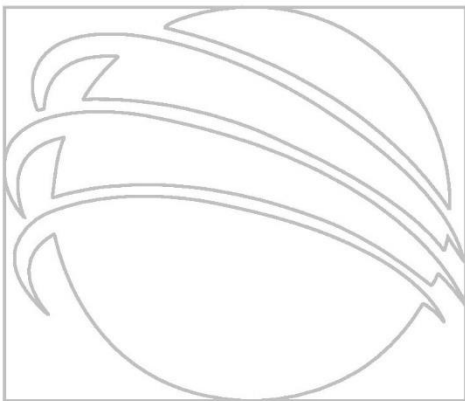


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Opportunities of Making and Using the Money Circulation Balance

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OPPORTUNITIES OF MAKING AND USING THE MONEY CIRCULATION BALANCE

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Summary¹: The present study is dedicated to the necessity for expanding research and experiments in line with the increasing role of money in the globalizing economy. It is based upon the conclusion that at the present moment there are no reliable instruments for macroeconomic cover and presentation of the objectively existing money circulation, together with the fact that part of the theoretical and practical problems related to this circulation is not solved.

The first part of the study examines the opportunities of designing a money circulation balance. It highlights the following issues:

- **The theoretical fundamentals of this balance**, including: the opportunities of using accounting principle of double entry of money flow, the necessity for aggregating economic agents, the need for identification of money flows within aggregate M3 and the opportunities of information providing of balance;
- **The patterns of money circulation balance**, presented through a brief historical review starting from the well-known “economic table” of Fr. Cane and ending with the established “national accounts” in order to reach the conclusion that a **dynamic matrix balance of money circulation** should be constituted; and
- **The information providing of the suggested balance** through analysis of the existing opportunities together with a proposal for realization through adapting the widely used not only in Bulgaria, but also worldwide accounting standard №7 Money Flows Statement.

The second part of the study is dedicated to the use of the offered dynamic matrix balance of money circulation. Specific examples illustrate the opportunities of using it for:

- conducting a more efficient and adequate monetary policy, consistent with both the demand for money and the influence of money circulation on the issue result/change in money supply; the change in money supply may take the form of an increase in money stock, withdrawal of money from circulation and/or preserving money stock unchanged;
- more precise determination of money velocity through the number of its turnovers while using the aggregate of all money flows instead of the Gross Domestic Product;
- enrichment of vertical and horizontal structural analysis of money circulation;
- tracing chain dependencies between money flows within the money circulation and their influence on money supply on the basis of an example linked to a change in corporate income taxation and
- creation of matrix of coefficients that helps in formulating respective prognostication balances after the total amount of money circulation has been forecasted.

In conclusion, the present study suggests that future research and implementation of the suggested pattern for money circulation balance can be accomplished either by the Bulgarian National Bank or by the National Statistics Institute.

JEL codes: E15, E5.

Key words: money circulation, money accounting matrix, national balances, monetary policy.

¹ The full text of the study is available at www.vuzf.bg/ Publication. Questions and comments are welcome at the author’s e-mail address: mhristov24@abv.bg

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It is only natural that the evolution of monetary theory and policy has had its ups and downs. Nevertheless, however, the assertions of some theoreticians and practitioners that money will possibly totally disappear from human relations have not come true to this very day. Even for a more remote future there is a slim chance for the state to be released from its care of money. What we are witnessing is just the opposite – there is even a marked tendency towards strengthening the role of money in the global economic space. This necessitates the intensification of research and experiments in this field rather than the underestimation of monetary theory and policy. It is in this way alone that we can create prerequisites for a more effective usage of money as a human society phenomenon.

This is the topic of the paper offered to your attention. It deals with some of the still unsolved problems in the theory and policy of the **objectively existing money circulation**. Research work shows that lying at the roots of these problems is the lack of tools for their macro-economic coverage and presentation. The word goes in the first place about the problems related to the:

- conducting of an efficient and adequate monetary policy;
- difficulties in determining the velocity of money circulation between the economic agents;
- lack of opportunities of making a graphic macro-economic analysis of money circulation;
- difficulties in tracking the chain dependencies among money flows within money circulation and
- some difficulties related to the prognostication of money circulation.

The above problems determine the contents of this paper and the order in which the issues are presented.

Part One

OPPORTUNITIES OF MAKING A MONEY CIRCULATION BALANCE

1.1. Theoretical Basis of Balance

It is a well-known fact that money circulation includes all the money flows, i.e. the circulation of money between the economic agents represented by physical and juridical persons capable of using money. We should not underestimate the fact that in each and every money flow, the amount of money supplied equals the amount of money received. That means that in making the balance we have all the prerequisites to apply the **basic principle of accounting – the principle of double entry**. Therefore, we can **not only suppose, but also maintain that it is possible to strike a money circulation balance the way a balance of accounts is made**. Obviously, what we find here is an analogy between bringing assets and liabilities into equilibrium in the accounting balance on the one hand, and the balancing of the inflows and outflows within money circulation - on the other. This is an analogy which can be disputed but with difficulty.

It is also known that to reach an equilibrium between the assets and liabilities in the balance of accounts is done by the help of respective accounts. However, they are not always directly connected with money circulation between different economic agents. This can be proved by a number of examples. Suffice is to mention the accounting of the depreciation of fixed and intangible assets alone in which there is no connection between the different economic agents. From this point of view the picture we get when equalizing the inflows and outflows **within money circulation** is quite different. **Participating here are always different economic agents among which money circulates**. It is this very fact that creates the greatest difficulties in

solving the problems related to the macro-economic coverage and presenting of money circulation in the form of a balance. These difficulties are stemming from the multitude of existing subjects. In each and every state the number of physical persons that are taking part in money circulation comes to millions. Not less is that of juridical persons who are sides in it. And this brings to the fore the necessity of **aggregating (joining) the economic agents.**

V.Crelle is perfectly right when underlining in his statement that *"...it is not possible to cover separately all acts of exchange between the economic agents of any economy. Even if it was possible to get the necessary statistical data, everything would turn into unlimited chaos of numbers which would be of little informative value..."*²

G. Marshall has also his good reason when writing that *"All these centers are impossible to be included the reason being the lack of the necessary data on a significant part of them and because of the fact that even if we had the data and could make the so-called integral accounts of the economic processes the latter would turn out to be too long and, therefore, would be analyzed but with difficulty."*³

As a result of this and some other reasoning we come to the inevitability of **aggregating, i.e. joining, the economic agents in question** when striking the money circulation balance.

The assertion made by V.Crelle that *"...with the introduction of the aggregation process we miss the connection between the economic agents. This is inevitable when we talk about a general survey the way we inevitably miss the details when watching a picture of a painter from a distance to see its overall composition."*⁴

² Крелле, В. Сводные экономические расчеты. Moscow, 1964, p.13

³ Маршал, Ж. Новые элементы французской системы национальных счетов. Moscow, 1967, p. 65

⁴ Крелле, В. Сводные.....p.13

The need of aggregating the economic agents when striking a money circulation balance brings a number of problems to the fore. The better part of them is related to choosing the **principles** on which the balance should be made as well as to the assessments made on the possibilities of taking them into account. We have adopted most different principles from most different authors and this has resulted in a great variety of opinion on it how to classify the physical and juridical persons as sides in the flow of money representing money circulation.

