570
		5% Critical Value	-1.9677
		10% Critical Value	-1.6285

Sample(adjusted): 1983 1996
Included observations: 14 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RILP90(-1)	-0.505893	0.270623	-1.869368	0.0862
D(RILP90(-1))	0.154923	0.301090	0.514541	0.6162
R-squared	0.238606	Mean dependent var		-0.001244
Adjusted R-squared	0.175156	S.D . dependent var		0.053821
S.E. of regression	0.048881	Akaike info criterion		-5.905169
Sum squared resid	0.028672	Schwarz criterion		-5.813875
Log likelihood	23.47105	F-statistic		3.760562
Durbin-Watson stat	2.127135	Prob(F-statistic)		0.076348

RIFA90

ADF Test Statistic	-2.043472	1% Critical Value*	-2.7411
		5% Critical Value	-1.9658
		10% Critical Value	-1.6277

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RIFA90(-1)	-0.436880	0.213793	-2.043472	0.0603
R-squared	0.229052	Mean dependent var		-0.001859
Adjusted R-squared	0.229052	S.D . dependent var		0.064230
S.E. of regression	0.056396	Akaike info criterion		-5.686360
Sum squared resid	0.044528	Schwarz criterion		-5.639157

Log likelihood	22.36362	Durbin-Watson stat	2.278235

RIGLEE90

ADF Test Statistic	-3.947379	1% Critical Value*	-2.7411
		5% Critical Value	-1.9658
		10% Critical Value	-1.6277

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RIGLEE90(-1)	-1.051505	0.266380	-3.947379	0.0015
R-squared	0.526592	Mean dependent var		-0.003485
Adjusted R-squared	0.526592	S.D . dependent var		0.206954
S.E. of regression	0.142394	Akaike info criterion		-3.833976
Sum squared resid	0.283864	Schwarz criterion		-3.786773
Log likelihood	8.470745	Durbin-Watson stat		2.018502

Deler

ADF Test Statistic	-1.678449	1% Critical Value*	-2.7411
		5% Critical Value	-1.9658
		10% Critical Value	-1.6277

LS // Dependent Variable is D(Deler)

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Deler (-1)	-0.318329	0.189657	-1.678449	0.1171
D(Deler (-1))	0.267715	0.269237	0.994349	0.3382
R-squared	0.187267	Mean dependent var		-0.000772
Adjusted R-squared	0.124749	S.D. dependent var		0.059031
S.E. of regression	0.055226	Akaike info criterion		-5.669068
Sum squared resid	0.039649	Schwarz criterion		-5.574662
Log likelihood	23.23394	F-statistic		2.995411
Durbin-Watson stat	1.956867	Prob(F-statistic)		0.107150

RIGVA90

ADF Test Statistic	-1.820642	1% Critical Value*	-2.7411

		5% Critical Value	-1.9658
		10% Critical Value	-1.6277

LS // Dependent Variable is D(RIGVA90)

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RIGVA90(-1)	-0.400396	0.219920	-1.820642	0.0901
R-squared	0.186345	Mean dependent var		0.003605
Adjusted R-squared	0.186345	S.D. dependent var		0.047003
S.E. of regression	0.042398	Akaike info criterion		-6.256984
Sum squared resid	0.025166	Schwarz criterion		-6.209781
Log likelihood	26.64331	Durbin-Watson stat		1.955217

xgdp90

ADF Test Statistic	-2.858582	1% Critical Value*	-3.9635
		5% Critical Value	-3.0818
		10% Critical Value	-2.6829

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
xgdp90(-1)	-0.471825	0.165056	-2.858582	0.0144
D(xgdp90(-1))	0.496888	0.216623	2.293789	0.0407
C	0.107586	0.038882	2.767028	0.0171
R-squared	0.473320	Mean dependent var		-0.002692
Adjusted R-squared	0.385540	S.D . dependent var		0.034881
S.E. of regression	0.027342	Akaike info criterion		-7.021792
Sum squared resid	0.008971	Schwarz criterion		-6.880182
Log likelihood	34.37936	F-statistic		5.392110
Durbin-Watson stat	1.914585	Prob(F-statistic)		0.021344

RIG90

ADF Test Statistic	-1.978565	1% Critical Value*	-2.7570
		5% Critical Value	-1.9677
		10% Critical Value	-1.6285

Sample(adjusted): 1983 1996

Included observations: 14 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RIG90(-1)	-0.433464	0.219080	-1.978565	0.0713
D(RIG90(-1))	0.353978	0.280807	1.260573	0.2314
R-squared	0.253046	Mean dependent var		-0.000241
Adjusted R-squared	0.190800	S.D . dependent var		0.047091
S.E. of regression	0.042361	Akaike info criterion		-6.191487
Sum squared resid	0.021534	Schwarz criterion		-6.100193
Log likelihood	25.47527	F-statistic		4.065248
Durbin-Watson stat	2.274796	Prob(F-statistic)		0.066724

DMX

ADF Test Statistic	-4.478897	1% Critical Value*	-2.7411
		5% Critical Value	-1.9658
		10% Critical Value	-1.6277

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DMX(-1)	-1.164134	0.259915	-4.478897	0.0005
R-squared	0.587900	Mean dependent var		0.017974
Adjusted R-squared	0.587900	S.D . dependent var		0.365151
S.E. of regression	0.234409	Akaike info criterion		-2.837036
Sum squared resid	0.769266	Schwarz criterion		-2.789832
Log likelihood	0.993690	Durbin-Watson stat		2.069732

Drnxbb

ADF Test Statistic	-1.793974	1% Critical Value*	-2.7275
		5% Critical Value	-1.9642
		10% Critical Value	-1.6269

LS // Dependent Variable is D(Drnxbb)

Sample(adjusted): 1981 1996
Included observations: 16 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Drnxbb (-1)	-0.345216	0.192431	-1.793974	0.0930
R-squared	0.176597	Mean dependent var		0.000258

Adjusted R-squared	0.176597	S.D. dependent var	0.031835
S.E. of regression	0.028887	Akaike info criterion	-7.028240
Sum squared resid	0.012517	Schwarz criterion	-6.979954
Log likelihood	34.52291	Durbin-Watson stat	1.830310

DER90

ADF Test Statistic	-1.940385	1% Critical Value*	-2.7275
		5% Critical Value	-1.9642
		10% Critical Value	-1.6269

LS // Dependent Variable is D(DER90)

Sample(adjusted): 1981 1996
Included observations: 16 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DER90(-1)	-0.401488	0.206911	-1.940385	0.0714
R-squared	0.199615	Mean dependent var		0.007160
Adjusted R-squared	0.199615	S.D. dependent var		0.206123
S.E. of regression	0.184406	Akaike info criterion		-3.320767
Sum squared resid	0.510085	Schwarz criterion		-3.272481
Log likelihood	4.863122	Durbin-Watson stat		1.687209

