DIMITAR A. TSENOV ACADEMY OF ECONOMICS - SVISHTOV
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CHALLENGES TO THE MODERN MONETARY POLICY AND OPTIMIZATION OF MONETARY AGGREGATES MANAGEMENT

AUTHOR'S SUMMARY

OF A PHD DISSERTATION IN THE DOCTORAL PROGRAMME IN FINANCE, MONEY CIRCULATION, CREDIT AND INSURANCE

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The PhD thesis was discussed and allowed to be defended pursuant to the provisions of the Act on Development of the Academic Staff on an extended session of the Department of Finance and Credit at D. A. Tsenov Academy of Economics held on 19.11.2021.

The full volume of the dissertation is 198 standard pages and consists of: introduction (7 pages), main text comprising three chapters (175 pages), conclusion (5 pages), list of references (104 titles), and a declaration for originality. The text of the dissertation includes 31 figures, 11 tables and one equation.

The final session of the scientific jury for defence of the dissertation shall be held on 11.02.2022 at 11.00 in the Rectorate meeting room at D. A. Tsenov Academy of Economics – Svishtov.

All material related to the defence shall be available upon request at the Department of Doctoral Studies and Academic Staff Development of D. A. Tsenov Academy of Economics – Svishtov.

I. GENERAL CHARACTERISTICS OF THE DISSERTATION THESIS

1. CONTEMPORANEITY OF THE TOPIC

Money is a universal means of exchange, a means of preserving value and a unit of account. The fundamental function of money is to be used as a medium of exchange, which defines its role in the economy. In his works, the economist Murray Rothbard states that money is the general medium of exchange that all other goods and services are traded for and that it is the final payment for such goods and services on the market. (Rothbard, 1978, p. 144) From the point of view of its historical development, money has emerged as a purely market phenomenon without any legislative initiative of the state. This statement is proved by Ludwig von Mises's Regression Theorem, which is a praxeological analysis of the marginal utility of money traced back to the historical moment in which a commodity becomes a medium of exchange. That is, according to Mises's theorem, the natural, i.e. market appearance of a new medium of exchange is based on an already existing price mechanism, and is not imposed through coercion or by law.

In terms of its role in the economy, money is fundamental to establishing pricing systems and developing the credit market. Without the natural transition to indirect, money-mediated exchange, the division of labour, trade, and economic prosperity in general would not have been possible. However, money is not a constant phenomenon, but a phenomenon that is constantly changing. Historically, there has been a clear trajectory of their change from predominantly gold and silver money through cash receipts with relatively high levels of commodity collateral to a monetary system with completely uncollateralized money. For example, during the classical gold standard, much of the money in circulation was actually physical gold and/or silver coins. Gradually, gold took

on the main monetary function - a universal medium of exchange in trade relations. Gold coins and paper banknotes, which are receipts for a certain amount of gold coins, have a relatively large share in the total money supply. The main advantage of the commodity standard is that it allows the isolation of political interests from the management of monetary policy. The economist Ludwig von Mises claims that the advantage of the gold standard is due solely to the fact that the value of gold is not subject to political interferences. (Mises, 1923-1931, p. 90) Under the gold standard, if the supply of money increases too much, lending activity will increase and interest rates will fall, leading to the withdrawal of gold reserves from the economy. However, the requirement for a commodity collateral would force governments and central banks to raise interest rates again and reduce the supply of money and, accordingly, constrain lending. In this way, the balance of payments deficit will be corrected quickly and almost automatically.

Over the time and going through the two world wars, governments took steps to increase gradually the quantity of paper money which substituted the commodity money. This incentive decreased the purchasing power of money and greatly facilitated bank lending. During the period between the gold standard in the 1920s until the monetary system established in Bretton Woods in 1944, the quantity of paper money that had no or only limited gold collateral was increasing rapidly. Thus governments and central banks acquired full control over the management of money supply and credit when the US President Richard Nixon finally discontinued the gold standard in 1971. This proved to be a turning point in the historical development of monetary systems because the world adopted a system of completely unsecured money under the full control of central banks and national laws.

The denunciation of the gold standard and in particular the gold collateral of the US dollar in 1971 posed major challenges to the correct definition of money and money substitutes. Moreover, it raised the issue of correct measuring the monetary base and the quantity of money generated through the banking

system. Therefore, this required the development of a technology for measuring the amount of money in the economy. In other words, the abolition of the gold coverage of money posed the problem of the existence of measures, known today as monetary aggregates, through which to monitor and manage the money supply. These monetary aggregates are important, because if the amount of money in the economy cannot be defined correctly from a theoretical point of view and measured correctly on an empirical level, then conducting an adequate and forward-looking monetary policy is fraught with serious risks.

Today, there are two prevailing views regarding the definition of money supply and its measurement. They stem from the concepts of the Keynesian and Monetarist economic schools. However, the two monetary concepts, which are used by every central bank in the world, are based on inaccurate and incomplete definitions of money and money substitutes. This leads to certain errors and omissions in the definition and calculation of monetary aggregates currently used by central banks. Thus, the measurement of the money supply is not accurate because it is based largely on empirical correlations and inductive statistical techniques. In particular, most of the errors in the calculation of monetary aggregates and their subsequent management occur through the inclusion in the measurement of the money supply of liquid assets that do not have a reliable monetary definition. On the other hand, certain monetary categories are not included in the volume of money supply as they should.

In recent decades, the interference of central banks in the economic and financial systems is increasing. Moreover, in recent years, central banks have dramatically expanded their influence on macroeconomic processes, especially through their anti-crisis policies. This active monetary policy of central banks places an even stronger emphasis on the definition of money, the calculation of monetary aggregates and the consideration of their impact on the economy. In such a situation, any incorrect structuring of money supply measures can have many negative effects on business valuations, pricing mechanisms, and incentives for consumption and savings. Therefore, a review and a critical analysis of

the existing approaches and tools for measuring money supply in conditions of a slack monetary policy could be useful. Moreover, such a review and analysis is imperative in the light of the global finance processes since the 2008 crisis and the recent COVID-19 crisis. Thus, they can reveal the shortcomings of the process of calculating the money supply and can be used to put forward proposals for modification or optimization of the way money is managed in the economy and solve the dilemma faced by politicians and central bankers today. The active monetary policy dilemma they face is whether to follow an expansionary (i.e. easy) money policy and thus risk an increase of the rates of inflation or a tight money policy, which can lead to a significant slowdown in economic growth.

Against this background, it is important to say that a limiting condition for the correct measurement of money supply and the definition of monetary aggregates is the requirement for an accurate definition of money in the context of a monetary system operating entirely with unsecured money. In such a system, money must act as a universal exchange medium in all transactions. In other words, money should have the function to cover in full the debt incurred in a transaction. The dissertation research addresses the need for such a definition of money and money supply in the monetary system and a methodology for optimizing the measurement or management of money supply. In this regard, the relevance of the dissertation is determined by the following factors:

First. The importance of money and money supply for the dynamics of major macroeconomic variables in monetary systems based on fiat money.

