Statty Stattev, Associate Professor, Dr. Ec. Scs.

THE INTERACTION BETWEEN THE BANKING SYSTEM AND THE REAL ECONOMY (Part One: Theory and Methodology)

This article focuses the attention on the analysis of the banking dynamics and the impact on the development of the real sector due to the dominant role of the banking system in the financial sector. *The main objective is to derive and argue the theoretical and methodological approach in the study of the interrelations between the banking system and the real economy in a single country and on this basis to study the interdependence and the causal relation between the dynamics of the banking sector and the real sector in Bulgaria in the long and short run, in order to distinguish the basic transmission mechanisms between them and to make a general assessment of the state of the financial system both for the entire transition period, as well as within the two specific periods before and after the introduction of the Currency Board.*
The first part presents an explanation of the theory and methodology of this analysis. The specific results from the recent empirical analysis of the banking system and the real economy in Bulgaria shall be outlined in the second article.

JEL: E58; E61; G28

Introduction

Ever since the beginning of 1980s, the relationship between financial development and economic growth has rigorously become the subject matter of serious and large-scale research of both a theoretical and empirical nature. The enhanced interest in this area of issues can be explained by several interrelated reasons. One of them is connected with development economics and in particular – with the problems of developing countries and the activity of the international financial institutions. Another reason is the impetus given to the development of economic growth theories and their becoming a methodological basis for the search of dependencies stemming from financial development that affects the real sector dynamic development, which was provoked by the needs of regulatory policies in the developed countries. The third reason is the formation of consistent data bases by the IMF and by the World Bank shortly afterwards, concerning financial development and economic growth accordingly, which cover the majority of the countries in the world and encompass the entire period after 1960. The fourth reason is connected with the development of various econometric methods making it possible to assess the dependency and causality between the financial sector and the real sector of the economy, the differentiation of these two sectors in the short-term and long-term periods of time, as well as the identification of the principal channels through which finances impact economic growth.

Because of the dominant role of the banking system within the financial system at large, the analysis in this study has been focused, on the whole, on the banking

system's dynamic development and its connections with the development of the real sector. *The major objective of this research paper is to analyze and substantiate a theoretical and methodological approach conducive to the study of the interconnectedness between the banking system and the real economy in any individual country and – on the basis of this – to explore the dependency and causality between the dynamic development of both the banking and real sectors in Bulgaria in the short-term and long-term range, to outline the characteristics of the basic transmission mechanisms between them, and to make a comprehensive assessment of the situation of the financial system both for the entire period of the country's transition to a market economy and within the limits of its two distinct periods: before and after the implementation of the Bulgarian currency board mechanism.*

This first part of the study makes a substantiation of the theory and methodology of the analysis carried out. The subsequent second part, subject to a separate research paper, will outline the specific results from the empirical analysis made simultaneously of the Bulgarian banking system and the real economy of the country. The realization of the objective this study has set to accomplish is connected with the solution of several more specific *research tasks, which determine the three sections of the structure of this first part if the study, namely:*

First: A critical review of the major theoretical views concerning the nature of the relationships between the banking system and the real economy, laying the stress upon the functions of the banking system with respect to economic development and the services it renders to the real sector;

Second: Classification and making operational a system of banking and real economy indicators compiled at various levels of aggregation, which have been applied to assess individual features and specific traits pertaining to the functioning of the two sectors;

Third: Selection, reasoning, substantiation and structuring of a set of econometric methods permitting the study of the dependency between financial and economic development, which meet the applicability conditions with respect to an individual country, whereby the preliminary preconditions in the direction of causality have been avoided and a possibility has been found to differentiate and delimit the short-term from the long-term dependencies.

This study differs from the larger part of existing analyses concerning the interconnection between the financial sector and economic growth by several more significant magnifications and reductions of the analysis made.

The more important *magnifications* include:

- the study of the effects and causality between the dynamic development of the banking system and economic growth in both directions, which is connected with going beyond the limits of the accepted economic growth theories, assuming that financial development is one of the factors having a direct or indirect impact on the changes taking place in the economy's aggregate output in the long run;
- the study of the autonomous interactions between the dynamic development of the banking sector and the changes in a number of other dimensions characteristic

for the behavior of the real sector, such as investments, government procurement orders for respective purchases, employment, the foreign trade commodity exchange, and inflation, which have traditionally been regarded as controlled variables upon simulating the dependency of economic growth on financial development;

- focusing the analysis on the identification of long-term equilibrium dependencies between the dynamic development of the two sectors and simultaneously solving the issue concerning the presence of causality in the short-term and/or long-term periods of time;
- measuring economic growth by means of two major real sector indicators and assessing the specific dependencies each of them is subjected to or experiences *vis a vis* the indicators characterizing the dynamic development of the banking sector. Where the production function has been used, the assessment is made with respect to all the rest of the indicators characterizing the real sector;
- adopting a more comprehensive approach to the exploration of the possible transmission mechanisms between the banking system and economic growth with the assumption that these transmission mechanisms cannot be brought down only to the theoretically substantiated changes in investments and the overall factor productivity, and that some of the transmission mechanisms function not only in the direction from finances to growth, but in the opposite direction as well;
- employing different versions of production functions in the study, which have been compiled with a varying scope of the variables they contain, whereby an act of successive inclusion and exclusion of some of the variables has been carried out to the purpose of tracing up their effect on the rest of the variables, outlining at the same time the respective transmission mechanisms.

The more important *reductions* of the analysis carried out can be systematized in the following way:

- what has remained outside the scope of this study is the impact of the non-banking financial institutions, the stock exchange, and a number of non-economic factors, such as the political system, the legal system, the institutional framework, the macroeconomic regulations, etc., on the banking system itself, which makes it impossible to trace up the way in which their impact affects the real sector. This reduction can be explained with the impossibility to quantify the non-banking financial institutions and the rest of the factors enumerated above;
- this analysis does not explore the dependencies between the development of the banking sector and the dynamic development of production on the level of a certain sector of the national economy or a given individual enterprise;
- the exploration of the dependency between the development of the banking system, the foreign direct investments, and economic growth also remains outside the scope of the study, because of the insufficient consistency of empirical data. Equally unexplored remains the role of foreign direct investments made in the banking sector for its own sake. The study has also refrained from analyzing the direct foreign investments made through bank intermediation and their role for the dynamic development of the real sector of the economy as well;

• the study does not interpret and compute indicators concerning the real sector, such as the changes in the overall factor productivity and in human capital, which are assumed to be major indicators according to the theories of growth and have often been employed to the purpose of analyzing the relationship between the banking system and economic growth.

Underlying Theoretical Premises and Empirical Research

In economics, the dependency between financial development and economic growth (or the so-called finance/growth nexus) has been subject to various interpretations. The historic development of this subject matter initially saw the emergence of concepts claiming that *the development of the financial system had a positive effect on the dynamic development of the real sector of the economy*.[1] As early as 1873, when analyzing the higher level of economic development of the United Kingdom in comparison with the majority of other countries in the world, *W. Bagehot*[2] reached the conclusion that this development was the direct consequence of the capacity of the British financial system to raise resources for "a huge amount of work". For his part, *J. Schumpeter* substantiated the key role of financial institutions for the overall development of the economy in the following way: "… the connection between the capacity of banks to create credit, on one hand, and innovations, on the other, is of a fundamental significance for the understanding of the underlying mechanism of capitalism".[3]

As late as the middle of the 20th century, the concepts outlined above were subjected to a critical reconsideration, which does not throw any doubt whatsoever on the existence of a connection between the two indicators. This reconsideration was rather focused on the direction and specific channels and mechanisms of the perceived impact. *J. Robinson* defended the alternative view that the direction was from the demand side rather than the supply side of financial services, i.e. "where enterprises develop effectively, the financial business follows suite".[4] Following this logic, *J. Gurley and E. Shaw* focused their attention on financial intermediation and its role in the process of loan extension.[5] In their opinion, the developed countries have much better organized and widely penetrating financial systems, which help the movement of loanable funds between creditors and debtors, whereas in the less

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[1] Such an understanding can be found as early as in A. Hamilton's work (1781). He qualifies banks as "the most successful engines ever invented", which are capable of securing economic growth. See *Hamilton, A*. (1781), as quoted by *Hammond,* 1991, p. 36.

[2] See *Bagehot, W*. Lombard Street. Homewood, IL: Richard D. Irwin, 1873, (1962 Edition), pp. 3-4.

