ON A GENERAL FRAME FOR MACROECONOMIC MODELLING*

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Rezumat

Scopul proiectului de cercetare a constat în identificarea bazelor metodologice pentru descrierea agregată a economiei naționale româneşti, atât din punct de vedere logic cât şi din perspective surselor de date empirice pentru modelare.

Obiectivele specifice ale studiului au fost: a) descrierea piețelor economice în corelație cu descrierea logică a comportamentelor economice; b) stabilirea blocurilor sectoriale ale economiei româneşti, pe baza omogenității activității şi comportamentului economic; c) asocierea blocurilor sectoriale la conturile naționale, pentru asigurarea surselor de date empirice pentru calibrarea şi utilizarea modelului; d) asocierea blocurilor sectoriale la piețele economice; e) asocierea conturilor naționale la piețele economice; f) identificarea claselor de interacțiuni dintre blocurile sectoriale stabilite

Abstract

The purpose of the research project was to identify the methodological bases for the aggregate description of the Romanian national economy, both logically and in terms of the sources of empirical data for modelling.

The specific objectives of the project were: a) description of the economic markets in correlation with the logic description of the economic behaviours; b) determination of the sectoral blocks of the Romanian economy, on the basis of the homogeneity of the

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economic; activity and behaviour; c) association of the sectoral blocks to the national accounts, so as to ensure the sources of empirical data for the calibration and utilisation of the model; d) association of the sectoral blocks to the economic markets; e) association of the national accounts with the economic markets; f) identification of the classes of interactions between the determined sectoral blocks.

Keywords: modelling, markets, sectoral block, national accounts.

JEL classification: B41, C02, E01, E44.

1. Identification and evaluation of the economic markets

By market we will understand an "institutional device" which allows the general communication between two subjects, this communication being either intentional (deliberate) or not (spontaneous). The extension of the concept of market to the concept of communication[1] is, in our opinion, justified by the purpose of capturing a specific homogeneity of the concept of market. Therefore, even in its extended meaning, the market presumes a two-way contemporaneous communication between the participants, a dialog[2]. If during a communication interaction, communication takes place in just one way (for instance, conveying an order, donating a material good), we do not deal with a market. However, if communication is two-way, an interconnected two-way communication (one way of the communication is generated or implied by the other way of the communication), then we deal with a market (for instance a debate of ideas, the sale, for a price, of a material good). The communication

[1] *We can take here into consideration the more general concept of communicative action, introduced into the scientific debate by Jürgen Habermas.*

[2] *We purposely avoid using the concept of dialog, because this concept doesn't have the significance of „two interconnected discourses", as it is generally believed, but that of exchange of ideas expressed orally between two or more contemporary persons, with the purpose to extract new ideas which to exceed the original points of view and which to be shared, ultimately, by all the participants in that exercise of communication („dia" means through not two, and „logos" means discourse, speech).*

which takes place one-way is a non-market[3] communication, while the two-way communication is a market-type communication.

On the grounds of what we showed above, we may give a general definition of the market*: a communication between at least two contemporary subjects taking place two-way and in an interconnected manner*[4].

A generic market transforms into an economic market if the transactions (communication) have an economic object (Figure 1).

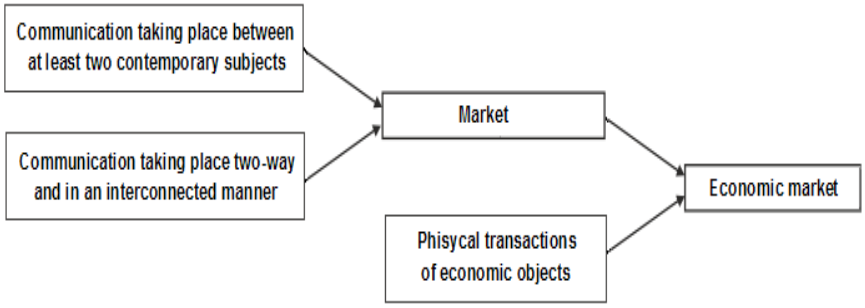

Figure 1 - The logic of the economic market generation

[3]*This is the deep, theoretical reason for which, for instance, the public goods are those goods produced in the public sector and transmitted free of charge to the consumer (outside the market, or in non-market manner). The free of charge transmission of goods to the consumer short-circuits communication in the opposite direction (payment of the price). The fact that the definition of the public goods also includes other necessary attributes which we didn't mention above (for instance, non-competitiveness, or non-exhaustion etc.), is not relevant here, because this is just an example.*