Second. The existence of methodological shortcomings in the currently existing methods for measuring money supply.

Third. The importance of accurate and correct measurement and management of money supply and monetary aggregates in the conditions of very loose monetary policies of leading central banks in recent decades.

2. SUBJECT AND OBJECT OF THE RESEARCH

The subject of the dissertation research is money supply and its **object** are the available tools for measuring money supply and defining its theoretical, monetary, and quantitative characteristics.

3. RESEARCH GOAL AND OBJECTIVES

The main **goal** of the dissertation thesis is to present a comprehensive study of the possibilities for optimizing the measurement of money supply by constructing a monetary aggregate that corresponds to the theoretical concept of money as a universal means of exchange. To this end, the dissertation thesis comprises the following eight tasks, the consistent completion of which will ensure the achievement of the main goal of the dissertation:

First. To perform a systemic analysis of money as an economic phenomenon and formulate a definition of money substitutes.

Second. To analyze the main stages of development of the monetary systems.

Third. To analyze the characteristics of fiat money systems.

Fourth. To formulate a methodological definition of the classical concept of money supply measurement.

Fifth. To determine the shortcomings of the classical money supply measures.

Sixth. To investigate possibilities for optimization of money supply measurement.

Seventh. To investigate the possibility for construction of money aggregates that reflect the actual money supply.

Eighth. To conduct an empirical study for quantitative measurement of money aggregates and their effect on key macroeconomic variables.

4. RESEARCH METHODOLOGY

The methodology of the dissertation research includes methods such as chronological and comparative analysis, synthesis, praxeological methods, induction and deduction, graphical analysis and quantitative analysis of dependencies.

5. RESEARCH THESIS

The thesis defended in the dissertation is that *the traditional monetary aggregates do not represent correctly the money supply in fiat money systems and, therefore, there are possibilities for optimization of the accuracy of their measurement by means of a monetary aggregate that takes full account of the function of money as a universal means of exchange in all possible transactions.*

6. CONSTRAINTS

The main **constraints** to the dissertation research are related to the availability of empirical data on the money supply, its measurement and the optimization of its reporting. Therefore, the study focuses only on the money supply in the US economy, for which there is accurate, verifiable and reliable data that allow proper methodological testing and corroboration of the theories, concepts and measures considered in the dissertation.

7. PRACTICAL APPLICABILITY

The dissertation has three main aspects of practical applicability:

First. The findings from the dissertation research would allow central banks to effectively distinguish between standard money and cash equivalents in terms of debt instruments. This would allow a qualitative optimization of

money supply management, which will improve the efficiency and effectiveness of their monetary policy.

Second. The main results of the dissertation thesis allow prioritization of the function of monetary aggregates as the main tool used by central banks for analyses and forecasts regarding the economy and the financial sector.

Third. The contributions of the dissertation would enable central banks to perform more comprehensive and transparent statistical measurements and interpretation of monetary components and thus make adequate management decisions.

II. STRUCTURE AND CONTENTS OF THE DISSERTATION THESIS

The dissertation thesis meets the requirements pursuant to Art. 27, Para. 2 of the Regulations on the Implementation of the Development of Academic Staff in the Republic of Bulgaria Act. It comprises 198 standard pages across the following structural unit:

First. Introduction of 7 standard pages.

Second. Main body, comprising three chapter of a total of 175 standard pages.

Third. Conclusion of 5 standard pages.

Fourth. List of 104 references and internet sources, of which 64 bibliographical sources and 40 internet sources, including 91 publications in English and 13 in Bulgarian.

Fifth. Originality statement according to Art. 68 para. 2 of the Regulations on the Academic Staff Development at D. A. Tsenov Academy of Economics

The introduction of the dissertation outlines the main aspects of its relevance and defines its main scientific parameters, i.e. its object, subject, goal,

tasks, thesis, methodology and constraints. Chapter One traces the historical development of money and its role and functions of money. It also defines the characteristics of money substitutes. The second chapter focuses on the historical stages of evolutionary development of monetary systems as well as on the analysis of theoretical concepts of the nature, functions and management of money supply. The third chapter presents the methodological aspects in optimizing the management of money supply by constructing and substantiating a monetary aggregate reflecting the actual money supply. The chapter provides a theoretical and empirical comparative analysis between this monetary aggregate and the generally accepted monetary aggregates M1 and M2, which are published by the US Federal Reserve. Finally, the conclusion summarizes the main findings and the most important conclusions of the study. In particular, the dissertation comprises the following main components:

INTRODUCTION

CHAPTER ONE. MONEY AS AN ECONOMIC PHENOMENON – ORIGIN, EVOLUTION AND ECONOMIC ROLE

1. A chronological analysis of the development of money as a universal means of exchange
2. Methodological characteristics of Ludwig von Mises's Regression Theorem
3. Economic and financial definition of monetary functions
4. Types of money and economic characteristics of money substitutes

CHAPTER TWO. EVOLUTIONARY AND THEORETICAL ASPECTS OF MONETARY SYSTEMS

1. Evolutionary characteristics of monetary systems from the classical gold standard up to the Bretton Woods system
2. Financial and historical characteristics of fiat money systems

3. Analysis of the traditional concepts for calculating and managing money aggregates

CHAPTER THREE. OPTIMIZATION OF MONETARY AGGREGATES MANAGEMENT – THEORETICAL AND EMPIRICAL ASPECTS

1. Methodological optimization of the money supply measuring technique
2. Enhanced money supply measurement through a monetary aggregate which reflects the actual supply of money
3. Empirical analysis of the effects of money supply on key macroeconomic indicators

CONCLUSION

BIBLIOGRAPHY

STATEMENT OF ORIGINALITY

III. RESUME OF THE DISSERTATION THESIS

INTRODUCTION

The introduction to the dissertation describes and presents the main topics comprising its body. It consistently clarifies the relevance and added value of the studied theoretical and empirical concepts and presents the object, the subject, the main goals and tasks of the dissertation research. It also defines the research thesis, main constraints and methodology and describes the structure and content of the individual parts of the dissertation.

CHAPTER ONE. MONEY AS AN ECONOMIC PHENOMENON – ORIGIN, EVOLUTION AND ECONOMIC ROLE

The first chapter traces the historical development, the role and functions of money as an economic phenomenon. The historical analysis proves that the development of the commercial economic relations can be divided into three periods. The first is the subsistence farming period, in which production took place at the household level, where each family produces the goods and services they need to live. This type of farming does not require any exchange with economic agents that are not relatives or close neighbours. In such a farm, the emergence of an economic good that has an exchange function is impossible. Gold or silver coins are not needed, for the simple reason that they can neither be consumed nor used in the process of producing the necessary goods.