The leading principles are possibly contained in the opinion of G. Marshall who holds that the aggregate economic agents should “...*be both homogeneous and indicative from the point of view of economic analysis.*”⁵ **Homogeneity** creates prerequisites for including economic and juridical persons of approximately the same characteristics as far as their participation as sides in money circulation is concerned, in the aggregate economic agents. The principle of **indicativeness** on the other hand should be related to the formation of aggregate economic agents that create the necessary prerequisites for getting a global idea of money circulation and the money flows contained in it.

The object of this research is justified by the aspiration for differentiating as few a number of aggregate economic agents as possible. The grounds for such an approach are contained in the theoretical-methodological treatment of the issues under discussion. Analyses show that most suitable in this respect is the following composition of aggregate economic agents:

first, Business Agents (**BS**);

second, Non-Business Agents (**NBS**);

third, Physical Persons (**PP**);

fourth, Ministry of Finance (**MF**);

fifth, Insurance and Social Insurance Institutions (**ISII**);

⁵ **Маршалл, Ж.** Новые.....p.65

sixth, Bank Institutions (**BI**);

seventh, External Agents (**ES**).

It is not difficult to relate the physical and juridical persons as sides in the circulation of money within the money flows and the overall money circulation to the above aggregate agents. Nevertheless, however, some specifications are to be made when discussing these problems.

We must underline in the first place that all juridical persons producing material comforts, i.e. commodities and utility services, are included in the notion **business agents** whereas the juridical persons who create non-material comforts, i.e. non-material services, are related to the **non-business agents**. The latter include the finance and credit institutions with that section of their inflows and outflows which is connected with their maintenance. By this we have in mind the Ministry of Finance, the insurance and social security institutions and the bank system. However, since these institutions are juridical persons, i.e. sides in the money flows, when forming their huge and relatively independent money funds they have to be presented independently as well. Thus for instance, the **Ministry of Finance** is an aggregate economic subject, connected with the state budget; **the insurance and social insurance institutions** are representatives of the insurance and social security funds whereas the **bank institutions** are on one hand creators of money and on the other they are juridical persons accumulating and spending the loanable funds.

When dealing with the theoretical basis of the money circulation balance we should not underestimate the problem of the **currency** in which it should be made.

In Bulgaria, too, this problem is stemming from the very fact that not all the money flows are formed by using the national currency – the Lev. There are some other flows as well: in Dollars, in Euro and in other national monetary units. Research shows that the solution of this problem should be done in a way the accounting balance is stricken, i.e. through transforming the money flows in question into

national monetary units by the help of the everyday currency fixings made by the Bulgarian National Bank.

Special attention should be paid to the identification of the money flows within money circulation. It is an indisputable fact that we should take into account the theoretical concepts and the policy related to the **monetary aggregates**. The existing differences, however, give rise to extremely great difficulties.⁶ Nevertheless, we have all the good grounds for covering the flow of money included in **aggregate M3** known as broad money and most often treated as an aggregate of the ready money and the demand deposits as well as the money which is in the form of savings and time deposits. Research in this field gives us all the good reason to accept that the **initial attempts at making and using the money circulation balance should be based on the opportunities of its providing with information.**

1.2. Patterns of the Money Circulation Balance⁷

The evolution connected with the patterns of the money circulation balance is rather interesting. Starting from the **economic table** made by F.Kenne (1694-1774) and going through the **graphical expression of reproduction on a simple-scale and reproduction on an enlarged scale** of Karl Marx (1818-1883) we shall eventually come to the internationally accepted **national accounts**⁸ known in the European Union as European National Accounting System 95 (ENAS 95). What we should point out is B. Issaev's opinion that *"...this is a system of interrelated documents on the*

⁶ See: **Issing, Otmar**. Einfurung in die Geldtheorie. Munchen.1998.pp 6-10

⁷ See: **Христов, М. and Христов, Ст.** Книга за парите. Veliko Turnovo, 2002, p. 190-202

⁸ See: **Маршал, Ж.** Новые.....; **Крелле, В.** Сводные экономические расчеты. Moscow, 1964 ; **Фриш, Р.** Таблица межотраслевых потоков РЕФИ-ОСЛО.(Quoted on: Статистика народного богатства, народного дохода и национальные счета. Moscow, 1967); **Mooslechner, und Nowotny, E.** Gesamtwirtschaftliche Finanzierung und offentliche Verschundlung. Osterreichisches Forschungsinstitut fur Sparkassenwesen, Linz. Band 20/1980 and **Национални сметки за България.** Sofia, 1996

*principle of **double entry** in which each operation is registered in the assets of one document and in the liabilities of another.”⁹*

Nor should we neglect the even more specialized patterns of the **REFI- model** type worked out by R. Frisch. Here is what A.L.Weistein writes about it: “...*actually, it turns out to be not only a material but a financial pattern as well which can to a great extent replace the heavy system of national accounting.*”¹⁰

Research work shows that used within these patterns are the opportunities of applying a certain **composition of accounts** or of building the respective **matrices**. The first approach is used in national accounting and the second one – in R. Frisch’s elaboration. Each of these approaches has its advantages and defects. Because of the limited volume of this paper, however, it will draw the attention to the matrix patterns of money circulation balance alone.

The grounds for this can be found in the fact that they give a more perspicuous idea of the flow of money and allow some more effective solutions to the problems already mentioned to be made. We cannot underestimate the fact that the **financial accounts**, being part of the national accounts, are composed first and foremost on the basis of certain amounts of monetary aggregates whereas the matrix balances are worked on the basis of the respective money flows.¹¹ We should also take into consideration the fact that differentiated within the matrix patterns of money circulation balance can be two in the main: **static and dynamic patterns**. The aggregate economic agents in the **static patterns** are included in a square matrix with an equal number of rows and columns. Every flow of money in it is registered as an outflow for one of the subjects and as an inflow for the other of the subjects.

⁹ **Исаев, Б.** Национальное счетоводство – новейшее направление в экономической статистике капиталистических стран. See: Статистика народного богатства, народного дохода и национальные счета. Moscow, 1967, p. 98.

¹⁰ **Вайнштейн, А.Л.** О макроэкономических моделях решения Р. Фриша. See: Статистика народного богатства, народного дохода и национальные счета. Moscow, 1967, p.204.

¹¹ See: **Europäische Zentralbank.** Monatsbericht. Juni – 06/2004, pp 26-29

These patterns give the momentary picture of money circulation between the established aggregate economic agents. And this is their major defect.