RII90

ADF Test Statistic	-2.687850	1% Critical Value*	-2.7411
		5% Critical Value	-1.9658
		10% Critical Value	-1.6277

LS // Dependent Variable is D(RII90)

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RII90(-1)	-0.689096	0.256374	-2.687850	0.0177
R-squared	0.337415	Mean dependent var		0.011579
Adjusted R-squared	0.337415	S.D. dependent var		0.178593
S.E. of regression	0.145374	Akaike info criterion		-3.792555
Sum squared resid	0.295869	Schwarz criterion		-3.745352
Log likelihood	8.160087	Durbin-Watson stat		1.938682

RIIR

ADF Test Statistic	-2.416323	1% Critical Value*	-2.7411
		5% Critical Value	-1.9658
		10% Critical Value	-1.6277

LS // Dependent Variable is D(RIIR)

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RIIR(-1)	-0.591657	0.244858	-2.416323	0.0299

R-squared	0.294063	Mean dependent var	-0.002197
Adjusted R-squared	0.294063	S.D. dependent var	0.122730
S.E. of regression	0.103118	Akaike info criterion	-4.479429
Sum squared resid	0.148866	Schwarz criterion	-4.432225
Log likelihood	13.31164	Durbin-Watson stat	1.768225

dfa

ADF Test Statistic	-2.951408	1% Critical Value*	-3.9635
		5% Critical Value	-3.0818
		10% Critical Value	-2.6829

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
dfa (-1)	-0.809356	0.274227	-2.951408	0.0112
C	0.051342	0.021787	2.356588	0.0348

R-squared	0.401220	Mean dependent var	-0.001523
Adjusted R-squared	0.355160	S.D . dependent var	0.059818
S.E. of regression	0.048035	Akaike info criterion	-5.948093
Sum squared resid	0.029995	Schwarz criterion	-5.853686
Log likelihood	25.32662	F-statistic	8.710810
Durbin-Watson stat	2.041437	Prob(F-statistic)	0.011241

DIGDP90

ADF Test Statistic	-3.280171	1% Critical Value*	-2.7570
		5% Critical Value	-1.9677
		10% Critical Value	-1.6285

Sample(adjusted): 1983 1996
Included observations: 14 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIGDP90(-1)	-0.903292	0.275379	-3.280171	0.0060
R-squared	0.448495	Mean dependent var		-0.005427
Adjusted R-squared	0.448495	S.D . dependent var		0.063113
S.E. of regression	0.046870	Akaike info criterion		-6.052006
Sum squared resid	0.028558	Schwarz criterion		-6.006359
Log likelihood	23.49890	Durbin-Watson stat		1.977753

DGS90

ADF Test Statistic	-3.836601	1% Critical Value*	-2.7411
		5% Critical Value	-1.9658
		10% Critical Value	-1.6277

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DGS90(-1)	-1.021242	0.266184	-3.836601	0.0018
R-squared	0.512490	Mean dependent var		-0.000491
Adjusted R-squared	0.512490	S.D . dependent var		0.058831
S.E. of regression	0.041077	Akaike info criterion		-6.320275
Sum squared resid	0.023622	Schwarz criterion		-6.273072
Log likelihood	27.11799	Durbin-Watson stat		1.890232

DNR90

ADF Test Statistic	-3.708364	1% Critical Value*	-2.7411
		5% Critical Value	-1.9658
		10% Critical Value	-1.6277

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DNR90(-1)	-0.990388	0.267069	-3.708364	0.0023
R-squared	0.495525	Mean dependent var		-0.000366
Adjusted R-squared	0.495525	S.D . dependent var		0.108153
S.E. of regression	0.076817	Akaike info criterion		-5.068320
Sum squared resid	0.082612	Schwarz criterion		-5.021117
Log likelihood	17.72832	Durbin-Watson stat		1.959657

IRIR

ADF Test Statistic	-3.743112	1% Critical Value*	-3.9635
		5% Critical Value	-3.0818
		10% Critical Value	-2.6829

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IRIR(-1)	-1.046295	0.279525	-3.743112	0.0025
C	1.076942	0.296818	3.628294	0.0031

R-squared	0.518713	Mean dependent var	-0.005880
Adjusted R-squared	0.481691	S.D . dependent var	0.357475
S.E. of regression	0.257360	Akaike info criterion	-2.590994
Sum squared resid	0.861043	Schwarz criterion	-2.496587
Log likelihood	0.148377	F-statistic	14.01089
Durbin-Watson stat	1.976523	Prob(F-statistic)	0.002460

Dqe

ADF Test Statistic	-2.055449	1% Critical Value*	-2.7411
		5% Critical Value	-1.9658
		10% Critical Value	-1.6277

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DQE(-1)	-0.583322	0.283793	-2.055449	0.0590

R-squared	0.216222	Mean dependent var	-0.001959
Adjusted R-squared	0.216222	S.D . dependent var	0.014227
S.E. of regression	0.012596	Akaike info criterion	-8.684467
Sum squared resid	0.002221	Schwarz criterion	-8.637264
Log likelihood	44.84942	Durbin-Watson stat	1.814516

RIAP

ADF Test Statistic	-2.863847	1% Critical Value*	-2.7411
		5% Critical Value	-1.9658
		10% Critical Value	-1.6277

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.

RIAP(-1)	-0.741929	0.259067 -2.863847	0.0125
R-squared	0.368737	Mean dependent var	-0.000477
Adjusted R-squared	0.368737	S.D . dependent var	0.015068
S.E. of regression	0.011972	Akaike info criterion	-8.786046
Sum squared resid	0.002007	Schwarz criterion	-8.738843
Log likelihood	45.61127	Durbin-Watson stat	2.053767

ICPI

ADF Test Statistic	-3.241061	1% Critical Value*	-3.9635
		5% Critical Value	-3.0818
		10% Critical Value	-2.6829

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ICPI(-1)	-0.893580	0.275706	-3.241061	0.0064
C	0.963815	0.319735	3.014420	0.0100
R-squared	0.446914	Mean dependent var		0.001209
Adjusted R-squared	0.404369	S.D . dependent var		0.594182
S.E. of regression	0.458573	Akaike info criterion		-1.435708
Sum squared resid	2.733754	Schwarz criterion		-1.341301
Log likelihood	-8.516269	F-statistic		10.50447
Durbin-Watson stat	1.990301	Prob(F-statistic)		0.006438

IGDPD

ADF Test Statistic	-3.343867	1% Critical Value*	-3.9635
		5% Critical Value	-3.0818
		10% Critical Value	-2.6829