The natural course of development of human relationships directs the economic processes to direct exchange or the so-called barter economy, i.e. exchange of goods without using money as a medium. Part of the goods produced by some economic agents is exchanged for part of the goods produced by other

economic entities and thus both parties gain greater utility than before the exchange. This leads to an expansion of the range of goods and services for consumption. Gradually, barter trade becomes an increasingly sought-after way to meet people's needs.

The study clarifies that barter trade faces two problems that are very difficult to overcome. The first problem is related to indivisibility of certain goods, which often puts a barrier to any attempt for direct exchange. The second obstacle to barter trading is even more difficult to overcome. Even when goods can be exchanged divided into separate units, the two parties involved in the exchange transaction may have conflicting needs or preferences.

The dissertation reveals that the solution to these two main obstacles to barter trade was found when the economic agents became aware of the possibility of indirect exchange. This new step to improving the efficiency and effectiveness of trade practices is the mediation of exchange through a widely accepted medium of exchange. Aristotle was the first to analyse the process of transition from barter to indirect exchange in his treatise Politics. He believes that direct exchange is not part of the money-making process, that the process of creating money is completely natural and has to meet the needs of all agents. The more complex form of exchange has developed on the foundation of a simpler form. In a situation where the citizens of a certain country become increasingly dependent on those of another importing the goods that are scarce in their country and exporting goods which are in a serious surplus, money inevitably comes into use. (Аристотел, 4-ти век пр.н.е). In turn, the British economist and philosopher Adam Smith wrote in his most famous work, The Wealth of Nations, that a commodity must be durable, easily portable and homogeneous in order to have the potential to become a medium of exchange. Smith explains the qualitative differentiation of commodity money. Metallic money can be stored at a relatively much lower cost than any other commodity. They are scarce and extremely durable, which improves the efficiency of trade relations. Commodity money should first be divided into a certain number of

parts, then merged again into a homogeneous whole, a feature that other durable and scarce goods do not have (Смит, 1776, стр. 26).

It is clarified that in the process of trade development people gradually realized that indirect exchange improves the general well-being of the economic agents. Thus, money became increasingly important in the economy, and some goods with better characteristics were perceived as more universal than others, which means that initially people were forced to use less common goods as indirect exchange media but the natural search for convenience and security resulted in choosing more scarce goods to mediate trade. The process of narrowing the range of such goods is also determined by the efficiency of trade, which is much higher in the presence of fewer alternative means of exchange. The dissertation shows that in this historical period, all metals, and especially the precious ones, meet to the greatest extent the quality requirements for performing the function of a medium of exchange. However, they were too scarce to be commonly used as a medium of exchange.

The dissertation presents the opinion that there is no place in the world where precious metals have not been used as media of exchange. It turns out that more than 6,000 years ago, people valued highly gold and silver because of their beauty and scarcity. Golden treasures from the ancient Thracian civilization dated 4000 BC were discovered in a tomb in the town of Varna. Although their resources are more limited, they are relatively easier to extract and process than many other metals. The dissertation states that precious metals are evenly distributed geographically and there are many findings that prove that they were used not only for decorations such as jewellery, ornaments and architectural decorations, but also for industrial purposes and as a widely accepted media of exchange. This is why the precious metals dominated the process of exchange over all other alternative goods, including other types of metals and two of them - silver and gold – have retained their status of universal media exchange for an extremely long period of time and even today can serve as a money substitute.

The analysis shows that over time, the direct use of gold and silver began to dominate the exchange process. These commodities are divisible into extremely small parts. At the same time, at the cost of a very small loss of weight or value, they can be melted back into larger parts. Their homogeneity implies that each part has the same value per unit weight. That is why, according to the French economist Jean-Baptiste Say, precious metals have the characteristics of maintaining the same quality around the world. Gold does not differ in terms of quality regardless of whether it was mined in Europe, in America, or in the sands of Africa. It remains unchanged in adverse weather, climate and humidity conditions, i.e. the relative weight of each unit of gold is proportional both to its relative quality and its value as a unit of exchange (Say, 1821, p. 222).

The moment a given commodity is used as a medium of exchange for most commercial transactions, is acquires the status of money. This money is accepted on the free market while the economic agents start looking for a more suitable commodity to be used as a medium of exchange. This natural process of quality selection gradually narrowed the list of suitable commodities and raised the confidence in precious metals, in particular gold and silver.

The dissertation shows that one of the important points in the process of understanding the nature of money as an economic phenomenon is Ludwig von Mises's regression theorem. Mises integrates the concept of marginal utility into monetary theory, explains the components of the value of money, and traces the origin and development of the exchange value of the medium of exchange. According to the Austrian economist, the value of a universal medium of exchange, such as money, has two components. The first component is the direct value and the second is the exchange value. Mises defends the thesis that the demand for goods used as a medium of exchange is the composite of two partial demands: the demand displayed by the intention to use it directly (for consumption and production) and that displayed by the intention to use it indirectly (as a medium of exchange). Another semantically identical definition regarding

precious metals is the combination of their industrial demand and monetary demand. The value in exchange of a medium of exchange is the result of the cumulative effect of both partial demands (Mises, 1949, p. 405).

Mises's definition is based on the concept that the demand for a commodity that is employed for everyday consumption is its primary demand. As soon as this commodity is used as a medium of exchange, this creates an additional, secondary demand. The total demand for such a commodity is the sum of its primary and secondary demand. Mises explains that the amount of goods we can acquire in exchange for the universal medium of exchange is its price. Therefore, the price of the medium of exchange is expressed in different quantities and types of goods and services and is partly determined by the demand of those who want to acquire it precisely because of its exchange function. If at some point, people stop using this commodity as a medium of exchange, it will lose its exchange demand (i.e. its exchange value) and its price will decrease accordingly. Mises successfully integrated the theory of marginal utility of money demand in his regression theorem. He concludes that money does not differ from other goods in terms of diminishing marginal utility. The utility of money is expressed in terms of other goods and services at current market prices. The basis of the regression theorem is the use of yesterday's objective exchange value to derive the subjective exchange value of money today. Mises states that the direct use of a commodity is fundamental in monetary theory. According to him, a medium of exchange cannot exist if it does not have an economic past, i.e. nothing can acquire the monetary function of exchange if it did not exist as a commodity with a certain exchange value long before it was first used as a medium of exchange (Mises, 1949, p. 423).

It is clarified that in the process of generating the exchange value, a situation is reached in which the demand for a medium of exchange generated by the performance of the function of a medium of exchange depends on its exchange value. Many economists believe that such a thesis creates difficulties that are insoluble and abstain from following this line of reasoning. Their main criticism

that it is illogical to explain the purchasing power of money by reference to the demand for money and at the demand for money by reference of its purchasing power. According to Mises, however, this difficulty is only apparent because it is rooted in the acceptance of the definition of purchasing power of the immediate future, i.e. of the impending moment. To solve this problem in the theoretical explanation we should refer to the purchasing power of the immediate past, i.e. of a moment just passed (Mises, 1949, p. 405).

