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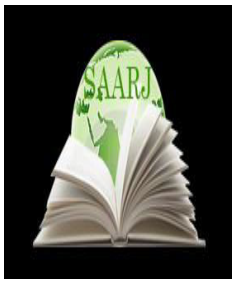

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(Double Blind Refereed & Reviewed International Journal)

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IMPACT OF MONETARY AND MACRO PRUDENTIAL POLICIES ON FINANCIAL STABILITY

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ABSTRACT

The objective of this paper is to study the impact of different instruments of monetary and macro prudential policy on financial stability, using a sample of 48 countries, over the period 2000-2016. Based on the recent survey conducted by the IMF in 2016, we extend the database created by Cerutti, et al. (2015), considering macro prudential instruments through a binary approach. The results show the effectiveness of both monetary and macro prudential policies in reducing credit growth and so, in stabilizing financial system. However, macro-prudential regulation is more effective than monetary policy, given the number of monetary policy objectives and the short-term interest rate limit. Macro prudential tools appear to be more effective for emerging countries, given the degree of openness and limited external financing possibilities; these tools are used to limit excessive lending. For advanced countries that are more financially open, with more diversified and sophisticated external financial sources, macro prudential tools seem to be less effective and difficult to monitor, they are used to control mortgage borrowing and foreign-exchange loans.

KEYWORDS: *Macroprudential Policies, Monetary Policy, Effectiveness, Procyclicality, Financial Stability,*

JEL Classification: *E43, E58, G18, G28*

I. INTRODUCTION

The collapse of the 2007/2008 crisis was characterized by a new debate on the relationship between monetary policy and financial stability and the necessity for the central bank to be more careful about financial risks through a new regulatory framework known as macro prudential regulation. Hence, the central bank's role in financial stability is complex. It involves different mechanisms, and depends on several factors, such as the coordination between monetary policy and macrporudential policy, the characteristics of the central bank and the characteristics of the country.

A large body of literature is carried out. The first category of studies are based on the relationship between monetary policy and financial stability. In this context, there are those who show that prolonged monetary easing negatively affects financial stability (Ciccarelli et al. 2013 and Gelos, 2017);others demonstrate that targeting inflation negatively affects financial stability (Fouejieu, 2017; Fazio et al., 2018). However, Blot et al. (2014) state that there is no positive relationship between price stability and financial stability because instability may appear in an optimum inflation situation. For Vasile and Anca (2013), interest rate efficiency depends on monetary policy, when the interest rate is used as monetary tool for inflation targeting, financial stability is encouraged. In addition, among countries with fixed exchange rates, the foreign interest rate that affects domestic variables may insure financial stability.

The second category of studies focus on the relationship between macro prudential policy and financial stability. In general, the effectiveness of macro prudential policy is based on the control of asset price growth rates and credit growth rates, which are the main sources of financial risk. Several authors study the effectiveness of a specific instrument in ensuring financial stability conducted on a single country (Jimènez and Sayrina, 2006; Keys et al. 2009; Catte et al. 2010; Igan and Kang,2011; Gauthier et al.2012; Glocker and Towbin, 2012). However, other researchers base their studies on a range of instruments on a sample of countries. They test the impact of macro prudential tools related to capital to credit and capital to liquidity, namely dynamic provisioning and credit growth limitation, foreign lending limitation, LTV ratio, reserve requirements and DTI ratio on the procyclicality of asset, debt and non-core liability growth. They prove the effectiveness of these tools in ensuring financial stability (Antipa et al. 2010; Barrell et al. 2010; Lim et al. 2011; Claessens and Ghosh, 2012; Tovar et al. 2012; Bruno and Shin, 2013; Lim et al. 2013; Cerutti et al. 2015).

Another series of studies examines the relationship between central bank characteristics and financial stability. They find that transparency, independence and communication can improve financial stability (Horváth and Vasko, 2016 and; Ioana-Iuliana and Tomuleasa, 2015, Klomp and J. Haan, 2008; Doumpos et al. 2015; Ioana-Iuliana and Tomuleasa, 2015; Mendonça and Moraes, 2018).

Other studies are interested to the interaction between macro prudential policy and monetary policy. There is some evidence that policy coordination is beneficial to financial stability (Gelain et al. 2013; Angeloni and Faia, 2013; Angelini et al. 2014; Klingelhöfer and Sun, 2018). Others prove the opposite (Beau et al. ,2012; Christensen et al. 2011; Gertler et al. 2012; De Paoli, 2013; Chen and Columba, 2016).

The objective of this paper is to study the effectiveness of monetary and macro prudential policies on financial stability. Based on the model developed by Cerutti et al. (2015),we study the impact of monetary policy and macro-prudential policy tools on financial stability. We use a sample of 48

countries, divided into 26 emerging and 22 advanced countries for annual data over the period 2000-2016.

Despite considerable progress, presented by the model of Cerutti, et al. (2015), in assessing the effectiveness of macro-prudential policies, many shortcomings remain to be addressed: the database is incomplete in terms of the period of study and the number of tools considered. Therefore, we use an extended study period (17 years instead of 14 years), using more macro prudential tools (18 policies instead of 12 policies). Indeed, based on the most recent survey conducted by the IMF in 2016 on the use of macro prudential tools, we create a new database considering macro prudential tools through the binary approach, the same approach used by the Cerutti, et al. (2015). The effectiveness of macro-prudential measures is usually detected only through their impact on credit and housing price growth, in our study, we are moving towards assessing the side effects of macro-prudential policies, examining their impact on banking risk and therefore, financial instability.

The paper is organized as following. Section 2 exposes the empirical methodology, including the model to estimate, variables and data analysis. Section 3 presents our estimations results and interpretation. Section 4 concludes.

II. Empirical methodology

A. Model

Our model is given as below:

$$FSI_{i,t}=a_0+a_1FSI_{i,t-1}+a_2\,Z_{i,t-1}+a_3\,X_{i,t-1}+a_4MPP_{i,t-1}+\epsilon_t$$

FSI (Financial stability index): matrix of financial stability variables, MPP (Macroprudential Policy), Z: matrix of monetary policy instruments, X: control variables matrix, a_0: is a constant,ϵ_t : is an error term (see Table 1 for variables definitions and data sources).

With, *d*esignates the country and*t*the period.

To study the impact of each monetary and macro prudential policy instrument on financial stability indicators, we use the GMM system on a sample of 48 countries and for annual data from 2000 to 2016. In addition, for robustness check, the sample is divided to advanced countries (22 countries) and emerging countries (26 countries) to compare the results between the two groups of countries (See countries list in table 2).

B. Variables and data analysis

Information on the use of macro prudential tools are limited, because they are not clearly identified in the literature. Cerruti et al. (2015) have collected some data earlier on a set of 119 countries for the period 2000-2013. These data are extracted based on the IMF survey, the "Global macro prudential Policy Instruments" (GMPI), carried by IMF Monetary and Capital Department during 2013-2014. IMF staff asks directly country authorities about their use of macro prudential tools. The IMF survey cover 18 instruments, Cerruti et al. (2015) used only 12. In our analysis, and based on IMF survey carried on 2016, we try to extend the period of study to 2010-2016 and the number of tools to 18 (See table A1 in Appendix for the whole instruments classified by country and year). We also aggregate these measures along two categories: those addressed to borrowers(LTV+DTI), based on demand side (see TableA2 in Appendix) and those addressed to lenders(rr+ liquidity+ lfx+ capital+ custody+ lvr+ sifi+ cbc+ lcg+ llp+ loanr+ lfc+ ot+ ltd+ tax+ lev), based on supply side (see tableA3 in Appendix).

In order to compare advanced and emerging countries about the use of macro prudential tools, we plot the evolution of macro prudential policy tools over the period 2020-2016. Figure1 shows that there is an increase in use of macro prudential tools over time. However, emerging economies use most frequently macro prudential instruments than advanced countries. This is due to high exposition of emerging markets to external attacks, their more volatile capital flows and more vulnerable financial system. The macro prudential tools addressed to lenders sharply increase during the period2011-2016compared to those addressed to borrowers, mainly for advanced countries. This can be explained by their high level of market volatility (figures 2 and 3).

Figure1: All macroprudential policy tools by income level

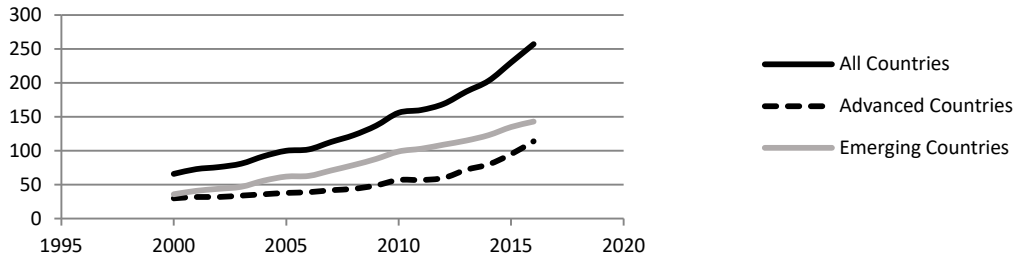

Figure2: Macroprudential tools addresssed tolenders (Supply)

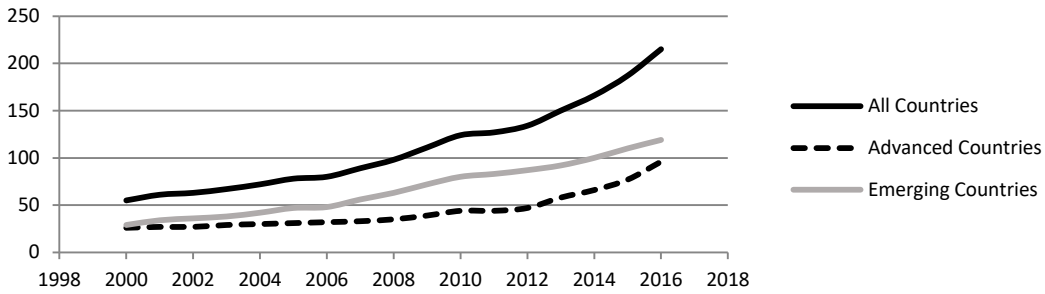

Figure3: Macroprudential tools addressed to borrowers (Demand)