[3] See *Schumpeter, J*. Business Cycles: A Theoretical, Historical, and Statistical Analysis of the Capitalist Process. New York: McGraw-Hill, 1939, p. 111.

[4] See *Robinson, J.* The Generalization of the General Theory. - In: The Rate of Interest and Other Essays. London: MacMillan, 1952, p. 86.

[5] See *Gurley, J. and E. Shaw*. Financial Aspects of Economic Development. - American Economic Review, 1955, N 45, p. 515-538; *Gurley, J. and E. Shaw*. Money in a Theory of Finance. Washington DC: The Brookings Institution, 1960.

developed countries the financial systems exist at a much lower level of penetration and the economic entities mainly rely on self-financing and on direct investment funding. *Gurley and Shaw* substantiate the rule that the higher rate of economic growth and the more developed financial system mutually stimulate each other, and within the framework of such a theoretical model their levels are defined simultaneously and mutually unequivocally.

H. Patrick has launched the idea about making a strict distinction between the demand driven approach to financial development, in accordance with which the latter follows the development of the real economy, and the supply driven approach, whereby financial development precedes the demand for financial services and has an autonomous effect on economic growth.[6] The first more comprehensive study of the connection between the financial and real sectors of the economy has been attempted by *R. Goldsmith* who noted that "one of the most important problems in the area of finance, if not the most important, … is the effect produced by the financial structure and financial development on economic growth".[7] On the basis of empirical data encompassing 35 countries and covering a period spanning over 103 years, Goldsmith has proved the positive correlation between financial and economic growth without committing himself, however, to a clear definition of the causality of such correlation.

A specific view on the transmission of effects between financial development and economic growth in Great Britain at the time of the Industrial Revolution has been formulated by *J. Hicks*. In his opinion, it is not technological innovations that underlie economic growth, because the goods subject to the ongoing output had been invented at a much earlier time. What he assumed to be the fundamental innovation, which gave an impetus to the economic prosperity of Great Britain during the 18th century, was the liquidity of the capital market guaranteeing the transformation of liquid assets into long-term investments.[8]

According to *K. L. Gupta*, all views and concepts commented on thus far belong to *the school of financial structuralists*. What is typical about this school is the understanding that economic growth is affected by the magnitudes and the structure of financial variables.[9] In particular, this presupposes the dependence of economic growth on the level of variables such as, for instance, the depth of financial intermediation, measured by the ratio of total financial assets in terms of the GDP, and on the inherent structure of the aggregated financial variables themselves. *The school of financial repressionists* emerges as an alternative to the structuralist view, and – in the opinion of its proponents – it is price variables that

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[6] See *Patrick, H*. Financial Development and Economic Growth in Underdeveloped Countries. - Economic Development and Cultural Change, 1966, N 14, pp. 174-189.

[7] See *Goldsmith, R*. Financial Structure and Development. New Haven, CT: Yale University Press, 1969, p. 390.

[8] See *Hicks, J*. A Theory of Economic History. Oxford: Clarendon Press, 1969, pp. 143-145.

[9] See *Gupta, K. L*. Aggregate Savings, Financial Intermediation and Interest Rate. - Review of Economics and Statistics, 1987, N 69, pp. 303-311.

occupy the principal place among the financial factors of growth. The origin of this school is connected with the hypothesis launched by *R. McKinnon and E. Shaw* in 1973, according to which the regulatory impact on financial markets by means of depreciating the actual interest rate below its equilibrium level and the genuine overvaluation of the national currency both produce the effect of a disincentive on savings, and hence – on investments and economic growth.[10]

A considerable part of the more contemporary theoretical and empirical studies on the interconnectedness between finance and the real economy is based on the achievements of *the endogenous theory of economic growth*. The fundamental place among them is allotted to the publications of *R. King and R. Levine* in 1993, which marked the beginning of the *functional approach* to the relationship in question.[11] From a strictly conceptual point of view, this approach is much broader than the one adopted by J. Tobin, R. McKinnon, and other researchers. The functional approach is based on money only and offers at the same time a strict distinction between the financial and the real sectors of the economy.[12] The results from the numerous subsequent empirical studies have been equivocal, though. In the prevailing number of cases, the presence of a positive dependency has been confirmed, although this does not imply causality, as can be seen in the works of R. King, S. Zervos, R. Levine, N. Loayza, T. Beck, V. Bencivenga and B. Smith, etc.[13] In individual publications, such as those of De Gregorio, P. Guidotti, J.-C. Bertelemi and A. Varodakis, etc., it has been proven that financial development is negatively related to growth inasmuch as the sign preceding financial variables in regression equations is negative, although their coefficients in the majority of cases prove to be statistically insignificant upon making the models dynamic. Even though the latter fact has not been subject to a meaningful consideration, in a sense it can be interpreted as a confirmation of the principled assumption made by R. Lucas to the effect that the role of financial development has in fact been strongly overexposed.[14]

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[10] See *McKinnon, R.* Money and Capital in Economic Development. Washington, DC: Brookings Institution, 1973; *Shaw, E*. Financial Deepening in Economic Development. New York: Oxford University Press, 1973.

[11] See *King, R. and R. Levine*. Finance and Growth: Schumpeter Might Be Right. - Quarterly Journal of Economics, August 1993, Vol. 108, N 3, pp. 717-738; *King, R. and R. Levine*. Finance, Entrepreneurship, and Growth: Theory and Evidence. - Journal of Monetary Economics, 1993, N 32, pp. 513-542.

[12] See *Tobin, J.* Money and Economic Growth. - Econometrica, 1965, October, N 4, pp. 671-84; *McKinnon, R.* Money and Capital in Economic Development. Washington, DC: Brookings Institution, 1973.

[13] See *King, R. and R. Levine*. Finance and Growth…, p. 717-738; *Levine, R. and S. Zervos*. Stock Markets, Banks, and Economic Growth. - American Economic Review, 1998, N 88, pp. 537-558; *Levine, R., N. Loayza, and T. Beck*. Financial Intermediation and Growth: Causality and Causes. - Journal of Monetary Economics, 2000, N 46(1), pp. 31-77; *Bencivenga, V. and B. Smith*. Some Consequences of Credit Rationing in an Endogenous Growth Model. - Journal of Economic Dynamics and Control, 1993, N 17, pp. 97–122; *Greenwood, J. and B. Smith*. Financial Development and the Development of Financial Markets. - Journal of Economic Dynamics and Control, 1997, N 21, pp. 145-181.

[14] *Lucas, Jr. R. E*. On the Mechanisms of Economic Development. - Journal of Monetary Economics, 1988, N 22, pp. 3-42.

It becomes possible to overcome the unilateral nature of the approaches described above by applying the dynamic rows analyses, which – according to Sims – is an atheoretical approach to the analysis of macroeconomic dependencies.[15] It is thus that in practice the theoretical generalizations about the particulars of the financial development / economic growth nexus or relation is arrived at on the basis of summarizing empirical analyses. Without giving any unconditional preference whatsoever for one or another of the approaches enumerated thus far, the study, subject to this research paper, has attempted to combine them in the best possible way from the point of view of meeting the purposes of the analysis held herein.

The prevailing opinion has been that the relation between financial development and financial growth (or the so-called "finance/growth nexus") can be studied on the basis of competing theories concerning the form of manifestation of the financial structure – whether it is mainly bank-based or intermediary-based, or it is mainly market-based, or it is based on the financial services on offer, as the financial services view maintains. A continuation in the direction of this logic also includes the legal set-up of the financial and real sectors, either in the capacity of an autonomous theoretical branch, called "law and finance view", or as a further development of the research done so far.

The theoretic foundations of the *bank-based structure* have been expressed in the arguments that banks play the most important and leading role in the process of raising financial resources, finding winning projects, providing management control and risk management at the same time. This theory upholds the stance that financial intermediaries are capable of funding the real economy in a much more effective way than financial markets do mainly in the less developed economies and the emerging market economies. At the early stages of its development this theory was substantiated with the thesis about the positive role of public banks, which – in the conditions prevailing in the said economies – ensure a better way of allocating financial resources and safeguard economic entities from losses and bankruptcies.[16]

What is dominant in this theoretical scheme is also the understanding that bank-based financial systems react to the changing conditions much better and with less aggregate losses for the entire economy, especially in a short-term period of time.[17] The activity of banks possesses specific traits of its own, which give sufficient grounds for a critical reconsideration, and at the same time give rise to arguments in support to the market-oriented financial systems. There are several major specific traits of the banks. First, throughout the entire period of funding economic entities, the banks and the other financial intermediaries have access to confidential information about the borrowers, which is inaccessible to all the rest of the market players. Second, related

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[15] *Sims, C.* Macroeconomics and Reality. - Econometrica, January 1980, Vol. 48, N 1, pp. 1-48.