The author of the dissertation states that Mises's theorem traces the origin and development of the exchange value of the medium of exchange based on its essential and specific exchange function. Thus, the regression theorem reveals how the medium of exchange originates from the interaction between the basic economic rules applicable to all economic phenomena. In this way, Mises refutes the claim that money arose at a random time and place in the past.

The author points out that Mises's regression theorem is based on praxeological deduction and includes two main elements. On the one hand, it explains money in terms of marginal utility, but on the other hand, it explains the nature and the genesis of money by going back to a time when there were no prices in monetary terms. The second element of the theorem involves the development of money from the barter economy to monetary relations. Against this background, a key point in Mises's understanding of money is that his regression theorem does not address all media of exchange that have ever existed. It addresses the need for an objective price framework for the emergence of each medium of exchange. The need for a completely free choice and the existing economic relations at a certain moment in the past made it impossible for the economies to fall back to barter trade. This, in turn, quite logically poses the need for a direct exchange and a pricing mechanism to create the value of money.

Economic agents need a pricing mechanism in order to decide to use a certain commodity as money. Without a price benchmark, the natural emergence

of a medium of exchange that is widely used in economic relations is not possible. As a science of human action, praxeology has nothing to do with the process of converting a commodity into money. The regression theorem does not consider why new currencies appear in circulation and what are the reasons for trusting them.

It should be noted that the historical context has a great influence on the foundations of the regression theorem. Mises has a clear starting point that puts commodities at the heart of the monetary theory. In a free-market environment, imbalances in estimating the price levels of a commodity are entirely possible. This will distort the demand and supply of such a commodity, which in turn will sooner or later lead to a more gradual or rapid adjustment of its price. If, for some reason, an attempt is made to change the average prices of commodities sold on the market, there is no factor that can generate such a movement (Mises, 1912, p. 128).

Historically, economic schools have proposed different theoretical concepts regarding the primary and the secondary functions of money and how they affect the structure of money supply. Generally, there are three fundamental functions that define money as an economic phenomenon, i.e. its ability to serve as a universal exchange tool, a value preservation tool and a unit of account.

The economic functions "medium of exchange" and "universal medium of exchange" are fundamentally different. It is this difference that shows which commodity is only a commodity and which commodity can be used as money. Therefore, without such a distinction many goods may be defined as money. According to Karl Menger, money is a universal medium of exchange (Menger, 1892, p. 11), which means that it must be accepted by all economic agents. Similar ideas were widely promoted by John Maynard Keynes and other modern economists. Despite the differences of Menger and Keynes's reasoning, a universal type of money accepted worldwide is not possible in a market economy and different national states.

In his writings, Ludwig von Mises disregards the constraint that all subjects must accept one medium of exchange in order for it to be defined as money. He makes it clear that money is a medium of exchange that is generally accepted and widely used. (Mises, 1949, p. 398) Mises also proves that there is no theoretical need for absolutely all economic agents to use one medium of exchange in order for it to fully meet the requirement for universality and thus be accepted as money. Therefore, its widespread use is a sufficient condition, despite the lack of specific quantitative parameters.

In turn, the universal status of money stems from its quality of effective means of exchange. This status is based on its universal use on the one hand and with its quality of value-preserving unit of account on the other. When a medium acquires the capacity for value preservation and is accepted as a unit of account, then it can naturally begin to be used universally and regularly.

The dissertation presents the opinion that the primary function of money is exchange. However, the functions of a means of storing value and a unit of account have their important place and influence on the process of origination and circulation money. These functions are secondary because they emerge after the advent of the medium of exchange, but are a key element in gaining the universal status of the medium of exchange.

After presenting the origin, nature and functions of money as well as some of the important theoretical cases in monetary theory in the first part of the dissertation, an attempt is made for a general classification of money based on their nature and form. Based on it, three main groups of money are distinguished – natural money, forced money and fiat money.

The first group of money is natural money or money that has acquired the status of a universal medium of exchange entirely on the market. They were created without any state intervention and without violation of private property rights. The main types of natural money are commodity money, money certificates and credit money.

The second main group of money are non-market means of exchange, which have acquired their universal status of use on the basis of coercion and disregard for private property rights. The main example of this type of money is fiduciary money, which is a substitute for money, but is not a commodity such as gold or silver. This characteristic is related to their origin and influence on the money supply. Fiduciary money is created through the banking system and the mechanism of partial reserve banking. They are not neutral to the money supply, as were commodity money until 1971 and paper notes in the monetary systems thereafter. The creation of fiduciary money increases the total money supply.

The third main group of money is fiat money, which is institutionally imposed and is not backed by any commodity. The balance sheet assets of central banks contain certain amounts of banker's gold and other gold-backed instruments, but they cannot be directly related to the possibility of increasing the money supply. Fiat money exists due to the obligation established by the state to use it and can be called entirely state-controlled money. It acquires the status of monetary substitute after it is imposed as a legal tender by a decree of the government. This type of money is a substitute for natural money and has long been used as a universal means of payment that mediates international trade and is used in the financial system.

In the 1970s, the monetary system experienced enormous tensions. The money substitutes they used lost much of the trust of the citizens. Their issuer no longer had the obligation to convert them into natural money. The bank notes are claims against the issuing bank, which has neither the resources nor the willingness to meet its obligations. Their status of natural money substitutes gives their holders the time to wait and see what future changes may occur. In fact, these means of exchange take on the functions of credit money, which in this new situation are exchanged with a certain deduction from their exchange value.

Therefore, it can be concluded that the theoretical framework and empirical data show that fiat money cannot occur naturally. Moreover, the

economist Guido Hülsmann states that, in fact, paper money provides only monetary services whereas commodity money provides two types of services - monetary and commodity. Therefore, the prices paid for paper money can shrink to zero, whereas the price of commodity money will remain positive as long as it can be used as a commodity. This means that paper money carries the risk of consistent and complete loss of its value (Hülsmann, 2008, p. 31).

CHAPTER TWO. EVOLUTIONARY AND THEORETICAL ASPECTS OF MONETARY SYSTEMS

The second part of the dissertation discusses the concepts related to money supply management. It traces the stages of development of the world monetary systems from the classical gold standard to today's fiat monetary system. The classical approaches for measuring the money supply are also analysed.