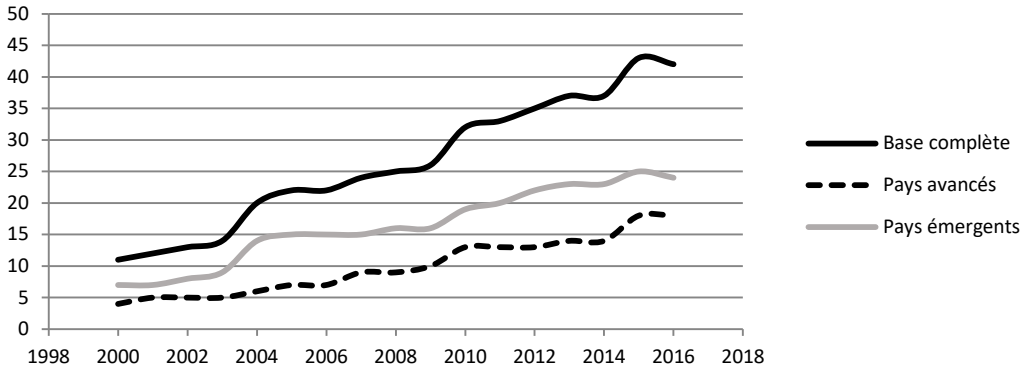

TABLE1: VARIABLES DEFINITION

Matrix	Variables	Définitions	Sources
FSI	**Crédit growth rate**	The growth rate of the banking system's debt to the private sector. Credit growth reflects cyclical fluctuations in domestic credit. Rapid credit growth is associated with increasing financial and macroeconomic instability, falling credit standards and increasing risks.	**WDI**
	Z-score	Measures the likelihood of a country's banking system failing. The Z-score compares the buffer of a country's banking system (capitalization and returns) to the volatility of those returns. It is estimated at (ROA + (equity/assets)) / SD (ROA); SD (ROA) is the standard deviation of the ROA. ROA, equity and assets are aggregated at country level. Calculated from the non-consolidated bank-by-bank data underlying Bankscope, (calculations made by WDI).	
MAPP	**Loan to value (LTV)**	Limits prepayments of mortgages by imposing or encouraging a limit or determining regulatory risk weights.	IFS
	Debt to income (DTI)	Debt/income ratio. Limits household indebtedness by imposing or encouraging a limit.	
	Leverage ratio (LEV)	Prevents banks from exceeding a minimum leverage ratio.	
	counter-cyclical capital buffer (CCB)	Require banks to hold capital at times when credit is growing rapidly	
	Reserve requirements (RR) :	Limits credit growth, can also be targeted to limit foreign currency credit growth.	
	capital conservation buffer (CONSERVATION)	Banks are required to hold a capital conservation buffer of 2.5% to withstand future periods of stress	
	Capital requirements (CAPITAL)	Capital requirements for banks, which include risk weights, systemic risk buffers and minimum capital requirements. Countercyclical capital buffers and capital conservation buffers are captured in their respective sheets and are therefore not included here. Sub-categories of capital measures are also provided, categorizing them into household (HH), corporate (Corp), broad-based (Gen) and FX (FX) targeted measures.	
	Leveragelimits	Limit on banks' leverage, calculated by dividing a	

	(LVR)	capital measure by the bank's exposures that are not risk-weighted (for example, the Basel III leverage ratio).
	Loan losses provisions (LLP)	Provisions for losses on loans for macro-prudential purposes, which include dynamic provisioning and sectorial provisions (e.g. housing loans).
	Limits to credit growth (LCG)	Limits on the growth or volume of global credit, credit to households, or credit to businesses by banks, and penalties in the event of strong credit growth. Subcategories of limits to credit growth are also classified as targeted measures for the household sector (HH), targeted measures for the corporate sector (Corp) and large-scale measures (Gen).
	Loan restrictions (LoanR)	Lending restrictions, which are more appropriate than those considered in "LCG". They include lending limits and prohibitions, which may be conditioned by the characteristics of the loan (maturity, size, LTV ratio and type of loan interest rate), the banks characteristics of (e.g. mortgage banks) and other factors. Sub-categories of lending restrictions are also provided, classified into measures targeted at the household sector (HH) and measures targeted at the corporate sector (Corp). Restrictions on foreigncurrencyloans are recorded in "LFC".
	Limits on Foreign Currency (LFC)	Foreign Currency Loan Limits and Rules or Recommendations on FC loan
	Taxes (TAX)	Tax measures Taxes and levies applied to specific transactions, assets or liabilities, such as stamp duties and capital gains taxes.
	Liquidityrequirements	Measures taken to mitigate systemic risks of liquidity and funding, including minimum requirements for liquidity coverage ratios, liquid asset ratios, stable and net funding ratios, core funding ratios and currency-neutral external debt restrictions.
	Limits on the loan-to-deposit ratio (LTD)	Loan/Deposit Ratio (LTD) limits and penalties for high LTD ratios.
	limits of foreign exchange positions (LFX)	Limits on net or gross open foreign exchange positions, foreign exchange exposure limits and foreign exchange financing, and regulation of asymmetric exchange rates.
	SIFI	Measures taken to mitigate the risks of systemically

		important financial institutions at the global and national levels, including capital and liquidity surcharges.	
	Other (OT)	Macroprudential measures not included in the above categories, such as stress tests, restrictions on profit distribution and structural measures (e.g. exposure limits between financial institutions).	
	MAPP Index	This is the global aggregate index including the 18 individual macroprudential measures, so varies between 0 and 18)	
	Demand Index	It is an aggregate sub-index including 2 measures (ltv+ dti) policies intended at borrowers, therefore varies between (0 and 2).	
	Supply Index	This is an aggregate sub-index includes 16 measures (rr+ liquidity+ lfx+ capital+ custody+ lvr+ sifi+ cbc+ lcg+ llp+ loanr+ lfc+ ot+ ltd+ tax+ lev) policies aimed at lenders, thus varies between (0 and 16).	
Z	**Interest rates**	The short-term interest rate (money market rate; interbank market rate, three-month Treasury bill rate).	IFS-OCDE
X	**Growth rate**	Refers to the positive change in the production of goods and services in an economy over a given period.	WDI
	Inflation rate	The percentage of increase/decrease in the prices of goods and services over a given period.	

TABLE 2- COUNTRIES LIST

22 *Advanced Economies*
Australia, Austria, Belgium, Czech Republic, Estonia, Finland, France, Germany, Greece, Iceland, Italy, Japan, Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal. Singapore, Spain, Sweden, Switzerland.
26 *Emerging* Economies
Armenia, The Bahamas, Brazil, Chile, China, Colombia, Costa Rica, Egypt, Guyana, Hungary, India, Indonesia, Jamaica, Malaysia, Mexico, Paraguay, Peru, Philippines, Romania, Russia, South Africa, Sri Lanka, St. Kitts and Nevis, Thailand, Trinidad and Tobago, , Ukraine,

III. Estimations results and interpretations

The impact of macro-prudential policy on financial stability is estimated in three steps:

- Estimation of the impact of the overall aggregate index, which includes all macro-prudential policies,

- Estimation of the impact of the aggregate sub-indexes: the "supply" sub-index including macro-prudential policies for lenders (RR, LIQUIDITY, LFX, CAPITAL CONSERVATION, LVR, SIFI,

CBC, LCG, LLP, LOANR, LFC, OT, LTD, TAX AND LEV) and the "demand" sub-index which includes macro-prudential policies for borrowers (LTV AND DTI),

- Estimation of the impact of individual macro prudential tools.

Financial stabilityis measured through two indicators: the rate of credit growth and the Z-score.

A. The impact of the global aggregate index

The credit growth rate is the dependent variable:

For the whole sample, the MAPP aggregate index is associated negatively and statistically significant with credit growth, which prove the effectiveness of macro prudential policies in reducing credit growth. This is affirmed by the majority of research investigating on the impact of macro prudential policies on financial stability indicators (Antipa et al. 2010; Barrell et al. 2010; Lim et al. 2011; Claessens and Ghosh, 2012; Tovar et al. 2012; Bruno and Shin, 2013; Lim et al. 2013; Cerutti et al. 2015; Alam et al. 2019).

The interest rate has a negative and statistically significant effect on credit, but lower than the effectof macro prudential policies (0.439 < 1.238),somacroprudential instruments are more effective on financial stability. There are three explanations: First, the bias of endogeneity may not be fully resolved. Secondly, the short-term interest rate used may not be the best indicator of monetary policy. Third, monetary policy has other objectives than managing credit flows, such as targeting inflation, which makes it less powerful in this area (Alam et al. 2019).

The coefficients for the growth rate and inflation variables are positive and significant as expected.

Considering two sub-sample, advanced and emerging countries, the results presented show that the MAPP index has higher impact for emerging economies than for advanced countries (2.154>0.655), which shows that macroprudential policies are more effective in emerging countries. Two explanations can be presented:first, macroprudential tools are more popular and more used in emerging markets than in the case of advanced countries characterized by the multiplicity of funding sources that may be more effective than these regulations. Second, the majority of advanced countries are open countries, which makes it difficult to make macro-prudential tools that will be easily overcame specifically by borrowers' access to different sources of financing, highlighting the need for capital flowsregulation measures. Emerging markets then tend to beless open, which facilitates the establishment and continuation of macro-prudential policies. Hence, the degree of openness of countries is an importantcondition in the choice of policies to be implemented.

For GDP growth, the associated coefficients are positive and significant but with low elasticity for both groups of countries (0. 851 and 0. 81 respectively for advanced and emerging countries). Hence, credit growth is not associated with economic growth in these countries due to the financial system development that promote economic activity, unlike in the case of developing countries where growth is closely associated with credit growth.

Similarly for the monetary policy instrument, the interest rate is associated with negative and significant coefficients (-0.781 and -0. 329 respectively for advanced and emerging countries). This shows the weak performance of monetary policy in reducing credit growth due to the development of the financial system that offers more sources of financing, which reduces dependence on credit bank.

TABLE 3: THE IMPACT OF THE GLOBAL MACROPRUDENTIAL POLICY INDEX (GMPI) ON CREDIT GROWTH RATES AND THE Z-SCORE

	Creditgrowth rate			Z-score		
Variables	All	Advanced	Emerging	All	Advanced	Emerging
MAPP	-1.238 *** (0.11)	-0.655* (0.377)	-2.154*** (0.981)	-0.007*** (0.002)	-0.049 (0.03)	-0.009** (0.003)
GDP	0.815 *** (0.026)	0.851*** (0.065)	0,81*** (0.059)	-0.005 *** (0.000)	0.014 *** (0.003)	-0.001 (0.001)
INFLATION	0.163 *** (0.02)	0.624*** (0.242)	-0.033 (0.088)	-0.009*** (0.001)	-0.038 *** (0.009)	-0.002** (0.001)
INTEREST RATE	-0.439 *** (0.035)	-0.781*** (0.282)	-0,329*** (0.139)	-0.002* (0.001)	-0.032*** (0.004)	-0.005*** (0.001)
AR(1)[1]	0.0049	0.0869	0.0195	0.1476	0.0149	0.0035
AR(2)[1]	0,6472	0.4793	0.1670	0.2294	0.2645	0.5868
Sargan test[2]	1	1	1	1	1	1

The robust standard deviations grouped by country are in brackets. ***, ** and * indicate significance at levels of 1.5% and 10%, respectively

The Z-score is the dependent variable:

The global aggregate index is associated with a negative and significant coefficient with the "Z-score" which shows that of macroprudential tools can reduce banking risk-taking and so,reduce financial instability. Similarly for monetary policy, monetary easing and inflation targeting lead to an increase in financial risks through risk taking channel.