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IGDPD(-1)	-0.923946	0.276311	-3.343867	0.0053
C	0.999220	0.320486	3.117829	0.0082
R-squared	0.462398	Mean dependent var		0.004149
Adjusted R-squared	0.421044	S.D . dependent var		0.605628
S.E. of regression	0.460817	Akaike info criterion		-1.425942
Sum squared resid	2.760581	Schwarz criterion		-1.331536
Log likelihood	-8.589511	F-statistic		11.18145

Durbin-Watson stat	1.992092	Prob(F-statistic)	0.005283

ICFPI

ADF Test Statistic	-3.116243	1% Critical Value*	-3.9635
		5% Critical Value	-3.0818
		10% Critical Value	-2.6829

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ICFPI(-1)	-0.855159	0.274420	-3.116243	0.0082
C	0.916533	0.313668	2.921986	0.0119

R-squared	0.427589	Mean dependent var	0.000306
Adjusted R-squared	0.383558	S.D . dependent var	0.539056
S.E. of regression	0.423233	Akaike info criterion	-1.596097
Sum squared resid	2.328645	Schwarz criterion	-1.501690
Log likelihood	-7.313350	F-statistic	9.710973
Durbin-Watson stat	1.978281	Prob(F-statistic)	0.008187

DSC90

ADF Test Statistic	-6.438629	1% Critical Value*	-2.7411
		5% Critical Value	-1.9658
		10% Critical Value	-1.6277

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DSC90(-1)	-1.485168	0.230665	-6.438629	0.0000

R-squared	0.747474	Mean dependent var	-0.000430
Adjusted R-squared	0.747474	S.D . dependent var	0.026124
S.E. of regression	0.013128	Akaike info criterion	-8.601741
Sum squared resid	0.002413	Schwarz criterion	-8.554537
Log likelihood	44.22898	Durbin-Watson stat	2.158788

DDAD90

ADF Test Statistic	-3.469846	1% Critical Value*	-2.7411
		5% Critical Value	-1.9658
		10% Critical Value	-1.6277

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DDAD90(-1)	-0.937554	0.270200	-3.469846	0.0038
R-squared	0.459054	Mean dependent var		0.005952
Adjusted R-squared	0.459054	S.D . dependent var		0.078535
S.E. of regression	0.057762	Akaike info criterion		-5.638509
Sum squared resid	0.046710	Schwarz criterion		-5.591305
Log likelihood	22.00474	Durbin-Watson stat		1.931831

RIs

ADF Test Statistic	-1.710892	1% Critical Value*	-2.8270
		5% Critical Value	-1.9755
		10% Critical Value	-1.6321

Sample(adjusted): 1986 1996
Included observations: 11 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RIs(-1)	-0.453792	0.265237	-1.710892	0.1179
R-squared	0.226291	Mean dependent var		0.000591
Adjusted R-squared	0.226291	S.D . dependent var		0.045539
S.E. of regression	0.040056	Akaike info criterion		-6.348423
Sum squared resid	0.016045	Schwarz criterion		-6.312251
Log likelihood	20.30800	Durbin-Watson stat		2.022785

RIAPIE

ADF Test Statistic	-2.718997	1% Critical Value*	-2.7411
		5% Critical Value	-1.9658
		10% Critical Value	-1.6277

Sample(adjusted): 1982 1996
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RIAPIE(-1)	-0.731007	0.268852	-2.718997	0.0166
R-squared	0.343150	Mean dependent var		-0.001549
Adjusted R-squared	0.343150	S.D . dependent var		0.026317
S.E. of regression	0.021329	Akaike info criterion		-7.631064
Sum squared resid	0.006369	Schwarz criterion		-7.583861
Log likelihood	36.94890	Durbin-Watson stat		1.877783

RIv

ADF Test Statistic	-2.633153	1% Critical Value*	-2.7411

		5% Critical Value		-1.9658
		10% Critical Value		-1.6277
Sample(adjusted): 1982 1996				
Included observations: 15 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
RIv(-1)	-0.666371	0.253070	-2.633153	0.0197
R-squared	0.330952	Mean dependent var		-0.007319
Adjusted R-squared	0.330952	S.D . dependent var		0.381485
S.E. of regression	0.312037	Akaike info criterion		-2.264925
Sum squared resid	1.363141	Schwarz criterion		-2.217722
Log likelihood	-3.297140	Durbin-Watson stat		2.046826

IMD

ADF Test Statistic	-3.488788	1% Critical Value*		-4.3260
		5% Critical Value		-3.2195
		10% Critical Value		-2.7557
Sample(adjusted): 1987 1996				
Included observations: 10 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
IMD(-1)	-1.211843	0.347354	-3.488788	0.0082
C	1.271854	0.375115	3.390573	0.0095
R-squared	0.603404	Mean dependent var		-0.004089
Adjusted R-squared	0.553829	S.D . dependent var		0.394819
S.E. of regression	0.263723	Akaike info criterion		-2.488853
Sum squared resid	0.556400	Schwarz criterion		-2.428336
Log likelihood	0.254880	F-statistic		12.17164
Durbin-Watson stat	2.002376	Prob(F-statistic)		0.008213

dir

ADF Test Statistic	-1.671228	1% Critical Value*		-2.7570
		5% Critical Value		-1.9677
		10% Critical Value		-1.6285
Sample(adjusted): 1983 1996				
Included observations: 14 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
dir (-1)	-0.387330	0.231764	-1.671228	0.1229
D(dir (-1))	0.188631	0.291883	0.646255	0.5314
D(dir (-2))	0.267833	0.319113	0.839305	0.4192

R-squared	0.203698	Mean dependent var	-0.000329
Adjusted R-squared	0.058915	S.D . dependent var	0.594451
S.E. of regression	0.576674	Akaike info criterion	-0.913548
Sum squared resid	3.658077	Schwarz criterion	-0.776608
Log likelihood	-10.47030	F-statistic	1.406924
Durbin-Watson stat	1.913947	Prob(F-statistic)	0.285712

B) Monthly Indicators

MXGSD

ADF Test Statistic	-5.814983	1% Critical Value*	-4.0909
		5% Critical Value	-3.4730
		10% Critical Value	-3.1635

Sample(adjusted): 1991:02 1996:12
Included observations: 71 after adjusting endpoints

Variable	Coefficient	Std. Erro	t-Statistic	Prob.
MXGSD(-1)	-0.698698	0.120155	-5.814983	0.0000
C	203.6311	42.27347	4.816996	0.0000
@TREND(1991:01)	5.767173	1.075216	5.363735	0.0000