In the **dynamic patterns** of making a money circulation balance built on a similarity to the accounting circulation sheets the static patterns can be supplemented by the money balances at the beginning and at the end of the period of time chosen. The grounds for this can be found in the fact that the balances in question come as a result of the money circulation in the preceding period. It is true that they do not give a full idea of the circulation's dynamics. At the same time, however, we cannot ignore the fact that these types of patterns are very close to it. If the causes for the money flow are neglected with the view of simplifying the contents, the conclusions can be confirmed by making a dynamic matrix balance of money circulation with all the above mentioned aggregate economic agents included in it. Furthermore, we have to accept for the sake of **this pattern's universality** that:

- the money flows in the period chosen will be marked by **X_{ij}**;
- the money balances at the beginning of the period – by **Y_{io}**;
- the money balances at the end of the period – by **Z_{9j}**.

Under these conditions the dynamic matrix balance of money circulation will acquire the following form¹²:

Table 1. Pattern of a Dynamic Matrix Balance of Money Circulation

Outflows (i) →			BS	NBS	PP	MF	ISII	ES	BI	Total
Inflows (j) ↓		OH (Y)								

¹² See: **Христов, М.** Икономико-математически модели на междуотрасловия баланс на паричните отношения. Вагн, 1972, pp 45-97

		0	1	2	3	4	5	6	7	8
BS	1	Y10	X11	X12	X13	X14	X15	X16	X17	7 $\sum_{j=1} X1j$
NBS	2	Y20	X21	X22	X23	X24	X25	X26	X27	7 $\sum_{j=1} X2j$
PS	3	Y30	X31	X32	X33	X34	X35	X36	X37	7 $\sum_{j=1} X3j$
MF	4	Y40	X41	X42	X43	X44	X45	X46	X47	7 $\sum_{j=1} X4j$
ISII	5	Y50	X51	X52	X53	X54	X55	X56	X57	7 $\sum_{j=1} X5j$
ES	6	Y60	X61	X62	X63	X64	X65	X66	X67	7 $\sum_{j=1} X6j$
BI	7	-	X71	X72	X73	X74	X75	X76	X77	7 $\sum_{j=1} X7j$
Total	8	6 $\sum_{i=1} Yi0$	7 $\sum_{i=1} Xi1$	7 $\sum_{i=1} Xi2$	7 $\sum_{i=1} Xi3$	7 $\sum_{i=1} Xi4$	7 $\sum_{i=1} Xi5$	7 $\sum_{i=1} Xi6$	7 $\sum_{i=1} Xi7$	$\sum DMC$
	9	OK (Z)	Z91	Z92	Z93	Z94	Z95	Z96	Z97	6 $\sum_{j=1} Z9j$

Built in this balance are the following **basic links**:

First, of the coverage of the domestic money circulation ($\sum DMC$) as an aggregate of all money flows:

$$\sum_{i=1}^7 \sum_{j=1}^7 X_{ij} = \sum_{j=1}^7 \sum_{i=1}^7 X_{ij} \quad (1.1)$$

The above formula shows that the money circulation in the period of time chosen represents a **sum-total of all the outflows** of the respective aggregate economic subject which is **equal to the sum-total of all the inflows** of these subjects.

Second, between the amounts of the inflows and outflows of the individual aggregate economic agents:

$$\sum_{j=1}^7 X_{kj} = \sum_{i=1}^7 X_{ik} \quad (k = 1...7) \quad (1.2)$$

This formula shows that the sum-total of the inflows of each and every of the aggregate economic agents included can be equal to, bigger or less than the sum-total of its outflows.

Third, between the money balances at the beginning of the period chosen, the sum-total of the inflows in the same period, the sum-total of the outflows during the period and the money balances at the end of the period with the individual aggregate economic agents:

$$Y_{ko} + \sum_{j=1}^7 X_{kj} - \sum_{i=1}^7 X_{ik} = Z_{9k} \quad (k=1...7) \quad (1.3)$$

Fourth, between the amounts of money balances at the end and the beginning of the period chosen:

$$\begin{array}{l} 6 < 6 \\ \sum_{j=1}^6 Z9j = \sum_{i=1}^6 Yio \\ j=1 > i=1 \end{array} \quad (1.4)$$

Before drawing any conclusions on the links between the amounts included in the formula it is necessary to determine their contents. Analyses provide all the grounds to assert that these amounts indicate the amount of money servicing the domestic and external economic agents alike at those two moments, i.e. amounts that give an idea of the **nominal money stock**. All this means that when the two sides of the formula are equal to one another the money stock in question remains the same. And vice versa, if the amount of money balances at the end of the period chosen is bigger than that at the beginning of the period, we can speak of an increase. The money stock will decrease if the correlation between these two amounts is the reverse. All these different versions result in an **issue of money**. In the first case there is **no change in the issue of money**, in the second – **additional issue of money takes place**, and in the third – **money withdrawal takes place**.

Fifth, the difference between the sum-totals of the money balances at the end and at the beginning of the period chosen:

$$\begin{array}{l} 6 < 6 \\ \sum_{j=1}^6 Z9j - \sum_{i=1}^6 Yio = \pm Z97 \\ j=1 > i=1 \end{array} \quad (1.5)$$

In the cases when the amount of the money servicing the economic agents has increased the outflows of the bank institutions will be bigger than their inflows and the difference in the formula will be a negative quantity. Its value will be a positive quantity only when there is a decrease of the amount of money in question.

Then the correlation between the bank institutions' money flows will be the reverse. And vice versa, when the money under discussion preserves its amount, **Z97** will be equal to zero.

1.3 Information Providing for the Dynamic Matrix Balance of Money

Circulation

Following the above characteristics of the aggregate economic agents included in money circulation and the reasoning on the flow of money within the money circulation balance offered it is pretty obvious that a broader interpretation of the problems related to the opportunities of its **information providing** is needed. **We can turn to the indisputable fact that such a circulation really exists and use it as a starting position for contemplation on the topic.** It is to some extent, more or less, a target of attention of **financial and statistical accounting** in the first place.

Research shows, however, that their independent presenting reveals various possibilities of information providing. It also proves that they should to a certain extent be used simultaneously.

And at last but not least research work points to the fact that **the information provided as a result of financial accounting is preferred to the other one.** The reason for this is not because the tools of statistics are underestimated but because this kind of accounting in parallel with the rest of its functions is meant to register the flow of money between the individual economic agents as well. The preference is also grounded on the fact that the money circulation balance offered is based on the same principle as financial accounting – the principle of double entry.

Therefore, **the basic problem to be adequately solved is to guarantee conditions for making use of the registered flow of money between the economic agents from financial accounting for the needs of the information providing of the money circulation balance offered.**

Analyses show that in the first place two of the established **national accounting standards** can be used to this end: *first*, the standard of the **Income Statement** (NSS 1) and *second* the standard of the **Money Flows Statement** (NSS 2).¹³

There are two major differences between these two standards. One is connected with the different treatment and classification of the respective money flows and the other – with the fact that contained in the Money Flows Statement is also information about the funds at the beginning and at the end of the period chosen.