B. The impact of the "Supply" and "Demand" aggregate sub-indices

The credit growth rate is the dependent variable

Both "supply" and "demand" indices are associated with negative and significant coefficients to credit growth with a higher effect than the respective monetary policies for both regressions and seem to be more effective in the case of emerging economies. In fact, only tools intended for the borrower are associated with a significant and negative coefficient exclusively for emerging countries. In addition, both control variables are associated with positive coefficients is significant with credit growth.

The Z-score is the dependent variable

Similarly, monetary policy leads to an increase in financial risks, and macroprudential policies seem ineffective in securing financial stability even if the supply index is associated with a positive and statistically significant coefficient, but this impact is slight (0. 0058) mitigated by the negative coefficient associated with the demand index (-0. 104).

TABLE 4: THE IMPACT OF AGGREGATED MACROPRUDENTIAL POLICY SUB-INDICES (SUPPLY AND DEMAND) ON FINANCIAL STABILITY

	CreditGrowth Rate			Z-score		
Variables	All	Advanced	Emerging	All	Advanced	Emerging
SUPPLY	-1.256 *** (0.138)	-0.896 (0.726)	-1.061 (1.326)	0.0058** (0.002)	-0.062*** (0.02)	-0.01** (0.005)
GDP	0,852*** (0.025)	0,832*** (0.058)	0,796*** (0.046)	-0.005*** (0.000)	0.014 *** (0.03)	-0.001 (0.001)
INFLATION	0,168*** (0.022)	0.559*** (0.247)	0.02 (0.096)	-0.009*** (0.001)	-0.037 *** (0.01)	-0.002** (0.001)
INTEREST RATE	-0,398 *** (0.026)	-0.664*** (0.308)	-0,401*** (0.17))	-0.02** (0.000)	-0.02*** (0.004)	-0.005*** (0.001)
AR(1)[1]	0.0046	0.0860	0.0367	0.1563	0.1754	0.0041
AR(2)[1]	0.0514	0.4815	0.1289	0.2003	0.2425	0.5752
SARGAN TEST	1	1	1	1	1	1
DEMAND	-2.286*** (0.661)	-0.723 (0.593)	-5.857*** (2.23)	-0.104*** (0.013)	-0.244 (0.183)	-0.022*** (0.005)
GDP	0,837*** (0.02)	0.774*** (0.073)	0,774*** (0.064)	-0.006*** (0.000)	0.011*** (0.002)	0.000 (0.001)
INFLATION	0.15*** (0.024)	0.571*** (0.268)	-0.053 (0.072)	-0.009 *** (0.001)	-0.041*** (0.007)	-0.003** (0.001)
INTEREST RATE	-0.35*** (0.063)	-0.797*** (0.317)	-0,293*** (0.131)	-0.004*** (0.001)	-0.022*** (0.004)	-0.004** (0.001)
AR(1)[1]	0.0049	0.0829	0.0268	0.1520	0.2133	0.0054
AR(2)[1]	0.0469	0.4769	0.1306	0.2304	0.2160	0.5584
SARGAN TEST[2]	1	1	1	1	1	1

Source: The robust standard deviations grouped by country are in brackets. ***, ** and * indicate significance at levels of 1,5% and 10%, respectively.

C. The impact of individual macro prudential policies

The credit growth rate is the dependent variable

For the whole sample, most of the tools are effective, but when we differentiate countries based on income; the results show that the Loan/Value ratio (LTV) and the reserve requirement (RR) are only effective for advanced countries. Hence, the problems of these countries are associated with the development of the mortgage market and foreign exchange loans given their degree of openness. While the Debt/Income Ratio (DTI) cap, the Currency Loan Limit (LFC) and the loan/deposit ratio (LTD) cap are only effective for emerging economies. Hence, the problems of these countries are associated with excessive lending.

The Z-score is the dependent variable

As expected, most individual tools are ineffective. For all regressions, existing policies with a positive and statistically significant impact appear to be neutralized by ineffective policies. For the whole countries of our sample, the tools (LEV, TAX, CAPITAL, LCG, LVR and OT) seem to be effective in reducing banking risk and enhancing financial stability.However,these effects seems to

be mitigated by negative effects of other tools (LTV, DTI, RR, SIFI and LIQUIDITY). Similarly, for advanced countries where the effectiveness of (LIQUIDITY) is limited by the ratio (DTI). While for emerging markets, the effectiveness of LEV and LIQUIDITY tools is abated by DTI and CONSERVATION tools.

TABLE 5: THE IMPACT OF INDIVIDUAL MACROPRUDENTIAL POLICIES ON CREDIT GROWTH RATES AND Z-SCORE

	Credit Growth Rate			Z-score		
	All	Advanced	Emerging	All	Advanced	Emerging
LTV	-3.529*** (0.437)	-2.264*** (0.628)	3.397 (4.852)	-0.25*** (0.029)	-0.131 (0.259)	-0.002 (0.015)
DTI	-9.189*** (1.22)	-1.169 (4.747)	-15.466** (4.797)	-0.121*** (0.015)	-0.349* (0.196)	-0.065** (0.031)
RR	-13.009*** (0.651)	-2.211** (0.861)	-8.202 (5.938)	-0.259*** (0.045)	0.075 (0.18)	-0.079 (0.182)
LEV	2.974 (2.286)		-5.413 (6.774)	0.387*** (0.038)	-15.497 (12.645)	0.111** (0.056)
CBC	-4.589*** (0.536)	-1.041 (70.467)	-20.902 (135.373)	0.085 (0.072)	-0.257 (0.163)	0.057 (0.289)
TAX	-0.016 (1.123)	16.501*** (1.999)	2,807 (7.205)	0.14*** (0.023)	-0.321 (0.279)	-0.072 (0.052)
CAPITAL	-7.378*** (0.239)	-5.559 (3.622)	-4.691 (3.554)	0.078*** (0 .008)	0.016 (0.058)	-0.037 (0.028)
LOANR	-4.03*** (0.775)	-0.968 (2.386)	7.731 (5.806)	0.000 (0.023)	-0.132 (0.122)	-0.05 (0.042)
LFX	1.073 (0.89)	-6.01 (17.559)	-1.49 (4.666)	0.049 (0.049)	-0.514 (1.082)	0.000 (0.028)
LFC	-12.371*** (1.014)	1.016 (19.229)	-7.018* (4.106)	-0.031 (0.135)	0.389 (0.543)	-0.087 (0.14)
LCG	0.17 (2.912)	5.415 (4.351)	-4.096 (7.235)	0.478*** (0.179)	-1.375 (1.627)	-0.017 (0.09)
LTD	-2.796 (6.213)		-23.392* (12.093)	0.163 (0.174)		0.107 (0.29)
LVR	8.401*** (1.082)		0.074 (3.773)	0.133*** (0.032)		0.047 (0.047)
LLP	-7.402*** (0.95)	0.512 (2.973)	2.321 (3.728)	-0.002 (0.014)	7.226 (14.752)	-0.008 (0.027)
SIFI	-5.778*** (0.869)	-32.166 (29.74)		-0.133** (0.055)		
LIQUIDITY	0.62 (1.489)	-14.024 (9.181)	-2.794 (9.539)	-0.168*** (0.022)	0.03* (0.175)	0.03* (0.016)
CONSERVATION	-1.377*** (0.493)	3.964 (18.413)	4.039 (18.572)	0.013 (0.013)	-0.009 (0.084)	-0.088* (0.051)

OT	1.673 (1.319)	-5.218 (7.782)	-1.856 (6.55)	0.155*** (0.013)	-0.071 (0.072)	0.006 (0.079)

Each instrument is added separately to the basic regression, but their coefficients are represented in the same column for greater compactness. The robust standard deviations are in brackets. ***, ** and * indicate significance at levels of 1. 5% and 10%, respectively.

IV. CONCLUDING REMARKS

A large body of literature shows the complexity of the central bank's role in financial stability, where several mechanisms and factors may play an important role. First, the study of the relationship between monetary policy and financial stability shows that the two monetary policy instruments that are inflation targeting and monetary easing, lead to an increase in financial risks through the risk-taking channel. Second, most studies on the relationship between macro prudential policy and financial stability shows the effectiveness of macroprudential regulation. Third, studies of the relationship between the interaction of the two monetary and macroprudential policies with financial stability shows that there is no consensus. Some of them prove the effectiveness of the coordination between the two policies, however, other find an ineffective relationship. Finally, the study of the relationship between the characteristics of the central bank and financial stability shows the effectiveness of three characteristics: independence, transparency and communication.

Our empirical study focuses on the impact of monetary and macroprudential policies on financial stability as represented by two indicators, the credit growth rate and the Z-score. The results show the effectiveness of both policies in reducing credit growth. Macro-prudential regulation is more effective than monetary policy, given the multiplicity of monetary objectives and the short-term interest rate limit. Macroprudential tools appear to be more effective for the emerging countries group given the degree of openness and limited external financing possibilities; they are aimed at addressing excessive lending. For advanced countries that are more financially open and offer more diversified and sophisticated external financial sources, macroprudential tools appear to be less effective and difficult to monitor, they are intended to restrict mortgage borrowingand foreign-exchange loans. However, central bank policies appear to be ineffective in reducing banking risk, it encourage investors to move to the shadow banking system, the development of corruption and the increase in financial risk through the risk-taking channel.