R-squared	0.335324	Mean dependent var	9.855513
Adjusted R-squared	0.315775	S.D . dependent var	114.1254
S.E. of regression	94.40217	Akaike info criterion	9.136463
Sum squared resid	606000.4	Schwarz criterion	9.232069
Log likelihood	-422.0891	F-statistic	17.15275
Durbin-Watson stat	1.962675	Prob(F-statistic)	0.000001

IAERM

ADF Test Statistic	-2.760654	1% Critical Value*	-3.5362
		5% Critical Value	-2.9077
		10% Critical Value	-2.5911

Sample(adjusted): 1992:02 1997:04
Included observations: 63 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IAERM(-1)	-0.170284	0.061683	-2.760654	0.0076
C	0.370166	0.177351	2.087195	0.0411

R-squared	0.111062	Mean dependent var	-0.052182
Adjusted R-squared	0.096489	S.D . dependent var	0.749110
S.E. of regression	0.712053	Akaike info criterion	-0.647975
Sum squared resid	30.92817	Schwarz criterion	-0.579939
Log likelihood	-66.98190	F-statistic	7.621212
Durbin-Watson stat	1.958906	Prob(F-statistic)	0.007609

IAMMGSD

ADF Test Statistic	-4.693567	1% Critical Value*	-3.5380
		5% Critical Value	-2.9084

		10% Critical Value	-2.5915

Sample(adjusted): 1992:02 1997:03
Included observations: 62 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IAMMGSD(-1)	-0.531533	0.113247	-4.693567	0.0000
C	0.632177	0.139174	4.542345	0.0000

R-squared	0.268556	Mean dependent var	0.002197
Adjusted R-squared	0.256366	S.D . dependent var	0.335974
S.E. of regression	0.289725	Akaike info criterion	-2.445920
Sum squared resid	5.036433	Schwarz criterion	-2.377303
Log likelihood	-10.15066	F-statistic	22.02957
Durbin-Watson stat	2.069634	Prob(F-statistic)	0.000016

IERM

ADF Test Statistic	-8.924690	1% Critical Value*	-3.5253
		5% Critical Value	-2.9029
		10% Critical Value	-2.5886

Sample(adjusted): 1991:03 1996:12
Included observations: 70 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IERM(-1)	-1.078427	0.120836	-8.924690	0.0000
C	1.173283	0.135955	8.629950	0.0000

R-squared	0.539452	Mean dependent var	0.000887
Adjusted R-squared	0.532679	S.D . dependent var	0.428679
S.E. of regression	0.293049	Akaike info criterion	-2.426678
Sum squared resid	5.839672	Schwarz criterion	-2.362435
Log likelihood	-12.39198	F-statistic	79.65009
Durbin-Watson stat	2.007172	Prob(F-statistic)	0.000000

MCPI

ADF Test Statistic	-5.570550	1% Critical Value*	-3.5226
		5% Critical Value	-2.9017
		10% Critical Value	-2.5879

Sample: 1991:01 1996:12
Included observations: 72

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MCPI(-1)	-0.606296	0.108840	-5.570550	0.0000
C	0.649729	0.116550	5.574670	0.0000

R-squared	0.307144	Mean dependent var	0.001431
Adjusted R-squared	0.297246	S.D . dependent var	0.063804
S.E. of regression	0.053488	Akaike info criterion	-5.829227
Sum squared resid	0.200264	Schwarz criterion	-5.765987
Log likelihood	109.6886	F-statistic	31.03102
Durbin-Watson stat	2.075419	Prob(F-statistic)	0.000000

IMM2

ADF Test Statistic	-7.222320	1% Critical Value*	-3.5111
		5% Critical Value	-2.8967
		10% Critical Value	-2.5853

Sample(adjusted): 1991:03 1997:12
Included observations: 82 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IMM2(-1)	-0.793088	0.109811	-7.222320	0.0000
C	0.841352	0.116543	7.219251	0.0000

R-squared	0.394682	Mean dependent var	0.000626
Adjusted R-squared	0.387115	S.D. dependent var	0.065164
S.E. of regression	0.051015	Akaike info criterion	-5.927192
Sum squared resid	0.208201	Schwarz criterion	-5.868491
Log likelihood	128.6619	F-statistic	52.16190
Durbin-Watson stat	1.889524	Prob(F-statistic)	0.000000

RIMM2

ADF Test Statistic	-3.935432	1% Critical Value*	-2.5912
		5% Critical Value	-1.9442
		10% Critical Value	-1.6178

Sample(adjusted): 1991:03 1997:12
Included observations: 82 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RIMM2(-1)	-0.328493	0.083471	-3.935432	0.0002

R-squared	0.160436	Mean dependent var	0.000626
Adjusted R-squared	0.160436	S.D. dependent var	0.065164
S.E. of regression	0.059708	Akaike info criterion	-5.624453
Sum squared resid	0.288770	Schwarz criterion	-5.595103
Log likelihood	115.2496	Durbin-Watson stat	2.200239

RIMNR

ADF Test Statistic	-9.052092	1% Critical Value*	-2.5912
		5% Critical Value	-1.9442
		10% Critical Value	-1.6178

Sample(adjusted): 1991:03 1997:12
Included observations: 82 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RIMNR(-1)	-0.973890	0.107587	-9.052092	0.0000

R-squared	0.502822	Mean dependent var	-0.002427
Adjusted R-squared	0.502822	S.D. dependent var	0.215829
S.E. of regression	0.152183	Akaike info criterion	-3.753225
Sum squared resid	1.875929	Schwarz criterion	-3.723875
Log likelihood	38.52927	Durbin-Watson stat	1.973903

RIERM

ADF Test Statistic	-8.205859	1% Critical Value*	-2.5958
		5% Critical Value	-1.9450
		10% Critical Value	-1.6182

Sample(adjusted): 1991:03 1996:12
Included observations: 70 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RIERM(-1)	-0.988207	0.120427	-8.205859	0.0000

R-squared	0.493896	Mean dependent var	0.000887
Adjusted R-squared	0.493896	S.D. dependent var	0.428679
S.E. of regression	0.304966	Akaike info criterion	-2.360924
Sum squared resid	6.417315	Schwarz criterion	-2.328803
Log likelihood	-15.69335	Durbin-Watson stat	2.000323

