ULBS

Universitatea "Lucian Blaga" din Sibiu

The Interdisciplinary Doctoral School

PhD Field: **FINANCE**

PHD THESIS

FINANCIAL SYSTEM, THE SOURCE OF ECONOMIC CRISES: THE MAIN DETERMINANTS OF FINANCIAL INSTABILITY

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INTRODUCTION

The motivation and importance of the topic

Following the Great Recession, the profession of economist (macroeconomist) was affected and questioned, even by those who work in the field. Before the global crisis, economists believed that "the central problem of preventing depression has been solved, for all practical purposes, and in fact has been solved several decades ago" (Lucas, Robert, 2003) and that "the state of macroeconomics is good" (Blanchard, Olivier, 2008).

This overconfidence in macroeconomic theory came from a period of prosperity that lasted from the mid-1980s to 2007, called the Great Moderation. Great Moderation is in fact the given name by Stock and Watson (2002) for the changes in the business cycle that accounted for the volatility decline in Real GDP. Their study suggests that a better monetary policy, good luck in sense of missing supply shocks and modifications in the structure of economy are the main factors.

In this period, inflation was low and stable, and real economic growth registered a substantial decline in volatility. Macroeconomists have not considered that volatility to be a good long-term friend and have confused financial stability with price stability. Thus, although the compound annual growth was below that reported in the Golden Age of Capitalism (3.24% for 1945-1973 or 2.995% for 1945-1975 and 3.119% for 1985-2007 or 2.739% if we include the Great Recession), economists praised the benefits of the low volatility in the times of the Great Moderation, without balancing the risks involved. In the same way that bankers become euphoric after a long time of economic growth and underestimates the risks (Minsky, 2011), so do economists, they have more and more confidence in their own econometric models, although they could not produce crises, but only random fluctuations around the trend of economic growth.

But this state of self-esteem among economists was illusory because in the last month of 2007, in U.S. started a deep crisis, a crisis that was not included in the mainstream economists' model projections. Paul Krugman (2009) invoked informational efficient market theory and market imperfections as reasons for the myopia of economists and the crisis. Bernanke (2010) advocated the global abundance of savings as the determinant of the housing bubble and financial crisis of 2007. With a few minor exceptions (Wynne Godley, Steve

Keen, Arturo Estrella, etc.), all economists have misinterpreted the causes by omitting the largest debt accumulation in the history of mankind until that moment.

Thus, there is a **need to study this topic** in depth, namely the economic crises and their sources, emphasizing the main determinants of financial instability, this being a first argument in the necessity of the research that will follow. In our view, the state of macroeconomics got worse in the last 6 decades. In mainstream macroeconomics money and financial phenomena do not matter. The level of debt and the flow of debt are not incorporated in most of the macroeconomic models. What is most important, before the Great Recession all macroeconomists explained economics just by looking at trends. No large deviations from trends were expected to occur. We believe that finance is the source of crises with the exception of wars and pandemics and when the economic system will reduce its sensitivity to financial system, we will experience only mild negative economic growth, but no true recessions in the way they are defined by NBER – National Bureau of Economic Research.

Besides the generosity of this theme, the **motivation and topicality** of choosing this subject is given by the following arguments:

- the theory of economic crises went out of mainstream's research interests before the Great Recession;
- development of the theory of financial instability according to which over-indebtedness is at the root of economic crises in developed and emerging countries;
- the few theoretical and practical concerns that explain what are the main determinants of financial instability;
- the fact that researchers in the academic environment and practitioners are increasingly interested in this subject because it still has elements of novelty.

The topic is very important not only for acknowledging the role of finance in the economic cycle but also for recession prediction. Recession forecast has always been the *holy grail* of macroeconomics. Prediction of recession is not only important for governments and the banking sector (more detailed central banks) to ensure jobs and quality of life, but also for investors in order to hedge their portfolios and for big firms also, in order to adjust production and inventories.