We should not ignore the fact that both direct and indirect approaches of representing the money flows can be applied in the second of the standards.

No further details about the two national accounting standards will be given. I should only point out that as far as the information providing of the dynamic matrix balance of money circulation is concerned **the Money Flows Statement worked out on the direct method is preferred to that made according to the indirect method.** This is necessitated in the first place by the fact that contained in it are not only the inflows outflows but the money balances at the beginning and at the end of the period of time chosen as well.

It should be also taken into consideration that the filling of the square matrix fields of the offered balance with information contained in the Money Flows Statement can be done in two ways: *first*, by using the inflows, and *second*, by taking into account the outflows.

As is shown in the research the results of the two approaches cannot be the same. This is owing to the fact that it is with the first approach alone that all the money flows are connected with a circulation of money between different economic agents. We should not forget that with the second approach a certain amount of the

¹³ **НСС 1** – Представяне на финансови отчети; **НСС 7** – Отчети за паричните потоци. Promulgated in State Newspaper, issue 22/27 Febr., 2002. These two standards are fully adapted to the corresponding international accounting standards.

outflows do not correspond to other economic agents. We can once again point to the way of registering the assets depreciation as a typical example in this respect. Added to it can be also the cases in which some internal money stores are spared out.

Everything we have said so far gives us all the good reason to accept that the **dynamic matrix balance of money circulation should be made on the basis of the inflows of the individual juridical economic agents.**

The above made assertion does not mean a full rejection of the usefulness of its working out by using information related to the money outflows. Nor should we ignore the fact that the comparison drawn between the two types of balances will create prerequisites for making additional conclusions. The discussion of these conclusions in this very paper, however, will complicate its contents. This is the reason why it does not dwell on the second version.

Research work shows that **certain corrections should be made in the standard under discussion** for the needs of the dynamic matrix balance of money circulation. **This is prompted by the necessity of creating prerequisites for getting an idea of where the inflows are coming from as well as of the direction in which the outflows are going to.** To this end we should also build in it the aggregate economic agents chosen. As a result the Money Flows Statement will acquire the form shown in **Table 2.**

It is also imperative for us to establish such practices in which all the juridical persons no matter whether business or non-business agents should be obliged to present the modified form of the national accounting standard under discussion.

Table 2. REPORT on money flows of.....

for the period-..... , 200...

No	Business agents→ Money Flows ↓	BS	NBS	PP	MF	ISII	ES	BI	Total
1	2	3	4	5	6	7	8	8	10
A	<u>Inflows from:</u>								
1	Main Activity								
2	Investment Activity								
3	Finance Activity								
B	<u>Outflows for:</u>								
1	Main Activity								
2	Investment Activity								
3	Finance Activity								
C	Chang in Money Stock in the Period (o,+,-)								
D	Money Stock at the Beginning of the Period								
E	Money Stock at the End of the Period								

.....

(Place and date)

Head of Team:

Made by:

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Once the juridical economic agents present their money flow statements, it will be easy to aggregate the information contained in them in conformity to the needs of the dynamic matrix balance of money circulation. The matrix fields related to the physical persons and to the external subjects that cannot be obliged to present the national accounting standard in question could be easily filled. We should not ignore the fact that the money inflows and outflows of these subjects are the inflows and outflows of the juridical subjects respectively and it is a must for the juridical persons to present such statements.

When making the first money circulation balance, however, certain difficulties will arise connected with the necessary information about the presence of money balances related to the physical subjects and the external subjects at the beginning of the period of time chosen. They can be overcome by making additional surveys and analyses. Afterwards these difficulties will disappear since the money balances at the end of the period will be in fact the money balances at the beginning of the following period of time chosen. Thus it is only natural that remaining blank in this strongly aggregate dynamic balance of money circulation will be fields X33 and X66 which give an idea of the flow of money between the physical persons and the external economic agents.

OPPORTUNITIES OF USING THE DYNAMIC MATRIX

BALANCE OF MONEY CIRCULATION

As is shown by research the offered dynamic matrix balance of money circulation can be successfully used for solving not only the problems listed at the beginning of this paper but for their solution on a much broader basis as well. Its objects, however, as well as the desire for more clarity give all the grounds to keep the problems under discussion within limits.

2.1. The Dynamic Matrix Balance of Money Circulation and Money

Creation Policy

The opportunities of using the dynamic matrix balance of money circulation for the needs of money creation policy should be considered in a close dependence on the form of the **money creation**. They can be connected with:

First - **money issue**, i.e. the necessity of additional money supply;

Second - **zero money issue**, only when no changes are needed in the amount of the money in circulation, and

Third - **money withdrawal**.

The data in **Table 3** can be used to prove the opportunities of the offered balance. It is evident from the data that **Version A** is related to the necessity of increasing the money in circulation, i.e. **to issue money**. In principle, this necessity is

prompted by the needs of payment of the economic agents outside the bank institutions and their desire to store value by holding money. To attain this objective the economic agents make efforts to increase the money inflows and optimize the money outflows. This means that the information about the additional money demand within the balance is contained in the first place in the fields giving an idea of the money inflows and outflows of the non-bank economic agents. We should not underestimate the information contained in the fields related to the bank institutions either.

**Table 3. Dynamic Matrix Balances of Money Circulation
(Versions A, B and C)**

Outflows (i) →			OH	BS	NBS	PP	MF	ISII	ES	BI	Total
Inflows (j) ↓			(Y)								
			0	1	2	3	4	5	6	7	8
BS	A	1	6	60	20	10	15	10	5	20	140
	B		6	60	20	10	15	10	5	8	128
	C		6	60	20	10	15	10	5	8	128
NBS	A	2	3	10	5	5	12	5	2	5	44
	B		3	10	5	5	12	5	2	2	41
	C		3	10	5	5	12	5	2	2	41
PS	A	3	2	10	5	-	1	2	1	3	22
	B		2	10	5	-	1	2	1	3	22
	C		2	10	5	-	1	2	1	3	22
MF	A	4	2	10	2	2	1	3	10	2	30
	B		2	10	2	2	1	3	10	2	30
	C		2	10	2	2	1	3	10	2	30
ISII	A	5	1	15	2	1	1	2	5	5	31

	B		1	15	2	1	1	2	5	2	28
	C		1	15	2	1	1	2	5	2	28
ES	A	6	2	12	2	1	1	3	-	5	24
	B		2	12	2	1	1	3	-	4	23
	C		2	12	2	1	1	3	-	4	23
BI	A	7	-	10	4	2	1	2	2	1	22
	B		-	10	4	2	1	2	2	1	22
	C		-	12	4	2	1	2	2	1	24
Total	A	8	16	127	40	21	32	27	25	41	313
	B		16	127	40	21	32	27	25	22	294
	C		16	129	40	21	32	27	25	22	296
		9	OK								
			A	19	7	3	0	5	1	-19	35
			B	7	4	3	0	2	0	0	16
			C	5	4	3	0	2	0	+2	14

Analyses show that with the **additional money demand at given periods of time the sum-total of the money inflows of the non-bank aggregate economic agents is bigger than the sum-total of the money outflows. This is identical to the bigger sum-total of the money outflows as compared to the money inflows with the bank institutions.**

The amount of the additional money demand ($\sum AMd$) can be fixed in the dynamic matrix balance of money circulation by the help of the following formula:

$$\sum_{j=1}^6 \sum_{i=1}^6 X_{ij} > \sum_{i=1}^6 \sum_{j=1}^6 X_{ij} \quad (2.1)$$

This conclusion is fully proved by the data about **Version A**, contained in **Table 3**. In Version A the difference between the two amounts in question is equal to 19

units [(313-22) – (313-41)] and represents the **additional demand for money**. By using a formula made on the analogy of the above one we can ascertain the situation within each of the individual non-bank aggregate economic subject.