**MacKinnon critical values for rejection of hypothesis of a unit root.*

Appendix IV

Econometric Functions
A) Annual Variables

RICA90=C(1)*RID90+C(2)*RIX+C(3)*RIM+C(4)*DRGCBE+C(50)*DUM84
+C(51)*DUM94
RITO90=C(5)*RID90+C(6)*RIX+C(52)*DUM91+C(53)*DUM93+C(54)*DU
M94
DRPSBE=C(7)*RIBE90+C(55)*DUM90+C(56)*DUM92
DGDP90=C(8)*DGVA90
RILP90=C(9)*RIFA90+C(10)*RIGLEE90+C(11)*T+C(12)
Deler=C(13)*(Deler(-1)+Deler (-2))+C(14)*RIGVA90+C(59)*DUM90
+C(60)*DUM91
xgdp90=C(15)+C(16)*RIG90(-1)+C(17)*DMX(-1)+C(61)*DUM88
Drnxbb=C(18)*DER90+C(19)+C(62)*DUM90+C(63)*DUM91
RII90=RIG90+C(20)*RIIR+C(21)*RIX+C(64)*DUM90+C(65)*DUM91+C(6
6)*DUM92
dfa=C(22)+C(23)*DIGDP90+C(67)*DUM90+C(68)*DUM92
DGS90=C(24)*DNR90*(1+C(25)*IRIR)+C(69)*DUM82+C(70)*DUM90+C(
71)*DUM93
Dqe=C(26)*RIAP+C(27)*RIG90+C(72)*DUM82+C(73)*DUM92+C(74)*DU
M95
ICPI=C(28)*IGDPD+C(75)*DUM90
ICFPI=C(29)*IGDPD+C(30)+C(76)*DUM92+C(77)*DUM83+C(78)*DUM82
DSC90=C(31)*(DDAD90-DGS90)+C(32)*(DDAD90(-1)-DGS90(-
1))+C(79)*DUM84
+C(80)*DUM87
RIs=C(33)*RIG90+C(34)*RIAPIE
RIv=IMD-1+RIs+C(35)*dir +C(81)*DUM95

System: ANRO98
Estimation Method: Iterative Least Squares
Sample: 1980 1996

	Coefficient	**Std. Error**	**t-Statistic**	**Prob**.
C(1)	0.359613	0.188865	1.904078	0.0584
C(2)	0.094139	0.050159	1.876801	0.0620

C(3)	-0.090348	0.031349	-2.882005	0.0044
C(4)	-0.366449	0.189479	-1.933976	0.0546
C(50)	0.045339	0.029217	1.551805	0.1223
C(51)	0.039169	0.030902	1.267549	0.2065
C(5)	0.287411	0.185220	1.551724	0.1223
C(6)	0.376449	0.064690	5.819316	0.0000

	Coefficient	**Std. Error**	**t-Statistic**	**Prob**.
C(52)	0.406724	0.048669	8.357001	0.0000
C(53)	-0.116241	0.035806	-3.246385	0.0014
C(54)	-0.166487	0.038519	-4.322232	0.0000
C(7)	-0.128950	0.027147	-4.750056	0.0000
C(55)	0.018421	0.009673	1.904422	0.0583
C(56)	-0.021440	0.009580	-2.238091	0.0263
C(8)	1.124653	0.117446	9.575931	0.0000
C(9)	1.022981	0.226699	4.512509	0.0000
C(10)	0.247226	0.094102	2.627215	0.0093
C(11)	0.007762	0.002760	2.812229	0.0054
C(12)	-0.099111	0.032552	-3.044722	0.0027
C(13)	0.244065	0.021412	11.39863	0.0000
C(14)	-0.215249	0.071307	-3.018610	0.0029
C(59)	0.209938	0.011421	18.38217	0.0000
C(60)	0.079258	0.014338	5.527854	0.0000
C(15)	0.226710	0.004973	45.59217	0.0000
C(16)	0.543516	0.085874	6.329212	0.0000
C(17)	-0.065684	0.020770	-3.162396	0.0018
C(61)	0.031505	0.019278	1.634245	0.1038
C(18)	-0.047809	0.025425	-1.880391	0.0615
C(19)	-0.016664	0.005609	-2.971238	0.0033
C(62)	-0.073137	0.022033	-3.319434	0.0011
C(63)	-0.044756	0.023318	-1.919342	0.0564
C(20)	-0.411282	0.232914	-1.765808	0.0790
C(21)	0.202040	0.104131	1.940248	0.0538
C(64)	-0.210211	0.059503	-3.532768	0.0005
C(65)	-0.119359	0.050063	-2.384204	0.0181
C(66)	0.408461	0.095951	4.256985	0.0000
C(22)	0.048530	0.003531	13.74464	0.0000
C(23)	-0.244817	0.075245	-3.253603	0.0013

C(67)	0.165867	0.013212	12.55408	0.0000
C(68)	0.071796	0.013583	5.285763	0.0000
C(24)	0.604716	0.061031	9.908300	0.0000
C(25)	-0.451896	0.117177	-3.856526	0.0002
C(69)	-0.018421	0.009116	-2.020868	0.0447
C(70)	0.016667	0.009559	1.743546	0.0828
	Coefficient	**Std. Error**	**t-Statistic**	**Prob**.
C(71)	-0.052529	0.009088	-5.779843	0.0000
C(26)	0.470118	0.210836	2.229778	0.0269
C(27)	-0.287306	0.047930	-5.994323	0.0000
C(72)	0.017170	0.007005	2.451205	0.0151
C(73)	-0.044884	0.010091	-4.447738	0.0000
C(74)	0.019487	0.007874	2.475002	0.0142
C(28)	1.003681	0.010152	98.86827	0.0000
C(75)	-0.110320	0.046884	-2.353026	0.0196
C(29)	0.926194	0.019113	48.45846	0.0000
C(30)	0.065390	0.022661	2.885634	0.0043
C(76)	0.132648	0.032851	4.037840	0.0001
C(77)	0.079089	0.033051	2.392947	0.0177
C(78)	-0.078724	0.032820	-2.398642	0.0174
C(31)	0.175326	0.079161	2.214811	0.0279
C(32)	-0.280027	0.076824	-3.645067	0.0003
C(79)	0.012474	0.010661	1.170068	0.2434
C(80)	0.020664	0.010402	1.986584	0.0484
C(33)	0.654426	0.120828	5.416187	0.0000
C(34)	-0.400918	0.260259	-1.540457	0.1251
C(35)	-0.251304	0.034133	-7.362579	0.0000
C(81)	-0.190456	0.100632	-1.892596	0.0599

Determinant residual covariance 1.66E-66

Equation:RICA90=C(1)*RID90+C(2)*RIX+C(3)*RIM+C(4)*DRGCBE+C(50) * DUM84+C(51)*DUM94
Observations: 16

R-squared	0.902099	Mean dependent var	-0.006231
Adjusted R-squared	0.853149	S.D. dependent var	0.072606

S.E. of regression	0.027823	Sum squared resid	0.007741
Durbin-Watson stat	1.766103		

Equation: RITO90=C(5)*RID90+C(6)*RIX+C(52)*DUM91+C(53)*DUM93 +C(54)*DUM94

Observations: 16

R-squared	0.902466	Mean dependent var	0.019462
Adjusted R-squared	0.866999	S.D. dependent var	0.094540
S.E. of regression	0.034478	Sum squared resid	0.013076
Durbin-Watson stat	2.172721		