Under the current stagnation conditions (*secular stagnation*), the awareness of academics, economic decision makers and economic agents of the importance of the finance

sphere becomes a fundamental condition for the adoption of sustainable economic and monetary policies. Thus, the motivation of choosing the topic addressed is the desire to provide answers that will support the formulation of coherent policies that bring long-term prosperity.

The current macroeconomics contains concepts and models that include rational expectations, maximizing utility, "cleaning up" markets and equilibrium.

The equilibrium concept has always prevailed over leverage, and maintained a sentiment that powerful disturbing events can't happen, or that it can be quickly restored. Due to this notion, economists always assume that no matter how large is the deviation from normal times, the economy will always revert to equilibrium either with intervention (keynesian) or without (libertarians). The equilibrium framework will always understate the risks, always focus attaining a certain optimum growth rate, while ignoring the process, disregarding the debt that was/will be accumulated in order to obtain it.

Rational anticipations theory state that due to the unpredictable evolution of prices, economic agents are formulating expectations about their future evolution and thus any systematic state intervention in the economy is irrelevant because the economic agents will predict both the evolution of prices and possible government policies, so the fiscal and monetary policies will have impact only on prices, not on economic growth or employment. The hypothesis of rational expectations also notes that market participants use the data appropriately, know the literature provided by economic theory and do not make systematic errors.

Even if the entrepreneurs have all the information and can predict correctly the future events, they will not hide from the effects of the credit expansion but will use this opportunity to make a profit from the newly created money (Huerta de Soto, Jesus, 2009, pp.536-537). Only in post-Keynesian and Austrian theories businessmen are fooled by the euphoria of bankers.

Moreover, in the macroeconomic models there are no banks, nor any money creation, there is only an intermediation from agents with a propensity for low consumption or patience, to those with a higher propensity for consumption, respectively those with impatience. Debt becomes important only in the case of a liquidity trap. "Ignoring the foreign component, or looking at the world as a whole, the overall level of debt makes no difference to aggregate net worth – one person's liability is another person's asset. It follows that the

level of debt matters only if the distribution of that debt matters, if highly indebted players face different constraints from players with low debt" (Krugman, Eggertsson, 2011). The mistake of Paul Krugman and most mainstream economists is the misunderstanding that commercial banks intermediate financial resources, instead banks create money which implies additional purchasing power. Even more important is the debt level when considering the high debt service ratio that creates a heavy burden on economy and the fact that in a fragile financial environment small variations can create large impulses and there is no need of powerful shocks for an economy to enter in a recession.

We can draw a parallel between the period after the Great Depression and that one after the Great Recession, both being periods preceded by large accumulations of debt and during which the debt deleverage occurred and, nevertheless, the debt-deflation theory proposed by Fisher (1933) was not understood by the academic environment: "Fisher's idea was less influential in academic circles, but because of the counterargument that deflation by debt represents only a redistribution from one group (borrowers) to another (creditors). It has been suggested that in the absence of unpleasantly large differences between marginal propensities for consumption between groups, pure redistributions should not have significant macroeconomic effects" (Bernanke, B., 2000, p. 24). Although, Bernanke does not join these intellectual groups that consider that deflation by debt is just a simple redistribution, he also misunderstands Fisher's theory, because he does not regard debt as the source of the crises, but only as their way of propagation. For him and most macroeconomists, the causes of recessions are random shocks after which companies and households can no longer borrow or refinance due to the loss of collateral.

The **assumptions** from which we began the research relate to the following:

- money supply leads the economic cycle and monetary base lags the cycle;
- money influences Real GDP;
- money is not neutral;
- credit velocities are not stable;
- securitization diminishes the potency of monetary policy;
- money is important at global level;
- real GDP growth and stock market returns are not normally distributed;
- output Gap/ Real Potential GDP is autocorrelated;
- yield spreads predict recessions;

- yield spread can not predict negative changes in Real GDP that do not match recessions;
- the Great Recession could have been predicted by a model based especially on financial variables.