Calculations show that in this version the total amount of the additional demand for money comes as a result not only of the positive difference between the total amounts of the money inflows and outflows of the: business agents (by 13 units: 140-127); non-business agents (by 4 units: 44-40); physical persons (by 1 unit: 22-21); insurance and social insurance institutions (by 4 units: 31-27). It is also due to the negative difference between these amounts: by 2 units for the Ministry of Finance (30-32) and by 1 unit for the external subjects (24-25). Which means that the general need for additional money might be connected with unidirectional transformations in the correlation of the money inflows and outflows of all the non-bank aggregate economic agents included in the balance, but it might equally not be related to such transformations. It is quite possible, even in theory alone, for a certain part of them to come out with equal amounts of their money inflows and outflows in the period of time chosen.

On the other hand it is a well-known fact that to meet the demand for money of the aggregate non-bank economic agents, the bank institutions should supply **(create) additional amounts of money**. The information connected with this is contained in the dynamic matrix balance fields, giving an idea of their **money inflows and outflows**. We can ascertain from it that **we can really speak of additional money creation in the cases when the amount of money outflows of this aggregate economic agent exceeds the amount of its inflows**. This can be seen in the following formula:

$$\sum_{i=1}^6 AMd = \sum_{i=1}^6 Xi7 > \sum_{j=1}^6 Xj7 \quad (2.2)$$

These assertions are fully conformed by the data about **Version A**, contained in **Table 3**. They really show that the total amount of the additionally offered money stock in the period of time under consideration is within 19 units (41-22), i.e. it is equal to the total amount of the additional demands of money of the non-bank aggregate economic agents. On the other hand, the distribution of the money in question between those subjects shows that they influence unsteadily the total amount of the additional money creation.

Quite different is the picture presented by the data about **Version B** contained in the dynamic matrix balance of money circulation. What we have in it is **zero money issue**, i.e. the amount of money in circulation at the end of the period of time chosen is the same as at its beginning. This is confirmed not only by the equilibrium between the sum-totals of the money inflows and outflows of the non-bank aggregate economic agents (294-22) but by the unchanged amount of the money outflows and inflows with the bank institutions (22 units) as well.

Analyses also show that the zero issue is connected not only with the positive difference between the money inflows and outflows of the economic agents (by 1 unit: 128-127), non-economic agents (by 1 unit: 41-40), physical persons (by 1 unit: 22-21), insurance and social insurance institutions (by 1 unit 28-27). It is also related to the negative difference between them with the Ministry of Finance - by 2 units (30-32), and the external subjects – by 2 units (23-25). A great number of combinations leading to zero issue are possible between the money inflows and outflows of the individual non-bank aggregate economic agents. It is not necessary, however, to present them in this research.

It is in **Version C** that we come at last to a situation in which money issue is in fact **withdrawing of money**. At it the comparison between **the sum-total of the money inflows and outflows of the non-bank aggregate economic agents and the sum-total of their money outflows shows that the first sum-total is by 2 units less**

than the second one $[(296-24) - (296-22)]$. The fact that the **sum-total of the money inflows with the bank institutions is bigger than the sum-total of their money outflows by 2 units too** (24-22) also proves the above money issue result.

The reasons for this transformation as compared to the rest of the versions should be sought not only in the similar transformations described but in the fact that the economic agents have increased their money outflows directed to the bank institutions by 2 units (12-10) as well. Thus they have decreased their debts to the latter.

The rest of the conditions being on an equal footing, this has caused reduction in money demands and withdrawal of money. No further proofs are needed to accept the assertion that **this version of money issue can also come as a result of a great number of combinations between the money inflows and outflows of the non-bank aggregate economic agents. As compared to the money outflows of the bank institutions, however, the amount of their money inflows is bigger.**

This gives us all the good reason to say the following: **transformations in the form and amount of the money issued can really be provoked by an unlimited number of transformation combinations within the money inflows and outflows of the non-bank aggregate economic agents. Money issue or money withdrawal are possible only in the cases when the changes in question are related to the money inflows and outflows of the bank institutions.** On this basis we can draw the conclusion that **to a certain extent the changes described here are connected not only with the supply but with the demand for money as well.** This means that only a **money creation policy** based on the information contained in the money circulation balance can take into consideration the interaction existing between the two processes. Nor should we ignore the fact that **irrespective of all the disputes on the matter, as far as monetary policy is concerned it is the demand for money rather than the supply of it that should be brought to the fore.** This conclusion is established by the fact that the demand in question is conditioned by the changed

demands for the non-bank aggregate economic agents and the money creators should reckon with them.

2.2 The Dynamic Matrix Balance of Money Circulation and Money

Velocity

The attempts to present the velocity of money are most often related to the transformation of the well-known formula of the “**Equation of Exchange**” by the money quantity theory.¹⁴ (12) Therefore, the velocity in question measured in **number of turnovers (V)** can be found by multiplying the quantity of the goods sold (**Q**) by their average prices (**P**) and dividing the product to the money stock (**M**) which services the economic agents. Here is the formula offered:

$$V = \frac{Q \cdot P}{M} \quad (2.3)$$

As far as the denominator of this formula is concerned we can hardly make any serious objection in principle. The numerator, however, needs substantial correction. The correction is imperative even in the cases when we accept that the product is an expression of the Gross Domestic Product (**GDP**) and the related purchase-and-sale transactions fully cover the function of money as a **means of payment**. The need of correction is provisioned at least by the fact that money within its circulation between the economic agents can also act as a **store of value**.

Analyses show that at the current moment there are no suitable sources of information to fill the elements of this formula. This impedes the determination of the money velocity measured not only in number of turnovers but in the **time needed for one turnover, presented in days** as well. They also show that this field can to a great extent be filled with the information contained in the dynamic matrix

¹⁴ **Woll, A.** Wirtschaftslexikon. Munchen, 2000, p. 739

balance of money circulation. It is not difficult to prove this by the help of the exemplary data valid for the three versions and presented in **Table 3**.

