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MACROMODEL ESTIMATIONS FOR THE ROMANIAN "PRE-ACCESSION ECONOMIC PROGRAMME"

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I. The main issues. II. The macromodel used in simulations. III. Main scenarios for 2002–2005. IV. Concluding remarks.

The new (2002) version of the "Pre-Accession Economic Programme" has to take into account both the experience accumulated in the implementation of its previous (2001) form, and the changes occurred during 2001–2002 in the domestic and international environment, which have affected the Romanian economy. Obviously, there are numerous questions that should be analysed from this perspective. The paper is covering three groups of issues. The first chapter attempts to define some reference points, which have to be considered during the updating of the Romanian "Pre-Accession Economic Programme". The contents and the main functional characteristics of the macromodel used in the simulations for this purpose are examined in the second chapter. The third chapter discusses the computational hypotheses and presents the numerical estimations for two scenarios, considered by the author as the most relevant for the period 2002–2005. Some concluding remarks close this explorative study.

I. THE MAIN ISSUES

It would be irrelevant to emphasize that almost all the major problems of the present day Romanian society – beginning with various pressing social needs and ending with the requirements of a civilised infrastructure – cannot be satisfactorily solved because of the very limited economic resources. That is why all responsible forces – government authorities, political parties, trade unions, employers associations, non-governmental organisations – understand that the growth of the domestic output is the key-solution.

From this point of view, it is necessary to evaluate correctly the results obtained in 2001. According to official statistics, the real gross domestic product

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increased by 5.3% – one of the highest rates in region. The disinflation continued, the annual average consumer price index was slightly higher than 30%, declining from 45.8% in 1999 and 45.7% in 2000. Nevertheless, the current account registered an upsetting deficit, and the inflation remained the highest among the countries candidate to the accession to the European Union; the arrears did not cease to expand. It was, therefore, very important that the recovery started during 2000 should continue in 2001. However, the support for economic growth remained fragile and marked by some important disequilibria.

1. The debates concerning the present state and future possible evolution of the Romanian economy often shifted between demand-side and supply-side policy mixes. This is to be expected, since the productive performance of our economy currently suffers from a severe double constraint – both from the supply and the demand sides.

1.1. In the case of the supply constraints, we can identify four essential stylised factors:

a) There are still many chronically under-performing production capacities. Their utilisation implies substantial inefficient reallocation of resources, which affects negatively the overall supply.

We have used a rating function to estimate the size of the under-performing segment of the Romanian economy (see Appendix I). This function uses an aggregate of the following balance sheet indicators: operating results (OR), overdue payments (OP), and financial expenditures (FE), all of them as ratios to turnover (total sales); share of wages in gross value added (WG); ratio of overdue payments to claims (OC). The panel-sample covers the period 1995–2000 and included, each year, 10.5–15 thousand enterprises, representing 80% of the turnover of the officially registered firms. According to this function, the firms can be divided into five categories, the first category being considered clearly performant, whilst the last one – completely economically non-viable. Obviously, the other three categories designate intermediary positions. The fifth category was characterised by the following indicators:

Table 1

Economic parameters of the non-performing category

Economic parameters	1995	1996	1997	1998	1999	2000
OR (operating results to turnover), %	–10.50	–10.22	–5.70	–11.35	–6.85	–11.50
OP (overdue payments to turnover), %	67.21	63.89	87.10	126.90	137.58	120.23
FE (financial expenditures to turnover), %	18.35	16.57	30.59	22.64	29.81	22.68
WG (share of wages in gross value added), %	102.14	106.55	88.51	111.50	86.01	103.24
OC (overdue payments to claims)	1.56	1.56	2.39	1.92	2.38	1.80

A brief examination of these data is enough to conclude that such a category cannot function without important redistribution of resources from the economically viable sectors. The size of this category is estimated in Table 2.

Table 2

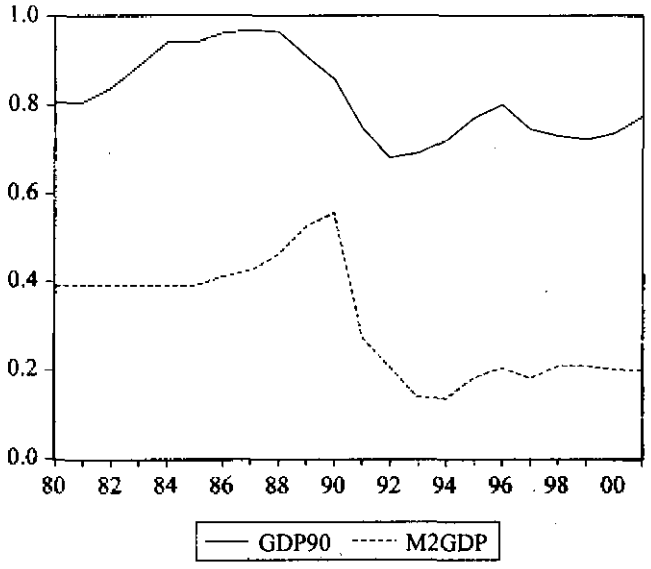
Share of the non-performing category in total sample, percent

	1995	1996	1997	1998	1999	2000
Number of firms	5.43	7.36	7.67	7.95	8.50	7.21
Turnover	6.89	13.44	9.28	8.62	9.77	9.72
Number of employees	9.56	18.29	15.47	16.45	15.43	13.47

Therefore, 7–8% of the firms belonging to the non-performing segment of the economy cover 9–10% in turnover and 14–15% in number of employees of all registered commercial companies. The agricultural households were not included in this analysis. The data concerning 2001, which will be examined in the following months, may somewhat change this picture, but not significantly.

b) The delays in the privatisation process and the numerous patrimony litigations made other capacities, although potentially profitable, be underused or even completely blocked.

c) A large part of the viable segment of the economy is severely under-monetised. The ratio of M2 to GDP (noted M2GDP) drastically decreased during the 1990s. Graph 1 presents its change in comparison to the evolution of the gross domestic product, expressed in trillion ROL constant prices 1990 (noted GDP90).



Graph 1

The correlation between M2GDP and GDP90 is relatively high (0.817612).

From this point of view, we also cannot ignore the international experience. During the second part of the 1990s, the annual average ratio M1/GDP in Romania was only 7.53%, with a tendency to decrease towards 5%. This level was comparable with Slovenia (7.93%), but considerably lower than many other transition countries: Czech Republic 26.87%, Estonia 19.69%, Hungary 18%, Latvia 16.16%, Lithuania 12.93%, Poland 12.98%, Russia 11.02%, Slovak Republic 26.22%. In the traditional market economies such a coefficient, as a rule, is even higher: Australia 19.11%, Canada 19.26%, Denmark 29.76%, France 23.23%, Germany 22.89%, Norway 40.96%, Portugal 26.88%, Spain 27.54%. The analysis of the ratio M2/GDP induces similar conclusions (for details, see Appendix II). I placed the under-monetisation among the supply-restraining factors because of its severe effects on the firms' working capital.

d) The burden of taxation also affects output. Paradoxically, the widespread perception of the taxpayers (households and firms) – that the taxation burden is very high – seems to be rejected by some aggregate evaluations. For instance, in 2001, the share of the general consolidated budget revenues to the gross domestic product represented 31.9%, smaller than the average level in the European Union.

However, such an estimate is deceiving. We should not forget that the denominator of this ratio comprises two significant components, which are placed outside the reach of taxation:

- the so-called unobserved economy, officially estimated at 21–22% of the gross domestic product, and
- the households' production for self-consumption amounting to some additional 5–6%.

If recalculated with these two corrections, the overall taxation rate becomes 43.1–44.3%. Taking into account the weight of labour income in the value added, and the costs of capital, such a rate can be considered as excessive. This affects even more not only the investment potential of firms, but also aggravates the working capital rationing. Maybe, the present needs for high budget expenditures makes it difficult to ease the fiscal burden on households and firms, but this does not mean that a relative over-taxation does not exist in Romania.

1.2. On the demand-side there are also some serious constraints:

a) First, it would be impossible to deny that real domestic demand is severely depressed.

- The "Integrated Survey of Households" offers relevant information on consumption. Thus, during the last few years, only 53–54% of households' expenditures covered market transactions, whilst 29–31% remained in a non-market framework (in principle, self-consumption); the difference (to 100%) represented taxes and other similar payments. The structure of the consumption expenditures is also significant: 53–54% on food, approximately 29% on other goods, and only 17–18% on services. Moreover, expenditure on: electric power, heating, water,

transport, and telecommunications represents almost two thirds of the expenditures on services. The data on widespread and growing poverty are also well documented [Ionete and Wagner; Ionete and Chircă; National Institute of Statistics – Romania 2001a; Zamfir, Bădescu, and Zamfir].