[16] See *Gerschenkron, A*. Economic Backwardness in Historical Perspective. A Book of Essays. Cambridge, MA, USA: Harvard University Press, 1962.

[17] *Singh, A*. Stock Markets, Financial Liberalisation, and Economic Development. - Economic Journal, 1997, N 107(442), pp. 771–782; *Stiglitz, J. E*. Credit Market and the Control of Capital. - Journal of Money, Credit, and Banking. - World Development, 1985, N 17(1), pp. 133–152.

banks and businesses can unite (sometimes tacitly, in result of the fact that each of them pursues a goal of its own, but it does not run contrary to the goals and interests of the partner) against the rest of the public. Third, when a bank starts negotiations with a company for the extension of a loan, the objective is to look for low-risk projects yielding a relatively high margin of profit, which leads to the potential danger of banks hampering technological advance and constraining innovations.[18]

The theoretical foundations of *the market-oriented financial system* are erected in opposition to the bank-based financial system, whereby the advantages of the well-functioning financial markets have been formulated and proved on one hand, and on the other – the shortcomings of the bank-based financial system have been emphasized and its problems have been revealed. Almost all researchers, however, accept the opinion of J. Boyd and B. Smith, which has also been proven empirically by means of a model specially designed to the purpose, that in their economic development the various countries go through different stages, which also match the respective changes in their financial systems. According to these two authors, the more developed a given economy is, the more its financial system is market-based, and on the contrary: the lower the level of economic development is, the more the financial system is based on the banks.[19]

From an empirical point of view, the two provisionally divided financial structures – the bank-based and the market-based – do not mutually exclude themselves, but rather complement each other. S. Tadesse has proved that in countries with a poorly developed financial system banks play a stronger role in the economy, whereas in countries with a well developed financial sector financial markets play a dominant role.[20] On the other hand, R. Levine and S. Zervos have proved independently from each other that both the highly liquid financial markets and the strongly developed banking systems are conducive to high and stable economic growth.[21] The study made by F. Arestis, P. Demetriadis, and C. Liontel has produced an interesting result to the effect that financial markets contribute to the promotion of economic growth, but their impact is much smaller that that of the banks.[22] On the basis of an extensive empirical study encompassing 44 countries, A. Demirgüç-Kunt and R. Levine have proved that the countries with well developed financial markets also enjoy well developed banks and other financial

[18] See *Weinstein, D. and Y. Yafeh*. On the Costs of a Bank-Centered Financial System: Evidence from the Changing Main Bank Relations in Japan. - Journal of Financial Economics, 1998, N 532, pp. 635-672.

[19] See *Boyd, J. and B. Smith*. The Evolution of Debt and Equity Markets in Economic Development. - Economic Theory, 1998, N 12, pp. 519-560.

[20] See *Tadesse, S.* Financial Architecture and Economic Performance: International Evidence. - Journal of Financial Intermediation, 2002, N 11, pp. 429-454.

[21] See *Levine, R. and S. Zervos*. Stock Markets, Banks, and Economic Growth. - American Economic Review, 1998, N 88(3), pp. 537-558.

[22] See *Arestis, P., P. Demetriades, and K. Luintel*. Financial Development and Economic Growth. - Journal of Money, Credit, and Banking, 2001, N 331, pp. 16-41.

intermediaries.[23] The empirical proofs displayed in the above quoted studies testify to the fact that banks and financial markets simultaneously and to different degrees contribute to the development of the real economy and they do so by means of the financial services they render.

The financial services theory is completely compatible with the two theoretical schools, which have already been commented upon above. And moreover, it is their synthesis and logical continuation. The real issue is not about choosing between financial markets or financial intermediaries, but rather about how to create a macroeconomic environment, which can prove conducive for the simultaneous effective functioning of both – the financial intermediaries and the financial markets. In support of this formulation, a number of authors such as R. Merton, Z. Bodie, R. Levine, and others, at the end of last and the beginning of this century came to the understanding that the division between financial intermediaries and financial markets is less important than the overall level and quality of the financial services on offer, which are yet to be discussed.[24]

It has often been claimed that the *legal basis of the financial and business environment* has a particular role to play as well. The effectiveness of the process of funding the real economy depends on the extent and size to which the rights of depositors, financial intermediaries, and individual investors on the financial markets are granted legal protection, and also depends on the way in which the relationships between the financial system and real business are subject to legal regulation. This conclusion, for instance, has been directly confirmed by the findings of the large-scale empirical analysis of A. Demirgüç-Kunt and R. Levine.[25] This theoretical development based on the financial services theory is accepted either as its continuation, or is separated into a new direction of research called "law and finance", which – following the pattern of naming the previous theories – is called "financial structure theory based on legal norms", or "*legal-based view*", for short.

From the point of view of the real economy, the functions of the banking system are seen as services rendered to the real sector. Actually, the variety of these functions (or else "services") does exist, because they can be aggregated and disaggregated in different ways. At any rate, however, a synthesis of all existing theories and concepts can be attained by reaching agreement on the presence of five major financial services, namely:

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[23] See *Demirgüç-Kunt, A. and R. Levine*. Stock Market Development and Financial Intermediaries: Stylized Facts. - World Bank Economic Review, 1996, N 102, pp. 291-322.

[24] See *Merton, R. and Z. Bodie.* A Conceptual Framework in Analyzing the Financial Environment. - In: Crane, D. et al. (eds.). The Global Financial System: A Functional Perspective. Boston, MA, USA, Harvard Business School, 1995; *Levine, R.* Financial Development and Economic Growth: Views and Agenda. - Journal of Economic Literature, 1997, N 35(2); *Levine, R*. Bank-based or Market-based Financial Systems: Which is Better? - Journal of Financial Intermediation, 2002, N 11, pp. 398-428.

[25] See *Demirgüç-Kunt, A. and R. Levine* (eds.). Financial Structure and Economic Growth: A Cross-Country Comparison of Banks, Markets and Development. Cambridge - Massachusetts, London – England: MIT Press, 2001, p. 12.

The first function – *raising savings and making economically viable other idle financial resources* – is the concentration of significant amounts of money (sufficiently large in volume to permit for an effective investment to be made) by means of bringing together the free or idle money of economic agents. This process consists of at least two aspects. First, in this way the concentration of numerous small savings and free resources is effected at minimized transaction costs. Second, in this way the information asymmetry can be overcome, which is connected with creating security for each individual small saver, and individual satisfaction can be achieved owing to the return each and every saving yields.

The second financial function is related to *the minimization of information gathering costs and the optimization of capital allocation, i.e. credit (*or *investments)*. The assumption that the intensity of capital flows is directly proportionate to the effectiveness of funded business entities and investment projects is based on the axiomatically accepted proposition that creditors and investors possess sufficiently credible and complete information about the funding they have been effecting. Project information, however, is asymmetric. It is normal for borrowers to present their projects making them look more effective and profitable than they actually are – this is an explanation of the well known problem, widely described in literature, about the moral hazard.[26] This is the reason why it is of vital significance for the financial intermediaries to carry out their own independent and objective assessment of the projects submitted to them together with the respective loan applications, so that they could prevent a possible unfavorable choice or adverse selection. The latter is a major element of the rationalization and economization of lending activities.[27]

The third principal financial function concerns the possibility for *trading, diversification, and minimization of financial risk*. Financial intermediaries help diversify the existing liquidity risks,[28] as well as the inherent idiosyncratic risks and demand risks.[29] On the other hand, risk diversification makes it possible to finance riskier but, at the same time, more profitable investment projects and innovations. There is a strong and significant link between diversification and minimization of financial risk, on one hand, and capital accumulation and economic growth, on the other.[30] Banks can ensure that with time risk is smoothed down by averaging the

[26] See *Bernanke, B. and M. Gertler*. Agency Costs, Collateral, and Business Fluctuations. - American Economic Review, 1989, N 79, pp. 257-276; *Thadder, E*. Long-Term Contracts, Short-Term Investment and Monitoring. - Review of Economic Studies, 1995, N 62(4), pp. 557-575.