All these assumptions are directions to be followed which make it possible to highlight the objectives pursued by this doctoral thesis. In this PhD thesis we propose a scientific approach and we hope that we will clarify at least some of the aspects that are less addressed in the specialized literature and highlight that the financial system is the source of the crises, it is not just the means of propagating the crises, as most mainstream economists claim (Bernanke's *financial accelerator theory*).

Research Objectives

The doctoral thesis, entitled "Financial system, the source of economic crises: the main determinants of financial instability" has set as the **main objective** to prove that all economic crises (with the exception of those produced by pandemics, wars and supply shocks) have financial roots.

The following secondary objectives were followed in order to attain the main objective:

O_1	Analysis and testing of the fundamentals underlying the financial-monetary economy
O_2	Conducting a series of econometric studies to prove the importance of money and finance in real economy
O_3	Researching the influence of financial system on economic crises from a historical perspective
O_4	Making a critique of equilibrium theory
O_5	Researching the main recession predictors and showing evidence that nearly all recessions have financial roots
O_6	Analysis of the main determinants of financial instability
O_7	Study the potential solutions for ensuring financial stability, for maintaining a resilient financial system
O_8	Proposing an econometric model for predicting recessions, based mainly on financial indicators and proving that the Great Recession could have been predicted by such a model

O_9	Forecasting the next recession in the U.S. after the Great Recession
O_{10}	Analysis of the recession delay in Romania
O_{11}	Analysis of how the Coronavirus recession differentiates from usual recessions

Research Methodology

The doctoral thesis is elaborated on the basis of a complex documentary material, difficult to systematize and to concentrate within the limits of the paper. The approach adopted as a result of an interdisciplinary approach has imposed a very complex **research methodology**, which focuses mainly on:

- the study of a general and specialized bibliography on the theoretical and practical situation in order to assimilate and deepen the knowledge required to carry out a scientifically based work;
- the approach, from a statistical point of view, to some economic models that have been imposed as necessary for the capitalization of concepts;
- the case studies carried out for the empirical support of the approached economic models;
- the use of the general – special or a special – general analysis in the preparation of certain principles and phenomena.

The nature of this research is primarily to test the theories and to apply analytical methods and techniques used in the analysis of the financial-monetary economy and financial instability. A variety of different research methods were used in this doctoral thesis, such as quantitative methods, the investigation method, the synthesis method, the comparative method. The way we applied them to the thesis is presented below.

Quantitative methods

We will focus our studies on U.S because it's the world's largest economy, because it is an open economy and due to public data transparency. Because of these attributes the risk of contagion is very high. If U.S will experience a recession, then the global economy will be affected. But while contagion is important, we do not view crises as exogenous shocks, we think contagion will just speed up the turning points. Without accumulating imbalances, it is very hard for an economy to fall in recession.

We will conduct studies also in Germany, Japan and South Africa, Australia and Romania.

The investigation method

This method was carried out by collecting, processing and analyzing the available data and information, followed by issuing opinions and proposals.

The synthesis method

We have used it for establishing the connections between the economic processes and the studied elements and to elaborate the conclusions.

The comparative method

It was used in our studies in order to highlight the similarities and the differences between the analyzed cases.

The processing of the data

The starting point for research is the compilation, processing and review of knowledge from multidisciplinary bibliographical sources: literature, legislation, studies, courses, treaties, reports on financial systems, as well as data summarizing the evolution of their key quantitative aspects.

In particular, the methods used in the analysis of data during scientific research are:

- a reading sheet for the synthesis of relevant knowledge from specialized literature and legislation related to the research subject;
- spreadsheets for the centralization and systematization of data on metrics unique to financial systems that will be used for econometric modeling;
- tables, figures and diagrams which present, in a compact and concise form, information on the indicators of the financial systems as well as the statistical data used.

Bibliographic processing is carried out using the Reading Sheets, which display the key ideas of the bibliography consulted, which are descriptive of the research subject, keywords, authors, year of publication, main results and research findings.

Quantitative data are secondary data that can be found in databases published by major organizations: the World Bank, IMF (International Monetary Fund), NBER, Eurostat, BEA (Bureau of Economic Analysis) etc. They are processed using recognized econometric tools and used in the field of finance, respectively EViews.