• The limited financial potential of firms and of households, the persistent inflationary expectations accompanied by the high interest rates, and the institutional instability does not stimulate investment.

b) With respect to the foreign markets, it is evident that the sudden contraction, in the early 1990s, of the commercial relationships with the former COMECON members and the developing countries, on the one hand, and the recent recession of the world economy, on the other hand, have seriously affected the Romanian economy. Moreover, the foreign competitiveness of our economy suffers from structural deficiencies.

2. The crucial problem is how to surpass or, at least, to attenuate the above-mentioned constraints.

2.1. Straightforward solutions to the supply-side problems.

a) The historical experience undoubtedly shows that sustainable long-run growth is impossible without the structural adjustment of the Romanian economy. This involves, first of all, a severe contraction of the so-called virtual sector. The problem is not new; it was identified and formulated in the beginning of the 1980s [Dobrescu, see Ionete pp. 207–209]. The delay in finding a solution has only complicated matters. We hope the Government will finally meet this major commitment.

b) It is also necessary to create the institutional premises in order to reactivate all the potentially profitable assets. It implies a fast clarification of the property rights, the strengthening of contractual discipline, and the normal functioning of markets and competition.

c) A more rapid re-monetisation of the Romanian economy is also necessary. Obviously, the process is complex and ought to be cautiously approached. On the one hand, the foreign capital inflows with such a destination mean an overall improvement of the business environment. On the other hand, if they are not doubled and supported by what is called "hard budget constraints" in the functioning of firms, the growth of money supply (increase in the monetary base, reduction in the required reserves ratio) would lead only to the acceleration of the price dynamics. Consequently, the erosion of the companies' working capital through inflation would aggravate the situation.

d) In the area of taxation, the stabilisation of the fiscal system is crucial. At the same time, it would be unrealistic to expect an improvement in the Romanian firms' competitiveness without a reduction in the taxes affecting labour costs.

Therefore, the main restrictions on the supply-side can only be overcome through structural (institutional, sectoral, technological, managerial) changes. In their

absence, the economic growth cannot even be sustained in the medium-run, involving unmanageable current account deficits.

2.2. The demand-side restrictions must be also approached carefully.

a) The simulations performed with our macromodel, in all its operational versions (beginning with the first, published in 1996), have signalled that the standard Keynesian policy recommendations would imply high risks in the case of Romania. The above-mentioned supply-side restrictions are so strong, and some important markets so distorted that the excessive stimulation of the nominal demand does only fuel inflation. So, we return again to the structural problems.

b) Currently, the external environment is particularly favourable for Romania, from two points of view. From the political perspective, the position of Romania as a candidate to the integration into NATO is better than ever before. The European Commission also has become more receptive to the specificity of our problems.

There are some signs as well that the world economy is ready to overcome the recent recession. According to the predictions of the LINK-Project (see Appendix III), the international commercial flows will register an important expansion, from the next year. After a modest increase (by 1.5% in 2002), it is estimated that the annual rate of increase in world exports will exceed 8% during 2003–2005. A vigorous recovery of the foreign trade of the developed market economies, especially of the European Union, is also predicted. These countries represent the largest share of Romania's international economic relations. Regarding the foreign trade of the Central and East-European countries, a relatively high rate is forecasted even for 2002. Consequently, an improvement of the growth rate is anticipated for the world economy and for its main regions, including the Central and East-European countries.

We can, therefore, assume an improvement of the international environment, which will favour the transition countries, including Romania. The stimulation of exports, accompanied by a sustainable expansion of imports, may be a sound support for economic growth. The main problem – for Romania and other transition countries – consists in the more and more limited possibilities to implement a pro-export policy based on the real depreciation of the national currency.

The question deserves a more in-depth discussion. This would mean the analysis of the implications of sectoral disparities for labour productivity, observed since Ricardo [Dornbush 1994], and conceptually systematised in the well-known Balassa-Samuelson effect [Balassa; Samuelson, 1964, 1994] and in the subsequent but related Bhagwati-Kravis-Lipsey theory [Kravis and Lipsey; Bhagwati]. "Because the price on a nontradable is determined entirely by its *domestic* supply and demand curves, shifts in those curves may cause the domestic price of a broad commodity basket to change relative to the foreign price of the same basket. Other things equal, a rise in the price of a country's nontradables will raise its price level relative to foreign price levels (measuring all countries' price levels in terms of a

single currency). Looked at another way, the purchasing power of any currency will fall in countries where the prices of nontradables rise." [Krugman, p. 411].

The empirical studies confirm the discrepancy between the exchange rate ER (linked with the law of one price operating in the tradable sector) and the purchasing power parity PPP (reflecting the overall price level of a given economy, including both the tradable and the nontradable sectors). Generally, the relation between purchasing power parity and the exchange rate (PPPER) is in a strong positive correlation with the level of economic development, synthetically reflected in the per capita GDP defined by the exchange rates (pcyer). In principle, this results from a more rapid growth of the labour productivity in the tradable sector than in the nontradable sector.

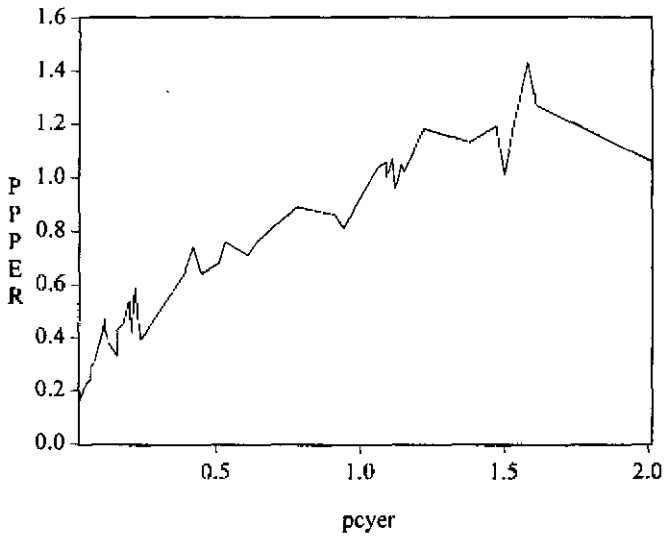
A cross-section analysis of a 43 countries sample (annual data for 1999) is synthesised in Appendix IV. pcyer is per capita GDP (indices based on exchange rates) in which OECD average level = 1, and PPPER – ratio between purchasing power parity (US$ = 1) and exchange rate (US$ = 1) The correlation between pcyer and PPPER is 0.94152 for the country indicators (in 1960 for 12 countries it was 0.92 [Balassa p. 589]), and even 0.982492 if these data are weighted by the size of the population. "It has long been noted that there is a positive correlation between comparative price levels and GDP per capita: the richer a country, the higher its relative price level tends to be, and vice versa. The 1999 results confirm this observation...country groups according to relative price levels can be formed. These are:

* a *high price level* group...: Denmark, Iceland, Japan, Norway, Sweden and Switzerland;
* a *medium-high price level* group...: Austria, Belgium, Finland, France, Germany, Ireland, Luxembourg, the Netherlands, the United Kingdom and the United States;
* a *medium-low price level* group...: Australia, Canada, Cyprus, Greece, Israel, Italy, Korea, Malta, Mexico, New Zealand, Portugal, Slovenia and Spain;
* a *low price level* group...: Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Poland, the Slovak Republic, Romania, the Russian Federation, Turkey and Ukraine." [Schreyer and Koechlin, pp. 10–11]

In Graph 2, PPPER is represented as a function of pcyer; with the countries arranged in ascending pcyer order on the X-axis.

Using this sample, we have estimated some econometric relationships (see Appendix V), which should be cautiously taken into account, since the data used in the analysis refer to a single year (1999).

If the reality is correctly approximated, this cross-section pattern can be interpreted from a temporal perspective, as follows: the economic growth of the less developed countries (such as Romania) will probably imply a gradual reduction in the difference between the purchasing power parity and the exchange rate, both expressed against the same foreign currency (US dollar or EURO). This is equivalent to saying that the ratio of domestic inflation (usually expressed by the



Graph 2

CPI) to the index of the nominal exchange rate (IER) is greater than one. The ratio of these two indices can be significantly influenced by the foreign capital inflows, the evolution of the prices of land and of tangible assets, and other factors. We cannot exclude the possibility that the currencies of transition economies will undergo a real depreciation. However, if their economic growth will be sustainable and durable, such an occurrence will only be temporary, the inequality CPI>IER remaining the dominant trend in medium and long run.