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Appendix

TABLEA1: THE USE OF ALL MACROPRUDENTIAL POLICIES OVER TIME (MAPP)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Armenia	1	3	3	3	3	3	3	4	4	4	5	5	6	6	6	6	6
Australia	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	4	6
Austria	2	2	2	3	3	3	3	3	3	3	4	4	5	5	5	5	5
Bahamas	1	1	1	1	2	3	3	3	3	3	3	3	4	4	4	4	4
Brazil	1	1	1	1	1	1	1	3	3	4	4	4	4	5	5	8	8
Belgique	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	4
Czech Republic	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	4	5
Chile	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
China	1	1	3	4	5	5	5	7	7	8	10	11	11	12	13	14	14
Colombia	3	3	3	4	4	4	4	5	5	6	6	6	6	6	6	6	6
Costarica	1	2	2	2	3	4	4	4	4	4	4	4	4	6	6	7	7
Egypt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESTONIA	1	1	1	1	2	2	3	3	3	3	3	3	3	3	4	7	8
Filande	2	2	2	2	2	2	2	2	2	2	4	4	4	4	4	4	5

France	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	4
Germany	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
Greece	2	2	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4
Guyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hungury	0	1	1	1	1	1	1	1	1	1	4	4	4	4	5	5	5
Iceland	1	2	2	3	3	3	3	3	3	3	3	3	3	4	4	4	5
India	1	1	1	1	2	3	3	3	3	4	6	6	6	6	8	11	11
Indonisia	0	0	0	0	0	1	1	1	2	3	4	4	5	5	6	6	7
italy	2	2	2	2	2	2	2	3	3	3	3	3	3	3	4	4	5
jamaique	1	1	1	1	3	3	3	3	3	3	3	3	3	4	5	5	5
japan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	4
Luxembourg	3	3	3	3	3	3	3	3	3	3	3	3	3	5	6	6	7
Malta	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
Malysia	4	4	4	4	4	5	5	6	6	6	7	8	8	8	8	8	8
Mexico	0	0	0	0	0	0	0	0	1	2	1	1	1	2	3	4	5
Netherlands	1	1	1	1	1	1	1	3	3	3	3	3	4	4	5	5	6
New Zealand	0	0	0	0	0	0	0	0	0	1	1	1	1	4	4	5	5
Norway	2	2	2	2	2	2	2	2	2	2	4	4	4	5	5	7	7
Paraguay	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4
Peru	2	2	2	2	2	2	2	2	2	2	3	4	6	6	6	6	6
Phellepine	5	5	5	5	5	5	5	5	5	5	5	5	5	5	6	6	6
Portugal	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4
Romania	1	1	1	1	3	4	4	4	7	7	7	7	8	8	8	8	9
russia	1	1	1	1	1	1	1	1	2	3	3	3	3	3	3	3	5
Singapore	2	2	2	2	2	2	2	2	2	2	3	3	3	5	5	6	7
si rilanka	1	2	3	3	3	3	3	3	4	5	5	5	5	5	5	6	6
southafrica	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	3	6
Spain	2	2	2	2	2	2	2	2	3	5	5	5	5	5	5	5	7
St.Kitts	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

Sweden	0	0	0	0	1	1	1	1	1	1	2	2	2	2	4	5	6
switzerland	0	0	0	0	0	0	0	0	1	3	3	3	4	6	6	6	6
thailand	0	0	0	1	2	2	3	3	3	4	4	4	4	4	4	4	4
Trinidad and Tobago	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2
Ukraine	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2

TABLE A2: THE USE OF MACROPRUDENTIAL POLICIES INTENDED AT BORROWERS: DEMAND (LTV+ DTI)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Armenia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Australia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bahamas	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2
Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
Belgique	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Czech Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Chile	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
China	0	0	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2
Colombia	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Costarica	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
Egypt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESTONIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Filande	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Greece	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
Guyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hungury	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2
Iceland	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

India	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2	1
Indonesia	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
italy	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
jamaique	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Luxembourg	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Malta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malysia	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
Mexico	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
Netherlands	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2
New Zealand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Norway	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2
Paraguay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peru	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
Phellepine	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Portugal	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Romania	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2
russia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Singapore	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2
si rilanka	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
southafrica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spain	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
St.Kitts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweden	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1
switzerland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
thailand	0	0	0	1	2	2	2	2	2	2	2	2	2	2	2	2	2
Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ukraine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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TABLE A3: THE USE OF MACROPRUDENTIAL POLICIES INTENDED AT LENDERS: SUPPLY (RR, LIQUIDITY, LFX, CAPITAL CONSERVATION, LVR, SIFI, CBC, LCG, LLP, LOANR, LFC, OT, LTD, TAX AND LEV)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Armenia	1	3	3	3	3	3	3	4	4	4	5	5	6	6	6	6	6
Australia	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	4	6
Austria	2	2	2	3	3	3	3	3	3	3	4	4	5	5	5	5	5
Bahamas	0	0	0	0	0	1	1	1	1	1	1	1	2	2	2	2	2
Brazil	1	1	1	1	1	1	1	3	3	4	4	4	4	4	4	7	7
Belgique	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	4
Czech Republic	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	4
Chile	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
China	1	1	2	3	3	3	3	5	5	6	8	9	9	10	11	12	12
Colombia	1	1	1	2	2	2	2	3	3	4	4	4	4	4	4	4	4
Costarica	1	2	2	2	3	3	3	3	3	3	3	3	3	5	5	6	6
Egypt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESTONIA	1	1	1	1	2	2	3	3	3	3	3	3	3	3	4	5	6
Filande	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	4
France	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	4
Germany	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
Greece	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3
Guyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hungury	0	1	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3
Iceland	1	1	1	2	2	2	2	2	2	2	2	2	2	3	3	3	4
India	1	1	1	1	2	3	3	3	3	4	5	5	5	5	7	9	10
Indonisia	0	0	0	0	0	1	1	1	2	3	4	4	4	4	5	5	6
italy	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	4
jamaique	1	1	1	1	3	3	3	3	3	3	3	3	3	4	5	5	5
japan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	4
Luxembourg	2	2	2	2	2	2	2	2	2	2	2	2	2	4	5	5	6
Malta	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2

Malysia	3	3	3	3	3	4	4	5	5	5	6	6	6	6	6	6	6
Mexico	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	3	4
Netherlands	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3	4
New Zealand	0	0	0	0	0	0	0	0	0	1	1	1	1	4	4	4	4
Norway	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	5	5
Paraguay	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4
Peru	2	2	2	2	2	2	2	2	2	2	3	4	5	5	5	5	5
Phellepine	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5
Portugal	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3
Romania	1	1	1	1	1	2	2	2	5	5	5	5	6	6	6	6	7
russia	1	1	1	1	1	1	1	1	2	3	3	3	3	3	3	3	5
Singapore	1	1	1	1	1	1	1	1	1	1	2	2	2	3	3	4	5
si rilanka	1	2	3	3	3	3	3	3	4	5	5	5	5	5	5	5	5
southafrica	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	3	6
Spain	2	2	2	2	2	2	2	2	3	4	4	4	4	4	4	4	6
St.Kitts	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Sweden	0	0	0	0	0	0	0	0	0	0	1	1	1	1	3	4	5
switzerland	0	0	0	0	0	0	0	0	1	3	3	3	4	6	6	6	6
thailand	0	0	0	0	0	0	1	1	1	2	2	2	2	2	2	2	2
Trinidad and Tobago	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2
Ukraine	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2

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OBTAINING SOME RESULTS THROUGH EXCHANGES IN REKURENT RELATIONSHIPS AND STUDYING THEIR APPLICATIONS IN SOLVING ISSUES

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ABSTRACT

As you know,in the field of mathematics, the question of the transition between expressions to a general aspect, based on the links, is defined by several substitutions. In this article, some types of rekurent relations and their application in the field of communication will be studied, and at the same time, methods of solving the issues proposed in many prestigious Olympiads will be presented.

KEYWORDS: *Rekurent Attitude, Sequences, Quadratic Equation.*

INTRODUCTION

An important role is played by the analysis of issues in various fields of mathematics on the basis of one general law. Especially in the theory of sequences, the formation of a formula that expresses the total limit of the sequence has several complexities. In this article, we will come up with several ways to find a recursive relationship, taking into account the processes of formation of the sequence. More precisely, the general expression of a $a_n = f(n)$sequence $a_n = f(n)$consists in the consideration of the application of methods of searching for a formula in the future transition and practical matters .

The article presents various issues and non-standard approaches to them.

First we introduce the concept of dividing some common formulas into types.

Let us be given the following attitude.

$$f_0(n)a_n + f_1(n)a_{n-1} + \cdots + f_r(n)a_{n-r} = g(n)$$

there$f_i(n)\ va\ g(n)$variable n is the functions.

If$f_r \neq 0\ va\ f_0 \neq 0$, in this case, the r-order is called the rekurent attitude.

If$g = 0$, a linear same-sex rekurent relationship without it is called.

First of all, we study the relationship of the 1-order linear recursive.

(1) $a_n = f(n)a_{n-1} + g(n) \quad n \geq 2\,, a_1 = \alpha$

There$f(n)\ va\ g(n)$functions with variable n and we

$f(n) \neq 0$let's go through the method of finding the general formula for the condition in which we.

First we enter the following auxiliary function.

$p_n = f(1)f(2)f(3)$ ... ... $f(n)$and proceeding from this it is possible to write (1) as follows.

$\frac{a_n}{p_n} + \frac{a_{n-1}}{p_{n-1}} = \frac{g(n)}{p_n}\ va\ agar\ \frac{a_n}{p_n} = \partial_n$assuming that definition, then

(2) $\partial_n - \partial_{n-1} = \frac{g(n)}{p_n}$comes to view.

If (2) to n:=2,3,4,5…….,n-1,n if we calculate the total sum by putting such numbers.

$$\partial_n - \partial_1 = \sum_{r=2}^{n} \frac{g(r)}{p_r} \quad (3)$$

So$\frac{a_n}{p_n} = \partial_n$taking into account the sign (3) write as follows

$\{a_n\}$we can move on to the relationship that characterizes the general had of the sequence.

So, $\partial_n - \partial_1 = \frac{a_n}{p_n} - \frac{a_1}{p_1} = \sum_{r=2}^{n} \frac{g(r)}{p_r} \rightarrow$

$$a_n = p_n\left(\frac{\alpha}{f(1)} + \sum_{r=2}^{n} \frac{g(r)}{p_r}\right)\ a_1 = \alpha\,, \qquad p_1 = f(1)$$

Now we will come to another rekurent attitude, which is the private status of our method we have studied.

So, we will describe the method of determining the total limit of the 1-ordinal linear, non-homogeneous, unchangeable coefficients recursive relationship.

$a_n = c_1 a_{n-1} + c_2 \ \ n \geq 2\,, \qquad a_1 = \alpha \quad bu\ yerda\ \ c_1, c_2\ \ = const\ va\ c_1 \neq 1$

We perform the following replacement$a_n = b_n + \gamma\,, \gamma = const$

$$b_n + \gamma = c_1 b_{n-1} + c_1\gamma + c_2$$

$$b_n = c_1 b_{n-1} + (c_1 - 1)\gamma + c_2$$

If we$\gamma = \frac{c_2}{1-c_1}\ deb\ tanlasak, natijada\ \ b_n = c_1 b_{n-1}$it will look like.

This is the geometric progression and its overall had$b_n = b_1 c_1^{n-1}$

it will look like.