The key type of analysis of quantitative data is based on econometric methods. In this research, we test the hypotheses with the help of Pearson correlations, cross-correlations, autocorrelations, least squares regressions, stepwise regressions, Granger causality, Vector

Autoregressive models, two sided and one sided Hodrick Prescott trend, stationarity (ADF, Phillips-Perron, KPSS) and normality tests (Jarque-Bera and standard deviation/mean absolute deviation). We also use PROBIT and logistic (LOGIT) equations and regularization (LASSO - Least absolute shrinkage and selection operator).

Systematic presentation of the contents of the doctoral thesis

In order to respond to the objectives of the doctoral thesis, the paper is structured in five chapters, briefly summarized below.

Considering the fact that the central element of this scientific research is proving that the financial system is the source of economic crises, the purpose of the first chapter, entitled *Theoretical and pragmatic considerations regarding the financial system and the reverberations on the real economy,* is to understand how the financial system works, what are the main tools of the Federal Reserve, how it can impact monetary aggregates and to research how finance is affecting real GDP. The first chapter is focused on providing a picture of the current U.S financial system and its evolution since 1959 (the start of Federal Reserve database for monetary aggregates).

The first subchapter contains general aspects of the financial system. In the second subchapter a series of empirical tests are conducted to get a clear view of relationships involving economic activity and financial variables. But before that, the focus of the research is on the most relevant coordinates of the financial-monetary economy. It is shown how money are created by banks and how it can be „destroyed". Money is created when banks are extending loans and when the loans are repaid, the money is temporarily out of circulation. We have checked which monetary aggregate leads the economic cycle and which one lags behind the cycle. We also check if the change in monetary base is causing variations in money supply as suggested by money multiplier theory or viceversa. We go one step further and explore the relationship between lendable reserves (monetary base; total balances maintained), monetary aggregates and bank credit with VAR. In the same subchapter we test a common theory in literature according to which the relation between money (M2) and Real GDP is weakening. At the end of the second subchapter we argue against long run neutrality and long run superneutrality by using Austrian theory arguments, correlations between money supply, monetary base and GDP deflator and calculations of money elasticity of real output.

In the next subchapter, we analyze the developments in the financial system of United States. We create proxies for credit stock that flows into GDP, not into speculations and test the stability of velocities in order to find out if Fed can target nominal GDP with credit aggregates. We test the malleability of the banking system in the US by constructing time series related to the interconnectedness of the financial system and checking how banks and non-banks respond to shocks in monetary policy. On the same line with testing the malleability of the banking system we will also derive a securitization ratio to assess the influence of monetary policy over Real GDP. We run 2 OLS regressions in order to estimate interest elasticity of GDP and the interest elasticity that varies with the degree of securitization. We also investigate if Federal Reserve had a bigger role than supply chain innovations in determining the Great Moderation.

The last part of the subchapter is focused on analyzing the dynamic lead-lag patterns between short and long term interest rates. In regard to fluctuations in real GDP, central banks use short-term interest rates in order to minimize output gap and to target inflation. The findings could help us understand why inversions of the yield curve occur since is believed that long-term interest rates may be affected by short-term interest rates in normal times.

In the second chapter, *Historical, conceptual and empirical approaches to crises*, we start with researching the influence of financial system on economic crises from a historical perspective. We continue with a critical assessment of the equilibrium theory. We have tested if output gap/ Real Potential GDP is autocorrelated, how much it stays during narrow ranges and whether the main economic variables: economic growth, unemployment and stock indexes returns follow a normal distribution. The results show us that economy does not tend to equilibrium and that extreme events happen more frequently than the Gauss Bell would predict. Recessions occur due to the large mismatches between aggregate demand and aggregate supply, most often due the fall in the former. This is caused by negative yield spreads and by the extreme events in finance world which determine decreases in Net Interest Margin in the financial sector. Financial enterprises will tighten credit standards, as we explain in the second part of the chapter. This is why we argue against the division of cycles into business and financial cycles.