Equation: DRPSBE=C(7)*RIBE90+C(55)*DUM90+C(56)*DUM92

Observations: 16

R-squared	0.675628	Mean dependent var	0.006134
Adjusted R-squared	0.625725	S.D. dependent var	0.015648
S.E. of regression	0.009573	Sum squared resid	0.001191
Durbin-Watson stat	2.037058		

Equation: DGDP90=C(8)*DGVA90

Observations: 16

R-squared	0.859408	Mean dependent var	-0.000369
Adjusted R-squared	0.859408	S.D. dependent var	0.047435
S.E. of regression	0.017786	Sum squared resid	0.004745
Durbin-Watson stat	2.128041		

Equation: RILP90=C(9)*RIFA90+C(10)*RIGLEE90+C(11)*T+C(12)

Observations: 16

R-squared	0.632756	Mean dependent var	0.007543
Adjusted R-squared	0.540945	S.D. dependent var	0.062256
S.E. of regression	0.042181	Sum squared resid	0.021350
Durbin-Watson stat	2.087778		

Equation: Deler=C(13)*(Deler(-1)+Deler(-2))+C(14)*RIGVA90+C(59)* DUM90+C(60)*DUM91

Observations: 15

R-squared	0.981263	Mean dependent var	0.040552
Adjusted R-squared	0.976152	S.D. dependent var	0.071912
S.E. of regression	0.011105	Sum squared resid	0.001357
Durbin-Watson stat	2.225223		

Equation: xgdp90=C(15)+C(16)*RIG90(-1)+C(17)*DMX(-1)+C(61)*DUM88

Observations: 15

R-squared	0.844006	Mean dependent var	0.227942
Adjusted R-squared	0.801462	S.D. dependent var	0.041726
S.E. of regression	0.018592	Sum squared resid	0.003802
Durbin-Watson stat	2.083794		

Equation: Drnxbb=C(18)*DER90+C(19)+C(62)*DUM90+C(63)*DUM91

Observations: 17

R-squared	0.621881	Mean dependent var	-0.022522
Adjusted R-squared	0.534622	S.D. dependent var	0.031234
S.E. of regression	0.021307	Sum squared resid	0.005902
Durbin-Watson stat	1.968496		

Equation: RII90=RIG90+C(20)*RIIR+C(21)*RIX+C(64)*DUM90+C(65)*DUM91+C(66)*DUM92

Observations: 16

R-squared	0.932482	Mean dependent var	-0.009436
Adjusted R-squared	0.907930	S.D. dependent var	0.148459
S.E. of regression	0.045047	Sum squared resid	0.022322
Durbin-Watson stat	1.785082		

Equation: dfa=C(22)+C(23)*DIGDP90+C(67)*DUM90+C(68)*DUM92

Observations: 15

R-squared	0.942707	Mean dependent var	0.063795
Adjusted R-squared	0.927081	S.D. dependent var	0.047140
S.E. of regression	0.012729	Sum squared resid	0.001782
Durbin-Watson stat	1.821834		

Equation: DGS90=C(24)*DNR90*(1+C(25)*IRIR)+C(69)*DUM82+C(70)*DUM90+C(71)*DUM93
Observations: 16

R-squared	0.961875	Mean dependent var	-0.008473
Adjusted R-squared	0.948011	S.D. dependent var	0.038935
S.E. of regression	0.008878	Sum squared resid	0.000867
Durbin-Watson stat	2.121050		

Equation: Dqe=C(26)*RIAP+C(27)*RIG90+C(72)*DUM82+C(73)*DUM92+C(74)*DUM95
Observations: 16

R-squared	0.796932	Mean dependent var	0.001681
Adjusted R-squared	0.723089	S.D. dependent var	0.013010
S.E. of regression	0.006846	Sum squared resid	0.000516
Durbin-Watson stat	1.946273		

Equation: ICPI=C(28)*IGDPD+C(75)*DUM90
Observations: 16

R-squared	0.989563	Mean dependent var	1.075490
Adjusted R-squared	0.988818	S.D. dependent var	0.429511
S.E. of regression	0.045419	Sum squared resid	0.028880
Durbin-Watson stat	1.951794		

Equation: ICFPI=C(29)*IGDPD+C(30)+C(76)*DUM92+C(77)*DUM83+C(78)*DUM82
Observations: 16

R-squared	0.995375	Mean dependent var	1.070922
Adjusted R-squared	0.993693	S.D. dependent var	0.398221
S.E. of regression	0.031625	Sum squared resid	0.011001
Durbin-Watson stat	2.038094		

Equation:DSC90=C(31)*(DDAD90-DGS90)+C(32)*(DDAD90(-1)-DGS90(-1))+C(79)*DUM84+C(80)*DUM87

Observations: 15

R-squared	0.634734	Mean dependent var	0.000418
Adjusted R-squared	0.535116	S.D. dependent var	0.015053
S.E. of regression	0.010264	Sum squared resid	0.001159
Durbin-Watson stat	2.052052		

Equation: RIs=C(33)*RIG90+C(34)*RIAPIE
Observations: 12

R-squared	0.700075	Mean dependent var	-0.017642
Adjusted R-squared	0.670083	S.D. dependent var	0.041686
S.E. of regression	0.023944	Sum squared resid	0.005733
Durbin-Watson stat	1.904584		

Equation: RIv=IMD-1+RIs+C(35)*dir+C(81)*DUM95
Observations: 11

R-squared	0.935176	Mean dependent var	0.107289
Adjusted R-squared	0.927973	S.D. dependent var	0.374933
S.E. of regression	0.100624	Sum squared resid	0.091127
Durbin-Watson stat	2.073998		

B) Monthly Variables

MXGSD=MXGSD(-12)*IAERM(-1)^C(36)*IAMMGSD(-1)^C(37)
*EXP(C(82)*DUM23+C(83)*DUM44)
IERM=C(38)*MCPI(-1)+C(39)*IMM2+C(84)*DUM11+C(85)*DUM19
RIMM2=C(40)*RIMNR+C(41)*RIMM2(-1)+C(42)*RIERM(-
1)+C(86)*DUM06+C(87)*DUM11
+C(88)*DUM36+C(89)*DUM49