So, $b_n = a_n - \gamma = c_1^{n-1}(\alpha - \gamma) \qquad \rightarrow \qquad a_n = c_1^{n-1}(\alpha - \gamma) + \gamma$

So, 1-we will come up with an orderly non-linear rekurent relationship

$$a_n = \frac{\alpha\, a_{n-1} + \beta}{\gamma a_{n-1} + \delta} \quad bu\ yerda\ \ \alpha\beta\gamma\delta \neq 0, n \geq 2 \qquad \frac{\alpha}{\gamma} \neq \frac{\beta}{\delta}$$

We do the following replacement. $a_n = b_n + x$

$$b_n + x = \frac{\alpha b_{n-1} + \alpha x + \beta}{\gamma b_{n-1} + \alpha x + \delta}(1)$$

(1) From attitude find b_n, we will have the following.

$$b_n = \frac{(\alpha - x\gamma)b_{n-1} + (\alpha x + \beta) - x(\gamma x + \delta)}{\gamma b_{n-1} + \alpha x + \delta}$$

Now in this case we select x as follows. $(\alpha x + \beta) = x(\gamma x + \delta)$

If we find x from this, we need to solve the following quadratic equation. $\gamma x^2 + (\delta - \alpha)x - \beta = 0 \qquad x = x_1, x_2$

If we select an x_1 root of this equation, we will have the following.

$$b_n = \frac{(\alpha - x_1\gamma)b_{n-1}}{\gamma b_{n-1} + \alpha x_1 + \delta}$$

Or we can write differently as follows

$$\frac{1}{b_n} = \frac{\gamma x_1 + \delta}{(\alpha - \gamma x_1)b_{n-1}} + \frac{\gamma}{(\alpha - \gamma x_1)}$$

And this becomes a simple rekurent relationship, which we consider at the beginning, if we do the following replacements.

$$\frac{1}{b_n} = f_n \qquad => f_n = c_1 f_{n-1} + c_2$$

There $c_1 = \frac{\gamma x_1 + \delta}{(\alpha - \gamma x_1)}$ and $c_2 = \frac{\gamma}{(\alpha - \gamma x_1)}$

We will solve the following wonderful issue with the practical application of the revised rekurent relationship.

Issue 1: *Let's say* $\{a_n\}$*is a sequence of real numbers, let it have the following conditions.*

$$a_1 = 1\,, a_{n+1} = \frac{1}{16}(1 + 4a_n + \sqrt{1 + 24a_n})$$

$$that a_n = f(n) determine\ the\ appearance$$

Solution: in order to get rid of the square root,we perform the sign as follows.

$$1 + 24a_n = b_n^2\ ,\ \ b_n > 0 \quad => a_n = \frac{b_n^2 - 1}{24}$$

$$a_{n+1} = \frac{1}{16}\left(1 + 4a_n + \sqrt{1 + 24a_n}\right) \quad => \frac{b_{n+1}^2 - 1}{24} = \frac{1}{16}(1 + \frac{1}{6}(b_n^2 - 1) + b_n)$$

Simplified the last expression, in case we come to the following.

$4b_{n+1}^2 - 4 = b_n^2 + 6b_n + 5 \quad => \quad 2b_{n+1} = b_n + 3 \ , n \geq 1 \ because b_n > 0$

Now in this case $b_n = c_n + \delta$ if we do the replacement, we get the following.

$2(c_{n+1} + \delta) = \ c_n + \delta + 3 <=> 2c_{n+1} = c_n + 3 - \delta$ and this is due to the expression $3 = \delta$ if we choose as $=> c_{n+1} = \frac{c_n}{2} \quad => c_n = (\frac{1}{2})^{n-1} c_1$

This $b_n = 3 + \frac{1}{2^{n-2}} that's\ easy\ to\ find.$

We find the relationship $a_n = f(n)$ required of us as follows

$$b_n{}^2 = (3 + \frac{1}{2^{n-2}})^2 = 9 + \frac{1}{2^{2n-4}} + \frac{6}{2^{n-2}}$$

$=> a_n = \frac{1}{24}(8 + \frac{1}{2^{2n-4}} + \frac{6}{2^{n-2}})$ it turns out that.

The issue was resolved.

Let's come up with some great issues to work independently

[1] $If\ \{a_n\} is\ a\ sequence\ of\ real\ numbers, it\ has\ the\ following\ conditions$

$$a_1 = 0\,, \qquad a_{n+1} = \frac{6a_n + 2}{4 - 13a_n} \ .\ So\ find \{a_n\}.$$

[2]: $\{a_n\} the\ sequence\ of\ integers\ satisfies\ the\ following\ condition.$

$-\frac{1}{2} \leq a_{n+1} - \frac{a_n^2}{a_{n-1}} \leq \frac{1}{2} \quad , \quad a_1 = 2, \ a_2 = 7\ .So \quad \forall n \geq in\ 2 \ \ a_n prove\ that\ the\ odd\ consists\ of\ a\ sequence\ of\ numbers.$

(BMO 1988)

[3]: $\{x_n\} the\ sequence\ is\ defined\ as\ follows$

$x_1 = a\ , x_2 = b \quad and x_{n+2} = 2008x_{n+1} - x_n$. Without it there are such a and b, $\forall n \in N \quad for \quad 1 + 2006x_{n+1}x_n there\ will\ be\ a\ full\ square.$

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IMPROVEMENT OF CENTRAL BANK'S MONETARY POLICY

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ABSTRACT

The dissertation identifies problems associated with improving the regulatory framework of monetary policy and develops scientific proposals and practical recommendations aimed at solving these problems. This is due to the fact that in recent years in our country it has not been possible to ensure the investment attractiveness of financial assets, including shares, due to rising prices and high rates of depreciation of the national currency. The high growth rates of the money supply in recent years have undoubtedly stimulated the expansion of effective demand and contributed to the maintenance of positive GDP growth rates (although this has not always been possible). The current macroeconomic situation, including the current dynamics of inflation and forecast indicators, as well as the need to ensure stable and balanced economic growth, requires the central bank to take concrete and more effective measures to ensure price stability.

KEYWORDS: *Monetary Policy, Central Bank, Commercial Bank, Refinancing Rate, Required Reserve, Open Market Operations, Inflation, Devaluation, Exchange Rate, Money Supply, Demand For Money.*

INTRODUCTION

Improving the economic development of the country, ensuring the stability of the national currency, preventing the rise in inflation directly depends on the level of improvement of the Central Monetary Policy. The high growth rates of the money supply in recent years have undoubtedly stimulated the expansion of effective demand and contributed to the maintenance of positive GDP growth rates (although this has not always been possible). At the same time, the United States can pay off for the constant commitment of the FRS to stimulate the economy by expanding the money supply by increasing inflationary processes. In recent years, the Consumer Price Index (CPI) has increased annually by no more than 2.5-3% due to the expansion of the financial market, which absorbed the growth of the money supply. In a recession, there is a real threat that inflation will spiral out of control. A significant increase in the price level can lead to a

breakdown of the monetary system, a decrease in the inflow of investment into the economy, and a further drop in GDP. [1].

Improving the regulation of the money supply by the Central Bank of Russia, including the elimination of excess liquidity in the banking system by increasing the flexibility of the base interest rate, increasing the volume of transactions on the open market, will allow keeping the annual inflation rate within the forecast range. for 2018, amounted to 3%) [2].

The strategy of actions in five priority areas of development of the Republic of Uzbekistan for 2017-2021 recognizes the improvement of monetary policy using instruments widely used in international practice as one of the necessary conditions for ensuring the stability of macroeconomic growth (PC ^ -2017). This, in turn, gives rise to the need to improve the regulatory framework of monetary policy [3].

MATERIAL AND METHOD

According to J. Tobin, the government and the Central Bank can influence the rate of return on capital acceptable to investors by controlling the demand for financial assets and their supply, influencing their profitability. If the monetary authorities want to lower the expected rate of return on capital, which is acceptable to investors, then as an investment in real capital, they can affect the market rate of return on shares [4].

The conclusion of J. Tobin is of great practical importance for the economy of Uzbekistan. This is due to the fact that in recent years in our country it has not been possible to ensure the investment attractiveness of financial assets, including shares, due to rising prices and high rates of depreciation of the national currency. In turn, the decline in inflation and the devaluation of the national currency are issues within the competence of the government and the Central Bank. Therefore, in the Action Strategy for five priority areas of development of the Republic of Uzbekistan for 2017-2021, ensuring the stability of the national currency and reducing inflation has become a necessary condition for ensuring macroeconomic stability.

M. According to Friedman, the Central Bank has sufficient potential to regulate the money supply, and inflation is not a multifactorial process when it is a purely monetary phenomenon. Consequently, inflation can be curbed by regulating the money supply, and this task can only be fulfilled by the Central Bank [5].

M. Friedman scientifically substantiated that the annual growth rate of the money supply should be set as a strict indicator, and the implementation of this indicator should be monitored by the Central Bank. He proposed to set the annual growth rate of the money supply at 4% and that the growth of the money supply should be based on a steady increase in the price of the final product over a long period of time.

While F. Mishkin evaluates the open market operations of the US Federal Reserve System (FRS), FRS is mainly within the framework of the open market policy. It explicitly acknowledges that the US government sells and buys securities and that it does not trade in securities of private companies in order to avoid conflicts of interest. [6]

B. McCallum and K. David proposed to consider an individual's decision in relation to money not in isolation, but on the basis of a general model of human well-being [7].

Taylor's monetary rule allows the central bank to determine the possibility of interest rate changes in response to price changes and fluctuations in real output relative to its equilibrium level, and it

has a stabilizing property, that is, the ability to minimize cyclical fluctuations in the economy. However, practice has shown that the Taylor rule has certain drawbacks. In particular, GEP inflation indicators and GDP information may not fully cover economic variables.

Since there are other important indicators, such as monetary aggregates, credit multiplier, exchange rate, budget deficit, they cannot be ignored for a deeper analysis [8].

Uzbek economist O. Namozov studied the exchange rate of the national currency from the elements of the monetary system. According to his scientific conclusion, it is necessary to help solve the problem of liberalization of the over-the-counter foreign exchange market, ensuring the optimal unification of the exchange rate of the soum [9].

The scientific works of T. Bobakulov (Bobakulov, 2008) studied the issues of improving the practice of using the monetary policy instruments of the Central Bank of the country, ensuring the stability of the national currency. Based on the results of the study, he comes to the conclusion that the transfer of a part of the additional foreign exchange earnings to the Central Bank of the republic as a result of the conjunctural increase in prices for export from the country increases its ability to conduct foreign exchange interventions. and refinancing loans [10].

Results

The adoption of the new Law of the Republic of Uzbekistan "On the Central Bank of the Republic of Uzbekistan" plays an important role in strengthening the regulation of the economy with the help of monetary instruments, improving the regulation of the money supply [11].