The dissertation states that the evolution of world monetary systems can be divided into several main stages. The first is that of the classical gold standard, during which commodity money existed. This is a period of very limited dynamics in the money supply, and therefore high stability of money. The second stage took place during the First World War and can be characterized as the stage in which the classic gold standard was temporarily abolished. The gold standard as a new stage in the development of world monetary systems began after the First World War. It lasted until 1931, when the stage of floating exchange rates began. Economic evolution at this stage is the new global monetary system established in 1944 in Bretton Woods. The United States and the US dollar play a leading role in it. This system lasted until 1971-1973, when the convertibility of the US dollar into gold was abolished.

The classical gold standard existed between 1815 and 1914, although more countries began to maintain the gold standard only in the early 1970s. This monetary system is based on the provision that all economic activities, such as trade, consumption, and saving were backed with gold. The money supply is

equivalent to the supply of processed gold. Under these conditions, one US dollar was defined as 1/20 of a gold ounce and thus 20 dollars was the equivalent one ounce of gold. The pound sterling was equal to about ¼ of a gold ounce. This means that the practical exchange rates between the various national currencies were fixed not because they were arbitrarily controlled by government, but in the same way that one pound of weight is equal to sixteen ounces. (Rothbard, 1963, p. 89).

The dissertation research results show that the intensification of international trade in the period of the classical gold standard was not caused by the availability of universal international money but by the stability of the gold coins in circulation and their limited supply. Thus, the money supply has a stable anchor and prevents governments from devaluating their national currencies mainly to finance their excessive budget deficits. Therefore, the central role in the organization of such a monetary standard is played by the commodity backing of the monetary system and the use of very limited commodity reserves rather than a single supranational currency.

World War I which started in Europe in August 1914, had a profound effect on the US banking system and economy. It caused a short-lived shock to the financial system and thus the US was losing some of its gold reserve over a few months but then its export went up and gold started to flow back into the US bank vaults. As a result, the money supply gradually increased, which led to a completely logical increase of the prices of finished goods and services.

The outbreak of World War I marked the beginning of the period over which the classic gold standard lost its original concept. The reason for the change in the world monetary order is the inability and unwillingness of governments to comply with pre-made commitments for gold coverage of substitutes. This is due to the fact that the war gives rise to a sharp increase in money supply far beyond governments' obligations to keep certain ratios of gold reserves.

The main result of the hostilities and the financial chaos in Europe during the First World War was the tangible increase in the influence of the US dollar on the global financial market. Huge military spending forced the warring states to gradually abandon the gold standard, which means that their national currencies can no longer be converted into gold. On the other hand, the US dollar remained convertible into gold. Therefore, in an environment where the British pound and the other European currencies were under pressure, the financial institutions and businesses around the world accepted the US dollar as their preferred medium of exchange.

In the post-war period, the monetary systems of many European countries, including Britain, were unstable. This forced the British authorities to take steps to return to stable international money, i.e. to the gold standard. Similar processes took place in other countries, mostly in Europe. Thus, in the 1920s, many countries attempted to return to the pre-war gold standard by introducing a modified gold standard, known as the Gold Exchange Standard. It can be said that it started in 1926, after its almost simultaneous adoption by all countries. With this gold-exchange rate, central banks can much more easily increase money supply and generate inflation than the classic gold standard. Under the new conditions, only the United States remained committed to the mandatory exchange of dollars for gold on demand.

Another event that marked a significant change in the world monetary system was World War II. An international conference held in Bretton Woods, New Hampshire when the war ended in July 1944, outlined the new important changes in the global monetary system. The new monetary system is a modified version of the gold exchange standard. However, there are two significant differences. The first one is that instead of two main currencies (the US dollar and the British pound sterling), only the US dollar was acknowledged as a global currency in the new system. Thus, at an exchange rate of $35 per ounce of gold, the US dollar became the currency of currencies, i.e. the only dominant currency

in the world. The other significant difference between the Bretton Woods system and that of the 1920s is that people were no longer allowed to own gold.

An important consequence from the Bretton Woods conference was that delegates agreed to set up two new financial institutions, the International Monetary Fund (IMF) and the International Bank for Reconstruction and Development, now known as the World Bank. According to its founding documents, the IMF aims "To promote international monetary cooperation through a permanent institution which provides the machinery for consultation and collaboration on international monetary problems." (Ramlogan & Fritz-Krockow, 2007, стр. 1-4). All member countries participate in its financing through foreign exchange quotas available for loans to member countries with temporary balance of payments needs.

The dissertation thesis states that outside the clauses discussed in its 1944 founding treaty, the IMF created its own currency in 1970, known as Special Drawing Rights (SDR). SDRs are issued without collateral requirements with the argument that the increase in international liquidity may be insufficient compared to macroeconomic activity. This argument is based on the views of John Keynes regarding the possible negative effects of insufficient supply of money to cover the need for increased government and institutional interventions in the field of economy.

The dissertation paper points out that in the period 1968-1971, the Bretton Woods monetary system could not function sustainably. This was largely due to the fact that in the free markets of London and Zurich, sales of US dollars against gold were constantly increasing and the countries could not afford to maintain the exchange rate of $ 35 per ounce of gold. Gradually, foreign exchange markets started to show that the dollar was depreciating. This, in turn, further accelerated the sale of dollars in Europe. The pressure on the dollar is generated both by institutional and individual market players. The accumulated imbalances in the world monetary system lead to one of the turning points in modern monetary history. It happened on August 15, 1971, when US President Richard Nixon

closed the so-called gold window and the legally regulated gold convertibility of the US currency to gold finally ceased to exist. Later on, following the Smithsonian Agreement of December 18, 1971 of the finance ministers of the world's ten most developed nations, the gold content of the US dollar was reduced for the first time since 1934. It conversion rate was reduced from 35 dollars to 38 dollars per ounce of gold. Other national currencies were revalued to varying degrees against the US dollar. From that moment on, the world monetary system began to function only with fiat money.

In this new situation of using fiat money in the global financial system, one of the main challenges is to define and calculate the money supply. This process is important because adequate money supply management plays a key role in the stability of the financial and economic system. This raises the need for central banks to have theoretically sound and well-calculated monetary aggregates at their disposal in order to be able to effectively achieve the main goals of their policies and functions, i.e. to maintain price stability. In the 1940s, the Federal Reserve began publishing the volume of money not held in monetary and financial institutions, demand deposits and time deposits. After the final abolition of the gold standard and the monetary system of Bretton Woods in 1971, the Federal Reserve presented to the public the monetary aggregates M1, M2 and M3, which can also be defined as classic monetary aggregates.

Initially, the M1 monetary aggregate included physical currency and did not include money held with financial institutions and demand deposits with commercial banks, i.e. current accounts that do not pay interest. Over time, however, innovation in banking and financial processes narrowed the gap between commercial banks and savings institutions. Thus, the principle for classifying monetary measures changed to the degree of liquidity and the size of deposit accounts.