From this perspective, two issues become essential:

• One of them regards the export competitiveness of our economy, which cannot be sustained by a deliberate policy of real devaluation of the national currency (by keeping the rate of nominal exchange rate increase higher than the rate of inflation). International competitiveness should be achieved through structural changes: increasing the return of the production factors; developing of new, modern production capacities; promoting more efficient marketing methods; alleviating the fiscal burden; diversifying international markets, etc.

• The integration into the European Monetary Union raises a second problem (which is also valid for all the candidate-countries). According to Buiter and Grafe, $\pi_T^A = \pi_T^E + \varepsilon$, where π_T^A represents the inflation rate of traded goods prices in the accession country, π_T^E the inflation rate of traded goods prices in Euroland and ε the proportional rate of depreciation of the accession country's currency as against the euro. It is assumed that "the law of one price" holds for traded goods. If π^A and π_N^A are the CPI inflation rate and the non-traded goods inflation rate in the accession country and π^E and π_N^E the CPI inflation rate and the non-traded goods

inflation rate in Euroland, and the share of non-traded goods in the consumption bundle is α both in the accession country and in Euroland, we have $\pi^i = \alpha \pi^i_N + (1 - \alpha)\pi^i_T$, i = A, E. Assuming that the growth rate of wages within a country is the same for both sectors and the proportional mark-up on unit labour costs is constant, the authors derive:

$$\pi^A - \pi^E = \varepsilon + \alpha[(g^A_T - g^A_N) - (g^E_T - g^E_N)],$$

where the sectoral productivity growth rates are denoted by g^i_N and g^i_T, i = A.E. They conclude: "It seems likely that the differential between productivity growth in the traded goods sector and productivity growth in the non-traded goods sector is larger in the candidate accession country than in Euroland, because productivity catch-up is likely to be faster in the traded goods sector than in the sheltered sector. This means that the relative price of non-traded goods to traded goods will be rising faster in the accession candidate than in Euroland. This in turn implies that, at a given exchange rate, the overall inflation rate will be higher in the accession candidate than in Euroland." [Buiter and Grafe, pp. 309–310]

It is unlikely that the European Union will change the rules for the functioning of Euroland. Therefore, the introduction of EURO in a candidate-country, before reaching even a minimal compatibility level of economic development, is not recommendable. Such a level could be estimated, using – *inter alia* – a relevant relationship between PPPER and pcyer.

3. The above analysis shows that the fundamental problem of the Romanian economy is the inconsistent implementation of structural changes. As long as the transformation reforms are not finished, the global output will remain lower than the optimally achievable level (with the same production factors). The progress made in the implementation of the sound market mechanisms is important, but many problems still await to be solved.

Briefly, the Romanian economy must overcome soon its status of weakly structured system (from an institutional point of view), and become a sound, functional one. The necessary actions are known: finalising privatisation and restructuring programmes, ensuring the legislation coherence and stability, strengthening of financial discipline, improving the corporate governance, modernisation of the public administration, a more efficient fight against corruption. These measures are included in the governmental programme, as well as in the agreements concluded by Romania with the International Monetary Fund, the World Bank, and the European Union. The key-problem is to pursue these targets consistently.

That is why – from among the many traps that should be avoided during the coming years, especially in 2002 and 2003 – the "stop-and-go" pattern of structural changes is the most dangerous one. Although the deleterious effects of such

behaviour are beyond doubt, the temptation to resort to it cannot be ignored. Both the – still tense – social context and the relaunch of the electoral cycle may favour it.

Therefore, it is worth emphasising again and again that the faster institutional building of market mechanisms represents not only a *sine qua non* condition for the accession of Romania to the European Union, but also its main potential source of economic growth in the short-medium run.

II. THE MACROMODEL USED IN SIMULATIONS

The estimates presented below have been obtained using the 2000 version of the Romanian macroeconomic model [Dobrescu 2000], with some improvement and up-dating of the econometric functions. These changes will be particularly emphasised below.

1. The macromodel goal is estimating the short and medium run implications of income, fiscal, commercial, and monetary policies in the specific context of the transition.

It is divided into three main blocks:

- output and absorption (aggregate demand),
- production factors and labour income, and
- financial and monetary variables.

It works in connection with an additional system for the demographic indicators.

The structure of the macromodel is presented in Fig. 1.

2. The macromodel generally operates with annual indicators. In five cases, either annual or monthly ones are implied: consumer price index, monetary base, exchange rate, export, and import. If more than one relationship could be specified (somehow equivalent from the theoretical point of view) for the same endogenous variable, the selection was guided by two main criteria.

First we have taken into account the results of econometric tests; but their significance is limited for such short and distorted statistical series as those available for Romania.

That is why we have also adopted a second criterion. It results from the following assumption: the probability of separate relationships to correctly reflect the reality is higher when the system integrating them (together with the corresponding accounting identities) acceptably approximates the behaviour of the economy as a whole. Consequently, testing the entire macromodel, many of the econometric functions have been reconsidered in order to find more adequate expressions.

3. Fig. 2 describes the most important dependence relationships between variables included in the "output and absorption block".

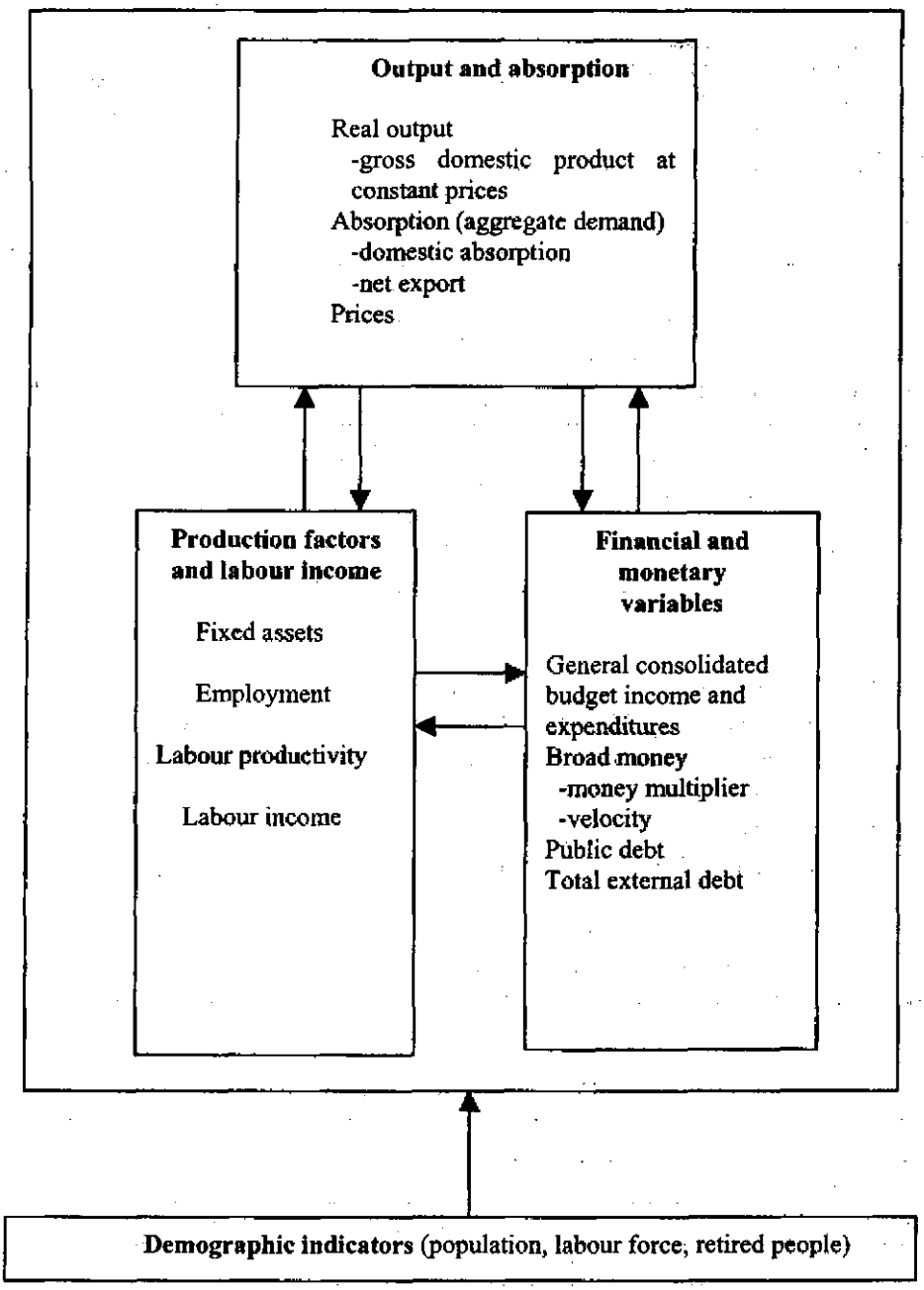


Fig. 1 – The general scheme of the macromodel.