According to Article 5 of the Law, the main tasks of the Central Bank are:

- ensuring price stability;

- ensuring the stability of the banking system;

- ensuring the stability of payment systems.

Central bank actions to ensure the stability of the banking system should not adversely affect price stability.

Profit is not the goal of the Central Bank. According to article 13 of the Law "On the Central Bank of the Republic of Uzbekistan", the authorized capital of the Central Bank is one trillion soums.

The increase in the authorized capital is carried out by the decision of the Senate of the OliyMajlis of the Republic of Uzbekistan.

The authorized capital of the Central Bank cannot be transferred to other persons or used as collateral.

According to the law, the Central Bank develops and implements monetary policy through measures:

- Formation of forecasts of macroeconomic indicators, including inflation, as well as the establishment of its target indicator;

- development of the main directions of monetary policy for the next year;

- setting goals in terms of monetary indicators;

- setting the refinancing rate and base rate, as well as interest rates on monetary transactions of the Central Bank;

- the establishment of standards for the required reserves of banks in the Central Bank;

- operations to provide and withdraw liquidity in the money market;

- interventions in the domestic foreign exchange market;

- Carrying out the communication policy of the Central Bank.

The US Federal Reserve System makes extensive use of monetary policy instruments such as refinancing policy, open market policy, monetary policy, and deposit policy. FRS does not use reserve requirements as a monetary policy instrument.

FRS loans play an important role in providing liquidity to commercial banks. FRS offers commercial banks several types of centralized loans at the same time. In particular, discount loans, secured loans, overdrafts and overnight loans are widely used.

The large volume of US government securities issues allows the FRS to use open market policy as a key instrument of monetary policy.

The volatility of the US dollar also worries countries such as Japan, Germany, France, the UK and China.

Because most of their international foreign exchange reserves are formed in US dollars.

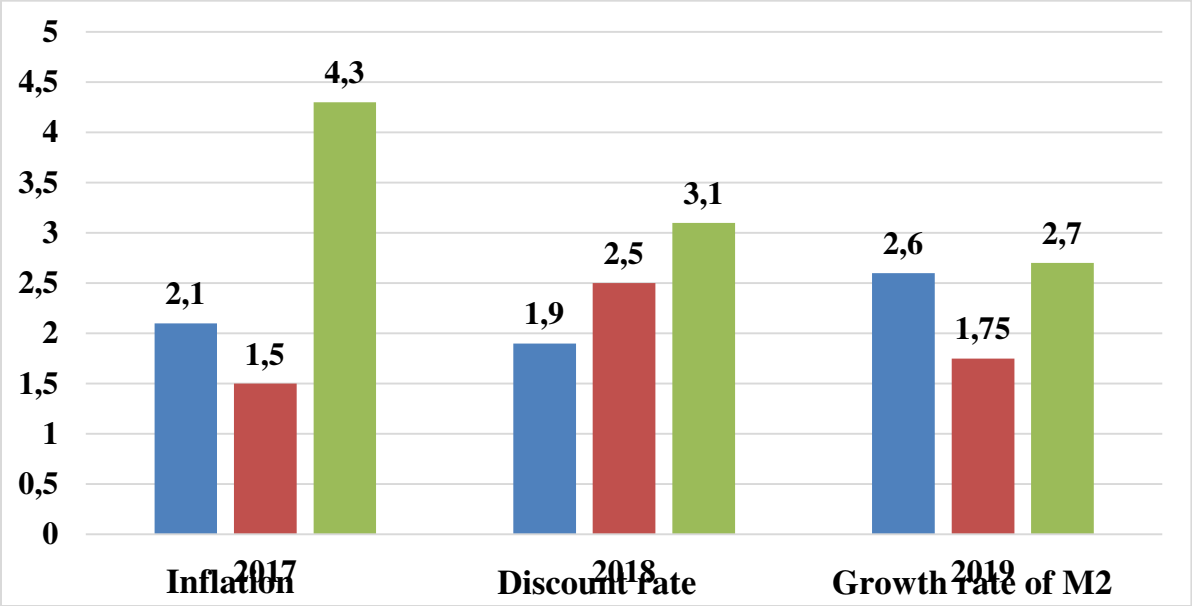

Figure 1. Annual inflation rate in the USA, discount rate of FRS and annual growth rate of money supply in percent [12]

Figure 1 shows that the annual inflation rate in the United States in 2017-2019 was moderate, that is, no more than 3 percent.

Figure 1 shows that the US FRS discount rate was increased by 1.0 percentage point in 2018 compared to 2017, but the discount rate was lowered in 2019 due to the country's slowdown in economic growth in 2019.

Figure 1 shows that in the USA in 2017-2019 there was a slowdown in the growth rate of the money supply.

From October 1, 2018, the country introduced the procedure for the formation of required reserves only in national currency, unified reserve requirements for deposits of legal entities and individuals, i.e. reduced reserve requirements for deposits in national currency and increased reserve requirements for deposits in foreign currency.

In order to ensure the return of assets in national currency in the face of increasing direct and indirect pressures of external factors on inflation and the creation of monetary conditions aimed at preventing the impact of government spending, including raising monthly wages and liberalizing inflation prices. Expectations and ensuring positive real interest rates From September 25, the Central Bank raised the refinancing rate from 14% to 16% per annum.

In 2018, the Central Bank of the Republic of Uzbekistan developed the main directions of monetary policy for 2019 and 2020-2021. In accordance with these guidelines, a strategy has been developed for their implementation in 2019-2021, taking into account the inadequacy of existing monetary policy instruments (interventions, refinancing rate, required reserves, Central Bank loans), their inefficiency and limited ability to influence liquidity in the banking system within the established terms, revision of methods was provided.

TABLE 1 REFINANCING OF THE CENTRAL BANK OF THE REPUBLIC OF UZBEKISTANAND THE RATE OF REQUIRED RESERVES IN PERCENT [13]

Indicators	**2017 й**	**2018 й**	**2019 й**	**2020 й**	**2021 й**
Refinancing rate, annual	14	16	16	15	14
Mandatory reserve rate on deposits of commercial banks in national currency	12,5	9,0	4,0	4,0	4,0

The data in Table 1 show that the refinancing rate of the Central Bank of the Republic of Uzbekistan in 2018 and 2019 remained unchanged at the level of 16.0%. According to the data, in 2017-2021, there is a trend towards a decrease in the rates of required reserves established by the Central Bank of the Republic of Uzbekistan on deposits of commercial banks in national currency. This is a positive situation in terms of providing liquidity to banks.

According to Table 1, the refinancing rate of the Central Bank of the Republic of Uzbekistan in 2020 compared to 2019 decreased by 1.0 percentage points.

This decision was made in order to further reduce the dynamics of inflation, maintain real interest rates in the economy at a positive level, as well as create favorable conditions for the recovery of economic activity.

In 2021, the Central Bank, together with the government, will consider all necessary measures to achieve the intended target of inflation below 10 percent by the end of the year.

Since the second half of 2020, the relative stability of regulated prices, stagnant consumer demand and, in general, changes in macroeconomic conditions have contributed to a slowdown in the annual rate of price growth. By the end of 2020, the rate of inflation slowed from 15.2 percent in 2019 to 11.1 percent. [14]

The current macroeconomic situation, including the current dynamics of inflation and forecast indicators, as well as the need to ensure stable and balanced economic growth, requires the central bank to take concrete and more effective measures to ensure price stability. Based on this, the

Central Bank focused on determining the conditions of monetary policy by actively applying the inflation targeting regime at the new stage of structural reforms. Such as:

- 5 percent constant inflation target (target) from 2023);
- In 2021, the goal was to reduce inflation to 10 percent.

In the coming years, factors such as the continuation of the current dynamics of economic development, the gradual implementation of structural reforms and a slight slowdown in the global economy will be taken into account when developing the main directions for determining priorities aimed at achieving a constant and intermediate target level of inflation.

DISCUSSION

Our research and analysis is aimed at identifying aspects of the Central Bank's monetary policy related to ensuring economic stability, managing transactions and influencing the money supply. Although economists have conducted a number of scientific studies to ensure the effectiveness of central bank monetary policy, we see that their impact on the money supply through the correct choice of indicators of direct monetary policy is limited to scientific and theoretical aspects.

CONCLUSION

When writing a scientific article, the following topical issues were identified related to improving the regulatory framework of monetary policy pursued by the Central Bank of the Republic of Uzbekistan:

1. The current instructions of the Central Bank do not reflect the criteria for choosing a monetary policy indicator.

The best foreign experience shows that for the correct choice of a monetary policy indicator, it is necessary to clearly define the criteria for choosing an indicator.

2. The problem associated with improving the regulatory framework for the practice of regulating the money supply.

The crux of the problem is that, firstly, there is no similarity between the change in the refinancing rate and the change in the rates of required reserves; secondly, the methods of regulating the money supply, which is formed under the influence of non-monetary factors of inflation, have not been clearly reflected in the existing regulatory documents.

To improve the regulatory framework of monetary policy, it is necessary to take the following measures:

1. In the current instructions of the Central Bank, the following criteria for the selection of indicators of monetary policy should be clearly reflected in the current instructions:

* The possibility of preventing the growth of the real exchange rate of the national currency in the inflation targeting mode;

* The impact of fiscal policy on the indicators of monetary policy;

* The impact of monetary policy indicators on the creditworthiness of commercial banks;

* Requirements for a quantitative assessment of the impact of monetary policy indicators on macroeconomic indicators;

* Influence of factors outside the competence of the Central Bank on the indicator of monetary policy.

2. To improve the regulatory framework for regulating the money supply, it is necessary to take the following measures:

* The procedure for monitoring changes in interest rates on the loan capital market through the Central Bank REPO auctions should be reflected in the regulations;

* Given the high share of cash in the monetary aggregate M1, it is necessary to change the monetary policy indicator and make the monetary aggregate M1 the object of control of the Central Bank.

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INNOVATIVE MANAGEMENT METHODS OF COMMERCIAL BANKS ARE THE KEY TO DEVELOPMENT

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ABSTRACT

This article discusses ways to manage commercial banks based on innovative approaches to increase sustainability and efficiency. At the same time, theoretical and practical proposals for the improvement of innovative management methods have been formed. . Financial assistance was provided to enterprises and organizations to prevent production downtime. It was noted that in the short term, attention should be paid to the financing of profitable projects. Of course, the reforms carried out in the development of the banking system are being implemented systematically.

KEYWORDS: *Innovation, Management, Methodology, Innovative Projects, Innovative Products, Banking Efficiency.*

INTRODUCTION

Today, the basis for economic development of the country is the effective regulation of financial market participants, increasing the stability, liquidity and profitability of the banking system, which is one of the main financial support, is of great importance for every commercial bank.