[4]*The term of interconnected signifies the following: the two ways of the communication are generated (causally or functionally) one by the other. For instance, a debate presumes the two-way communication of related ideas (question-response, argument-counterargument etc.), while an economic transaction presumes the two-way communication of objects with economic significance (good-price, good-good, good-service, service-service, service-price etc.). Therefore, even if we have a two-way communication, but the two ways of the communication are not caused reciprocally, we still don't have a market (for instance, someone gives me a bread, and I pay an earlier debt, having no relation with the bread).*

2. Classification of the economic markets

Market classification is important, on the one hand, because it clarifies additionally the concept of market and, on the other hand, because it provides a "map" of the markets "available" for the researcher of decision-maker.

We will propose concomitantly classification criteria for the markets as well as the typologies generated by these criteria.

A *first criterion* refers to the nature of communication (N). The communications from a generic market refer to the object subjected to communication between the participants on the market, which is why the nature of these communications may provide a first classification of the markets. According to this criterion we have the following possible classes of markets:

1. Class N1: markets where *ideas* are communicated (for instance: scientific conferences);
2. Class N2: markets where *symbols* are communicated (for instance: the stock exchange[5], the currency exchange[6], religious institutions);
3. Class N3: markets where *feelings/emotions/attitudes* (for instance: the artistic institutions, the political parties);
4. Class N4: markets where *objects* are communicated (for instance: market of the goods[7]);
5. Class N5: markets where *norms* are communicated (for instance: the legislative institutions);
6. Class N6: markets where *acts/actions* are communicated (for instance: the market of services[8]).

[5] *The securities transacted on the stock exchange have fiduciary character.*

[6] *The currencies transacted on the currency exchange have fiduciary character.*

[7] *Included here are the art objects, although there is a temptation to consider them symbols: an art object has intrinsic value, unlike a currency, which has no intrinsic value, just an assigned value (the attribute of fiduciarity has no relevance here, other symbols can be identified, which don't verify this attribute). Also included here are the quasi-goods, such as the energy resources (the latter cannot be considered services because they are tangible).*

[8] *According to the standard theory, the public goods (where we may also include, generically, the public services) do not pass through the market. However, if we consider the fact that the offer of public goods is financed from the taxes paid by the beneficiaries of these goods, we will find again the interconnected two-way communication. We will, however, have to accept the fact that the interconnected*

A *second criterion* is the lag between the two interconnected communications (L). Thus, we have the following markets possible according to this criterion:

1. Class L1: markets with natural lag (the alternation of the two interconnected ways of communication is done at a rate resulting from the nature of the specific transactions of that market: for instance, on a market of ideas running in oral form, the answer to a question will be delivered after the question ended, maybe a few seconds after the communication of the question)[9];
2. Class L2: markets with institutional lag (the alternation of the two interconnected ways of communication is done at a rate resulting from the institutional provisions: for instance, the professional qualification within the higher education can come only three years after the initial communication – „application" for the delivery of this qualification);
3. Class L3: market with forecast lag (the alternation of the two interconnected ways of communication is done at a rate resulting from the modelling/prognosis of those phenomena of communication);
4. Class L4: markets with accidental lag (the alternation of the two interconnected ways of communication is done at a rate resulting from the generated circumstantially, not predicted).

Because, specifically, in the economic act/economic action, there are three categories of flows taking place: real flows, financial flows and nominal flows, we will develop this aspect, because we consider that there can always appear a new criterion for the classification of the economic markets, the criterion of the economic sphere (real sphere, financial sphere, nominal sphere)[10].

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two-way communication must not verify the criterion of simultaneity (in practice, this criterion is verifiable rather accidentally than as a rule).