In the first place we should take into consideration the fact that the money circulation balance offered contains information about the whole of the money circulation, i.e. about all the money flows representing circulation of money between the individual economic agents. This gives us all the good reason to maintain that the information shows, though in a strongly aggregate form, the circulation of money as a means of payment as well as a means of value store. Therefore we can accept that **the numerator of the above formula can be replaced by the respective amount of the domestic money circulation ($\sum DMC$).**

Much more difficult to solve is the problem of the **money stock**, which services the economic agents as an element of the formula for establishing the number of turnovers of money circulation in the period of the time chosen as its denominator. This is due to the fact that the money circulation balance contains two quantities related to this element of the formula. These are the sum-total of the money balances at the beginning of the period

6

($\sum Y_{i0}$) and the sum-total of the money balances at the end of the period

i=1

6

($\sum Z_{9j}$).

j=1

In principle no such problem arises only when the issue result is zero, i.e. in the cases when these two amounts are equal to one another. This is obvious with **Version B** of the exemplary money circulation balance on **Table 3**. In it the number of the money turnovers is equal to about **18** (294:16). If accepted that this is the velocity of money

within one year or 360 days it will be established that the **time for one turnover** measured in days will be equal to **20 days** (360:18).

However, when there is some change in the money stock servicing the economic agents during a given period of time and it acquires the form of additional money creation or money withdrawal, it is much more difficult to establish the indicator for money velocity. In such cases three solutions are possible related to the money stock in question: *first*, to use the money balances at the beginning of the period of time chosen; *second*, to take the money balances at the end of the period, and *third*, to calculate the arithmetic average (simple or weighted) of this money stock.

According to the analyses made the third solution is preferred to the other two. They also show that within the framework of this solution, applying the weighted average has some advantages to the rest. However, there is no information whatsoever in the money circulation balance about it. Therefore, we should use a simple arithmetic average, taking into consideration the money balances at the beginning and at the end of the period of time chosen. This approach shows that in **Version A** the average money stock servicing the economic agents is about 26 units $[(16+35):2]$, and in **Version B** it comes to 15 units $[(16+14):2]$. It is evident from the calculations made that the deviations of the money stock simple average from the money balances at the beginning and at the end of the period of time chosen are in a direct dependence on the degree of changes in those balances. In principle it can be maintained that the bigger the degree, the more significant the deviations under consideration and vice versa. That means that through this approach it is not possible to obtain absolute precision related to the amount of the money stock servicing the economic subject during a given period of time. Nevertheless, however, the obtained results should be accepted as suitable until conditions are created for establishing the money stock as a weighted average. According to the analyses made the above problem is at times not only hard but

even impossible to solve since the changes in the money stock in question are a very frequent phenomenon.

The number of money turnovers for the period of time chosen is about 12 (313:26) and the duration of a turnover is 30 days (360:12) if the money stock simple average is applied in **Version A**. On the other hand the results in **Version B** are as follows: about 20 turnovers (296:15) and 18 days for one money turnover (360:20) respectively.

It is obvious that by the help of the indicators of money velocity we can draw conclusions, which, irrespective of their imprecision can reveal the tendency in the development of these significant for the monetary policy indicators only within several periods of time in succession. Some concrete measures of influencing the money velocity in question are possible to be taken on this basis. **Nor should we ignore the fact that the acceleration of the money circulating between the economic agents is equivalent to the decrease of the necessary money stock servicing the economic agents and vice versa.**

2.3 The Dynamic Matrix Balance of Money Circulation as a Structural Analysis Tool

Money circulation being a combination of money flows and the money stock servicing the economic agents being a sum total of the money which those subjects have at their disposal, the information contained in the dynamic matrix balance of money circulation can provide all the prerequisites for working out a rich structural analysis, which depends on the degree of the economic agents' aggregation. We should also add to this that through the information, included in the balance under consideration, both **vertical** and **horizontal structural analyses** are possible to be made. The above conclusion does not need any additional proofs whatsoever. We should only underline that at the present moment there is no information source for

such an analysis. It is hardly possible to maintain that it is not necessary. All this can be proved by the vertical and horizontal structural indicators given in **Table 4** on the basis of **Version A** on **Table 3** but within limits.

The data from the table mentioned show that the vertical structural indicators can be divided into three groups: *first*, indicators related to the **graphics of the money outflows** for each of the aggregate economic subject included in the balance; *second*, indicators related to the structure **of the aggregate amount of the external money circulation (Σ EMC)** taken as a totality of all the money inflows; *third*, indicators related to the structure **of the money balances at the beginning of the period of time chosen**.

Table 4. Structural Indicators of Version A. of the Dynamic Matrix Balance of Money Circulation

Outflows (i) →		OH (Y)	BS	NBS	PP	MF	ISII	ES	BI	Total
Inflows (j) ↓		0	1	2	3	4	5	6	7	8
BS	1	6	60	20	10	15	10	5	20	140
%↓		37	47	50	48	47	37	20	49	45
%→			43	14	7	11	7	4	14	100
NBS	2	3	10	5	5	12	5	2	5	44
%↓		18	8	12,5	24	38	20	8	12	14
%→			23	11	11	28	11	5	11	100
PS	3	2	10	5		1	2	1	3	22
%↓		13	8	12,5	-	3	7	4	7	7
%→			45	23		4	10	4	14	100
MF	4	2	10	2	2	1	3	10	2	30
%↓		13	8	5	9	3	11	40	5	9,5
%→			33	7	7	5	10	33	7	100

ISII	5	1	15	2	1	1	2	5	5	31
	%↓	6	12	5	5	3	7	20	12	9,5
	%→		48	7	3	3	7	16	16	100
ES	6	2	12	2	1	1	3		5	24
	%↓	13	9	5	5	3	11	-	12	8
	%→		50	8	4	4	13		21	100
BI	7		10	4	2	1	2	2	1	22
	%↓	-	8	10	9	3	7	8	3	97
	%→		45	18	9	5	9	9	5	100
Total	8	16	127	40	21	32	27	25	41	313
	%↓	100	100	100	100	100	100	100	100	100
	%→		40	13	7	10	9	8	13	100
	9	OK (Z)	19	7	3	0	5	1	-19	35
		%→	54	20	9	0	14	3	-	100

Ensuing from the **first group of the vertical structural indicators for the business agents** is the following conclusion. The greatest portion of their money outflows goes to the same aggregate economic subject (47%), whereas the smallest portion (8%) is directed towards the non-business agents, the physical persons, the Ministry of Finance and the bank institutions.

Some conclusions on the analogy with the above mentioned one as well as much more detailed deductions than this can be made about the rest of the aggregate economic agents included in the money circulation balance.

The second group of the vertical structural indicators on the other hand gives an idea of the individual economic agents' participation in the aggregate quantity of the domestic money circulation (Σ DMC), taken as a totality of all the money inflows.

The data on the table show that the business agents have the greatest share of participation in this totality (45%) whereas the physical persons and the bank institutions account for only 7% of it.

The third group of the vertical structural indicators provides information about the distribution of the money balances between the non-bank aggregate economic agents at the beginning of the period of time chosen.