[27] See *Stiglitz, J. and A. Weiss*. Credit Rationing in Markets with Imperfect Information. - American Economic Review, 1981, N 71(3), pp. 393-410.

[28] See *Greenwood, J. and B. Smith*. Financial Development and the Development of Financial Markets. - Journal of Economic Dynamics and Control, 1997, N 21, pp. 145-181.

[29] See *Obstfeld, M*. Risk Trading, Global Diversification and Growth. - American Economic Review, 1994, N 84(5), pp. 1310-1329.

[30] *Greenwood, J., and B. Jovanovic*. Financial Development, Growth, and the Distribution of Income. - Journal of Political Economy, 1990, N 98, pp. 1076–1107.

losses sustained on account of various macroeconomic shocks over a longer period of time.[31]

The fourth principal financial function is *the monitoring over corporate activities and the improvement of corporate governance*. Banks avail of multiple possibilities to influence the improvement and further perfection of corporate governance. The practice of using a "delegated observer" (who acts pretty much like a mystery client) is very effective, because, on one hand, it helps optimize and reduce the average costs for monitoring and control of companies, and, on the other, helps remove the problem with "free riders", because such an observer carries out these activities on behalf of and for the sake of all investors.[32] V. Bencivenga and B. Smith have proved that financial intermediaries, who in this way manage to improve the corporate governance of their client companies and increase the effectiveness of their corporate activity, succeed in attracting higher amounts of capital, allocating it at the same time both more effectively and more efficiently. It is thus that financial intermediaries contribute to raising the productivity of the real sector of the economy and the increase of capital accumulation, which, in the final account, contributes to the higher rate of economic growth.[33]

The fifth financial function consists of *servicing, support, and facilitation of the goods and services exchange*. J. Greenwood and B. Smith have proved that the facilitation and depreciation of the costs incurred for the exchange of goods and services brings about the deepening of specialization, the acceleration of technological and manufacturing innovations, and in the final account – results in the stimulation of economic growth by means of giving an impetus to the relationship between exchange – specialization – innovations – growth.[34] The lowering of information and transaction costs leads to the expansion of specialization both along the horizontal and the vertical line.

A System of Indicators Serving the Purposes of the Econometric Analysis Subject to This Study

The choice of real sector indicators has been substantiated by the following principles: a) they should measure economic growth directly; b) they should represent fundamental sources of economic growth, the impact of which can be compared with the effect caused by the financial sector; and c) they should refer to the major channels, through which the interaction between the financial and the real sector of the economy can take place. The classification of the real sector

[31] See *Allen, F. and D. Gale*. Financial Markets, Intermediaries and Inter Temporal Smoothing. - Journal of Political Economy, 1997, N 105(3), pp. 523-546.

[32] See *Diamond, D.* Financial Intermediation and Delegated Monitoring. - Review of Economic Studies, 1984, N 51, pp. 393-414.

[33] See *Bencivenga, V. and B. Smith*. Some Consequences of Credit Rationing in an Endogenous Growth Model. - Journal of Economic Dynamics and Control, 1993, N 17, pp. 97–122.

[34] See *Greenwood, J. and B. Smith*. Financial Development and the Development of Financial Markets. - Journal of Economic Dynamics and Control, 1997, N 21, pp. 145-181.

indicators takes into account the logic outlined above, whereby the indicators have not been grouped according to the intrinsic contents of the statistical population they concern, but have rather been grouped at the cross-point between the contents of the population they refer to and their role in the assessment of the relationships with the financial sector.

In order to measure economic growth, this study employs two standard and, to a large extent, widely accepted indicators, which represent the dynamic development of the real sector aggregate output. *The first indicator* is the percentage change in the course of time of *the real gross domestic product* (GDP), i.e. (Y_t = $rGDP_t$ = $rGDP_{t-1}$ * $GDPVI_t$). *The second economic growth indicator* takes into account the size of the population and is represented as a percentage change in the course of time of the *real per capita gross domestic product*, i.e. (YC_t = $rGDPp.c._t$ = $rGDPp.c._{t-1}$ * $GDPp.c.VI_t$).[35]

Another five indicators have been employed to measure the real sector and they refer to the dynamic development of investments, employment, government purchases (procurement orders), foreign trade commodity exchange, and the overall level of prices. *Capital accumulation* is represented by means of *the relative share of investments in terms of the GDP* and is calculated as a quotient of the numbers standing for the nominal gross fixed capital formation for a given period of time and the nominal GDP for the same period (IY = nGFCF / nGDP). Labor is measured on the basis of the absolute number of *the employed in the national economy* (LF = En) by respectively following up the rate of increase of this number. *The relative share of government purchases in terms of the GDP* is seen as an indicator for the size of the public sector in the economy and it is obtained as the sum total of the end consumer costs incurred by the government and by comparing the collective consumption in nominal terms to the nominal GDP (GY = (nFGCE+nCC)/nGDP)). *The foreign trade commodity exchange* assesses the degree of openness of the economy and is arrived at as a ratio between the sum total of exports and imports of goods and services at current prices to the nominal GDP (XY = (nEx+nIm)/nGDP). Inflation is calculated as a percentage change in the course of time of *the consumer price index* (CPI).

A wide range of indicators has been constructed to measure and describe the development of the banking system, which focus on separate characteristic features of bank intermediation. The structuring of bank financial indicators observes the principle of comprehensiveness, and it is on this basis that they are systematized in five larger groups. This “bundling” of the indicators does not

[35] In the works of a number of authors this second indicator of growth is employed in the capacity of a principal indicator. See *Ang, J. B. and W. J. McKibbin*. Financial Liberalization, Financial Sector Development and Growth: Evidence from Malaysia. Brookings Discussion Papers in International Economics, 2005, N 168; *Abu-Bader, S. and A. S. Abu-Oarn*. Financial Development and Economic Growth: Time Series Evidence from Egypt. Discussion Paper, 2005, N 14, Ben-Gurion University of the Negev, Israel, 35; *Barro, R. J.* Economic Growth in a Cross Section of Countries. - Quarterly Journal of Economics, 1991, N 106, pp. 407-43.

adhere strictly to any of the classifications existing in literature thus far and actually represents a combination of approaches taking into account the specific Bulgarian conditions. These approaches have been launched by a number of renowned authors studying the problems of this particular area and the names worth mentioning here are those of T. Beck, A. Demirgüç-Kunt, R. Levine, R. King, N. Loyaza, S. Zervos, etc.[36] A number of additions made by the author of this study have been introduced as well.

The first group of indicators are those concerning the depth (or size) of bank financial intermediation and for short this group is referred to under the umbrella heading of "*Depth"*.[37] The most frequently used indicator from the first group is the one based on *the liquid liabilities of the banking sector*, which is calculated as a ratio between these liquid liabilities and the GDP *(BD1 = TLL / Y)*.

The depth of bank intermediation can also be measured by the assets of the banking system. Similar ideas about defining the variables are encountered in the publications of P. Rousseau, P. Wachtel, G. Fink, P. Haiss, G. Vuksic, P. Arestis, P. Demetriades and others.[38] What is most common among all these indicators is the ratio between the *total bank assets to the GDP (BD2 = TA / Y)*, where the total bank assets are the sum total of the overall assets of the commercial banks and the overall assets of the central bank, calculated on the basis of these banks' analytical reporting. A similar indicator but of a different scope is the ratio of the *domestic bank assets to the GDP (BD3 = DA / Y)*

Other indicators for the depth of bank intermediation have been constructed on the basis of the structure of monetary aggregates. Such for instance is the ratio of the *M2 monetary aggregate to the GDP (BD4 = M2 / Y)*. It differs from the BD1 indicator mainly with the absence in its denominator of debt securities issued with up to 24 month maturity (i.e. treasury bills and notes) plus debt securities covering repurchase transactions (repo deals), and this actually means that this indicator includes liabilities of a higher order of liquidity. Another indicator measuring depth, which does not reflect the function of banks to guarantee liquidity, has been constructed following the concept

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[36] See *King, R. and R. Levine*. Finance and Growth: Schumpeter Might Be Right. - Quarterly Journal of Economics, 1993, Vol.108, N 3, pp. 717-738; *King, R. and R. Levine*. Finance, Entrepreneurship, and Growth: Theory and Evidence. - Journal of Monetary Economics, 1993, N 32, pp. 513-542; *Levine, R., N. Loayza, and T. Beck*. Financial Intermediation and Growth: Causality and Causes. - Journal of Monetary Economics, 2000, N 46(1), pp. 31-77; *Levine, R. and S. Zervos*. Stock Markets, Banks, and Economic Growth. - American Economic Review, 1998, N 88, pp. 537-558.