[9]*Sometimes, the answer to a question may come after years, decades, hundreds or even thousands of years (see the solution to the Poincare conjecture or the problem of Fermat's) conjecture. When the contemporaneity is no longer verified, the concept of market is, of course, not verified.*

[10]*We will develop these considerations in the chapter dealing with the sectoral blocks of the national economy.*

The *real flows* are those flows (which can also be stored), of non-monetary nature, intended to enter immediately (directly) into the final consumption or into the intermediary consumption (for instance: bread – for the final consumption, software – for the intermediary consumption). Therefore, the real flows have autonomy.

The *financial flows* are those flows (which cannot be stored), of monetary nature, intended to be the equivalent (in this terminology the interconnected contemporary communication) of the real flows (for instance: the wage – equivalent for the work, price – equivalent for the goods, fee – equivalent for services). Therefore, the financial flows have no autonomy.

The *nominal flows* are those flows (which can also be stored), of monetary nature, intended to create, independently of the real or financial flows, resources which can be converted either in real flows, or in financial flows.

The categories of economic flows also generate the three classes of economic activities (or economies): the real economy, the financial economy and the nominal economy[11].

We reach thus the conclusion that the economic markets can be classified simultaneously according to three criteria: along with the two criteria that have already been identified when we presented the general classification of the markets we will add the criterion delimiting the real economy, the financial economy and the nominal economy.

We will note this last criterion with (E): E1, the real economy, E2, the financial economy and E3, the nominal economy.

We all know that an economic process takes place by the combination of the two factors of production: capital and work[12]. Therefore, it seems only natural to have distinct markets for the two factors of production. We will note this criterion with F: F1 – capital, F2 – work.

The following aspect is also specific to the economic activity: some economic markets are *primary*, while others are *non-primary*.

[11] *Most of the theorizer analysts consider that there are just two such „economies": the real economy and the nominal economy (which includes both the financial economy and the nominal economy, as they have been defined in this paper).*

[12] *In the contemporary world, the third factor of production – nature – almost doesn't exist, being incorporated in the capital.*

By primary markets we understand those markets on which the economic of the specific transactions appears for the first time, while by non-primary markets[13] we understand those markets on which the economic object generated by the primary market is subsequently transacted. The non-primary markets can be secondary (transacting the economic object generated by the primary market), tertiary markets (transacting the economic object generated by the secondary market), etc. We therefore notice the need for a criterion identifying the level of the non-primary market (primary, secondary, tertiary market, etc.)[14]. For the necessities of our study we will not develop here the problem of such criterion (this matter will be resumed in the third year of the study: 2013).

We will subsequently refer only to the third level of the non-primary markets, meaning that we will have primary markets (G1), secondary markets (G2) and tertiary markets[15] (G3).

We might also consider another criterion for the classification of the economic markets, the spatial criterion: there may be spatially concentrated markets (the exchanges) and the spatially dispersed markets (most of the economic markets). If we note this criterion with

[13]*We will only consider the secondary and tertiary markets, as species defining species for the non-primary markets.*

[14]*It is obvious that we cannot presume that the non-primary markets (irrespective of their level) are indiscernible between them: there are both differences of mechanism and differences of impact (for instance, one of the "carriers" of the speculative loop which generated the current financial crisis was the multiplication of the nominal flows value through the secondary markets – insurance of the banking credits– and tertiary markets – reinsurance of the banking credits. The collaterals to the bank credits displayed the same problem: the secondary market guarantees these credits through guarantee funds, while the tertiary market means the endorsement of the banking credits guarantee, which is the same thing with guaranteeing the guarantee for the banking credits.*

[15]*The tertiary markets are less obvious in the general phenomenology of the economy. Nevertheless, they exist: for instance, within the process of starting and propagation of the current international financial crisis, granting bank credits to the non-banking, non-governmental clients was a primary market of nominal flows. These loans were insured at insurance financial societies, which means they were transacted on a secondary market of nominal flows. Finally, the insurance societies insured the insurance at reinsurance financial societies, therefore on a tertiary market of nominal flows.*

S, then we will have spatially dispersed markets (S1) and spatially concentrated markets (S2).

Principially, we may use yet another criterion of classification for these markets, the criterion of permanence: if we note this criterion with P, we will have permanent markets (P1), as most of the economic markets are, and temporary markets (P2), such as fairs, exhibitions etc.