From the late 1980s onwards, the world, and especially the United States, embraced interest rate policies as the key tool in managing monetary processes. This is largely due to the ongoing processes of deregulation in many leading

economies worldwide. Both processes cause serious disturbances in the definition and measurement of money supply. This disrupts the stability of the relationship between the narrowest conventional monetary aggregate M1 and the economy (Аврамов & Попов, 2003, p. 231). Thus, M1 began to have less and less descriptive ability in terms of economic processes.

Gradually, doubts were being raised about the sustainable link between M2 and economic growth indicators. Since the beginning of the 90's we have witnessed the lowest values of interest and discount rates for several decades. This is why many people withdrew their savings from their current and time deposits, which are part of the M2 aggregate to invest them in mutual funds and bonds, which are not included in any of the measures of money supply. However, the Federal Reserve Chairman Alan Greenspan noted in 2008 that, albeit to a lesser extent, M2 retains its status as a leading indicator of financial processes in the US economy (Federal Reserve Bank of Ney York, 2008).

On the onset of the 21st century, the Federal Reserve publicly announced (Federal Reserve Bank of Ney York, 2008), that it no longer considers the dynamics of money supply in the United States as a key indicator to justify monetary policy decisions and forecasts. Thus, following a decision by the Federal Reserve Board of Directors on March 23, 2006. (Federal Reserve Bank of Ney York, 2008), the publication of the monetary aggregate M3 was discontinued. Thus, today the main monetary aggregates that are published, analysed and used by the US Federal Reserve are M1 and M2. By definition, they reflect the different degrees of liquidity or expendability of different forms of money. The narrow M1 aggregate is limited to the most liquid forms of money. It includes currency held by the non-bank public, travellers' checks; demand deposits and other checkable accounts. Cash on hand and the monetary reserves form the so-called monetary base. It is fundamental to money management. Reserves are deposits held by banks and other depository institutions in their Federal Reserve accounts. On the other hand, M2 includes M1 plus savings deposits, time deposits of less than $ 100,000 and shares in retail money market mutual funds.

This makes this aggregate much broader and larger in volume compared to the M1. It is for this reason that the Federal Reserve and many economic analysts choose to monitor and use it rather than M1.

An interesting moment in the development of the M1 and M2 aggregates is the change in the methodology of their calculation that occurred in May 2020, when the US Federal Reserve included the savings deposits and money market deposit accounts (MMDA) with commercial banks and savings institutions in M1. Until then, these components were included in the broader M2 aggregate. This change led to a very strong increase in the values of M1 and created serious difficulties in the use of M1 for historical comparisons and quantitative analyses, including correlations with other monetary aggregates or economic variables.

The information on the main monetary aggregates used in the formation of monetary policy in the United States and their historical development indicates the existence of serious shortcomings in the approach used by the US Federal Reserve to manage the supply of money. The monetary analysis of the three monetary aggregates also shows that they generally suffer from methodological shortcomings due to the fact that they contain components that do not constitute a final means of payment in all possible transactions in the economy and are not convertible into cash at face value. With a precise definition of standard money and monetary substitutes, any monetary aggregate that includes their various parts in the right way would be methodologically correct and empirically accurate. Standard money as a financial means, is easy to identify, calculate and, of course, include in the measurement of money supply. This is because standard money is only cash that is not held by banks and financial institutions.

The big challenge in accurately measuring money supply is posed by money substitutes. This is because monetary substitutes are complex in nature and practically comprise of different components. Therefore, money substitutes must be adequately understood and effectively included in the process of measuring money supply. This requires that each of their forms be carefully

analysed in terms of the theoretical understanding of the nature of money and monetary functions in order to assess whether it should be included in money supply. On the other hand, an important question to answer is whether there are financial elements that are not included in the two main monetary aggregates M1 and M2. In other words, it would be interesting to analyse whether there are elements in the money supply that the Federal Reserve does not take into account in its monetary methodology, but which must be taken into account in the correct presentation of money supply in the United States. Considering this, the dissertation states that such components can be sought in the positions that the US Federal Reserve discloses in the categories of "near money" and "near, near money." Thus, on the basis of this theoretical understanding and through the analysis of the individual monetary components, we can construct a monetary aggregate that is a reliable tool that can be used by central banks to manage the money supply and the monetary system.

CHAPTER THREE. OPTIMIZATION OF MONETARY AGGREGATES MANAGEMENT – THEORETICAL AND EMPIRICAL ASPECTS

The third chapter of the dissertation presents possibilities for methodological optimization of the technology for measuring the money supply and develops, substantiates and presents a monetary aggregate with a structure that allows it to reflect the actual money supply. Further in the last chapter of the dissertation, a comparative empirical analysis is made between the influence of the aggregate that reflects the actual money supply and the M1 and M2 aggregates published by the US Federal Reserve on six macroeconomic variables characterizing the US economy - consumer prices, gross domestic product, employment, stock market, real estate market and current account balance.

The dissertation shows that within the theory of money there are different concepts of the nature of money and the measurement of money supply. It has

been found that over the years, various economic schools have attempted to define money supply, but none of them has come up with a clear argument to integrate theory and practice of calculating monetary aggregates into one. Neither the Chicago School of Economics, which accepts money supply as the main determinant of national income, nor Neo-Keynesianism come to a theoretically sound and clear definition of money supply. Moreover, monetarists face enormous difficulties in managing the money supply, precisely because they also do not have a theoretically sound concept for its calculation.

The calculation of the money supply by the Federal Reserve includes monetary components that do not fall within the definition of money and cash substitutes. On the other hand, there are monetary instruments that should be part of monetary aggregates but do not fall into aggregates such as M1 and M2. This carries a high risk of incorrect determination of money supply and errors in the management of money in circulation by central banks.

Examining the main components of conventional US monetary aggregates and liquid assets that are part of the money supply allows for a comparison and analysis to determine which of them meet the definition of cash and cash substitutes, which should be ignored and which should be taken into account the construction of a monetary aggregate, which takes into account the actual money supply.

Cash held by the non-bank public can be defined as standard money in the modern US monetary system that is functionally and semantically identical to the gold-backed money from the times of the commodity exchange system. They serve as the ultimate means of exchange for all goods and services, or in other words, as a universal means of payment. This defines cash as the main component in the structure of money supply.

Checking accounts (both checkable deposits and negotiable order of withdrawal (NOW) accounts) are claims on cash that are convertible at face value by the depositor or by a third party designated by the depositor. These deposit accounts are used for financial protection through the state deposit guarantee.

The US Federal Deposit Guarantee Corporation performs this function for all US banks in the event of bankruptcy. By 2020, it guarantees deposits of up to $ 250,000 per depositor. (Federal Deposit Insurance Corporation , 2020).