Dependent variables	Main explanatory variables
Real output, estimated by the gross domestic product at constant prices	Domestic absorption (domestic aggregate demand), export, money supply, taxation
Domestic absorption (domestic aggregate demand): market consumption of households, production for self-consumption, government consumption, and gross capital formation	Gross domestic product, general consolidated budget expenditures, inflation, interest rate, population, employment
Exports of goods and services	Exchange rate, imports of goods and services, exogenous parameter evaluating the influence of other factors
Imports of goods and services	Exchange rate, general consolidated budget deficit, exogenous parameter evaluating the influence of other factors
Gross domestic product deflator	Expected total income (approximating the nominal gross domestic product), real output
Consumer price index	Gross domestic product deflator, money supply
Gross capital formation price index	Gross domestic product deflator, investment rate
Exchange rate	Consumer price index, gross capital formation price index, interest rate, exogenous parameter evaluating the influence of other factors

Fig. 2 – Output and absorption.

These dependence relationships are summarised in a set of behavioural equations and accounting identities. Compared to the initial 2000 version of the macromodel, the present simulations take into account the following changes:

- the econometric function for imports explicitly includes the effect of foreign direct investments on imports;
- the annual and monthly econometric functions concerning inflation have been up-dated.

4. The second block of the macromodel refers to the production factors, especially to the employment problems. The main interactions within this block are defined in Fig. 3.

Dependent variables	Main explanatory variables
Fixed assets	Investments in fixed assets, rate of fixed assets depreciation
Investments in fixed assets	Investment rate, domestic aggregate demand, change in exports
Employment	Real output (gross domestic product at constant prices), labour productivity
Labour productivity	Fixed assets, real labour income per employed person
Labour income	Gross domestic product

Fig. 3 – Production factors and labour income.

During the present simulations, the influence of the introduction (in January 2002) of the guaranteed minimal revenue on registered unemployment has also been included.

5. The dependence relationships included into the third block (dealing with financial and monetary indicators) are synthesised in Fig. 4.

Dependent variables	Main explanatory variables
General consolidated budget income	Profit taxes and other direct taxes on firms; contributions to social insurance paid by employers; wage taxes and contributions to social insurance paid by employees; value added tax and other similar indirect taxes; customs duties; income from "privatisation"; other taxes paid by households
General consolidated budget expenditures	Public services (education, health, culture, municipal services, national defence, public order, other expenditures); social security (pensions, unemployment benefits, social assistance); expenditures on economic activity
Broad money	Monetary base; money multiplier
Velocity of broad money	Monetary distortion; share of accounted economy in total gross domestic product (created in accounted and non-accounted sectors); interest rate
Public debt	Internal public debt; external debt guaranteed or directly contracted by public authorities
Total external debt	Current account; change in National Bank reserves; foreign direct investments; non-reimbursable foreign loans; other resources

Fig. 4 – Financial and monetary variables.

The macromodel operates with an extended definition of the government budget, named general consolidated budget; it includes the state budget, the local budgets, the social insurance budget and other similar funds. All of them exert income redistribution functions regulated by authorities.

6. The macromodel (integrating all blocks) has been built on the assumption that one essential endogenous variable represents a target for the entire economic system. It is separately estimated as an expected value. The macromodel admits, therefore, an objective function consisting in minimising the difference between the variable computed using the macromodel and the expected value of the same chosen variable.

Different indicators can play such a target-role. The macromodel has been solved using successively in this role: gross domestic product (at current and at constant prices), domestic absorption (also at current and at constant prices), consumer price index, gross domestic product deflator, total labour income, export and import, exchange rate, investment in fixed assets (at constant prices), labour productivity (at constant prices), etc; in all cases the results have been similar. Therefore, from this point of view, the macromodel is flexible. Depending on the

available information and on the predictability of the desired indicators, the users can choose various solutions.

In the present simulations, the total expected nominal income (as a proxy for gross domestic product at current prices) has been used. The experience shows that trade unions, government budget, and firms establish their own target concerning the future nominal revenues. For this purpose they make use of all the available tools.

These targets are sometimes conflicting or contradict the monetary policy objectives. However, due to the weak market mechanisms and the "soft budget constraints", they are "made compatible" through inflation and extended arrear practice. The probability that the expected nominal income will be reached is, therefore, significant. Obviously, the implementation of structural reforms will change the situation.

III. MAIN SCENARIOS FOR 2002–2005

Two scenarios have been examined for the new version of the Romanian "Pre-Accession Economic Programme":

- the Desirable Scenario, embodying the performances envisaged in the "Romania's Medium-Term Economic Strategy" (2000) and in the previous form of the "Pre-Accession Economic Programme" (2001), and
- the Moderate Scenario, assuming the possibility of lower growth rates.

In the case of 2002, taking into account the official statistical data for 2001 and the evolution – during the latter months – of the macroeconomic policies, the author's estimations from November 2001 (Dobrescu 2002) have been improved.

Both scenarios are based on the premises that the Government and the National Bank will firmly act towards relaxing the constraints that currently hold back output growth.

A. DESIRABLE SCENARIO

A1. Computation hypotheses

1. The overall population dynamics, that of the population aged 15 and over, and also that of the labour force were projected using the demographic block. The decline in the overall population is continuing. The reduction in the population over 15 is estimated to be even more significant (400–425 thousand persons less in 2005 as compared to 2001).

As for the labour force, the compensation for the demographic decline through a slight increase in the participation rate is accepted as plausible.

The current accelerated increase in the number of retirees (fostered by new retirement regulations) is expected to trickle down. Consequently, the total number

of retirees, as well as that of the social welfare retirees (except farmers) will stay approximately at the current level.

2. The adoption of an income policy able to support the disinflation process has been taken into account. Thus, the following annual rates of the expected gross domestic product at current prices have been considered: approximately 29% in 2002, 20% in 2003, 15% in 2004 and 14–14.5% 2005. Reducing the social pressure towards increasing the nominal revenues involves, of course, the extension and consolidation of the agreement between the Government and the social dialogue partners.

3. Insofar as the general consolidated budget is concerned, the ratio of public expenditure of GDP is maintained constant (34.2%) during the entire interval.

This scheme was associated with a slight decrease in taxation; thus, the ratio of the general consolidated budget income to GDP will be 31.21% in 2002, 31.12% in 2003, 31.07% in 2004, and 31.02% in 2005. Such a reduction in the fiscal burden should operate first of all on labour taxation.

Under such assumptions, the budget deficit will be maintained around 3%.

4. One of the most important assumptions of the model is the re-monetisation of the economy. A successive increase in the monetary base by 34–35% in 2002, 16–17% in 2003, 16–17% in 2004, and 23–24% in 2005 was considered. The reserves requirement ratio would be gradually reduced to around 12.5% in 2005.

It is obvious that such evolutions would only be possible in strict compliance with the structural changes (privatisation, more efficient functioning of the markets, severe reduction in monetary distortion, especially that induced by arrears, etc.). They are also strongly conditioned by a consistent and decisive policy in the nominal income area (see point 2 of this section).

5. The expansion of final consumption would still be difficult to achieve due to the constraints on the supply-side, and to the danger of reactivation of the inflationary spiral. Thus, it will be more appropriate to stimulate investments, through lower taxation (also considered among the assumptions regarding the budget). Nevertheless, the desirable scenario continues to grant an important role to exports. A correction of the foreign trade deficit is also taken into account.

The simulations incorporate the hypothesis that the increase in the nominal exchange rate will lag behind that of the domestic price index. Obviously, the potential negative effect on the trade balance of such an evolution (discouraging exports and stimulating imports) has to be compensated for by structural changes and adequate policy actions.

6. It was also assumed that, as a result of transformation reforms followed by turning Romania into an attractive business environment, the foreign investment

inflows (direct and portfolio) would grow substantially. The increase in non-reimbursable loans is also taken into account.

7. At the end of this presentation of modelling assumptions for the desirable scenario, I must stress once more that all of them are strictly dependent on the creation of a well-structured and functional market mechanism.

A2. Results of simulations

The estimates are presented as they have been obtained from simulations, without corrections inspired by additional considerations (outside the model). Such amendments are normal in complex forecasts, particularly in an operational document such as a "Pre-Accession Economic Programme" (PEP).