System: MOS97
Estimation Method: Iterative Least Squares
Sample: 1991:01 1996:12

	Coefficient	Std. Error	t-Statistic	Prob.
C(36)	0.095495	0.029150	3.276031	0.0013
C(37)	0.402899	0.066778	6.033434	0.0000
C(82)	-0.389616	0.238635	-1.632684	0.1042
C(83)	0.310294	0.149331	2.077901	0.0391
C(38)	0.610099	0.161846	3.769635	0.0002
C(39)	0.374029	0.163759	2.284015	0.0235
C(84)	2.238173	0.101547	22.04078	0.0000
C(85)	0.301884	0.099567	3.031962	0.0028
C(40)	0.216075	0.034692	6.228433	0.0000
C(41)	0.499811	0.068726	7.272461	0.0000
C(42)	0.048045	0.018144	2.647916	0.0088
C(86)	-0.104969	0.040428	-2.596451	0.0102
C(87)	0.157373	0.039874	3.946754	0.0001
C(88)	0.113598	0.039888	2.847896	0.0049
C(89)	-0.118570	0.041176	-2.879574	0.0045
Determinant residual covariance			0.106535	

Equation: MXGSD=MXGSD(-12)*IAERM(-1)^C(36)*IAMMGSD(-1)^C(37)
*EXP(C(82)*DUM23+C(83)*DUM44)
Observations: 59

R-squared	0.752199	Mean dependent var	621.8525
Adjusted R-squared	0.738683	S.D. dependent var	186.2298
S.E. of regression	95.19915	Sum squared resid	498458.3
Durbin-Watson stat	1.988603		

Equation: IERM=C(38)*MCPI(-1)+C(39)*IMM2+C(84)*DUM11+C(85)*
DUM19
Observations: 71

R-squared	0.889030	Mean dependent var	1.086944
Adjusted R-squared	0.884062	S.D. dependent var	0.289868
S.E. of regression	0.098699	Sum squared resid	0.652682
Durbin-Watson stat	2.126977		

Equation: RIMM2=C(40)*RIMNR+C(41)*RIMM2(-1)+C(42)*RIERM(-1)+C(86)*DUM06
+C(87)*DUM11+C(88)*DUM36+C(89)*DUM49
Observations: 70

R-squared	0.524098	Mean dependent var	0.060447
Adjusted R-squared	0.478774	S.D. dependent var	0.054245
S.E. of regression	0.039163	Sum squared resid	0.096625
Durbin-Watson stat	2.119046		

Appendix V

Scenarios for 1998 - 2000

		INERSC			Average rate
Indicators	1997	1998	1999	2000	1997-2000
GDP (trill. ROL.)	249.75020	395.41302	566.83321	912.69985	-
GDP90 (trill. ROL.)	0.71823	0.69520	0.67703	0.66813	-2.38%
DAD (trill. ROL.)	267.26951	420.30383	598.01422	955.98584	-
DAD90 (trill. ROL.)	0.76861	0.73897	0.71428	0.69981	-3.08%
XGSD (bill.USD)	8.76580	7.81576	7.20850	6.97423	-7.34%
MGSD (bill.USD)	11.10880	10.64170	10.10607	9.95910	-3.58%
I90 (trill. ROL.)	0.14746	0.14893	0.14883	0.13926	-1.89%
gcbb	-0.05399	-0.05410	-0.05220	-0.04983	-
r n x	-0.07015	-0.06295	-0.05501	-0.04743	-
UN (mill.pers.)	0.88140	0.98078	0.98301	0.98142	-
GDPD	2.53700	1.63567	1.47199	1.63164	-
ß	1.32006	1.35147	1.37254	1.38424	-

		EIEMSC			Average rate
Indicators	1997	1998	1999	2000	1997-2000
GDP (trill. ROL.)	249.75020	430.01493	721.30020	1260.86016	-
GDP90 (trill. ROL.)	0.71823	0.69673	0.69680	0.63910	-3.82%
DAD (trill. ROL.)	267.26951	454.93329	759.42058	1322.53193	-
DAD90 (trill. ROL.)	0.76861	0.73710	0.73363	0.67036	-4.46%
XGSD (bill.USD)	8.76580	7.79617	7.44741	7.31002	-5.87%
MGSD (bill.USD)	11.10880	10.18603	9.63378	9.25370	-5.91%
I90 (trill. ROL.)	0.14746	0.14607	0.14815	0.12682	-4.90%
gcbb	-0.05399	-0.04591	-0.04106	-0.03909	-
r n x	-0.07015	-0.05795	-0.05285	-0.04891	-
UN (mill.pers.)	0.88140	0.97862	0.96712	1.01817	-
GDPD	2.53700	1.77491	1.67721	1.90585	-
ß	1.32006	1.27338	1.09171	1.00000	-

		RIRMSC			Average rate
Indicators	1997	1998	1999	2000	1997-2000
GDP (trill. ROL.)	249.75020	347.44115	444.30976	654.44068	-
GDP90 (trill. ROL.)	0.71823	0.68171	0.65005	0.62974	-4.29%
DAD (trill. ROL.)	267.26951	364.85708	460.71919	671.11820	-
DAD90 (trill. ROL.)	0.76861	0.71588	0.67406	0.64579	-5.64%
XGSD (bill.USD)	8.76580	7.55556	6.66229	6.20465	-10.88%
MGSD (bill.USD)	11.10880	9.96469	9.06013	8.43595	-8.77%
I90 (trill. ROL.)	0.14746	0.14935	0.14393	0.12975	-4.18%
gcbb	-0.05399	-0.04421	-0.04053	-0.03554	-
r n x	-0.07015	-0.05013	-0.03693	-0.02548	-
UN (mill.pers.)	0.88140	0.99189	0.99663	0.99273	-
GDPD	2.53700	1.46567	1.34109	1.52045	-
ß	1.32006	1.45110	1.58411	1.71551	-

		EIRMSC			Average rate
Indicators	1997	1998	1999	2000	1997-2000
GDP (trill. ROL.)	249.75020	431.02074	737.69068	1336.92392	-
GDP90 (trill. ROL.)	0.71823	0.68514	0.66093	0.64616	-3.46%
DAD (trill. ROL.)	267.26951	454.26090	770.21039	1384.97014	-
DAD90 (trill. ROL.)	0.76861	0.72209	0.69006	0.66938	-4.50%
XGSD (bill.USD)	8.76580	7.72920	7.07368	6.77710	-8.22%
MGSD (bill.USD)	11.10880	10.36253	9.96602	9.98022	-3.51%
I90 (trill. ROL.)	0.14746	0.13989	0.13364	0.12711	-4.83%
gcbb	-0.05399	-0.04836	-0.04754	-0.04587	-
r n x	-0.07015	-0.05392	-0.04408	-0.03594	-
UN (mill.pers.)	0.88140	0.98606	0.98590	0.98477	-
GDPD	2.53700	1.80914	1.77421	1.85373	-
ß	1.32006	1.44663	1.56842	1.68957	-