The data on the table prove that the largest share of the aggregate amount of the money balances (37%) goes to the business agents, whereas only 6% of it goes to the insurance and social insurance institutions.

On the other hand, the information from the table under consideration also shows that **the horizontal structural indicators** can be divided into three major groups too.

First, indicators giving an idea of the **graphic expression of the money inflows** of each of the aggregate economic agents included on the balance; *second*, indicators related to the **graphic expression of the aggregate amount of the domestic money circulation (ΣDMC)**, taken as a totality of all the money outflows, and *third*, indicators referring to the **graphic expression of the money balances at the end of the period of time chosen**.

Thus for instance, it is evident from the **first group of the horizontal structural indicators** referring to the Ministry of Finance that the external subjects account for the biggest share within all its money inflows (40%).

The smallest share goes to the internal redistribution of budget resources within this aggregate economic subject (3%). **In this case, too, conclusions on an analogy of the previous ones can be made about the rest of the aggregate economic agents included in the money circulation balance.**

The second group of the horizontal structural indicators shows that the biggest share (40%) of the total domestic money circulation (ΣDMC), viewed as a

totality of the money outflows, goes to the business agents and only 7% of it go to the physical persons.

The third group of the horizontal structural indicators gives us grounds to say that at the end of the period of time chosen the business agents have the biggest share of the money resources (54%) and the smallest share of them (3%) is with the external subjects.

Obviously, the above structural indicators as well as those missed in this research do not respond to reality. This is entirely due to the exemplary character of the dynamic matrix balance of money circulation used. We, however, cannot deny the opportunities the balance in question provides in this respect since they cannot be disputed at all. Nor can we ignore the fact that this balance will fill a large space in our practices related to the structural analysis of money circulation.

Furthermore, research work shows that the opportunities of working out a structural analysis by making use of the information contained in the aggregate dynamic matrix balance of money circulation can substantially expand in case the respective economic agents are disaggregated. This fully depends not only on the objectives laid but also on the opportunities of providing information about this type of balance.

2.4 The Dynamic Matrix Balance of Money Circulation and the Chain

Dependencies Among Money Flows

Analyses show chain dependencies exist among money flows within money circulation. The word goes about the multitude of necessary transformations to be done in a certain section of the money flows following the changes in a given money flow. These dependencies might not result in changes in the issues of money after the chosen period of time expires but they might well cause such changes. It is this fact that makes us dwell on the two versions separately.

2.4.1 Chain Dependencies Resulting in no Change in Money Issue

The data of the following money circulation balance can be used for the purposes of presenting the chain dependencies among money flows which do not result in changes in money issue:

Table 5. Chain Dependencies in Version A. Resulting in No Change in Money Issue

Outflows (i) →		OH (Y)	BS	NBS	PP	MF	ISII	ES	BI	Total
Inflows (j) ↓										
		0	1	2	3	4	5	6	7	8
BS	1	6	60	20	10	15	10	5	20	140
NBS	2	3	10	5	5	12	5	2	5	44
PP	3	2	10	5	-	1	2	1	3	22
MF	4	2	10 5	2	2	1	3	10	2	30 25
ISII	5	1	15	2	1	1	2	5	5	31
ES	6	2	12	2	1	1	3	-	5	24
BI	7	-	10	4	2	1	2	2	1	22
Total	8	16	127 122	40	21	32	27	25	41	313 308
	9	OK (Z)	19 24	7	3	0 -5	5	1	-19	35

The data from table 5. indicate that this version of money circulation assumes that the **money outflows from the business agents directed towards the Ministry of Finance have decreased from 10 to 5 units**. It is presumed that this has come as a result of the reduced corporate income taxation. Under equitable conditions, other than these, this change finds an expression in two directions. *First*, the total amount of the money outflows of the business agents falls down by this same extent (from 127 to 122 units); *second*, 5 units (from 30 to 25) decrease the total amount of the money inflows of the Ministry of Finance. This also influences the total quantity of the domestic money circulation (ΣDMC), which falls by 5 units (from 313 to 308). Under conditions different from these the reduced money outflows of the economic agents with the Ministry of Finance can be compensated with the money outflows going towards other aggregate economic agents.

This results in a decrease of their money inflows or in a change in their money balances at the end of the period of time chosen. The picture with the Ministry of Finance is similar to this one though not identical.

The reduced money inflows of this subject can necessitate a reduction of its money outflows, compensation by other money inflows or a change of its money balances at the end of the period of time chosen.

With the view of not complicating the contents of this research it has been accepted that the reduction of the money outflows of the economic agents and the decrease of the money inflows of the Ministry of Finance caused by the initial change only influences the money balances of the aggregate economic agents concerned at the end of the period of time chosen. Thus for instance the money balances with the economic agents increase from 19 to 24 units ($6+140-122$), whereas the Ministry of Finance marks a 5 unit's disequilibrium ($2+25-32$). In parallel with this the money issue preserves both its form and its quantity. It remains the same - 19 units of additional money creation: $(35-16)$ or $[(308-22) - (308-41)]$.

No additional proofs whatsoever are needed to maintain that the admitted reduction of the corporate taxation of the economic agents can stir much more complex chain dependencies neither influencing the money circulation's total amount, nor changing the form and extent of the money issue result.

However, this is possible only if the dependencies in question influence neither the money inflows nor the money outflows of the bank institutions as an independent aggregate economic subject.

2.4.2 Chain Dependencies Resulting in Changes in Money Issue

Analyses show that in the better part of the cases the chain dependencies between the money flows have their influence on the money issue result. This is also possible when the aggregate quantity of the domestic money circulation (ΣDMC) does not change. The data on Table 6 give a true picture of the situation:

Table 6. Chain Dependencies In Version A. Resulting in a Change in Money Issue

Outflows (i) →		OH (Y)	BS	NBS	PP	MF	ISII	ES	BI	Total
Inflows (j) ↓		0	1	2	3	4	5	6	7	8
BS	1	6	60	20	10	15	10	5	20	140
NBS	2	3	10	5	5	12	5	2	5	44
PP	3	2	10	5	-	1	2	1	3	22
MF	4	2	10 5	2	2	1	3	10	2	30 25
ISII	5	1	15	2	1	1	2	5	5	31

ES	6	2	12	2	1	1	3	-	5	24
BI	7	-	10	4	2	1	2	2	1	22
			15							27
Total	8	16	127	40	21	32	27	25	41	313
	9	OK	19	7	3	0	5	1	-19	34
		(Z)				-5			-14	30

It is evident from this table that with a preserved aggregate quantity of the domestic money circulation (ΣDMC) coming to 313 units, the additional money issue is not 19 but only 14 units (30-16). If we follow the change in the extent of the money issue result we shall find out that it is due in the first place to the reduction of the business agents' taxation by 5 units. Afterwards, however, these subjects have compensated for the reduction in question with an increase of their money outflows to the bank institutions by the same extent. As a result, the money balances with these subjects at the end of the period of time chosen remain the same – 19 units. Because of a lack of compensation money inflows with the Ministry of Finance on the other hand the initial change has again resulted in a disequilibrium between the money inflows and the money outflows. It has found an expression in the negative quantity of its money balances at the end of the period of time chosen (-5). This has caused the change in the money issue result we have found.