Forecast: RECESSIONF	
Actual: RECESSION	
Forecast sample: 1954M07 2020M10	
Adjusted sample: 1955M07 2020M10	
Included observations: 772	
Root Mean Squared Error	0.304226
Mean Absolute Error	0.184518
Mean Abs. Percent Error	9.340667
Theil Inequality Coefficient	0.509522
Bias Proportion	0.000057
Variance Proportion	0.352061
Covariance Proportion	0.647882
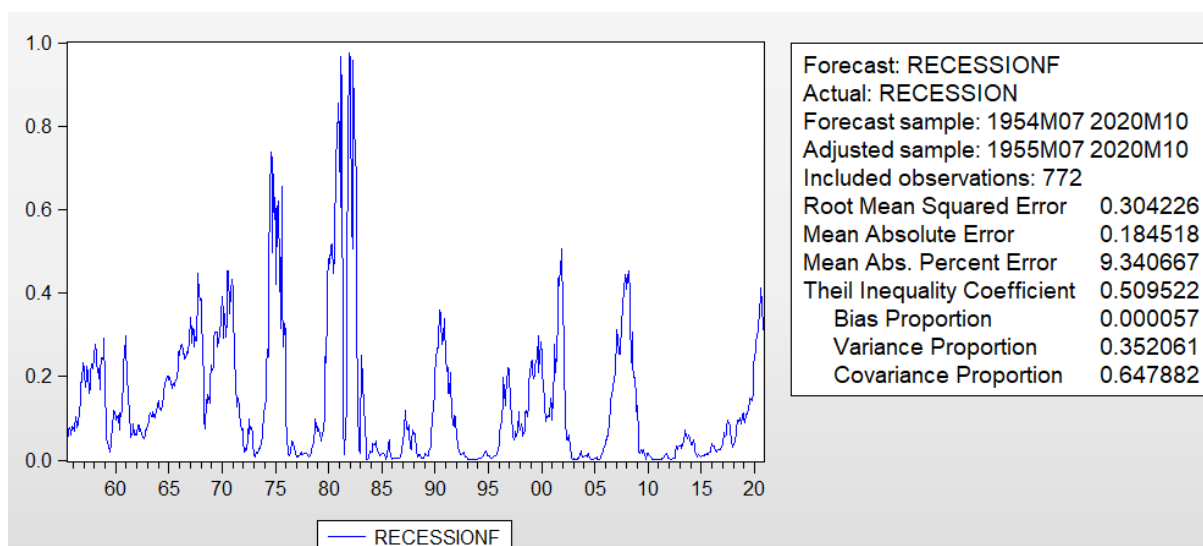
Figure 44. Predictive power of the Yield curve (10Y-3M), model with a lagged independent variable

Source: Authors' computations, data from St Fed Louis

We conduct a series of empirical tests in order to get a clear view of the link between financial variables and economic activity. We compare the inverted yield curves, respectively 10 years – 3 months and 10 year – federal funds rate, in terms of leads with real variables and indexes, such as New Orders – Stocks ISM index, initial claims, new building permits and Chicago Fed National Index.

We have researched the instances when the inverted yield curves have failed to predict recessions in United States, Japan, South Africa and Australia.

We have also checked other indicators with predictive properties like margin debit and excess bond premium, etc. In the last subchapter we have presented the indicators which don't add enough information or which lost their predictive power.

In the third chapter, *Main coordinates and determinants of financial instability*, we have researched the main determinants of financial instability, respectively capital mobility and the size of capital, decreasing profitability for financial institutions, economic inequality and low and stable inflation. Higher capital mobility has always been associated with banking crises, while due to the inverted yield curve, declining profitability for financial institutions is typically followed by a recession. Economic inequality has more channels which lead to financial fragility like higher propensity for loans due to low incomes. The Global Savings Glut could have been a result of increasing inequality as the corporate sector became net holders of financial assets before the Great Recession. The last channel is the riskiness

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channel – the wealthy hold riskier assets. Lastly, low and constant inflation just guarantees price stability, not financial stability, as with a low and stable inflation targeting we can't avoid deflation.