[37] See the respective indicators by groups in the Attachment at the end of the study.

[38] See *Rousseau, P. and P. Wachtel*. Inflation, Financial Development and Growth. – In: Negishi, N., R. Ramachandran, and K. Mino (eds.). Economic Theory, Dynamics and Markets: Essays in Honor of Ryuzo Sato. Kluwer, 2001, pp. 1-14; *Rousseau, P. and P. Wachtel*. Inflation Thresholds and the Finance–Growth Nexus. - Journal of International Money and Finance, 2002, N 21, pp. 777–793; *Fink, G., P. Haiss, and G. Vuksic.* Changing Importance of Financial Sectors for Growth from Transition to Cohesion and European Integration. Europainstitut Wirtschaftsuniversität Wien, EI Working Paper, 2004, N 58; *Arestis, P. and P. Demetriades*. Financial Development and Economic Growth: Assessing the Evidence. - The Economic Journal, 1997, N 107 (442), pp. 783-799.

and ideas launched by P. Demetriades, K. Hussein, R. La Porta, F. Lopez-de-Silanes, and A. Shleifer,[39] and it represents a ratio of *quasi-money to the GDP (BD5 = QM / Y).* In order to assess the relative significance and the variations occurring over time of the M2 components connected with liquidity and financial development, an additional accompanying indicator has been applied, namely the ratio of *quasi-money to M2 (BD6 = QM / M2)*. In the vein of the deliberations made above, the smaller the latter accompanying ratio is, the more logical it is to measure the depth of bank intermediation by means of quasi-money precisely.

The remaining indicators intended to measure the depth of bank intermediation are based on the domestic lending extended by the banking system as a whole. In this sense, together with the depth indicators, based on the total and domestic bank assets (BD2 and BD3), additional ratios have also been employed, which are of a relatively more disaggregated nature, namely the ratios of *domestic lending to the GDP (BD7 = DC / Y),* to *the total bank assets (BD8 = DC / TA)*, as well as to *the domestic bank assets (BD9 = DC / DA)*.[40] The idea about these new indicators is based on the fact that they eliminate the impact of those components of the total assets and respectively – of the internal bank assets, which are not directly related to the performance of the major financial functions the banking system carries out.

The second group of bank measuring tools is made up by the indicators concerning the performance of the central bank and the commercial banks, and for short this group is referred to under the umbrella heading of "*Bank*". The purpose of these indicators is to help assess the relative significance of the financial services rendered by the various types of banking institutions. Because within the banking sector of this country the only possible distinction to be made is between commercial banks and the central bank, the indicators focus precisely on their role. Inasmuch as the indicators give an idea about the size of the financial intermediation effected by the banks, the central and commercial banking indicators demonstrate a certain analogy with the depth indicators, but the specificity of the bank indicators is that they refer individually to the commercial banks and the central bank respectively.

In compliance with the deductive logic of presenting the indicators, the first sub-group of indicators concerning central and commercial banking is constructed on the basis of the total assets owned or the liabilities owed by the commercial

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[39] See *Demetriades, P. and K. Hussein*. Does Financial Development Cause Economic Growth? Time Series Evidence from 16 Countries. - Journal of Development Economics, 1996, N 51, pp. 387-411; *La Porta, R., F. Lopez-de-Silanes, and A. Shleifer*. Government Ownership of Banks. Harvard Institute of Economic Research, Discussion Paper, 2000, N 1890, Cambridge, Mass., USA: Harvard University, 58 p.

[40] The size of financial (in this particular case – banking) intermediation can also be measured by means of unconventional indicators, which remain outside the scope of this study, e.g. the relative share of employment in terms of the economy as a whole, or the relative share of this sector in terms of the GDP. For greater detail see *Graff, M. and A. Karmann*. What Determines the Finance-Growth Nexus? An Endogenous Growth Model and Empirical Evidence. Swiss Institute for Business Cycle Research Working Paper, 2003, N 73, pp. 10-11.

banks and the central bank. The major place among them occupies the ratio of *the total assets of commercial banks to the total bank assets (B1 = CBTA / TA)*. What is calculated as an accompanying measure is the ratio between *the total assets of the central bank (the Bulgarian National Bank – BNB) to the total bank assets (B2 = BNBTA / TA).* The size of intermediation of each of the two types of bank institutions is also compared with the scope of the economy by means of the ratios of *the total assets of the commercial banks to the GDP (B3 = CBTA / Y)*, and *the total assets of the central bank to the GDP (B4 = BNBTA / Y)*.

Stemming from the understanding that financial development in the national economy is more directly related not so much to the total bank assets but rather to their domestic component, similar indicators have been constructed on the basis of domestic assets. In this way, the second sub-group of indicators measuring central and commercial banking has been formed by the ratios of *domestic commercial bank assets to the overall domestic bank assets* and *to the GDP* respectively *(B5 = CBDA / DA* and *B7 = CBDA / Y*), and also by the ratio of *the central bank domestic assets to the overall domestic bank assets* and *to the GDP* respectively *(B6 = BNBDA / DA* and *B8 = BNBDA / Y).* The domestic assets of the central bank and the commercial banks themselves have been arrived at by calculating the difference between assets and the net foreign assets in the analytical reports of the two types of banks.

Another way of assessing the relative significance of the two major types of banking institutions is obtained on the basis of the direct ratio of *the total commercial bank assets to the total assets of the central bank (B9 = CBTA / BNBTA = CBTL / BNBTL)*, as well as the ratio of *the domestic commercial bank assets to the central bank domestic assets (B10 = CBDA / BNBDA),* and these two indicators make up the third sub-group of indicators concerning central and commercial banking. The idea here is that the larger the total (domestic) assets of commercial banks are in relation to the total (domestic) assets of the central bank, the more effectively banks perform their five financial functions, which – for its part – can positively affect the development of the real economy, given that all other conditions remain equal. Again, the indicator of the total assets is also meaningful in terms of the ratio between *the liabilities of the commercial banks* and *the liabilities of the central bank*.

The fourth sub-group of indicators describing central and commercial banking concerns the ratios of the various indicators measuring the assets of the commercial banks and the central bank to domestic lending. Thus, the ratios of the *total commercial bank assets to domestic lending (B11 = CBTA / DC)*, and of the *total central bank assets to domestic lending (B12 = BNBTA / DC)* reflect the different roles of the two types of banking institutions with respect to the formation of the loan portfolio. It is in a similar context that yet another two indicators have been constructed, which compare the ratios of *the domestic assets of commercial banks* and *the central bank respectively to domestic lending (B13 = CBDA / DC* and *B14 = BNBDA / DC)*.

At a further level of disaggregation, another three indicators concerning central and commercial banking have been formulated as well. The first one is a quotient of

the *commercial bank domestic lending divided by the sum of the same lending and the domestic assets of the central bank (B15 = CBDC / (CBDC + BNBDA)).* The latter two indicators are based on liabilities, i.e. *the ratio of commercial bank liquid liabilities to the GDP (B16 = CBLL / Y)* and *the ratio of the central bank liquid liabilities to the GDP (B17 = BNBLL / Y)*, which have been obtained by decomposing the ratio of the total liquid liabilities to the GDP *(BD1 = TLL / Y),* employed in the capacity of a depth indicator.

The third group of bank indicators is related to banking for the private sector (*Privy+Private*) and these indicators measure the allocation and channeling of funds obtained from savings to the non-governmental sector of the economy. Unlike the preceding two groups of indicators, which focus only on the scale of banking intermediaries, this group of indicators gives an idea about the activity of intermediaries upon performing one of their major functions, namely the reallocation of savings to private investors. The specificity arrived at turns the indicators for private sector banking into a preferred measure for the development of the banking system, on one hand, and into constituent components of the financial system development as a whole, on the other. In this capacity, they have mainly been employed in the analyses of authors such as: T. Beck, A. Demirgüç-Kunt, R. Levine, R. King, N. Loyaza, S. Zervos, P. Demetriades, K. Hussein, De Gregorio, P. Guidotti, and others.[41] The original varieties in this group of indicators concern the loans extended to the private sector.