Introducing these two additional criteria[16] in the previous table of classification, we will obtain the following image of the general typology of the economic markets[17] (Table 1):

Table 1

Abstract classes of economic markets (5)

F, G, P / N, E, S			F1						F2					
			G1		G2		G3		G1		G2		G3	
			1	2	1	2	1	2	1	2	1	2	1	2
2	2	1							N2.F2					
		2												
	3	1												
		2												
4	1	1							N4.F2					
		2												
6	2	1									N6.E2.F2.Gi			
		2												
	3	1	N6.E3											
		2												

Therefore, at first sight, there may be 120 distinct economic markets. As we will immediately find out, we will have to remove the cases of incompatibility of definition between the 120 theoretically-possible cases and retain only the cases which can exist logically. Some economic markets which are logically possible may not exist at

[16] *We give up the lag criterion because it seems irrelevant from the point of view of this study.*

[17] *The solid grey cells show cases of logical impossibility.*

this moment, either because of institutional reasons (they are not encoded[18]) or because of „natural" reasons: the current economic process didn't generate their necessity.

The cases of incompatibility appear when at least two criteria of classification are incompatible. Theoretically, we may have the following situations of logic impossibility:

a) All the cases in which the object of transaction is symbolic and the production factor is work: N2.F2;

b) All the cases in which the object of transaction is represented by objects (goods) and we are on the market of the labour force: N4.F2;

c) All the cases in which the object of transaction is symbolic, the economic activity is financial, the market trades labour force and the market is non-primary: N6.E2.F2.Gi (where i=1,2);

d) All the cases in which the object of transaction is represented by services (acts/actions), and the sphere of the economy is the nominal one: N6.E3.

Some criteria of classification of the economic markets don't have relevance in terms of the interest of the current study, which is why we will discard them. These are the criteria classifying the economic markets by their temporary or permanent character (P criterion), by their level of concentration (S criterion) and by their primary or non-primary nature (G criterion). By removing these criteria, we will obtain the following classification of the economic markets (5 theoretical economic markets as shown in Table 2):

- **Market A:** N2.E2.F1: the *monetary market (the market of credits)*;
- **Market B:** N2.E3.F1: the *capital market*;
- **Market C:** N4.E1.F1: the *market of goods*
- **Market D:** N6.E2.F1: the *market of services*
- **Market E:** N6.E2.F2: the *labour market*

[18] *Of course, some markets (in principle, any market) can exist informally, for instance the black of grey markets.*

Table 2

Aggregate abstract classes of economic markets

	E1	E2		E3
	F1	F1	F2	F1
N2		Monetary market (A)		Capital market (B)
N4	Market of goods (C)			
N6		Market of services (D)	Labour market (E)	

3. Identification and evaluation of the sectoral blocks of the national economy

We will call sectoral block, a *methodological portion of the system of the national economy, with a reasonable degree of homogeneity of the economic activities from that portion, irrespective of the level of heterogeneity between the sectoral blocks of the system of national economy.* Therefore, methodologically, there will be some kind of sui-generis entropic dissipation, so that the maximal reduction of the intra sectoral block heterogeneity might be possibly obtained at the expense of higher inter sectoral block heterogeneity

A sectoral block will be qualified concomitantly using four classification criteria.

a. Minimal internal (intra sectoral block) heterogeneity of the economic activities;
b. Type of economic activity (predominant, according to the previous criterion): real economic activity or nominal economic activity[19];
c. Association/non-association to the autochthonous (national) economic space);

[19] *In the current language (including in the scientific jargon) the concept of "nominal" is often mistaken for the concept of "financial". Subsequently we will not insist on this distinction, but we advise the reader that when he/she reads "financial" he/she should rather understand, "nominal". The financial economic flow is that monetary flow which is the equivalent of a real flow, while the nominal economic flow doesn't have this property. The real economic flow is the flow capable to form a particular requirement for consumption (final or intermediary).*

d. Public or private character of the economic activity.

On the basis of the classification criteria we suggested above we propose now a general classification of the sectoral blocks that can be associated to a national economy.