The fourth chapter, *Potential solutions for financial stability*, is focused on providing solutions for maintaning a resilient financial system, solutions like Chicago Plan and a cashless society. We also study if the policymakers can temper bankers' euphoria and capital mobility. The fourth subchapter analyzes if central banks should target inflation, if it should target price level or a tunnel without a specific inflation target. In the penultimate subchapter we study if the yield spread should be targeted instead of targeting short term interest rates. In the final subchapter of the fourth chapter we have investigated whether helicopter money can be used anticiclically and under which form it is the most effective.

In the last chapter of the theses, entitled "*New proposal on economic crisis forecast model*", we described the regular recession mechanism and designed an econometric model for predicting United States recessions. We have tested whether this model could have predicted the Great Recession. As the Great Recession could have been prediced by using this model which is based mainly on financial indicators, we can conclude that finance has a powerful effect on economic cycles.
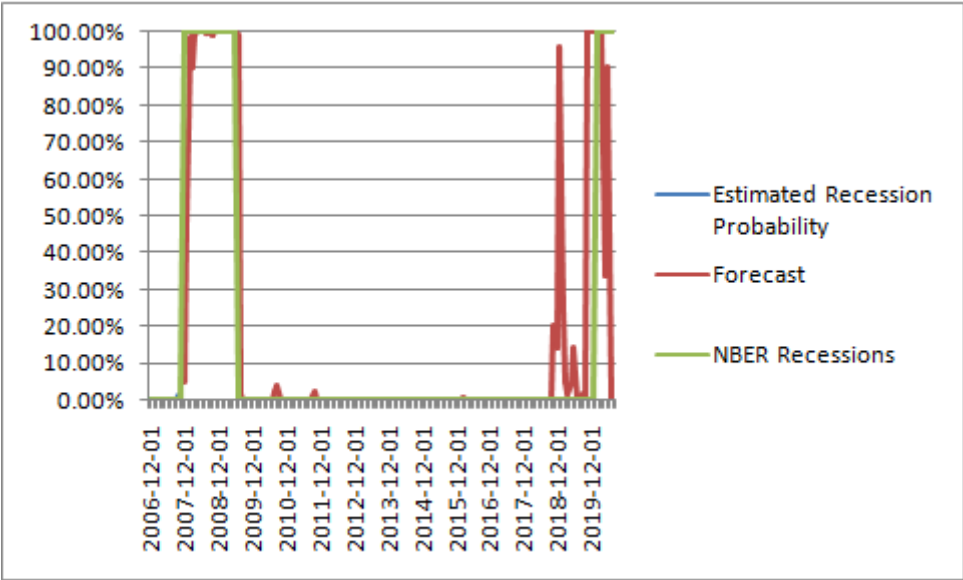

Figure 133. Recession probability and The Great Recession

Source: Authors' computations; data from St Fed Louis

We have also analyzed the Coronavirus recession in correlation with our proposed model and how it differentiates from usual recessions. Our model indicated the start of the recession prematurely in November 2019 due to market uncertainty reflected in margin debit and yield spreads. This time credit standards were tightened after the start of recession, not before.

We conclude with the presentation of the final conclusions, personal contributions and achieved objectives, establishing possible future directions of research and extension of the research of this doctoral thesis.

Obtained results

The personal contributions are presented in the doctoral thesis in the form of studies, analyzes and recommendations and summarized in the conclusions of each main chapter. The studies show that money supply leads the economic cycle and that monetary base lags the cycle. Money still matters, credit aggregates can't be used to target Nominal GDP and securitization does affect monetary policy effect on Real GDP growth. Money is not neutral and it is important even at global level. Yield spread predicts recessions. Financial indicators like yield spreads can predict recessions a significant amount of time before real variables can do.