The indicators from the first sub-group are calculated on the basis of data and information elicited from monetary reports. The most comprehensive indicator from the first sub-group, which is at the same of the broadest and most generalized nature, too, measures the activity of banking intermediation in terms of the size of the national economy and is calculated by the ratio of *non-government lending to the GDP (P1 = CNGS / Y)*. The indicator compares non-government lending with domestic lending. According to the variety of domestic lending employed, two versions of this indicator have been constructed here. As far as the first and more aggregated version is concerned, the ratio is between *non-government lending and total domestic lending (P2 = CNGS / DC)*, which is the sum total of the receivables of the government sector and the receivables of the non-government sector. The second version of the indicator is calculated as a ratio of *non-government lending to total domestic lending, from which the receivables of financial businesses have been subtracted (P3 = CNGS / (DC - CFE)*.

[41] See *Levine, R*. The Legal Environment, Banks, and Long-Run Economic Growth. - Journal of Money, Credit, and Banking, 1998, N 30, pp. 596-613; *Levine, R. and S. Zervos*. Stock Markets, Banks, and Economic Growth. - American Economic Review, 1998, N 88, pp. 537-558; *Levine, R., N. Loayza, and T. Beck*. Financial Intermediation and Growth: Causality and Causes. - Journal of Monetary Economics, 2000, N 46(1), pp. 31-77; *Beck, T., A. Demirgüç-Kunt, and R. Levine*. The Financial Structure Database. – In: Demirgüç-Kunt, A. and R. Levine (eds.). Financial Structure and Economic Growth: A Cross-Country Comparison of Banks, Markets, and Development. The MIT Press, 2001, pp. 17-80.

The second sub-group of private sector banking indicators concerns commercial banks only and their construction is based once again on information elicited from the analytical reporting of these banks. The first of these indicators is based on the ratio of *the non-government lending extended by commercial bank to their total assets (P4 = CBCNGS / CBTA)*. The next of the indicators has been constructed on a more disaggregated level and represents the ratio of *the receivables of commercial banks from the non-government sector to their domestic assets (P5 = CBCNGS / CBDA).* The last of the indicators from this sub-group is based on the ratio of *commercial bank lending for the non-government sector to the sum total of their receivables both from the non-governmental and the government sectors (P6 = CBCNGS / (CBCNGS + CBCGG) = CBCNGS / CBDC)*, i.e. in this case the ratio is between the lending extended by commercial banks to the non-governmental sector and their overall domestic lending.[42]

The indicators measuring the level of *the efficiency of the banking system* (*Bank Efficiency*, for short), which actually make up *the fourth group* of bank indicators, include generalized measures of commercial bank efficiency. Observing the rules of deductive logic, the presentation of *the fourth group* of efficiency indicators starts with *the coefficient of return on assets (ROA).* It is calculated as a *percentage ratio of the net profit reported since the beginning of the year to the average amount of assets reported since the beginning of the year at the level of the banking sector* (*BE1 = ROA = NP / AA*). In principle, the assumption is that inasmuch as the higher net profit is the result from the absence of competition among the banks, the higher value of ROA reflects a lower level of bank efficiency. *The coefficient of return on capital (ROE)* as a *quotient of net profit and the sum of the balance sheet capital and reserves of commercial banks* makes sense not so much as an independent indicator but rather as an indicator complementing the ROA indicator (*BE2 = ROE = NP / BCR)*. Thus, performing the empirical analysis of bank efficiency, we can follow up the conduct of both indicators and take into account the particular fluctuations in the levels of the average assets of commercial banks, on one hand, and the fluctuations in the sum of their capital and reserves, on the other.

The next bank efficiency indicator from this group is the *coefficient of return on assets generated from the core activity of banks (Core ROA)*. It is focused on the net income from a bank's core activity only, and is calculated as a *percentage*

[42] In individual studies, indicators constructed in the sense of private sector banking indicators, i.e. "Privy" and "Private", are frequently encountered under various names. Thus for instance, instead of "Privy", McKinnon, R. (1973); Shaw, E. (1973), and others, use the term of "Financial Intermediation Ratio". For their part, Beck, T., R. Levine and N. Loayza (2000); Levine, R., N. Loayza, and T. Beck (2000); Beck, T., M. Lunidberg, and G. Majnioni (2001); Rioja, F. and N. Valev (2004); Beck, T., A. Demirgüç-Kunt, and R. Levine (2004); Fink, G., P. Haiss, and G. Vuksic (2004); Kumbhakar, S., and G. Mavrotas (2005), and others, use the notion of "Private Credit". At the same time Levine, R. and S. Zervos (1998), and others, prefer the term "Bank Credit", whereas De Gregorio, J. and P.Guidotti (1995); Oks, A. (2001); Koivu, T. (2002); Neimke, M. (2003) and others, simply use the term "Credit", etc.

ratio of this net income since the beginning of the year to the average assets for the same period of time (*BE3 = CROA = Core ROA = NECA / AA*).

In order to assess the various aspects of internal (or in-house) bank efficiency, interest margin indicators have been introduced, which represent the difference between interest rates on loans and interest rates on deposits, as well as the costs for the maintenance of bank activity on the level of the banking sector. The common understanding is that the keener competition in the banking sector brings about relatively small deviations between the interest rate of loans and deposits, which – for its part – encourages savings that can be turned into loans intended to fund investment projects in the real sector.[43]

One of the variants of an interest margin indicator is compatible with the meaning of the "net interest income" indicator calculated by the Bulgarian National Bank. This indicator calculates the interest margin as a *percentage ratio between the net interest income and the average assets*, whereby both magnitudes concern the period since the beginning of the year (*BE4 = IRM1 = NIR / AA*). The second variant of an interest margin indicator is calculated as a percentage ratio of the *net interest income and the average interest-bearing assets since the beginning of the year* and coincides with the net interest margin indicator published by the BNB (*BE5 = IRM2 = NIR / AIA)*. The follow-up of the interest margin in its two versions in parallel contains sufficiently meaningful arguments to back it up with, inasmuch as the deviation between the two is indicative of the degree to which bank assets are channeled to the performance of the primary function of banking, namely transforming savings into investment.

The next indicator measuring the efficiency of the banking sector is the coefficient of *costs spent on maintaining bank activities* (or the *overhead costs of banks)*. This indicator can be encountered in the studies of R. Levine, A. Demirgüç-Kunt, H. Min, T. Beck, L. Laeven, M. Neimke, and others. However, these authors normally do not employ it as an autonomous indicator, but combine it with other

[43] See *Pagano, M.* Financial Markets and Growth. An Overview. - European Economic Review, 1993, N 37, pp. 613-622; *Berthélemy, J. C. and A. Varoudakis*. Economic Growth, Convergence Clubs, and the Role of Financial Development. Oxford Economic Papers, 1996, N 48, pp. 300-328; *King, R. and R. Levine*. Finance, Entrepreneurship, and Growth: Theory and Evidence. - Journal of Monetary Economics, 1993, N 32, pp. 513-542; *Demirgüç-Kunt, A. and R. Levine* (eds.). Financial Structure and Economic Growth: A Cross-Country Comparison of Banks, Markets, and Development. The MIT Press, 2001, pp. 81-140; *Neimke, M.* Financial Development and Economic Growth in Transition Countries. Institut für Entwicklungsforschung und Entwicklungspolitik der Ruhr-Universität Bochum, IEE Working Paper, 2003, N 173, 35 p.; *Honohan, P*. Financial Development, Growth and Poverty: How Close are the Links? – In: Goodhard, Ch. (ed.). Financial Development and Economic Growth: Explaining the Links, Palgrave Macmillan, London – New York, 2004, pp. 1-37; *Oks, A*. Efficiency of the Financial Intermediaries and Economic Growth in CEEC. University of Tartu, Faculty of Economics and Business Administration, Tartu University Press, 2001, ISSN 1406 – 5967; *Koivu, T.* Do Efficient Banking Sectors Accelerate Economic Growth in Transition Countries? Bank of Finland, Institute for Economies in Transition, BOFIT Discussion Papers, 2002, 14 p.; *Drakos, K.* Assessing the Success of Reform in Transition Banking 10 Years Later: an Interest Margins Analysis. - Journal of Policy Modeling, 2003, N 25, pp. 309-317.

measuring tools as well.[44] According to the basis, to which the overhead costs of banks refer, two variants of this indicators have been constructed. In its first variant, it has been calculated as a *percentage ratio of non-interest costs to the average bank assets since the beginning of the year* (*BE6 = NIRE1 = NIC / AA*), i.e. the basis for its calculation is the same as the basis in the case with the first variant of the interest rate margin indicator. In its second variant, non-interest costs are calculated as a *percentage of the incomes banks receive from their core activities since the beginning of the year* (*BE7 = NIRE2 = NIC / ECA*), which coincides with the indicator published by the Bulgarian National Bank called "efficiency ratio or coefficient". The logic underlying the overhead costs indicators is that their higher value is interpreted as a sign for the lower efficiency of banks, and in particular – they indicate poor management and an inefficient system of bank organization. On the contrary, the lower value of this indicator has been traditionally associated with a higher level of competitiveness and effectiveness of the banking sector at large.