The determination of the sectoral blocks of economic and/or institutional action must be done according to the criterion of homogeneity of the actions unfolding in that particular sectoral block.[20]

Each sectoral block should be „endowed" with two categories of aggregate economic transactions: a) real transactions (non-financial)[21]; b) financial transactions. Irrespective of the type of economic transactions, they are „nominated" through economic (or macroeconomic) indicators.

Each sectoral block will be characterised by a balance of payments in relation with any other sectoral block. The equilibrium of the balances of payment (including the equilibrium at the level of the domestic economy and at the level of the foreign economy) will be introduced and analysed using the usual technique of the models of financial programming. Similarly with the structure of the balance of foreign payments, the sectoral balance of payments will have two components: a) the commercial balance (real transactions); b) financial balance (financial transactions).[22]

On the basis of what we showed above, and using the dominant practice in the macroeconomic modelling, we propose the following structure of analysis:

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[20] *As it is known, there are two criteria, operating in the literature, which are applied simultaneously: a) the criterion of function (which can be assimilated to the criterion of activity, mentioned here); b) the criterion of resources' source (particularly of the financial resource). As it looks, this second criterion is not independent from the first one (that of function). Thus, logically, the first criterion is enough in this case.*

[21] *Obviously, it is of no consequence, here, the fact that any type of aggregate transactions will be expressed here in monetary form (aggregation is possible only using a common unit of quantification, the national currency).*

[22] *Maintaining the similitude with the principles of the foreign balance of payments, the sectoral commercial balance will record the autochthonous transactions, while the financial sectoral balance will record the non-autochthonous transactions (depending on the autochthonous transactions).*

The national economy, in its whole, forms the *domestic sector (SI)*. The rest of the world will form the *foreign sector (SE)*. At the interface between the domestic and foreign sectors lies the sectoral "membrane", represented by the economic and institutional border.

The **domestic sector** consists of the following sectoral *blocks*:

1. The domestic private block (BIP)

2. The domestic block of the state (BIS)

The **domestic private block** consists of:

- The lucrative domestic private block ($BIPL$)

  a) The non-financial lucrative domestic private block ($BIPL\bar{F}$)

  b) The financial lucrative domestic private block ($BIPLF$)

- The non-lucrative domestic private block ($BIP\bar{L}$)

- The domestic private block of consumption (the households) ($BIPCF$)

The **domestic block of the state** consists of:

- The domestic private block of the state ($BIPS$)

  a) The financial private domestic block of the state ($BIPFS$)

  b) The non-financial private domestic block of the state ($BIP\bar{F}S$)

- The public domestic block of the state ($BI\bar{P}S$)

  a) The governmental budgetary block (BBG)

  b) The non-governmental monetary block ($BM\bar{G}$)

The **foreign sector** consists of the following sectoral *blocks*:

1. The current account balance**Error! Bookmark not defined.** (BCC)

2. The capital balance (BC)

The definition significance of the content, for each of the ten distinct sectoral blocks is the following:

- The non-financial lucrative domestic private block ($BIPL\bar{F}$) includes: a) economic agents (firms) with non-financial lucrative activity; b) the self-employed economic agents with non-financial lucrative activity;

- The financial lucrative domestic private block (BIPLF) includes: a) the private commercial banks;[23] the private lucrative, non-banking financial organisations;

- The non-lucrative domestic private block ($BIP\bar{L}$) includes: a) non-lucrative organisations of the civil society; b) parties and other political organisations; c) other private non-lucrative organisations and administrations;

- The financial private domestic block of the state (BIPFS) includes: a) commercial banks owned by the state[24] b) other non-banking financial organisations owned by the state;

- The domestic private block of the final consumption (the households) (BIPCF) includes: the households[25] (population households);

[23]*The case in which the state has a specific participation in such structures will be approached, concretely, in the situations when series of statistic data are processed.*
[24]*The case in which the state has a participation less than 100% in such structures will be approached, concretely, in the situations when series of statistic data are processed.*
[25]*Obviously, the "households" also include the natural persons, the individuals. Because of this, on the basis of the mentioned criterion regarding the classification of the sectoral blocks, we cannot identify a distinct sectoral block of the labour force market. An important issue appears here, which we will ignore for the time being, the matter of the microeconomic fundamentals of the macroeconomic dynamics.*

• The non-financial private domestic block of the state ($BIP\bar{F}S$) includes: a) the national companies; b) the autonomous state companies, the commercial companies fully owned by the state;[26]

• The governmental budgetary block (BBG) includes: a) the central, regional and local public administration; b) the governmental agencies, of any kind;

• The non-governmental monetary block ($BM\bar{G}$): includes: the central bank;

• The current account balance (BCC): includes the autonomous commercial and capital transactions done by the domestic sector;[27]

• The capital balance (BC) includes: includes the non-autonomous capital transactions (generated for BCC balance).