Yield spread cannot predict negative changes in Real GDP that do not match recessions. New Orders – Inventories Index (indicator for industrial activity) can predict negative changes in GDP even in case of no match with recessions, however it is not such a good recession forecaster as the yield spread. The best recession predictors are: AAA bond yield minus federal funds rate (AAA_FF), commercial paper minus bill rate spread (commercial_paper_BR), excess bond premium, the yield spreads at different maturities (10 Years – 3 months equivalent bond basis Yield, 7 and 5 Years – federal fed funds rate and 30-year fixed mortgage rate – federal funds rate - MORTGAGE30US_F), margin debit, New Orders – Inventories Index,monthly supply of houses, New Private Housing Units Authorized by Building Permits (Permits) and Housing Starts.

The Great Recession could have been predicted with one-month delay by a model based especially on financial variables. Our model indicated the start of the recession prematurely in November 2019 due to market uncertainty reflected in margin debit and yield spreads. This time credit standards were tightened after the start of recession, not before.

Final conclusions, personal contributions and further developments

The aspects under which the **original contributions** to this doctoral thesis are contained are briefly illustrated below from a variety of points of view:

1. Theoretical-conceptual contributions:

- a synthesis of specialized literature, of analytical studies and of reports by international bodies on general aspects of the functioning of financial systems;
- defining the relations between financial variables and economic activity;
- analysis of how money is produced by banks and how it can be "destroyed;"
- questioning the theories of neutrality and super-neutrality of money by using Austrian theoretical arguments and finding rational and empirical proof against each theory;
- a critical evaluation of the theory of equilibrium and have shown that the economy does not tend to equilibrium, but rather to disequilibrium, and that economists are wrong to treat extreme events as exceptions;
- analyzing the effects of the financial system on economic crises from a historical perspective;
- proposing a hypothesis that explains why economic cycles and financial cycles cannot be distinguished – yield curve inversions impact the financial system, which tightens credit standards and triggers recessions;
- providing reasons for instances in which yield spread does not forecast recessions in the U.S., Japan, South Africa, Germany and Australia;
- identifying recession indicators that do not add enough information or have lost their predictive capacity;
- researching the main factors of financial instability, i.e. capital mobility and capital size, decreasing profitability of financial institutions, economic inequality and low and stable inflation;
- explaining why consumption at the macro level is always dependent on income, while consumption at the micro level can depend on debt for long periods;
- explaining the process by which economic inequality has led to global savings glut

- providing alternatives to sustain a resilient financial environment, such as the Chicago Plan and the cashless society, and highlighting the shortcomings of the Chicago Plan, in particular deflationary pressures;

- revealing the advantages and disadvantages of targeting price levels, targeting an inflation channel without a defined target, targeting nominal GDP and nominal GDP levels;

- explaining why and under what circumstances capital requirements policies would have worked in Romania prior to the Great Recession;

- explaining why QE failed to stimulate the economy and why People's QE is a better option;

- describing the recession mechanism, step by step from the yield curve inversion to the outbreak of the recession;

- identifying the differences between the Coronavirus recession and the usual recessions.

2. Methodological and instrumental contributions:

- assessing the impact of securitization on interest elasticity in a manner different from that of Estrella (2002) by utilizing real GDP growth instead of output gap;

- analyzing the dynamics between the short-term and long-term interest rates using a modified model of Meng, Su, Zhou and Sornette (2014);

- to highlight the connection between the consumption propensity and income inequality, a new indicator for inequality has been proposed;

- designing a recession forecast model by using a logistic equation with Lasso regularization that would have predicted the Great Recession.