		RIEMSC			Average rate
Indicators	1997	1998	1999	2000	1997-2000
GDP (trill. ROL.)	249.75020	347.44115	437.91598	627.23440	-
GDP90 (trill. ROL.)	0.71823	0.69354	0.68700	0.63963	-3.79%
DAD (trill. ROL.)	267.26951	366.20331	457.97813	650.90132	-
DAD90 (trill. ROL.)	0.76861	0.73099	0.71848	0.66377	-4.77%
XGSD (bill.USD)	8.76580	7.63430	7.06537	6.87051	-7.80%
MGSD (bill.USD)	11.10880	9.84650	8.94983	8.37582	-8.98%
I90 (trill. ROL.)	0.14746	0.15533	0.15921	0.13321	-3.33%
gcbb	-0.05399	-0.04188	-0.03434	-0.02802	-
r n x	-0.07015	-0.05400	-0.04581	-0.03773	-
UN (mill.pers.)	0.88140	0.98418	0.97704	1.01267	-
GDPD	2.53700	1.44067	1.27240	1.53839	-
ß	1.32006	1.27754	1.10348	1.00000	-

		RESSC			Average rate
Indicators	1997	1998	1999	2000	1997-2000
GDP (trill. ROL.)	249.75020	384.99954	503.71119	795.93121	-
GDP90 (trill. ROL.)	0.71823	0.73489	0.75455	0.78105	2.83%
DAD (trill. ROL.)	267.26951	408.19922	532.12616	838.17445	-
DAD90 (trill. ROL.)	0.76861	0.77917	0.79711	0.82250	2.28%
XGSD (bill.USD)	8.76580	8.95740	9.10676	9.50812	2.75%
MGSD (bill.USD)	11.10880	11.69524	12.06258	12.84662	4.96%
I90 (trill. ROL.)	0.14746	0.16375	0.17880	0.17256	5.38%
gcbb	-0.05399	-0.04485	-0.04012	-0.03645	-
r n x	-0.07015	-0.06026	-0.05641	-0.05307	-
UN (mill.pers.)	0.88140	1.14412	1.23714	1.30434	-
GDPD	2.53700	1.50659	1.27425	1.52652	-
ß	1.32006	1.26387	1.09276	1.00000	-

Appendix VI

Numerical illustrations of the arrears' problem

Table no. Ap.1 presents the initial equilibrium situation, with $\alpha_{ij} = 1$. Again, on the rows, we have the sales and on the columns the purchases for each of the 5 economic agents; the cashings and payments are equal for all of them.

The volume $M \cdot v^*$, here equal to 3125 units, is the total level of the transactions (defined by the sum of sales or of the purchases).

Table No. Ap.1

Economic agent	1	2	3	4	5	Total
1	-	100	350	50	225	725
2	250	-	150	200	25	625
3	200	300	-	25	100	625
4	125	175	100	-	200	600
5	150	50	25	325	-	550
Total	725	625	625	600	550	3125

The hypotheses on which the three typical cases are built are presented in Table No. Ap. 2.

Table No. Ap. 2

Cases	Transactions		$M \cdot v^*$	α_{ij}
	$\sum_i X_i$	x_{ij}		
I	Increases with 10% as compared to initial level (from 3125 to 3437,5)	Uniform increase with 10% as compared to initial levels	Remains at initial level (3125)	Are equal to 1 for the 4th economic agent (on row and column) and to 0.85242 for the other economic agents
II	Remains at initial level (3125)	Remain at initial levels	Decreases with 12.32% (from 3125 to 2740)	Are equal to 1 for the 4th economic agent (rows and columns) and to 0.8 for the others. These levels are considered minimal (= α^x_{ij}).
III	Decreases with 10% as compared to initial level (from 3125 to 2812.5) because the coefficients are at the minimum limit	Uniform decrease with 10% as compared to initial levels	Decreases with 10% as compared to level in case II (from 2740 to 2466)	The same as in case II

Table No.Ap.3 shows the situation of overdue returns, arrears and their balance.

Table No. Ap. 3

	Case I			Case II			Case III		
Economic agent	Overdue returns	Arrears	Balance	Overdue returns	Arrears	Balance	Overdue returns	Arrears	Balance
1	109.6	97.4	+12.2	135	120	+15	121.5	108	+13.5
2	69	73.1	-4.1	85	90	-5	76.5	81	-4.5
3	97.4	85.2	+12.2	120	105	+15	108	94.5	+13.5
4	-	-	-	-	-	-	-	-	-
5	36.5	56.8	-20.3	45	70	-25	40.5	63	-22.5
Total	312.5	312.5	-	385	385	-	346.5	346.5	-

The CA multiplier is 0.922 in all three cases.

Continuing the above numeric example, we shall assume the three cases as being time sequences of a cumulative process.

Table No. Ap. 4

Economic agent	Cumulated overdue returns	Cumulated arrears	Balance
1	366.1	325.4	+40.7
2	230.5	244.1	-13.6
3	325.4	284.7	+40.7
4	-	-	-
5	122	189.8	-67.8
Total	1044	1044	The multiplier CA is equal to (1044-81.4)/ 1044 = 0.922

Table No. Ap.5 presents the matrix of cumulated overdue returns (on the rows) and arrears (on the columns) in the cases I-III considered before:

Table No. Ap.5

Economic agent	1	2	3	4	5	Total
1	-	54.3	189.8	-	122	366.1
2	135.6	-	81.3	-	13.6	230.5
3	108.5	162.7	-	-	54.2	325.4
4	-	-	-	-	-	-
5	81.3	27.1	13.6	-	-	122
Total	325.4	244.1	284.7	-	189.8	1044

Through a bilateral compensation - in the cells symmetrical with respect to the null diagonal, the smaller figure is subtracted from the other - we get:

Table No. Ap.6

Economic agent	1	2	3	4	5	Total
1	-	-	81.3	-	40.7	122
2	81.3	-	-	-	-	81.3
3	-	81.4	-	-	40.6	122
4	-	-	-	-	-	-
5	-	13.5	-	-	-	13.5
Total	81.3	94.9	81.3	-	81.3	338.8

The net arrears (respectively overdue returns) have not changed (81.4), but, their gross volume is considerably reduced, so that the CA multiplier becomes 0.760 as compared to 0.922 obtained before.

This indicator can be further reduced through multilateral compensating operations. In the example considered above, such a possibility exists between economic agent 1, 2 and 3, in which case following results:

Table No. Ap.7

Economic agent	1	2	3	4	5	Total
1	-	-	-	-	40.7	40.7
2	-	-	-	-	-	-
3	-	0.1	-	-	40.6	40.7
4	-	-	-	-	-	-
5	-	13.5	-	-	-	13.5
Total	-	13.6	-	-	81.3	94.9

Appendix VII

Specific thematic index

Appendix VIII

Selective bibliography

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