It is strongly possible for the form of this result also to change under the influence of the chain dependencies, i.e. it is possible to obtain a zero value or to cause withdrawal of money. With a view of not complicating the present research these possibilities will not be presented in it.

We should only emphasize that the **problems considered are possible only in case the chain dependencies concern the money inflows and outflows of the bank institutions as an independent aggregate economic subject.**

2.5 The Dynamic Matrix Balance of Money Circulation as a Prognostication Tool

The need of money circulation prognostication cannot be disputed. It should be related not only to its aggregate amount but with its components representing money flows between the economic agents as well. Research work shows that used to this end can be a great number of the already known methods of prognostication which include the versions of the subjective, extrapolation, causality (cause/effect) and extreme methods. These methods make it possible for the aggregate amount of money circulation and of the individual money flows between the economic agents to be prognosticated; this does not hold true for the money circulation as a totality of these money flows. According to the analyses made this deficiency can be filled by using the information contained in the dynamic matrix balance of money circulation. This can be done by making a **matrix of coefficients** based on an already stricken balance. Thus for instance, if information is provided from the initially presented **Version A** of the dynamic matrix balance of money circulation the elements of the respective matrix can be calculated by dividing each absolute quantity of the money flows included in it (X_{ij}) into the aggregate quantity of the domestic money circulation (ΣDMC). Here is the matrix of coefficients we shall get as a result¹⁵:

¹⁵ The sum-totals of the corresponding coefficients in the matrix are rounded

Table 7. Coefficient Matrix Based on Version A.

Outflows (i) →		OH	BS	NBS	PP	MF	ISII	ES	BI	Total
Inflows (j)		(Y)								
↓										
		0	1	2	3	4	5	6	7	8
BS	1	6	60	20	10	15	10	5	20	140
			0.1916	0.0639	0.0319	0.0479	0.0319	0.0160	0.0639	0.4471
NBS	2	3	10	5	5	12	5	2	5	44
			0.0319	0.0160	0.0160	0.0383	0.0160	0.0064	0.0160	0.1406
PP	3	2	10	5	-	1	2	1	3	22
			0.0319	0.0160		0.0032	0.0064	0.0032	0.0096	0.0703
MF	4	2	10	2	2	1	3	10	2	30
			0.0319	0.0064	0.0064	0.0032	0.0096	0.0319	0.0064	0.0958
ISII	5	1	15	2	1	1	2	5	5	31
			0.0479	0.0064	0.0032	0.0032	0.0064	0.0160	0.0160	0.0991
ES	6	2	12	2	1	1	3	-	5	24
			0.0383	0.0064	0.0032	0.0032	0.0096		0.0160	0.0767
BI	7	-	10	4	2	1	2	2	1	22
			0.0319	0.0128	0.0064	0.0032	0.0064	0.0064	0.0032	0.0703
Total	8	16	127	40	21	32	27	25	41	0.9999
			0.4054	0.1279	0.0671	0.1022	0.0863	0.0799	0.1311	0.9999
	9	OK	19	7	3	0	5	1	-19	35
		(Z)								

By the help of this matrix of coefficients and following a respective prognostication of the total amount of the domestic money circulation (ΣDMC), we can not only find out its distribution in the form of prognosticated money flows between the aggregate economic agents, but can calculate its effect on the money issue result as well. When making the prognostication balance, however, the money balances from the beginning of the period of time should be replaced by those from

the end of the period of the balance that has served for calculating the matrix of coefficients.

Thus for instance, if it is found through one of the above mentioned prognostication methods that during the prognosticated period of time the amount of the domestic money circulation (ΣDMC) will grow from 314 to 400 units, the respective money circulation balance will acquire the form given in the following table¹⁶:

Table 8. Prognostication Dynamic Matrix Balance of Money Circulation

Outflows (i) →		BS	NBS	PP	MF	ISII	ES	BI	Total	
Inflows (j) ↓	OH (Y)									
	0	1	2	3	4	5	6	7	8	
BS	1	19	75	26	13	18	13	6	26	177
NBS	2	7	13	6	6	16	6	3	6	56
PP	3	3	13	6	-	1	3	1	4	28
MF	4	0	13	3	3	1	4	13	3	40
ISII	5	5	19	3	1	1	3	6	6	39
ES	6	1	16	3	1	1	4	-	6	31
BI	7	-	13	5	3	1	3	3	1	29
Total	8	35	162	52	27	39	36	32	52	313 400
	9	OK (Z)	34	11	4	1	8	0	-23	34 58

¹⁶ The money flows in this balance are rounded

It is evident from the prognostication balance of money circulation that as a result of the changes that have taken place in the individual money flows, the total amounts of the money inflows and outflows of the aggregate economic agents have undergone changes too.

The data in the balance also show that money balances at the beginning of the prognosticated period of time being equal to those at the end of the basis balance, the sum-total of the money balances at the end of the prognosticated period increases from 34 to 58 units. This comes as a result of the increased money stock of the business agents by 15 units (34-19). Those of the non-business agents have fallen by 4 units (11-7). The money stock of the physical persons has marked a 1 unit reduction (4-3), and that of the Ministry of Finance – also 1 unit (1-0). The money stock of the insurance and social insurance institutions has gone down by 3 units (8-3). *Second*, the money stock of the external subjects has fallen down to 0.

Corrections in the matrix of coefficients are possible to be introduced **in advance**, on the basis of studying the factors the individual money flows depend on. It is proved by the research that by the help of such a method and following the carrying out of the respective changes in the total amount of the domestic money circulation (ΣDMC), **an unlimited number of prognostication dynamic matrix balances of money circulation can be made**. All this creates the necessary prerequisites for **choosing the most-appropriate version** to be used for taking normative measures, juridical ones in the first place, to influence the future development of money circulation and the money flows connected with it. Since the questions referring to the ways and means for choosing the most suitable prognostication version deserve additional and more thorough investigation they are not included in this paper.

The contents of this research give us all the good reason to maintain that it is possible to design the suggested **dynamic matrix balance of money circulation**. They also prove that the offered balance can substantially help the solution of the problems related in the *first* place to money creation policy, in the *second* place – to the money velocity between the economic agents, in the *third* place – to the macro-economic structural analysis of money circulation, in the *fourth* place – to the chain dependencies between the money flows and in the *fifth* place – to the prognostication of money circulation. This also points to the **benefits we can get if we make and use the money circulation balance offered**.

The question remains open, however, of **choosing an institution** within the framework of which further research in this field will be carried out and practical actions will be undertaken on working out and using the dynamic matrix balance of money circulation. We have all the good reason to say this institution can be the **Bulgarian National Bank**. It may well be that there is another version of doing that: the **National Statistical Institute (NSI)** should be the institution that will collect and process the information with the Bulgarian National Bank being only its user.

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