With a certain degree of reservation, *the ratio of non-performing loans* within the overall amount of loans extended to non-financial enterprises (*BE8 = NPLR = NPL/NFITL*) can also be employed as an indicator measuring the effectiveness of the banking sector. The analytical meaning of such an indicator is that the higher value of this ratio is a sign for the lower efficiency of the banking system.

The fifth group of indicators refers to *the market structure of the banking sector* (Bank Structure), which – for its part – bears upon the conduct of the fourth group of indicators as well. A significant argument in favor of including this fifth group of indicators is the assumption that there may be a possibility for the changes in the market structure of the banking system to bring about such changes in its efficiency, which cannot be captured in their entirety in the generalized efficiency indicators.[45]

The most general among the market structure indicators is the *coefficient of banking sector concentration* (or concentration ratio, for short). It measures the

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[44] See *Levine, R*. International Financial Liberalization and Economic Growth. - Review of International Economic, 2001, N 9(4), pp. 688-702; *Demirgüç-Kunt, A., R.Levine, and H. Min*. Opening to Foreign Banks: Issues of Stability, Efficiency, and Growth. – In: Lee, S. (ed.). The Implications of Globalization of World Financial Markets. The Bank of Korea, Seoul, 1998, pp. 83-115; *Beck, T., A. Demirgüç-Kunt, and R. Levine.* The Financial Structure Database. – In: Demirgüç-Kunt, A. and R. Levine (eds.). Financial Structure and Economic Growth: A Cross-Country Comparison of Banks, Markets, and Development. The MIT Press, 2001, pp. 17-80; *Demirgüç-Kunt, A., L. Laeven, and R. Levine*. Regulations, Market Structure, Institutions, and the Cost of Financial Intermediation. Cambridge MA, NBER Working Paper, 2003, N 9890; *Neimke, M.* Financial Development and Economic Growth in Transition Countries. Institut für Entwicklungsforschung und Entwicklungspolitik der Ruhr-Universität Bochum, IEE Working Paper, 2003, N 173, 35 p.

[45] See *Beck, T., A. Demirgüç-Kunt, and R. Levine*. The Financial Structure Database. – In: Demirgüç-Kunt, A. and R. Levine (eds.). Financial Structure and Economic Growth: A Cross-Country Comparison of Banks, Markets, and Development. The MIT Press, 2001, pp. 17-80; *Demirgüç-Kunt, A. and R. Levine* (eds.). Financial Structure and Economic Growth: A Cross-Country Comparison of Banks, Markets and Development. The MIT Press, Cambridge - Massachusetts, London – England, 2001, 436 p.

extent to which it has the features of an oligopoly by monitoring the relative share of the several biggest banks within the overall number of commercial banks in the country, on one hand, and on the other, it compares their assets with those of all commercial banks in the country on the basis of their combined balance sheets.[46] Depending on the number of commercial banks, the assets of which are included in the numerator of the coefficient, two variants of the indicator have been constructed. The first one employs *the relative share of the three biggest commercial banks within the overall number of commercial banks* (*BE9 = 3BMSN = CB3 / CBTN)*, as well as *the ratio of the assets of the three biggest banks to the assets of all commercial banks* (*BE10 = 3BMSA = CB3TA / CBTA)*. The second variant of the concentration coefficient is constructed in a similar way: as the *relative share of the five biggest commercial banks within the overall number of commercial banks in the country* (*BE11 = 5BMSN = CB5 / CBTN)*, on one hand, and on the other – as the *quotient of the assets of the five biggest banks and the total assets of the commercial banks in the country* (*BE12 = 5BMSA = CB5TA / CBTA)*. The latter specification of the indicator has been introduced in some of the latest publications of the European Central Bank, which – upon the accumulation of sufficient data – could make it possible for this indicator to be employed for the purpose of conducting a comparative analysis of the market structure of the banking sector in Bulgaria and the market structure of the rest of the EU member states.[47]

The market structure of the banking sector can be characterized by the various forms of ownership as well. On the basis of this trait, two structural cross-sections have been made, whereby the banks, according to their form of ownership, have been classified into private and public, and according to the nationality of their owners – into local and foreign. In compliance with these two cross-sections, the next two types of indicators have been constructed. The first one concerns *the share of state-owned banks* and has been calculated in two ways. In this first way of computation, *the number of state-owned banks is compared with the overall number of commercial banks in the country (BE13 = GBMSN = GCBN / CBTN).* The ratio thus obtained gives a most general idea about the structuring of the banking sector in terms of the different forms of ownership, but it is in no way indicative of the activity of the various types of banks in the overall bank intermediation process. This is the reason why the second way of constructing the indicator *compares the assets of the state-owned banks with the total bank assets (BE14 = GBMSA = GCBA / CBTA).* The idea about employing

[46] Another way of measuring concentration is by employing the original index of O. Herfindahl or its modification – the Herfindahl-Hirschmann index (HHI), which the Bulgarian National Bank computes as well. The reduction in this study to the coefficient of banking sector concentration can be explained with its high correlation with the Herfindahl-Hirschmann index, which makes it unjustified to employ the two indices in parallel for this particular measurement.

[47] See European Central Bank, Banking Supervision Committee. EU Banking Structures Report for Year 2006.

this indicator[48] has come from the publications of P. Demetriades, S. Andreanova, R. La Porta, F. Lopez-De-Silanes, A. Schleifer, A. Demirgüç-Kunt, R. Levine, and others. The underlying meaning is that its higher values, exemplifying the smaller contribution of private banks, can be interpreted as an indicator for lower efficiency and a weaker development of the banking sector at large.[49]

The second indicator concerning the feature of ownership concerns *the share of foreign banks* and has also been presented in two forms, depending on whether the indicator focuses on the presence or the activity of these banks. According to the first approach, the indicator is obtained as *a quotient of the number of private banks, which has been divided to the overall number of the commercial banks operating in the country (BE15 = FBMSN = FCBN / CBTN).* The second approach and form of the indicator respectively makes it possible to employ the indicator as a tool assessing the activity of foreign banks and it is calculated as a *ratio of the assets of foreign banks to the total assets of commercial banks (BE16 = FBMSA = FCBA / CBTA).*

The formalization and substantiation of the role of the above indicator upon exploring the relationship between financial development and economic growth is present in the studies of R. Levine, A. Demirgüç-Kunt, H. Min, and others.[50] Its cognitive meaning is that the increasing share of foreign banks brings about the increased efficiency and effectiveness of the banking sector at large, which – in its turn – should positively impact the real economy. The expectations are that the penetration of foreign banks will result in a lower interest margin and reduced overhead costs in the banking sector, the high levels of which are actually one of the major motives provoking such a penetration. Another possible positive effect on domestic bank efficiency is connected with the assumption that foreign banks have

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[48] *Demetriades, P. and S. Andreanova*. Finance and Growth: What We Know and What We Need to Know. – In: Goodhart, C. (ed.). Financial Development and Economic Growth: Explaining the Links. London: Palgrave Macmillan, 2004, pp. 38-65; *La Porta, R., F. Lopez-de-Silanes, and A. Shleifer*. Government Ownership of Banks. Harvard Institute of Economic Research, Discussion Paper, 2000, N 1890, Harvard University, Cambridge, Mass., USA, p. 58; *Demirgüç-Kunt, A. and R. Levine* (eds.). Financial Structure and Economic Growth: A Cross-Country Comparison of Banks, Markets and Development. The MIT Press, Cambridge - Massachusetts, London – England, 2001, 436 p.