3. Empirical contributions:

- performing a series of empirical analyzes in order to obtain a better comprehension of the relation between financial variables and economic activity;

- to test the theory of money multiplier, the analysis of Hodrick and Prescott (1990) was extended until May 2019, in order to provide a perspective on which monetary aggregate leads the economic cycle and which one lags behind the cycle;

- determination of the causality between M2 and the monetary base using the Granger causality;

- analyzing the complex relationship between lendable reserves (monetary base; total balances maintained), monetary aggregates and bank credit with the VAR model;

- running a multiple regression and using recursive coefficients to check if the relationship between money and GDP is weakening;

- researching whether policymakers can temper the euphoria of bankers and the mobility of capital;

- developing credit proxies for GDP transactions and testing the normality and stationarity of the credit velocities;

- testing the malleability of the U.S. banking system by creating time series related to the interconnectedness of the financial system and checking how banks and non-banks respond to monetary policy shocks;

- estimating the effect of securitization on the monetary transmission process with the aid of 2 regression models for the period 1959Q1-2019Q1;

- analyzing whether the Fed played a greater role for in producing the Great Moderation than supply chain innovations;

- testing the normality of Real GDP growth and financial series;

- testing the predictive power of all recession indicators using PROBIT equations;

- showing that inverted yield curve is a very good recession predictor 12 months ahead, as opposed to real variables that are good at predicting recession just 2 months before or in some cases can only be used for predicting the recession at the time it occurs;

- empirically demonstrating that the yield spread (10Y-3 M) is a better recession predictor than the New Orders-Inventory, whereas the latter is better at predicting all economic downturns, not just recessions, indicating that downturns in industrial production can only cause downturns in economic activity, but not recession, and that the financial sector must be impacted before a recession occurs;

- proving that overproduction is not a reliable recession predictor;

- proving that decreasing profitability for financial institutions is usually followed by a recession;

- studies of the link between economic inequality and financial fragility – how, due to rising income inequality, low income households have contracted debt in order to preserve their lifestyle;

- mathematical demonstration that 0.01% of the top income comes primarily from income inequality, not from economic development, which means that the wealth produced by the richest 0.01% is not shared;

- finding evidence that the Bank of Japan's yield curve control policy renders Japan vulnerable to yield curve inversions and thus prone to recessions;

- demonstration of negative yield spread predictive forces in Romania and analysis of recession delay (massive capital inflows that partially counteract negative yield spread).

The **novelty elements of the doctoral thesis** provide useful and practical knowledge for researchers and policy makers and have the capacity to add value, since the presumed effect of this analysis on literature and practice is highlighted on the basis of the following key original contributions and results:

- proving that, due to the fact that negative shifts in the financial system precede recessions, financial variables have the ability to report a crisis much earlier than real variables, which are capable of reporting the crisis up to two months earlier;

- proving that financial variables better predict recessions, while industrial performance indicators better predict negative GDP fluctuations;

- developing a recession forecasting model that has the advantage of announcing the start of the crisis a month in advance.

Regarding the way of **capitalizing the research results**, we mention the fact that this process is a continuous one, which started during the doctoral scientific training and materialized in publications of scientific articles in specialized journals in the country and abroad, but also in participation in conferences. The activity of disseminating the research results will continue in the next period, on the one hand through new participation in scientific conferences and the publication of papers in prestigious journals, and on the other hand through the writing and publication of a scientific book, which will bring added value in the field of theory and practice of finance and its importance in real economy.

Without considering that this doctoral thesis is an exhaustive analysis of all aspects of the subject, we appreciate that the results obtained allow for **further developments and new directions for research**, namely:

- exploring whether the yield spreads can be strong predictors of recession, even in an environment with high likelihood of recession like in case of 1913-1933;

- improving the recession prediction model developed in this thesis;

- construction of a macro model with focus on the financial sector.

The limits of the research

The subject dealt with in the doctoral thesis is especially complex and has many dimensions, and socio-economic phenomena are difficult to capture only through the methods used in this study. Thus, the present doctoral thesis poses certain constraints, inherent in doctoral research in the socio-economic field, which allow the continuation and further development of the research of the subject in more complex works.

The lack of indicators and long time series for Romania is a constraint of this study, which has made it much more difficult for our country to formulate a model for forecasting recessions.

And obviously, we did not achieve one of our objectives. We could not forecast efficiently the next recession after the Great Recession in United States. The Coronavirus recession could not be forecasted properly with the proposed model because due to uncertainty in the market reflected in margin debit and yield spreads.

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