Especially in the current unstable economic situation, the expansion of the financial crisis through the ongoing Covid-19 pandemic in many countries requires the improvement of socio-economic reforms and increasing the stability of the banking and financial sector.

In this regard, it is expedient to ensure the stability and liquidity of the banking system, as well as the formation of "cushions" against internal and external risks.

At the same time, there are still unresolved problems in the banking system, in which President Shavkat Mirziyoyev said: The quality of banking services is not at the required level due to the use of outdated software.

In order to create a healthy competitive environment in the system, state participation in the activities of banks is gradually being reduced. In particular, the interest rate on loans under government programs has been equated with the refinancing rate and is set to be fully liberalized

from 2021. This will encourage banks to find more customers, attract resources, search for and develop loans ”[1].

The process of providing loans to sectors that are economically viable and effective in solving the problems that existed before and caused by the pandemic, as mentioned above, continues. Deferment of loan payments was also allowed. Financial assistance was provided to enterprises and organizations to prevent production downtime. It was noted that in the short term, attention should be paid to the financing of profitable projects.

In this regard, the draft law "On Innovative Activity" has been developed in our country. The law provides for targeted soft loans as a source of funding for innovative activities, which sets tasks for the development of new innovative goods and services.

LITERATURE REVIEW

Today, the development of the economy requires an increasingly serious impact from an innovative point of view, because the specificity of certain operations has a positive impact on the growth of the economy, the sustainable operation of all its segments [2].

As for the concept of "innovation", it is interpreted as "the end result of innovative activity integrated in the form of a new or improved product or technological process introduced in the market, applied in practice [3]".

Innovation is a set of knowledge and actions that lead to the creation or expansion of new products, services, processes and markets. Thus, innovation is recognized as one of the competitive forces of the organization [4].

According to economist I. Balabanov (2001) "innovation is a tangible result of the introduction of capital into new techniques or technologies, new forms of organization of production, labor, services and management, methods of planning and analysis [5]".

"Innovation is the result of positive activity aimed at the development, creation and dissemination of new products, technologies, the introduction of new organizational forms [6]," described the economist A.B. Borisov (2006).

At present, technological innovation is one of the most important tools influencing the economic sector, as well as the banking sector. According to De Young (2001), technological advances eliminate the models used in the development and provision of services in banks and replace them with new and alternative ones [7].

As economists I.Hobe and R.Alas (2016) have pointed out, innovation is one of the key factors in the profitability of banks and in the 21st century it is becoming increasingly crucial in terms of performance and competitiveness [8].

Commercial banks are one of the main subjects of innovation. Innovation is the interconnectedness of business models, the creation and implementation of organizational, functional products, completely new operational innovation services (Fliginskix T.N. 2016) [9].

It is necessary to identify the types of innovations in the banking system, including information technology (primarily bank cards, internet banking, mobile banking), consumption (mortgage, fast credit, leasing) and management (monitoring and control).

From the above definitions, we can see that one of the main sources of economic development in all areas today is innovative management.

Analyzing the scientific and theoretical views of economists, the author's approach to the innovative management of the banking system was formed. *"Innovation management is to increase the income of customers and the bank through the effective transfer of the pyramid of innovative ideas, technologies, services, products to the banking system".*

Research methodology.

This article uses methods such as analysis of scientific works, scientific monographs, textbooks and articles of foreign and domestic scientists, statistical analysis of commercial banks, analytical comparison of tables, grouping, calculation of quantity and quality indicators, comparing them with each other.

Analysis and discussion of results.

But the innovation will have a strong impact on the financial segment of the market. It should be noted that the minimal and short-term dynamics of some processes in the financial sector stimulate significant economic changes not only at the level of interstate regulation, but also in the entire international financial system [10]. Therefore, change in every sector of the economy is an impetus for rapid development, which is also closely linked with the banking system.

1-TABLE ANALYSIS OF CAPITAL AND ASSET PROFITABILITY OF COMMERCIAL BANKS[11]

Indicators	2016	2017	2018	2019	2020
ROE	12,6%	10,8%	12,8%	16,9%	10,1%
ROA	2,02%	1,7%	1,6%	2,0%	2,3%

In the banking system, the main focus will be on the bank's capital base and asset profitability.

In this table, the trend of changes in the profitability indicators of capital and assets of commercial banks for 5 years is presented.According to the state of January 1, 2020 year, ROA amounted to 2,3%, ROE 10,1%. Between the years 2016-2020, we can see that the level of profitability of capital of commercial banks decreased by 2,5 percent, while the profitability of banking assets increased by 0,3 percent. This is evident from the fact that banks do not have sufficient income from their capital and assets. In this regard, the use of innovative management techniques and the solution of problems related to the management of bank assets and liabilities is relevant.

Of course, the reforms carried out in the development of the banking system are being implemented systematically. It is desirable to focus the main attention on improving the ways of innovative management of banks and the practice of foreign countries.

In the practice of foreign countries, there is a policy aimed at developing a system of priorities and incentives that will direct their resources to support innovative development. The implementation of such a system requires the implementation of the following measures:

- ✓ Promoting public awareness of the establishment of specialized innovation banks;
- ✓ Encourage the state to create funds for long-term lending to banks by establishing appropriate tax incentives for funds allocated to achieve technological change. Economic-based taxes, which serve as an incentive, strengthen investment and innovation processes;
- ✓ Differentiation of the tax rate on the profit of banks depending on the area of use of resources - reduction of the rate in the allocation of resources for long-term lending to innovative

projects;

- ✓ Creation of a system of preferential guarantees for banks that provide soft loans for the implementation of investment projects for the development and introduction of innovative products;
- ✓ Introduction of a mechanism of state insurance of loans to entrepreneurs working in the development and production of high-tech products;
- ✓ Incentives for banks in the purchase of shares of enterprises producing innovative products by exempting the bank's income from the tax on income from shares in these enterprises;
- ✓ Improving the legal regulation of loan collateral for the development of innovative activities;
- ✓ Reduction of the reserve ratio for banks lending to innovative projects [12].

The implementation of these measures will lead to the fact that in the near future the main source of financing innovative projects in the conditions of an innovative economy will be bank loans.

Also, the analysis of economic resources and modern research shows that the structure of innovation strategy and subsequent stages of effective management in the Commercial Bank innovation process:

- identify changes in the bank's activities and needs by monitoring the external and internal environment of the bank;

- teamwork in developing a strategy and program of change to achieve the goal;

- support of innovative activity of personnel [13].

At this stage of development, the introduction of modern technologies and business processes in the financial sector will allow banks to operate effectively in two directions. In this case, banks will have to buy existing fintex startups or finance startups independently [14].

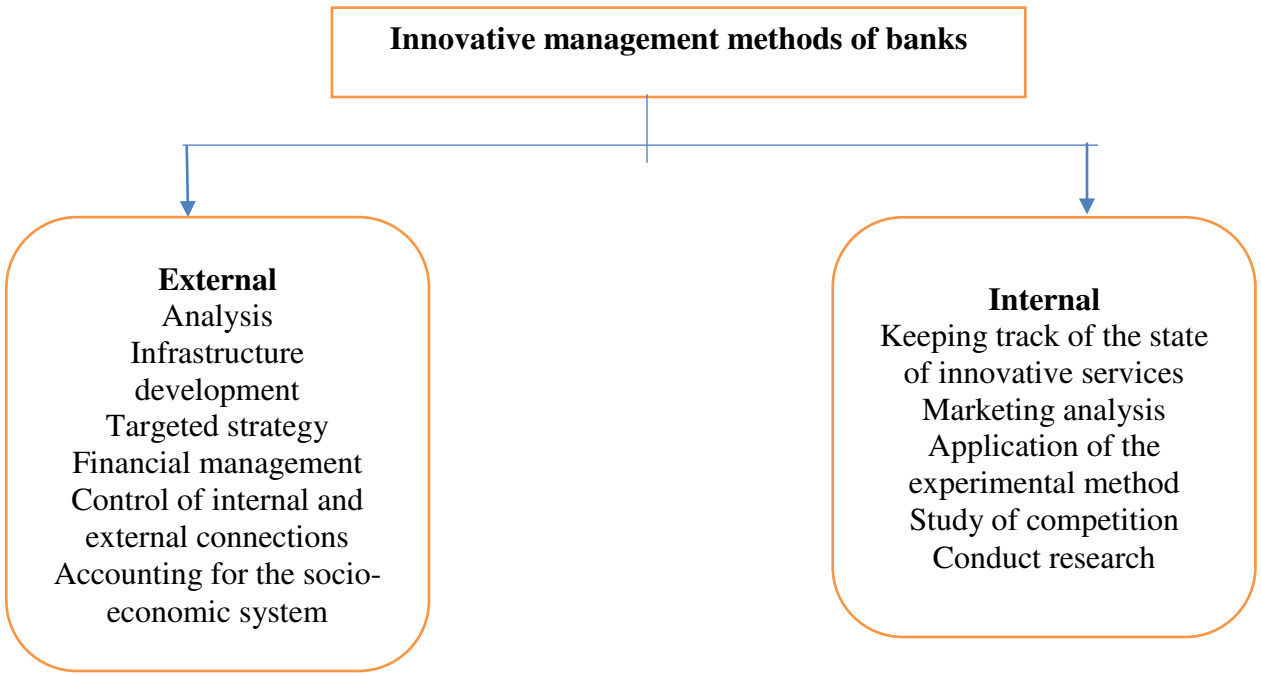

Figure 1. Innovative management methods of commercial banks [15]

Of course, banks are not ready for such decisions, it is a very complicated process, and today only the largest banks, which are the main link in the state banking system, are ready. At the same time, the use of innovative management methods in the management of commercial banks has a positive effect. It is expedient to divide the methods into internal and external types. In the method of external innovation management, first of all, the analysis should be carried out.Because the analysis allows us to identify all the problems and study the causes of their origin. The analysis of the internal and external environment of the financial market by banks is a key factor in determining the future tasks of foreign banks, countries, relations, as well as the study of the current economic situation in the country.

Infrastructure development is one of the most important tasks today, and foreign operations also show the need to pay special attention to infrastructure. In the banking system of the country, more attention is paid to the number of branches and financial resources are directed. In this case, it is advisable to use foreign experience.

Through a targeted strategy, commercial banks need to develop the bank's micro, meso and macro strategies, taking into account external and internal influences and factors.

TABLE 2. FORECASTING PERIOD OF THE BANK'S ASSETS AND LIABILITIES [16]

№	Planning period	Planning time	Form of implementation of results
1.	Macro planning	3-5 years	Active and passive operationsdeveloping a shaping strategyexit
2.	Mezo planning	1 year	Active and passive operationsdevelop a current plan of structure and size
3.	Micro planning	Moon, quarter	Active and passive operationsfast in structure and sizedevelop planned tasks exit

In financial management, the control, distribution and redistribution of cash flows also depend on the proper focus of revenue and expenditure.