Table 3

Estimates for 2002–2005 for the desirable scenario

Indicator	2002	2003	2004	2005
Gross domestic product, constant prices, change %	4.50	5.12	4.97	4.88
Domestic absorption, constant prices, change %	2.93	4.34	5.03	5.02
• of which: investment	5.70	6.47	9.68	9.58
Exports of goods and services, change %	5.12	5.08	7.98	8.24
Imports of goods and services, change %	1.81	3.53	8.26	8.70
Exchange rate (annual average), change %	18.41	10.13	5.98	5.41
Gross domestic product deflator, change %	23.54	14.29	9.64	9.00
Annual average consumer prices index, change %	23.97	14.54	9.80	9.16
Labour productivity (GDP per employed person), change %	3.83	3.97	4.01	3.86
Employed population, change %	0.65	1.10	0.92	0.98
Unemployment rate (annual average), %	11.46	10.21	9.00	7.82
Money multiplier (M2/M0)	4.67	4.92	5.17	5.42
Money velocity (GDP/M2)	4.14	4.04	3.80	3.35
The ratio of the general consolidated budget revenues to GDP	0.3121	0.3112	0.3107	0.3102
The ratio of the general consolidated budget expenditure to GDP	0.3420	0.3420	0.3420	0.3420
The ratio of the general consolidated budget deficit to GDP	–0.0299	–0.0308	–0.0313	–0.0318
The ratio of the foreign trade deficit to GDP	–0.06478	–0.05689	–0.05754	–0.05874

1. The level of the output in 2002 was not affected by a possible major negative influence of drought on agriculture production; it is also conditioned by maintaining the annual rates of exports and of investment over 5%. These factors

will sustain the economic growth in the next years. The European Commission anticipated-rates of economic growth of 4.2% in 2002 and 4.9% in 2003 [*Adevărul Economic* No.18 (526), 8–14 May 2002], and the International Monetary Fund of 4.5% and 5%, respectively [*Adevărul*, 20 April 2002].

2. Despite this expected acceleration of economic growth, the labour market remains strained. The reduction of the unemployment rate towards 7–8% may have an important influence over social stability. Unfortunately, it is unrealistic to expect an improvement in the proportion of wage-earning employees in the total employment; the increase (certainly significant) in the number of wage-earners in the private sector will be accompanied by the compulsory reduction in the number of employees in the state (especially the publicly funded) sector.

3. The growth of labour productivity intensifies, as a result of restructuring reforms. These changes, accompanied by a diminution in the fiscal burden on labour, will improve the competitiveness of the Romanian economy.

4. According to the planned institutional transformations, the macromodel estimates a contraction of the non-accounted (hidden) economy.

5. The most important problem is inflation, extremely harmful to an under-capitalised economy such as Romania's. The European Commission anticipates annual growth rates of the CPI of: 26% in 2002 and 18.1% in 2003 [*Adevărul Economic* No.18 (526), 8–14 May 2002], and the International Monetary Fund of 25.2% and 17.5%, respectively [*Adevărul*, 20 April 2002].

To reach, until 2004, an annual one-digit rate is not only possible, but also imperatively necessary. The projected disinflation is decisively conditioned by the restructuring programmes negotiated with international institutions and by the strict implementation of the above-mentioned income, fiscal, and monetary policies.

6. The macromodel estimates assume an increasing integration of Romania into the European and into the world economy. The ratio of the foreign trade deficit to GDP will decrease from approximately 6.5% in 2002 to 5.7–5.8% in the next years. These estimates are slightly lower than those of the International Monetary Fund [Adevărul, 20 April 2002]. Since the nominal exchange rate will increase at a lower rate than domestic inflation, maintaining the current account deficit within sustainable limits will be conditioned on structural changes.

7. The re-monetisation process intensifies. It is necessary to stress again that such an evolution is possible only under a tight and consistent income policy, strict financial discipline of transactions, clear and irreversible disinflation. The macromodel estimates take into account a rapid and drastic reduction in the stock

of arrears and their non-proliferation. The elimination of this onerous monetary substitute will be one of the most significant positive changes in the functioning mechanism of the Romanian economy. In fact it may be considered a genuine cornerstone of the entire transition process.

At the same time, it is necessary to remember that only a real re-monetisation of the economy – sustained by the corresponding structural transformations – is able to insure future economic development.

8. The budget deficits and the size of public debt are maintained within sustainable limits.

B. MODERATE SCENARIO

B1. Computation hypotheses

1. The qualitative hypotheses of this scenario are similar to those of the desirable scenario. In other words, it is also built on the assumption that the structural changes towards a functional market economy will be credibly implemented. Some computation hypotheses are also common: the demographic indicators, the correlation between the increase in the nominal exchange rate and the rate of domestic inflation, the evolution of the monetary base and of the reserves requirement ratio.

2. The first important difference concerns the income policy, considered less tight in the moderate scenario. Consequently, the growth rates of the nominal GDP become 25% in 2003, 20% in 2004, and 15% in 2005, (instead of: 20%, 15%, and 14–14.5%, respectively, in the previous scenario). Such an evolution can be induced by the political decision motivated by the new electoral cycle.

3. Based on the same viewpoints, the moderate scenario assumes higher levels of budget expenditure on public services, social protection, and economic actions. In order to avoid an excessive growth in the budget deficit, the relaxation of labour taxes (adopted in the desirable scenario) is eliminated.

4. If the economy does not respond rapidly to the real appreciation of the national currency (slower increase of the nominal exchange rate than domestic inflation), the exports can display lower growth rates. Such an occurrence is accepted in the moderate scenario. The foreign capital inflows are also taken to be lower.

B2. Results of simulations

Table 4 contains the main indicators of simulations.

It is easy to observe many similarities between desirable and moderate scenarios, due to their common qualitative and computational hypotheses.

Table 4

Estimates for 2002–2005 in moderate scenario

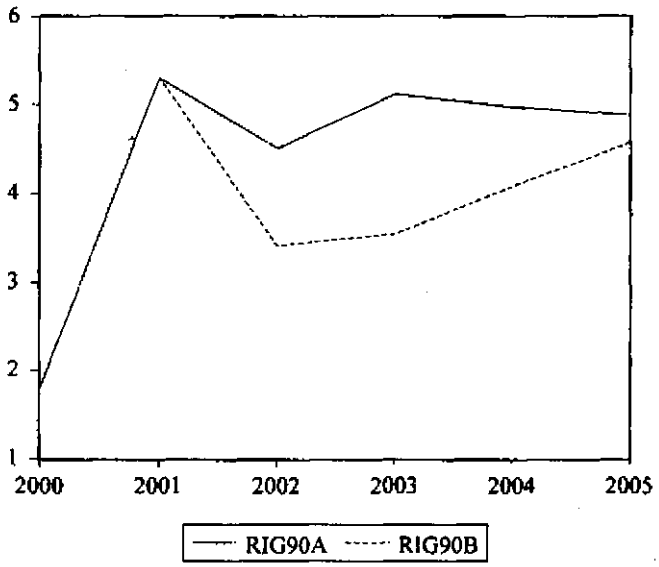
Indicator	2002	2003	2004	2005
Gross domestic product, constant prices, change %	3.41	3.55	4.08	4.57
Domestic absorption, constant prices, change %	2.29	4.06	4.19	4.31
• of which: investment	3.68	8.41	9.64	9.09
Exports of goods and services, change %	3.61	6.86	8.55	8.53
Imports of goods and services, change %	1.60	8.45	8.71	7.74
Exchange rate (annual average), change %	19.51	16.16	11.27	6.31
Gross domestic product deflator, change %	24.84	20.72	15.29	9.98
Annual average index of consumer prices, change %	25.29	21.09	15.56	10.15
Labour productivity (GDP per employed person), change %	3.12	2.95	3.42	3.64
Employed population, change %	0.29	0.58	0.65	0.90
Unemployment rate (annual average), %	11.78	10.99	10.04	8.95
Money multiplier (M2/M0)	4.67	4.92	5.17	5.42
Money velocity (GDP/M2)	4.14	4.21	4.12	3.65
The ratio of the general consolidated budget revenues to GDP	0.3133	0.3206	0.3193	0.3179
The ratio of the general consolidated budget expenditures to GDP	0.3430	0.3510	0.3520	0.3550
The ratio of the general consolidated budget balance to GDP	–0.0297	–0.0304	–0.0327	–0.0371
The ratio of the foreign trade deficit to GDP	–0.06930	–0.07460	–0.07567	–0.07300

IV. CONCLUDING REMARKS

1. The main differences between the two scenarios presented above pertain to the dynamics of output and inflation. These variables, in turn, have repercussions on other indicators.

a) The rates of economic growth (%) are shown in Graph 3 (RIG90A represents the desirable scenario, whilst RIG90B the moderate one).