4. Interactions between the economic markets and the sectoral blocks

The interactions taking place between the sectoral blocks and the economic markets cause, at the same time, interactions within the sectoral blocks and interactions within the economic markets. Therefore, we will subsequently show both the internal interactions (within the sectoral blocks and within the economic markets) and the external interactions (between the sectoral blocks and the economic markets).

Figure 2 shows a synoptic presentation of these interactions.

[26] *The case in which the state has a participation less than 100% in such structures will be approached, concretely, in the situations when series of statistic data are processed.*

[27] *We will not distinguish, for the time being, between the commercial and capital transactions done by the private sector and those done by the state but, within the context of some specific analyses, this operation has to be done (for instance, when we have to distinguish between the foreign debt and the public foreign debt).*

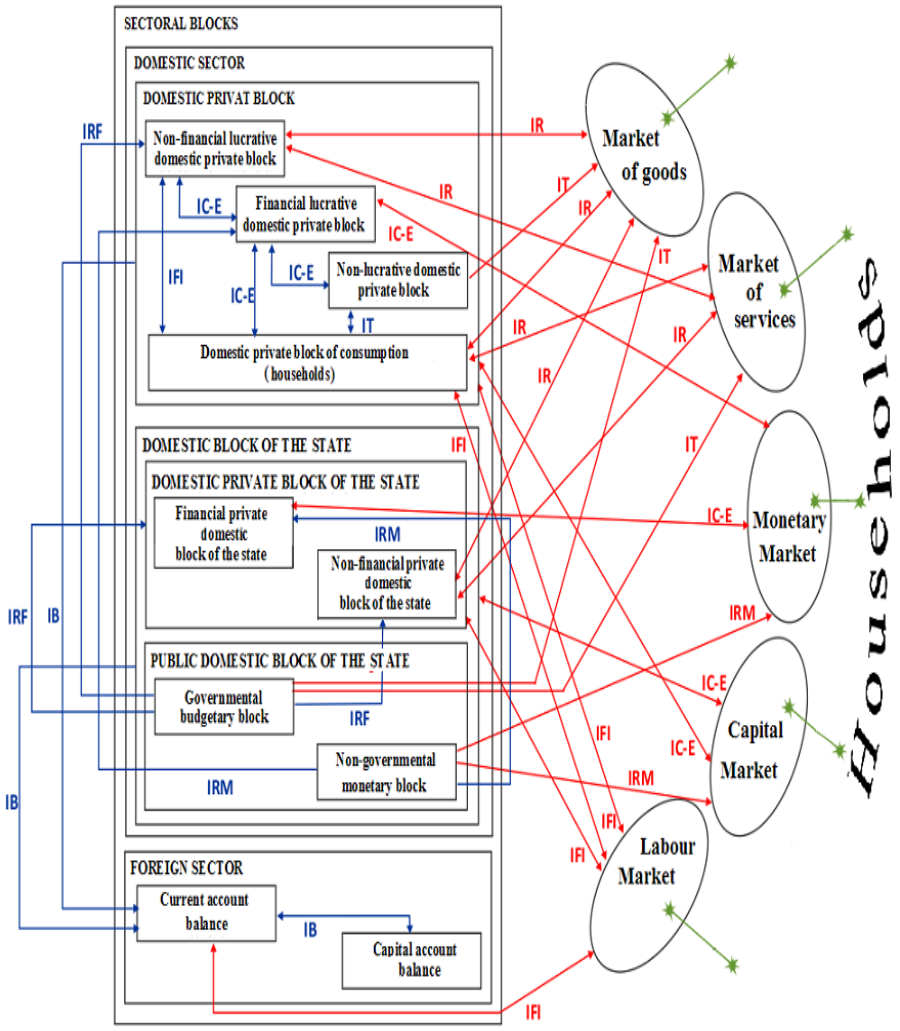

Figure 2 - Interactions between the economic markets and the sectoral blocks

The notations have the following significance:

- IR: interactions of accomplishment, in the economic meaning, that is to say, buying-selling;
- IC-E: interactions of crediting-saving;
- IRM: interactions of monetary regulation (monetary policy);

- IRF: interactions of fiscal regulation (fiscal-budgetary policy);
- IT: interactions of transfer (non-market);
- IB: interactions of balance;
- IFI: financial and informational interactions.

5. Interactions between the sectoral blocks and the national accounts

Same as for the interactions between the economic markets and the sectoral blocks, we will show the internal interactions (between the sectoral blocks and between the national accounts).

Synoptically, figure 3 shows the interactions between the sectoral and the national blocks.

The additional notations have the following significance:

- IP: interactions of production, in the economic meaning, that is to say, to produce the economic matter;

- Ir: interactions of income repartition (primary, secondary and tertiary distribution);

- IA: interactions of accumulation.

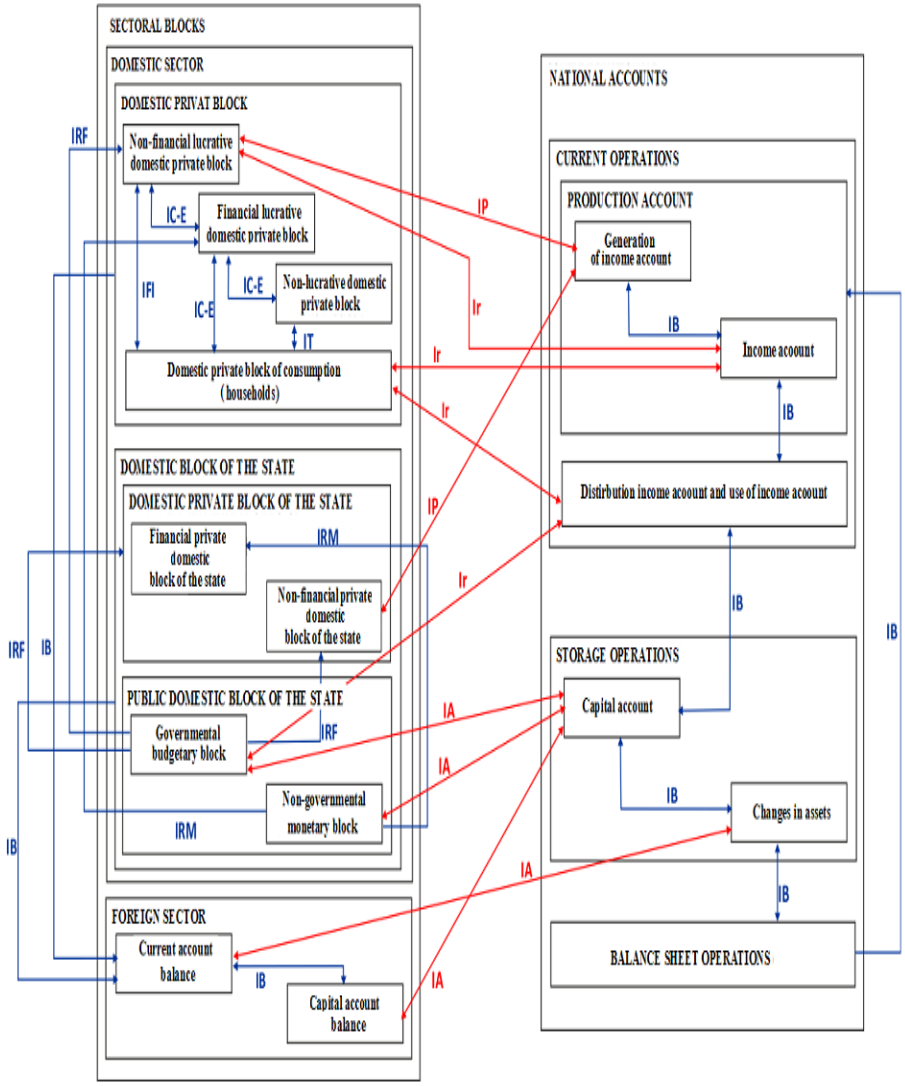

Figure 3 - Interactions between the sectoral blocks and the national accounts

6. Interactions between the economic markets and the national accounts