From an economic point of view, travelers' checks issued by nonbank financial institutions are credit claims on the investment portfolio of the issuing company. According to Salerno, travelers' checks are not the final means of payment in a transaction, because the amounts paid on the received checks are ultimately debited to demand deposits of AMEX or VISA. If the issuing company becomes insolvent, the holders of travelers' checks will be in the position of creditors, but without any state guarantees for the payment of their receivables. (Salerno, 2010, p. 120).

Non-bank travelers' checks do not meet either of the two basic principles of cash substitutes and should logically not be part of a monetary aggregate that reflects actual money supply. Savings deposits in commercial banks have identical characteristics to demand deposits. They can be exchanged for cash on demand and the exchange can be made at face value. Savings deposits are also covered by government guarantees and therefore accept the status of a low-risk monetary instrument. Thus, based on the arguments discussed in the third part of the dissertation, it is concluded that cash, demand deposits and savings deposits match the theoretical concept of money and cash substitutes and can be included in the structure of a monetary aggregate reflecting the actual money supply.

Money market deposit accounts (MMDA) are a hybrid monetary instrument of demand and savings deposits. They require collateral of up to a certain amount and are convertible into cash on demand. This justifies their inclusion in the actual money supply.

Unlike the deposit accounts on the money market, the share accounts in money market mutual funds (known in the United States by the acronym MMMFs) do not meet the criteria for inclusion in the money supply. The process of structuring them involves depositing cash with an investment fund, which

then invests it in money market instruments. These assets are managed by portfolio managers. This is a pure form of credit transaction, which does not lead to a change in the amount of money supply, but only to a change in money ownership. The inclusion of money market funds in the money supply structure will in practice lead to double counting of the same economic resources, which is not desirable. On the other hand, money market funds do not have the characteristics of current accounts because they do not serve as a final means of payment and are not convertible into cash at face value.

Credit card accounts have similar characteristics to money market mutual fund accounts. They do not meet the criteria of final means of payment because when they are used to purchase goods or services, this does not clear the debt position created in the current transaction. Term deposits over $ 100,000, mainly large certificates of deposit (CDs) are financial instruments that cannot be withdrawn on demand because they have a clearly defined maturity contract. Thus, certificates of deposit do not meet the requirement for convertibility in cash on demand and at face value, which means that they must be excluded from the structure of money supply.

The decision whether time deposits below $ 100,000 should be included in the structure of a monetary indicator that reflects the actual money supply is a totally different matter. These small-size certificates of deposit up to $ 100,000 as a rule have a very low risk profile because they are state-guaranteed by the Federal Deposit Insurance Corporation. There are well-argued opinions and criticisms that these low-risk characteristics are not enough to cover the definition of a cash substitute, because the withdrawal of term deposits of up to $ 100,000 prior to their maturity is subject to penalty fees and in such cases do not meet the requirement for conversion at face value. However, the problem with the conversion at face value can be overcome by calculating the so-called redemption value of withdrawals prior to maturity, i.e. the actual amounts received after deducting the penalty fees. In today's almost fully digitalized and highly competitive financial sector, the possibility of early termination of small-size

certificates of deposit agreements and the withdrawal of the deposited money is extremely fast and the discount rate is relatively small. Another important feature of certificates of deposit up to 100 thousand dollars is their large scale. This means that their inclusion in a monetary aggregate will have a significant impact on the total money supply. Therefore, the impossibility of converting certificates of deposit ahead of time into cash at face value should not be the only and practically main reason for their exclusion from the scope of the actual money supply. This holds even when the penalty for early withdrawal is significant.

The dissertation states that there are monetary instruments that are not included in the structure of the official monetary aggregates in the United States but meet the basic characteristics of monetary substitutes and meet the basic conditions for participation in the process of measuring actual money supply. Such instruments are demand deposits, current accounts of the federal government, foreign financial institutions and foreign banks held in the balance sheet of the central bank and/or national commercial banks are not included in any official monetary aggregate in the United States. The inclusion of this type of deposit accounts in the actual money supply will undoubtedly make a significant difference from aggregates such as M1 and M2, in the composition of which the described types of deposit accounts do not appear.

Having determined the components that make up the actual money supply, the author proceeds to construct a monetary aggregate that reflects the actual money supply based on the monetary theory of the Austrian School of Economics. As the purpose of the proposed monetary instrument is to measure the actual supply of money, in the dissertation it is referred to as Actual Money Supply (AMS) aggregate. Technically, the AMS aggregate follows the monetary aggregate developed by the economists Murray Rothbard and Joseph Salerno (Salerno, 2010) and known as True Money Supply (TMS). The structure of AMS ensures integration of fiat money to the main monetary functions - universal medium of exchange, value-preservation unit and accounting unit. To a large extent, the AMS aggregate covers the philosophy of Rothbard's money

supply with one significant difference - the inclusion of time deposits below $ 100,000 dollars in the monetary aggregate. Although the difference is only one, it is very significant both conceptually and empirically.

Specifically, AMS includes physical currency not held in and financial institutions; demand deposits that do not generate interest; other current accounts; savings deposits, including money market deposit accounts; time deposits of less than $ 100,000 excluding IRA and Keogh accounts; government demand deposits and savings deposits with commercial banks; government deposit accounts in the Federal Reserve; demand deposits and savings deposits of foreign banks and foreign official institutions in commercial banks.

The dissertation presents the view that, according to its volume, AMS resembles the M2 aggregate, but in fact methodologically it is much closer to the M1 aggregate because of the classical monetary aggregates it is closest to the theoretical matrix reflecting the essence and the functions of money and money substitutes. This means that a correct benchmarking, which focuses not only on the quantitative but also on the qualitative dimensions of money supply, requires AMS to be compared to M1 rather than to M2. In this way, the difference in the interpretation and use of money and cash substitutes can be shown very accurately through the definitions of the Federal Reserve and the theory of money and credit of the Austrian School of Economics.

The final part of Chapter Three of the dissertation provides a quantitative analysis of the impact of M1, M2 and AMS monetary aggregates on key macroeconomic indicators for the US economy. The analysis is made in order to show the strength and direction of the impact of different forms of money supply on key economic variables for a developed market economy and capital market such as the United States. Such an analysis may reveal detailed quantitative differences between M1, M2 and AMS; whether AMS is a real competitor to M1 and M2; whether AMS approximates economic processes well; the causes of some of the problems in the US economy and what is more appropriate to

focus on Federal Reserve policy - inflation, financial market dynamics or employment.