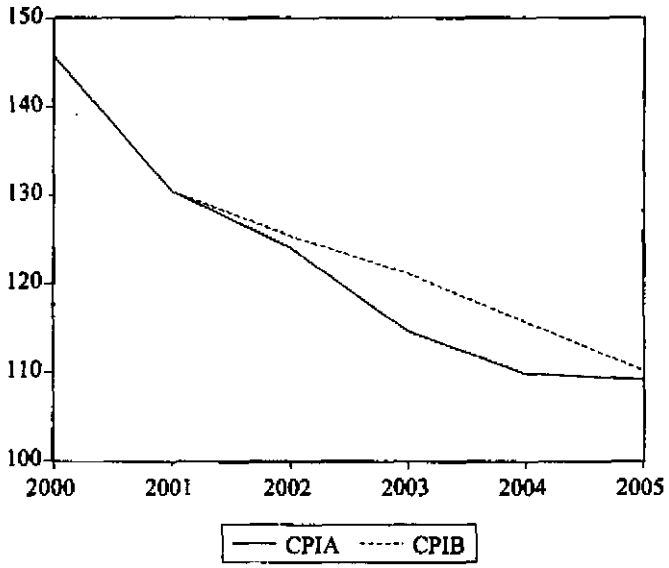
In the moderate scenario the rates are lower because of three main factors. One of them is the lower growth rate of exports in 2002 (3.61% as against 5.12% in the desirable scenario). This effect does not continue into the following years, if the dynamics of exports in the moderate scenario is picking up pace. Instead, the contractionary influence of lower foreign capital inflows is felt throughout the period. The estimated economic growth, in the moderate scenario, is closer, especially for 2002, to the forecasts of the HVB Bank (3.1% in 2002 and 4% in 2003 [*Adevărul*, 20 April 2002]), of the European Bank for Reconstruction and Development (3.5%



Graph 3

in 2002 [*România Liberă*, 21 May 2002]), of the Raiffeisen Zentralbank Österreich (3.6% in 2002 [*Curierul Național*, 21 May 2002]), and of Unicredito Italia (3.5% in 2002, 4.2% in 2003, and 4.4% in 2004 [*Curierul Național*, 21 May 2002]).

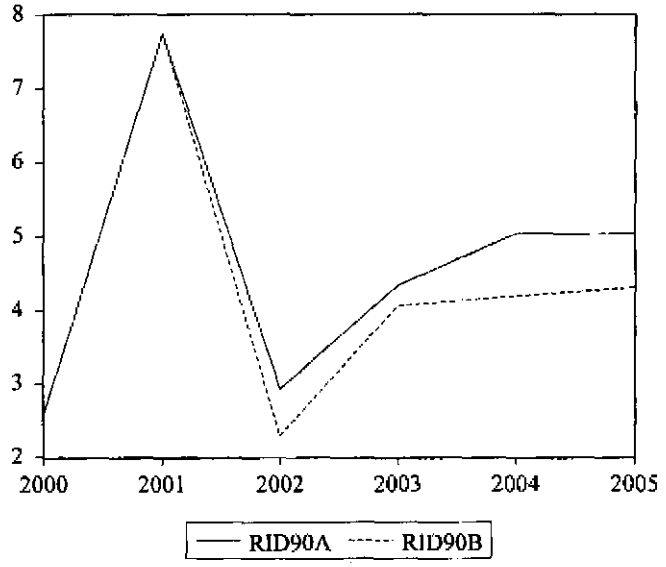
b) The consumer price indices (%, CPIA corresponding to the desirable scenario, and CPIB to the moderate one) are presented in the following Graph:



Graph 4

The higher CPI in the moderate scenario comes from the more relaxed income policy (including higher budget expenditures). The positive effect of re-monetisation on output is diminished by inflation itself. Similar forecasts for the CPI annual growth rate are also provided by: the HVB Bank (25% in 2002 and 18% in 2003 [*Adevărul*, 20 April 2002]), the European Bank for Reconstruction and Development (23.8% in 2002 [*România Liberă*, 21 May 2002]), the Raiffeisen Zentralbank Österreich (28% in 2002 [*Curierul Național*, 21 May 2002]), and Unicredito Italia (22% in 2002 and 17.5% in 2003 [*Curierul Național*, 21 May 2002]).

c) There are also differences concerning domestic absorption. Graph 5 compares the annual rates (%) of domestic absorption in the desirable scenario (RID90A) with those in the moderate one (RID90B).

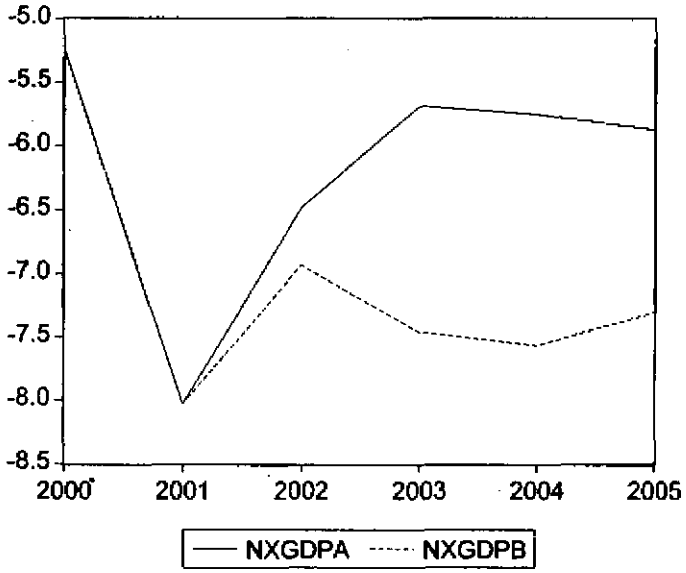


Graph 5

The lack of resources in the moderate scenario (due to the lower real GDP) is compensated partially by a higher foreign trade deficit, and partially by a slower expansion of domestic absorption. It is interesting to mention that this reduction affects primarily consumption, investment remaining at a high level in the moderate scenario.

d) The foreign trade deficit as a ratio (%) to GDP (noted NXGDPA and NXGDPB, respectively) is presented in Graph 6.

2. The desirable scenario has, therefore, some advantages, which make it the preferred course of action for future policies. Nevertheless, the probability that the Romanian economy will follow the moderate scenario remains high. Statistical data



Graph 6

for the first part of 2002 and the reactivation of the electoral cycle are serious arguments in favour of such a hypothesis.

3. It is necessary to emphasise again the crucial role of structural changes in overcoming the present institutional gap characteristic to the Romanian economy. Briefly, this means: (i) a permanent clarification of ownership rights and the continuation of the privatisation process; (ii) functional consistency and stability of the legal framework; (iii) finalising the banking sector reform; (iv) effective counteraction against economic monopolies and corruption. It also means boosting competition by simplifying the procedures governing market entry and the speeding up of bankruptcy procedures (market exit), as well as a significant improvement of the business environment. In the absence of these changes, not only the desirable scenario, but also the moderate one remains a simple intellectual exercise.

4. The real appreciation of the national currency must be sustained by a genuine improvement of the competitiveness of the Romanian economy. Otherwise, the consequences can only be negative. Table 5 contains a simulation using the macromodel, in which the ratio of the index of nominal exchange rate to consumer price index is lower than in the desirable scenario, the other hypotheses of the scenario remaining unchanged.

An artificially accelerated real appreciation of the ROL would be accompanied, therefore, by lower rates of economic growth and higher, unsustainable, foreign trade deficit.

Table 5

Implications for an accelerated real evaluation of ROL

Desirable Scenario	2002	2003	2004	2005
• Annual index of the nominal exchange rate (IER), %	118.41	110.13	105.98	105.41
• Annual consumer price index (CPI), %	123.97	114.54	109.80	109.16
• Ratio IER/CPI	0.95516	0.96154	0.96520	0.96566
• Growth rate of the real GDP, %	4.50	5.12	4.97	4.88
• Foreign trade deficit to GDP, (%)	–6.478	–5.688	–5.754	–5.899
Accelerated real appreciation of the ROL				
• Annual index of the nominal exchange rate (IER), %	111.68	103.82	99.87	99.28
• Annual consumer price index (CPI), %	124.66	115.10	110.31	109.60
• Ratio IER/CPI	0.89590	0.90190	0.90540	0.90583
• Growth rate of the real GDP, %	3.93	4.61	4.50	4.46
• Foreign trade deficit to GDP (%)	–6.650	–6.420	–6.813	–7.181

5. Certainly, we cannot exclude the possibility that some transformation processes come into conflict with the macroeconomic targets intended by the authorities. In such cases, the structural changes ought to have priority. Only through them, a sustainable development of the Romanian economy will be achieved.