While between the sectoral blocks and the national accounts, and between the sectoral blocks and the economic markets, the interactions were functional, between the national accounts and the economic markets, the interactions are purely of accountancy, recording the real and monetary economic operations. Although these interactions are not essential landmarks for the economic modelling, they are useful because the macroeconomic model targeted by this research has the national accounts as statistical referential (data). The sectoral blocks are the basic element of the macroeconomic model we are speaking of, but they have to be consistent with the economic markets (because the economic markets ensure the production, achievement and consumption of the economic activity substance) and with the national accounts (because they record the statistics regarding the activity of the economic markets, on the one hand, and of the sectoral blocks, on the other hand). This is the reason why, in the module for 2011 of our research, we deemed useful to identify the interactions between the national accounts and the economic markets, as well.

Figure 4 shows the synthesis of the interactions between the national accounts and the economic markets.

The additional notations have the following significance:

- II: interactions of recording.

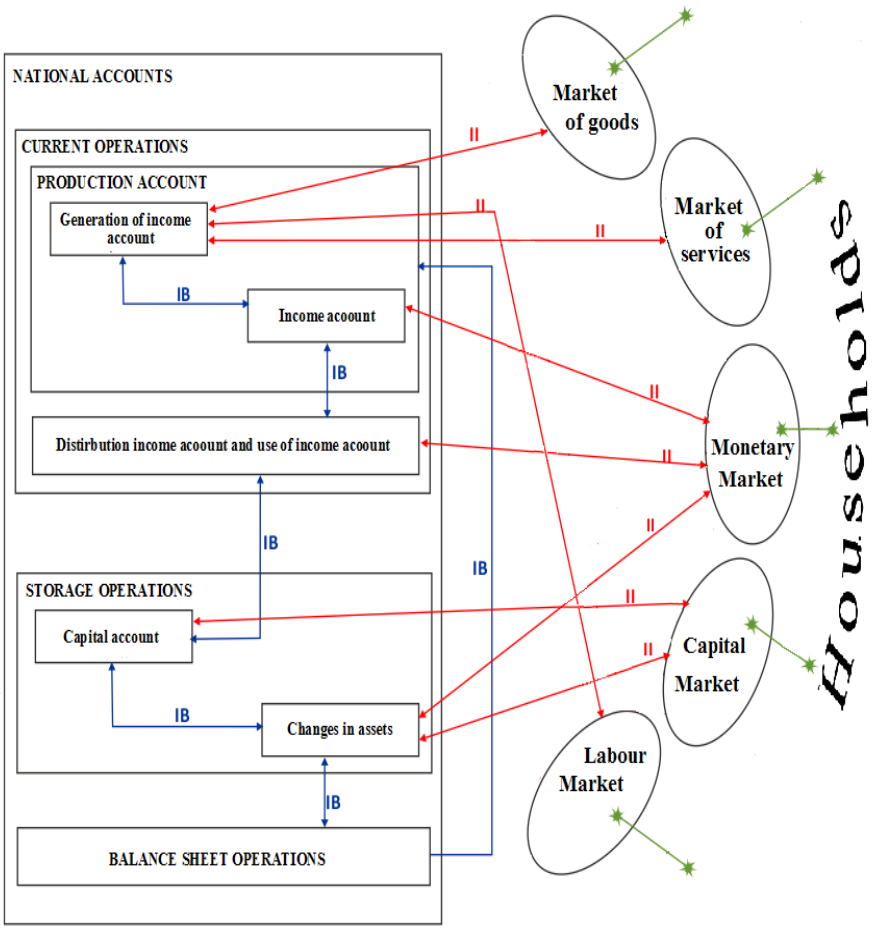

Figure 4 - Interactions between the national accounts and the economic markets

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