A quantitative assessment of the impact of money supply and monetary aggregates on key economic variables characterizing the US economy is performed by one-way linear regression analysis. The empirical analyses show that the "money - consumer price index" and "money - gross domestic product" correlations are the strongest ones. These conclusions are supported by extremely high levels of confidence, where the applied regression models and their coefficients are significant. Practically, the high degree of influence of the M1, M2 and AMS monetary aggregates on key economic variables characterizing the US economy gives serious grounds for re-thinking the role of monetary aggregates and paying more attention to their nature, structure, role and dynamics. On the other hand, empirical results show that AMS is a completely correct and representative monetary aggregate that takes into account the dynamics of standard money and cash substitutes. In terms of its logic, it rivals the monetary aggregate M1 but has the capacity to trace the dynamics of key macroeconomic variables in the US economy, which is characteristic of the far broader monetary aggregate M2. This is why a monetary aggregate such as the AMS provides a much better picture of the economic processes and the dynamics of money supply in the structure of mechanisms and policies of the Federal Reserve. On the other hand, the high degree of correlation and very strong regression relationships between AMS and the consumer price index, gross domestic product, current account balance, employment, real estate prices and stock market quotations allow for direct monetary aggregate management with greater weight than the implementation of policies to change interest rates or use instruments such as direct quantitative easing.

The statistical validity of the strong factor-result relations in the conducted empirical research provides opportunities for more accurate forecasts regarding the monetary policy based on the monetary aggregates such as AMS. The data show that the dynamics of correctly reported money supply should be included

in the structure of indicators that take into account the sustainability of different economic sectors. Moreover, the results of the empirical study and the conclusions drawn show that monetary changes in economic processes should not be neglected in the analysis and prevention of economic imbalances.

CONCLUSION

The conclusion summarizes the main theoretical and empirical results of the dissertation research. It clearly and argumentatively defines the conclusions regarding the object of the study. Guidelines for qualitative changes in the structure of the subject of the dissertation are also formulated. The implementation of the set goals and tasks of the dissertation is also considered in a concise and systematic order.

IV. DIRECTIONS FOR FUTURE RESEARCH IN THE FIELD OF THE DISSERTATION THESIS

The final results of the dissertation research provide very good and diverse prospects for conducting additional research on the issues addressed in the dissertation. The main reason is the relatively small number of in-depth theoretical and empirical studies on optimizing the measurement and management of monetary aggregates. It is therefore possible to add new value to academic debate and practical monetary policy decisions through future research with the following objectives:

First. To create a modified mechanism for structuring and managing the money supply to improve the efficiency and effectiveness of the decisions of the Federal Reserve or any other central bank.

Second. To develop and verify the adequacy of a methodology using monetary aggregates to forecast and model the dynamics of the main macroeconomic indicators taking into account the economic behaviour of households, businesses and the central government.

Third. To compare commodity money, fiat money and cryptocurrencies in a historical perspective with a projection to future innovations in exchange media.

Fourth. To conduct a theoretical and empirical analysis of the impact of cryptocurrencies on money supply, major monetary aggregates and economic processes.

V. LIST OF THE SCIENTIFIC CONTRIBUTIONS OF THE DISSERTATION THESIS

The findings of the dissertation research lead to the following six scientific contributions:

First. A deductively substantiated concept of money as a universal medium of exchange which does not emerge randomly in the past and whose economic characteristics do not differ from other commodities in terms of its diminishing marginal utility. Based on this concept and according to their characteristics, the media of exchange are classified into three groups - commodity money, uncollateralized money and fiat money.

Second. The main stages of development of the monetary systems worldwide are defined and their main financial and economic characteristics are presented in terms of the changes they initiate in terms of money supply management and monetary policy optimization.

Third. The thesis reveals that the classic monetary aggregates M1 and M2 do not represent money supply correctly because, due to the lack of an accurate methodological definition of standard money and monetary substitutes in their structure, they include components that do not have the characteristics of money as they cannot be used to settle directly the liabilities arising from all possible economic transactions.

Fourth. The technology for structuring and measuring the money supply is optimized methodologically by defining the components of standard money and money substitutes that should be included in the process of money supply measurement.

Fifth. A new AMS (Actual Money Supply) monetary aggregate which reflects the actual money supply and allows for differentiation of the economic effects of economic transactions with deferred and immediate settlement is proposed and justified. This aggregate is intended to separate the macroeconomic

effects of standard money and cash substitutes and increase the efficiency and effectiveness of the monetary policy utilized by central banks.

Sixth. The empirical analysis has proved that the capacity of the AMS monetary aggregate to describe the dynamics of key macroeconomic variables in the US economy is similar to that of the M2 aggregate and is much higher than that of the M1 aggregate and that the priority of the US Federal Reserve monetary policy should be on price stability rather than employment.

VI. PUBLICATIONS RELATED TO THE TOPIC OF THE DISSERTATION THESIS

Studies

Sirkarov, V. (2020). Evolution of monetary systems and the abandonment of the gold standard as a factor for financial crises. Svishtov. Annual Almanac "Scientific Research of Doctoral Students" ISSN: 1313-6542, Vol. XIII, Tsenov Publishing House, pp. 5-24 The study was published on: https://almanahnid.uni-svishtov.bg/title.asp?title=2637

Articles

Sirkarov, V. (2020). Bitcoin Cryptocurrency as Money – a Monetary Analysis by Using the Ludwig von Mises Regression Theorem, Dialog E-journal ISSN: 1311-9206, pp. 65-78. The article was published on: https://dialogue.uni-svishtov.bg/title.asp? title=1584

Sirkarov, V. (2021). Optimization of Monetary Aggregates from the Point of View of the Austrian Monetary Theory - Possibilities and Effects, Dialog E-journal, ISSN: 1311-9206, Vol. 3, pp. 79-95. The article was published on: https://dialogue.uni-svishtov.bg/title.asp? title=2685

Papers

Sirkarov, V. (2021). The effects on monetary policy as a result of cash hoarding. Collection of papers from the International Scientific Conference "Sustainable development and socio-economic cohesion in the 21st century – trends and challenges " dedicated to the 85th anniversary of D. A. Tsenov Academy of Economics, Svishtov, 8-9 November 2021, Vol. I ISBN 978-954-23-2067-8, Tsenov Publishing House, pp. 398-404. The paper was published on: https://dlib.uni-svishtov.bg/bitstream/handle/10610/4505/Tom1.pdf

VII. STATEMENT OF ORIGINALITY

according to Art. 68, Para. 2 of the Regulations for Academic Staff Development at D. A. Tsenov Academy of Economics

I, the undersigned Vladimir Hristov Sirkarov, doctoral student No. D020217153, hereby declare that:

First. The content of my dissertation thesis "Challenges to the Modern Monetary Policy and Optimization of Monetary Aggregate Management" is my own, original and authentic work and presents my own ideas, analyses, texts and comments based on reliable information corresponding to the objective truth.

Second. I have compiled it in compliance with the provisions of the Academic Staff Development Act and the Copyright and Related Rights Act.

Third. The scientific results obtained, described and/or published by other authors are cited in the text of the dissertation according to the established standards and are duly indicated in the list of references to the dissertation.

Fourth. The results achieved in my dissertation and its scientific contributions were not plagiarized from research works and publications in which I have not participated.

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30 Nov. 2021

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