Bucharest, June 2002

APPENDIX I
MICROECONOMIC ANALYSIS

Prof. C. Mereuță (Romanian Centre for Economic Modelling) has compiled a rating function, which attempts to evaluate in an integrative manner the market performances of the Romanian firms in transition. This function aggregates, using specific weighting coefficients, the following balance sheet indicators: operating results (OR), overdue payments (OP), and financial expenditures (FE), all of them as ratios to turnover (total sales); share of wages in gross value added (WG); ratio of overdue payments to claims (OC).

This rating function assigns to each firm a score (M), which may vary from zero to 100. The author considers relevant a five-category distribution: A^+ for $80 < M < 100$, A for $60 < M < 80$, B for $40 < M < 60$, C for $20 < M < 40$, and C^- for $0 < M < 20$. The first category is highly performant, whilst the last category certainly represents non-viable economic agents. Naturally, categories A, B, and C have intermediary positions.

The analysed sample covers 80% of the turnover of the officially registered firms (Computational assistance by Mrs. C. Oncescu is gratefully acknowledged).

The evolution of the mentioned categories, during 1995–2000 is presented in Tables A1–A6. The characteristic ratios are expressed as average levels of each category.

Table A1

1995

Category	Number of firms in sample	OR, %	OP, %	FE, %	WG, %	OC
A^+	4133	13.86	5.18	2.84	44.78	0.23
A	4332	4.74	6.47	3.27	60.34	0.36
B	1129	6.34	24.44	7.58	60.45	0.64
C	522	6.07	44.46	11.81	66.08	0.96
C^-	581	−10.50	67.21	18.35	102.14	1.56
Total	10697	7.14	14.70	5.21	58.17	0.58

Table A2

1996

Category	Number of firms in sample	OR, %	OP, %	FE, %	WG, %	OC
A^+	4787	15.05	4.73	2.87	43.21	0.20
A	5121	5.92	7.04	3.35	59.16	0.34
B	1457	10.09	21.36	13.24	55.51	0.54
C	762	7.16	39.82	13.24	63.15	1.15
C^-	964	−10.22	63.89	16.57	106.55	1.56
Total	13091	7.40	18.30	7.08	59.05	0.66

Table A3

1997

Category	Number of firms in sample	OR, %	OP, %	FE, %	WG, %	OC
A^+	4084	13.37	5.51	2.79	41.16	0.26
A	4546	5.85	7.04	3.35	56.76	0.37
B	1354	11.61	21.45	12.87	44.40	0.71
C	616	5.85	35.44	13.08	59.34	1.32
C^-	880	−5.70	87.10	30.59	88.51	2.39
Total	11480	8.66	18.27	8.05	50.84	0.76

Table A4

1998

Category	Number of firms in sample	OR, %	OP, %	FE, %	WG, %	OC
A+	4472	14.54	3.46	2.93	45.12	0.14
A	6711	3.87	8.02	2.82	55.53	0.44
B	1940	6.27	18.75	11.65	55.51	0.51
C	980	1.91	48.76	10.26	75.98	0.99
C-	1218	-11.35	126.90	22.64	111.50	1.92
Total	15321	5.75	21.76	6.61	57.93	0.74

Table A5

1999

Category	Number of firms in sample	OR, %	OP, %	FE, %	WG, %	OC
A+	3650	15.98	3.18	3.61	42.48	0.14
A	6168	4.36	6.15	3.48	47.81	0.31
B	2141	6.54	13.76	15.21	49.98	0.40
C	959	1.45	47.23	12.94	69.90	0.93
C-	1200	-6.85	137.58	29.81	86.01	2.38
Total	14118	6.10	22.90	9.14	52.12	0.78

Table A6

2000

Category	Number of firms in sample	OR, %	OP, %	FE, %	WG, %	OC
A+	4283	13.74	2.59	3.34	37.36	0.12
A	6404	4.42	5.11	3.60	54.01	0.29
B	2084	10.62	17.03	21.21	47.04	0.45
C	920	3.11	70.88	9.97	61.35	1.51
C-	1064	-11.50	120.23	22.68	103.24	1.80
Total	14755	6.60	22.98	9.11	49.84	0.77

Table A7 synthesises the characteristics of the last category (of chronically non-viable firms), during the entire interval.

Table A7

Category C⁻

Ratio	1995	1996	1997	1998	1999	2000
OR, %	–10.50	–10.22	–5.70	–11.35	–6.85	–11.50
OP, %	67.21	63.89	87.10	126.90	137.58	120.23
FE, %	18.35	16.57	30.59	22.64	29.81	22.68
WG, %	102.14	106.55	88.51	111.50	86.01	103.24
OC	1.56	1.56	2.39	1.92	2.38	1.80

The share of these five categories of firms in the whole sample changed as follows:

Table A8

Share in total sample, %

	1995	1996	1997	1998	1999	2000
Category A⁺						
Number of firms	38.54	36.51	35.57	29.19	25.85	29.03
Turnover	34.70	32.50	36.84	27.35	22.45	28.94
Number of employees	48.34	28.71	32.88	28.46	24.88	30.59
Category A						
Number of firms	40.55	39.18	39.60	43.80	43.69	43.40
Turnover	39.80	32.69	28.98	39.70	40.28	35.07
Number of employees	24.75	28.04	25.72	29.54	33.34	25.71
Category B						
Number of firms	10.59	11.13	11.79	12.66	15.17	14.12
Turnover	12.85	14.24	19.31	17.24	20.09	18.34
Number of employees	11.88	16.57	17.98	15.88	15.37	18.67
Category C						
Number of firms	4.88	5.82	5.37	6.40	6.79	6.24
Turnover	5.75	7.12	5.59	7.08	7.40	7.92
Number of employees	5.47	8.39	7.95	9.68	10.99	11.56
Category C⁻						
Number of firms	5.43	7.36	7.67	7.95	8.50	7.21
Turnover	6.89	13.44	9.28	8.62	9.77	9.72
Number of employees	9.56	18.29	15.47	16.45	15.43	13.47

APPENDIX II
RATIO OF MONEY SUPPLY TO GDP

No.	Country	Years	M1/GDP	M2/GDP
1	Romania	1995	0.093864	0.251012
		1996	0.099169	0.279691
		1997	0.071630	0.248503
		1998	0.057337	0.251262
		1999	0.054493	0.257055
2	Australia	1995	0.170669	0.609955
		1996	0.183326	0.635931
		1997	0.197258	0.648146
		1998	0.198215	0.666338
		1999	0.206237	0.705772
3	Canada	1995	0.171071	0.595212
		1996	0.186541	0.604674
		1997	0.194428	0.626558
		1998	0.200536	0.625198
		1999	0.210607	0.619444
4	Czech R.	1995	0.312128	0.786084
		1996	0.287191	0.734974
		1997	0.250713	0.703997
		1998	0.224657	0.675266
5	Denmark	1995	0.275219	0.63613
		1996	0.292734	0.559074
		1997	0.295626	0.570605
		1998	0.309967	0.589586
		1999	0.314654	0.642908
6	Estonia	1995	0.202361	0.254949
		1996	0.205659	0.269912
		1997	0.20557	0.303294
		1998	0.174149	0.284068

(continues)

Appendix II (continued)

No.	Country	Years	M1/GDP	M2/GDP
7	France	1995	0.232037	0.418439
		1996	0.22819	0.422811
		1997	0.235588	0.441682
		1998	0.233487	0.442958
8	Germany	1995	0.207072	0.342705
		1996	0.224571	0.341626
		1997	0.238027	0.345138
		1998	0.245906	0.349358
9	Greece	1995	0.140987	0.456545
		1996	0.14481	0.470424
		1997	0.152363	0.472815
		1998	0.154862	0.463933
10	Hungary	1995	0.181826	0.423237
		1996	0.18132	0.418053
		1997	0.180616	0.416671
		1998	0.176057	0.451656
11	Italy	1995		0.46671
		1996		0.455322
		1997		0.471483
		1998		0.473995
12	Latvia	1995	0.150596	0.233628
		1996	0.150454	0.231929
		1997	0.173186	0.27441
		1998	0.15934	0.254106
		1999	0.174573	0.283448
13	Lithuania	1995	0.144729	0.2331
		1996	0.114381	0.171814
		1997	0.133279	0.189669
		1998	0.129586	0.193706
		1999	0.123835	0.210625