Control over internal and external relations It is advisable to strengthen relations with correspondent banks and establish contacts with new banks.

If we talk about the methods of internal innovation management of a commercial bank, we must first keep track of the state of innovative services. Today, it is expedient to increase the share of innovative services in our banks and implement foreign experience.

Marketing analysis is a key factor in all areas. Therefore, ensuring the continuity of marketing analysis in innovative management methodology will only give a positive result and make it possible to avoid problems.

The main processes in the methodology of internal management are the introduction of a new idea or type of service in the bank branch by applying the experimental method in banking activities to reduce the level of risk.

It also allows banks operating in the financial market to maintain the stability and increase profitability of banks through the study of competition.

It is advisable to conduct research and create new innovative programs and services. In foreign

experience, too, commercial banks develop their own new types of services and sell them to other banks as an author. This will bring additional income to the banks.

CONCLUSIONS AND SUGGESTIONS

In improving the specifics of the banking sector and the process of innovative management methodology, we offer the following:

- Satisfaction of previously undisclosed needs of consumers through banking products with attractive consumer properties;

- development of new markets through regional expansion of banking activities and diversification of services;

- development and improvement of service tools that increase the efficiency of the bank;

- formation of an innovative system of management of the scope of innovative investment services, bank loans and risk;

- It is necessary to expand the organizational structure of the bank, which will ensure sustainable growth of financial results, economic efficiency and depending on the size of the consumer market.

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IMPROVING THE ORGANIZATION OF THE RESOURCE BASE OF PRIVATE BANKS OF THE REPUBLIC OF UZBEKISTAN

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ABSTRACT

This article is devoted to the formation of the resource base of private banks operating in the Republic of Uzbekistan. The data are taken from the analysis of financial statements on the banking system issued by the Central Bank of the Republic of Uzbekistan. It covers the activities of 6 existing private banks in the Republic of Uzbekistan. In addition, a conclusion was drawn on the elimination of abstract problems in the formation of the resource base of private banks. The ultimate goal of radical reforms in the banking and financial system of the country is to strengthen the resource base of banks, increase the level of bank capitalization, increase the confidence of businesses and the public in the banking system. Summing up our econometrically formed model, it should be noted that taking into account other factors, the volume of bank assets amounted to 1 billion.

KEYWORDS: *Private Banks, Resource Base, Capital, ROA, ROE.*

INTRODUCTION

In the world banking practice, the resource base of the banking system is necessary to stabilize the current socio-economic situation and make important strategic decisions on the future development of each country. The formation of resources for all commercial banks plays an important role, as the composition and size of their resources directly expand the scope of active operations of banks. Therefore, the amount of profit they will receive in the future is the key to the success of banking activities. "These processes require banks to create their own sufficient resource base, optimize the structure and strengthen it" [1].

At present, the issues of resource base and strengthening of commercial banks, their level of capitalization and insufficient resource base, weakness in attracting and increasing the volume of time and savings deposits, weak attraction of subordinated debt obligations by them are not sufficiently disclosed. In particular, issues related to increasing the level of capitalization of

commercial banks, ensuring a stable resource base, further strengthening the resource potential remain relevant in ensuring the stability of the resource base of commercial banks.

The ultimate goal of radical reforms in the banking and financial system of the country is to strengthen the resource base of banks, increase the level of bank capitalization, increase the confidence of businesses and the public in the banking system. In particular, "the issue of increasing the minimum authorized capital of banks to 500 billion soums by 2025" [2] and "the task of deepening the reform of the banking system, increasing the deposit base, strengthening their financial stability and reliability" [3]. In our country, the "Strategy for reforming the banking system of the republic for 2020-2025" [2] provides for the gradual privatization of state shares in 6 banks. These reforms require a further increase in the share of private banks and the strengthening of their resource base.

LITERATURE REVIEW

In times of banking crises in international practice, the bank's resource base is the most important factor in ensuring their stability. Alexei Mints, Victoria Marhasova, Hanna Hlukha, Roman Kurok and Tetiana Kolodizieva in their research found that the most optimal sources of the resource base of banks are the funds of other banks (bankruptcy rate -5.7%), funds of legal entities (bankruptcy rate -8.0%) and physical funds of individuals (bankruptcy rate - 28.5 percent) were recognized [4]. Given the crucial process of protecting banks from bankruptcy in these crises, it is necessary to set specific requirements to ensure their financial stability and further strengthen their resource potential.

There are different views on the formation and strengthening of the bank's resource base by economists.

Russian scientists E.G. Shershneva, E.S. Kondyukova learned that the bank's resource base can be realized through the formation of its own funds and borrowed funds [5].

In the textbook "Banking", co-authored by U.O.Azizov, T.M.Karaliev and others, the resource base of commercial banks is divided into the bank's own funds, equivalent funds and borrowed funds by type of resources [6].

According to one of our local scientists, Professor Sh.Z.Abdullaeva, "The resource base of commercial banks determines the level of its credit potential. The resource base created by the bank can be used to provide various loans and to finance investments and other active operations [7].

The resource base of private banks is a source of their own funds, as well as a condition for their return to the free funds of legal entities and individuals, used to increase opportunities for mobilizing financial resources and expanding the volume of active operations in order to maintain a high level of competitiveness and a positive image - the amount of borrowed and borrowed money [8].

MATERIALS AND METHODS

The analysis used the methods of statistical grouping, Grouping, comparison, systematic approach, and structural analysis

RESULTS AND DISCUSSION

Despite the above reforms, at present the resource base and total capital of private banks in the

country, the share of the banking sector in total capital remains low. The total resource base of private banks is only 4% of all commercial banks and 5.3% of their own funds[9]. When analyzing the resource base of private banks, the study of its composition is of particular importance.

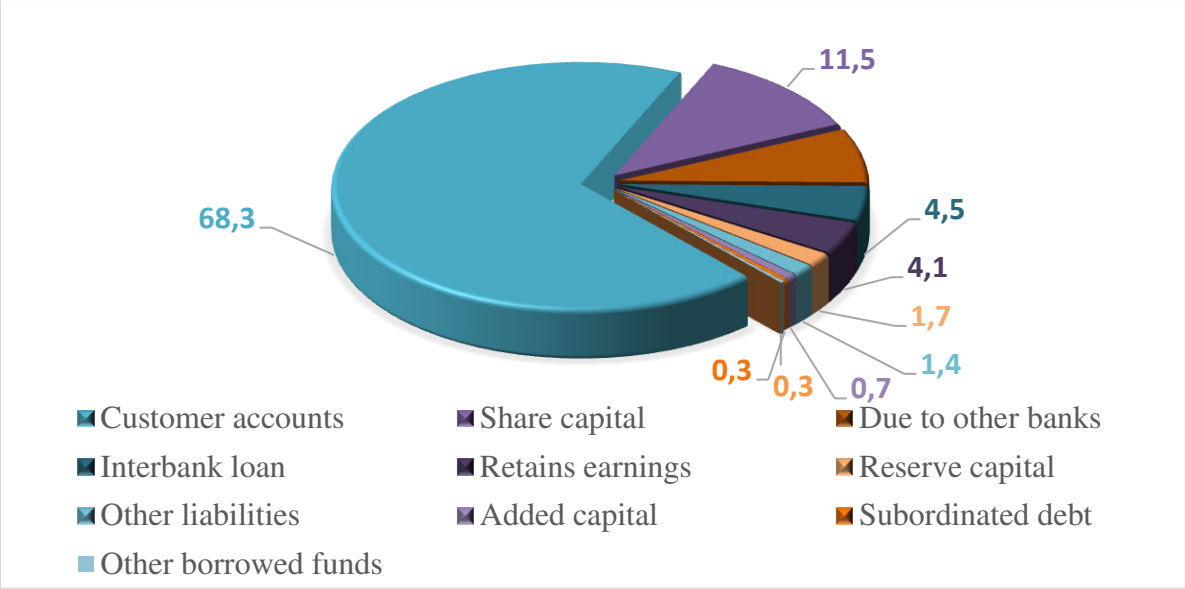

Figure 1. The structure of the resource base of 6 private banks operating in the Republic of Uzbekistan (in percent for 2019) [9].

As can be seen from the data in Figure 1, the main share in the structure of the resource base of private banks in 2019 was 68.3% of customer funds. After that, a large share was taken by their authorized capital and funds of other banks. Their share is 11.5 and 7.1 percent, respectively. As of January 1, 2020, the share of non-deposit funds of private banks in the structure of the resource base amounted to 13.7%, the bulk of which were funds from other banks (7.1%). Unfortunately, the share of subordinated debt obligations and other loans issued by private banks in the structure of non-deposit operations is very small. The fact that they are equal to 0.3%, respectively, suggests that the additional capital of private banks is not sufficiently formed. It turns out that special attention should be paid to optimizing the structure of the resource base of private banks.

CONCLUSION

Summing up our econometrically formed model, it should be noted that taking into account other factors, the volume of bank assets amounted to 1 billion. An increase in the recursive base of private banks by 0.42 billion soums, an increase in the number of branches by 1 unit by 154.5 billion soums, an increase in the long-term interest rate of banks by 1%, a returnable base of private banks by 313.76 billion soums and an increase in profitability banking capital by 1% led to an increase in the recursive base of private banks by 53.18 billion soums, and an increase in the profitability of bank assets by 1% increased the recursive base of private banks. for 495.75 billion soums. we see that this leads to a decrease in the amount.

In the course of our study, along with identifying existing problems in the process of forming the resource base of private banks, we identified ways to ensure the sustainability of the resource base of private banks by overcoming them as much as possible. In our opinion, these are:

1. It is important to constantly increase the share of the authorized capital in the bank's capital. After all, the authorized capital is the most stable part of private capital, along with the retained

earnings of the bank.

2. Private banks have the opportunity to strengthen the additional capital base by increasing the volume of subordinated debt. The absence of subordinated debt obligations in the practice of private banks indicates the weakness of their positions in the long-term lending market. Considering that subordinated debt obligations are the main part of the bank's additional capital structure, as well as a convenient and inexpensive means of attracting long-term resources, it is advisable to expand the practice of attracting subordinated debt obligations by private banks;

3. In order to strengthen the resource base, private banks should constantly introduce new, modern and attractive long-term deposit services provided by banks in order to increase the attraction of sustainable resources, taking into account the inflation targeting regime and encourage these clients to place deposits. back in the bank.

The full implementation of the above considerations in the activities of private banks, firstly, will increase their efficiency, and secondly, will have a positive effect on strengthening their resource base and will serve as an economic basis for their sustainable operation.

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