(continues)

Appendix II. (continued)

No.	Country	Years	M1/GDP	M2/GDP
14	Norway	1995	0.386229	0.563445
		1996	0.385001	0.548454
		1997	0.384397	0.523161
		1998	0.451965	0.595329
		1999	0.440381	0.558621
15	Poland	1995	0.122223	0.340666
		1996	0.135767	0.354554
		1997	0.131422	0.375802
16	Portugal	1995	0.24688	0.723611
		1996	0.255946	0.741757
		1997	0.273369	0.74563
		1998	0.299148	0.748275
17	Russia	1995	0.098194	0.179021
		1996	0.08967	0.166534
		1997	0.120346	0.184478
		1998	0.127141	0.233145
		1999	0.115889	0.21667
18	Slovak R.	1995	0.289584	0.683137
		1996	0.301112	0.712373
		1997	0.253338	0.681711
		1998	0.204674	0.652091
19	Slovenia	1995	0.073851	0.365442
		1996	0.076031	0.391849
		1997	0.078932	0.42471
		1998	0.088565	0.454971
20	Spain	1995	0.256346	0.424728
		1996	0.259226	0.430109
		1997	0.280305	0.455521
		1998	0.305754	0.491428

(continues)

Appendix II (continued)

No.	Country	Years	M1/GDP	M2/GDP
21	Sweden	1995		0.438073
		1996		0.465212
		1997		0.455709
		1998		0.435218
		1999		0.351247
22	USA	1995	0.164948	0.695318
		1996	0.15836	0.57664
		1997	0.154226	0.578619
		1998	0.151235	0.603374
		1999	0.157961	0.61783

Author's estimations based on *International Financial Statistics*, June 2000, International Monetary Fund.

APPENDIX III
WORLD EXPORT AND IMPORT GROWTH RATES, %

	2000	2001	2002	2003	2004	2005	Mean
World							
Exports	12.4	–3.4	1.5	8.1	8.1	8.8	5.8
Export price	0.2	–2.4	–0.6	2.2	1.9	1.7	0.5
Export, real	12.2	–1.0	2.2	5.8	6.1	6.9	5.3
Developed market economies							
Exports	7.8	–3.1	0.4	7.7	7.6	8.6	4.7
Imports	10.3	–3.4	–0.6	9.3	8.4	8.4	5.3
United States							
Exports	12.0	–6.3	–0.9	2.7	4.0	10.2	3.5
Imports	19.9	–5.7	–2.8	8.5	7.4	7.8	5.5
Japan							
Exports	14.3	–15.8	–2.0	5.0	3.3	4.0	1.1
Imports	22.0	–7.0	–8.8	4.5	8.4	8.3	4.0
European Union							
Exports	3.9	0.9	2.2	9.7	9.2	9.1	5.8
Imports	4.4	–1.3	2.1	10.8	9.2	9.0	5.6

(continues)

Appendix III (continued)

	2000	2001	2002	2003	2004	2005	Mean
Developing Countries							
Exports	21.9	–5.2	3.8	8.9	9.2	9.1	7.7
Imports	–94.3	–5.6	4.8	8.5	9.3	9.9	–35.3
Eastern Europe 6							
Exports	13.7	13.7	11.3	12.5	13.5	11.5	12.7
Imports	12.1	11.2	7.5	14.9	11.2	11.5	11.4

Gross Domestic Product (1995 U.S.$)
Growth Rate, %

	2000	2001	2002	2003	2004	2005	Mean
World total	3.9	1.4	1.8	3.2	3.5	3.4	2.9
Developed Market Economies	3.4	1.0	1.3	2.8	2.9	2.8	2.3
United States	4.2	1.2	2.4	3.4	3.4	3.2	2.9
Japan	2.2	–0.4	–1.1	1.7	2.5	2.4	1.2
European Union	3.3	1.6	1.4	2.7	2.7	2.6	2.4
Developing Countries	5.5	2.4	3.5	4.9	5.2	5.4	4.5
Eastern Europe 6	3.6	2.8	2.7	3.8	4.9	4.5	3.7

Source: Project LINK-World Economic Outlook.

APPENDIX IV
PURCHASING POWER PARITIES AND INTERNATIONAL COMPARISONS OF GDP (1999)

No.	Country	pcyer	PPPER	pop
1	Australia	0.92	0.84	170
2	Austria	1.15	1.02	72
3	Belgium	1.09	1.00	92
4	Canada	0.94	0.81	273
5	Czech Republic	0.24	0.39	92
6	Denmark	1.47	1.19	48
7	Finland	1.11	1.07	46
8	France	1.06	1.04	539
9	Germany	1.14	1.05	735
10	Greece	0.53	0.76	94
11	Hungary	0.21	0.42	90
12	Iceland	1.38	1.13	2

(continues)

Appendix IV (continued)

No.	Country	pcyer	PPPER	pop
13	Ireland	1.13	0.99	34
14	Italy	0.91	0.86	516
15	Japan	1.58	1.43	1135
16	Korea	0.39	0.64	420
17	Luxembourg	2.01	1.06	4
18	Mexico	0.22	0.59	873
19	Netherlands	1.12	0.96	142
20	New Zealand	0.64	0.76	34
21	Norway	1.53	1.19	40
22	Poland	0.18	0.45	346
23	Portugal	0.51	0.68	89
24	Slovak Republic	0.16	0.33	48
25	Spain	0.68	0.80	355
26	Sweden	1.22	1.18	79
27	Switzerland	1.61	1.27	64
28	Turkey	0.12	0.47	590
29	United Kingdom	1.09	1.06	533
30	United States	1.50	1.01	2445
31	Bulgaria	0.07	0.24	74
32	Croatia	0.20	0.54	40
33	Cyprus	0.61	0.71	6
34	Estonia	0.16	0.43	13
35	Israel	0.78	0.89	55
36	Latvia	0.12	0.42	21
37	Lithuania	0.13	0.38	33
38	Macedonia	0.08	0.30	18
39	Malta	0.42	0.74	3
40	Romania	0.07	0.29	201
41	Russian Federation	0.06	0.23	1310
42	Slovenia	0.45	0.64	18
43	Ukraine	0.03	0.17	449

Note: The cut-off date for all data used in the table was 31 December 2001
pcyer – per capita GDP (indices based on exchange rates), OECD level = 1
PPPER – ratio between purchasing power parity (US$=1) and exchange rate (US$=1)
pop – population, OECD level = 10000
Source: Schreyer and Koechlin, p. 3

APPENDIX V
ECONOMETRIC ESTIMATIONS (STD. ERRORS IN PARENTHESIS):

with non-weighted series:

PPPER = 0.3446995523 + 0.5676311816*pcyer [a1]
(0.028615) (0.031726)
Adjusted R^2 = 0.883692

PPPER = 1/(0.8129349321 + 2.510649865*EXP(-2.54062468*pcyer)) [a2]
(0.037933) (0.261684) (0.306689)
Adjusted R^2 = 0.924518

PPPER = 0.2419462675 + 1.017932267*pcyer – 0.2730023103*pcyer^2 [a3]
(0.027937) (0.081963) (0.047553)
Adjusted R^2 = 0.934639

with weighted (by the size of the population) series:

PPPER = 0.2500465407 + 0.6513723651* pcyer [b1]
(0.001101) (0.001116)
Adjusted R^2 = 0.965288

PPPER = 1/(0.7703105129 + 3.250624963*EXP(-2.519916061*pcyer)) [b2]
(0.001658) (0.015585) (0.012148)
Adjusted R^2 = 0.969924

PPPER = 0.195495067 + 0.9732059401*pcyer – 0.2072857174*pcyer^2 [b3]
(0.001115) (0.004073) (0.002558)
Adjusted R^2 = 0.977402

Obviously, the specification search could be extended to multivariate models. If PPPER is related only to pcyer – as in the above exercises – a simple linear function (a1 or b1) does not seem plausible: we have no solid arguments that the increase in pcyer could involve a continuous increase in PPPER. A logistic representation of the relationship (a2 or b2) implies an asymptotic ceiling (1.230 and 1.298, respectively). Unlike a2, the quality of regression b2 is acceptable. According to Graph 1, a parabola is also a possible functional relation between the two variables, but the economic interpretation of the maximum level of PPPER (1.191 in a3 and 1.338 in b3) is not clear. This discussion does not concern the transition countries, because of the substantial gap, which still separates them from the developed market economies. It is expected that, in their case, an increase per capita GDP will be associated with a decrease in the difference between the purchasing power parity and the exchange rate.

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