[49] R. La Porta, F. Lopez-de-Silanes, and A. Shleifer suggest the employment of certain derivatives of BE11 indices as well, such as the ratios of the assets of the 10 biggest banks to the total bank assets in cases when a certain bank is defined as a state-owned bank and the government ownership amounts to 20%, 50% and 90% respectively. For further detail see *La Porta, R., F. Lopez-de-Silanes, and A. Shleifer.* Government Ownership of Banks. Harvard Institute of Economic Research, Discussion Paper, 2000, N 1890, Harvard University, Cambridge, Mass., USA, 58 p.

[50] *Levine, R.* International Financial Liberalization and Economic Growth. - Review of International Economic, 2001, N 9(4), pp. 688-702; *Demirgüç-Kunt, A., R. Levine, and H. Min.* Opening to Foreign Banks: Issues of Stability, Efficiency, and Growth. – In: Lee, S. (ed.). The Implications of Globalization of World Financial Markets. The Bank of Korea, Seoul, 1998, pp. 83-115; *Beck, T., A. Demirgüç-Kunt, and R. Levine.* The Financial Structure Database. – In: Demirgüç-Kunt, A. and R. Levine (eds.). Financial Structure and Economic Growth: A Cross-Country Comparison of Banks, Markets, and Development. The MIT Press, 2001, pp. 17-80.

amassed more experience with time and consequently are in the position to identify and fund winning investment projects in a much better way.

The system of indicators constructed in this section of the study can be employed for an independent descriptive analysis of the behavior of the banking system and its relations with the dynamic development of the real economy. Moreover, appropriately selected sub-groups of indicators can also be used for the purposes of econometric simulation and the analysis of the mutual dependency subject to this research paper.

Econometric Simulation

The choice of econometric methods takes into account the compliance with several basic conditions at the same time. The first of them is that the selected econometric methods should make it possible to study the dependency between financial and economic development in an individual country in detail, simultaneously taking into consideration the fact that the contents and construction of the indicators to be employed should observe the specificity of the country subject to the study. The second condition is to avoid any preliminary setting of prerequisites as to the direction of causality, because such prerequisites are typical for the methods offering to distinguish the dependent and independent variables in the models subject to the study. The third conditions is for the econometric methodology to permit the follow-up of both the long-term and short-term relationships between the two sectors, whereby the analysis should not be limited to the long-term correspondences only, which are characteristic for most of the accepted growth theories. The fourth condition is for the simulation to be feasible with the available number of observations held on the variables in the periods before and after the implementation of the currency board mechanism in this country. The only group of econometric methods, which simultaneously complies with the four conditions set in advance among all the possible varieties – static cross-section analyses for a group of countries, time series analyses for individual countries, panel analyses for a group of countries, and standard single equations presenting the production function approach, is the group of econometric methods employing time series analyses, and it is these methods that have consistently been applied to the subsequent theoretical and empirical analysis.

When time series for the purpose of econometric analysis are constructed, only those indicators are selected, for which a sufficient number of observations exists over a relatively long period of time (whereby the selection is made among the indicators, which were subject to the detailed substantiation in the previous section of the study).[51] It is in this way that seven indicators – representative for

[51] For a large part of the indicators, the time-series are very short: from 1998 or 1999 onwards, which does not permit their inclusion in the econometric study. This is the reason why the behavior of these indicators is subject only to a descriptive analysis, which will be displayed in the second part of the research paper.

each of the sectors – have been selected and they perform the role of independent variables in the econometric models that have subsequently been constructed.

The indicators selected for the real sector are indicated by R_j (j = 1, 2, 3, 4, 5, 6, 7) and individually they look like as follows:

R_1 - real GDP in million denominated BGN at 1995 prices – (Y);

R_2 - real per capita GDP in million denominated BGN at 1995 prices – (YC);

R_3 - share of the gross fixed capital formation in terms of the GDP – (IY);

R_4 - average number of the labor force employed in the national economy – (LF);

R_5 - share of the government public procurement purchases in terms of the GDP – (GY);

R_6 - share of the foreign trade commodity exchange in terms of the GDP – (XY);

R_7 - consumer price index, the base year being 1995 – (CPI).

The indicators selected for the banking sector are indicated by F_i (i= 1, 2, 3, 4, 5, 6, 7) and individually they look like as follows:

F_1 - share of quasi-money in terms of the GDP – (QMY);

F_2 - share of the M2 monetary aggregate in terms of the GDP – (M2Y);

F_3 - share of the liquid liabilities in terms of the GDP – (LLY);

F_4 - share of domestic lending in terms of the GDP – (DCY);

F_5 - share of non-governmental lending in terms of the GDP – (PCY);

F_6 - share of domestic bank assets in terms of the GDP – (DFAY);

F_7 - share of the total bank assets in terms of the GDP – (TFAY).

The time series selected in this way have been subjected to the Dicky-Fuller and Phillips-Peron stationarity tests, which determine the variety and nature in which they will subsequently be employed in the study. Thorough check-ups have been held for each of the variables on the basis of the Schwarz Information Criterion – SIC, and the Akaike Information Criterion – AIC. The possible pairs of combinations between each of the financial variables and each of the real sector variables have also been checked up for dependency or causality by means of the Granger Test[52] What can be said with respect to the case with two variables (R_j and F_i) is that R_j causes F_i according to Granger, if on the basis of the past R_j values we can explain the current dynamic development of F_i. Special attention has been paid to the fact that what is at issue here is the correlation of two variables, one of which may have some (or respectively may have no) contribution to the explanation of the behavior of the other, which implies no causal relationship between them whatsoever. By

[52] For greater theoretical detail see in *Granger, C. W. J.* Investigating Causal Relations by Econometric Models: Cross Spectral Methods. - Econometrica, 1969, N 37(3), pp. 424-438.

means of the Granger causality test methodology, described above, results for the presence of short-term dependencies (i.e. causalities) between the variables have been obtained.

The search for long-term dependencies is carried out by means of the Johansen test, and the identification of long-term causalities is carried out by means of the Wald test. The target here is to assess each of the co-integration equations, so that a comprehensive and meaningful VAR construction could subsequently be compiled, namely a Vector Error Correction Model, or VECM for short. The serious advantage of these model constructions in comparison with all the rest of such constructions is that upon their employment the variables need no *a priori* definition of being either endogenous or exogenous. All variables here are presumably regarded as being endogenous and are defined by means of the model itself. What is necessary to take into account upon the construction of the specific VEC models employed in this study are a number of particulars. First, at all times one of the variables must be either the GDP or the per capita GDP, i.e. Y or YC. Second, the presence of one to three out of the seven selected variables describing financial development – F_i – is also mandatory. Third, between one and three out of the remaining five variables describing economic development – R_j – (Y and YC having already been reserved) must be included in the model at all times. It is under these conditions that the specific VEC model has been described by means of a system of 6 equations, which looks as follows:

$$DLGY_t(YC_t) = a_1 + a_{1,1}ECT_{t-1} + \sum_{k=1}^{n} b_{1,k} DLGY_{t-k}(YC_{t-k}) + \sum_{k=1}^{n} c_{1,k} DLGF_{i,t-k} + \sum_{k=1}^{n} h_{1,k} DLGR_{j,t-k} + e_{1,t}$$

$$DLGF_{i,t} = a_2 + a_{2,1}ECT_{t-1} + \sum_{k=1}^{n} b_{2,k} DLGY_{t-k}(YC_{t-k}) + \sum_{k=1}^{n} c_{2,k} DLGF_{i,t-k} + \sum_{k=1}^{n} h_{2,k} DLGR_{j,t-k} + e_{2,t}$$

$$DLGR_{j,t} = a_3 + a_{3,1}ECT_{t-1} + \sum_{k=1}^{n} b_{3,k} DLGY_{t-k}(YC_{t-k}) + \sum_{k=1}^{n} c_{3,k} DLGF_{i,t-k} + \sum_{k=1}^{n} h_{3,k} DLGR_{j,t-k} + e_{3,t}$$

where ECT_{t-1} serves as an error correction member with a single lag in time,[53] which is the same for all the equations. Under normal circumstances, ECT_{t-1} usually inclines to zero, which means that the system is in equilibrium or in a state close to equilibrium.

The factor playing the major role in the choice of the VEC models as a tool for analysis is the understanding that it is these models that simulate the long-term equilibrium in the system subject to analysis. This takes place by introducing into the analysis past presumed equilibriums in the capacity of factors, which determine the current state and future development of the variables subject to analysis.

In the course of the practical implementation of the generalized VEC model described above, the analysis goes through several successive stages and in each

[53] ECT – error correction term.

of them various measures and concretizations of the general model are obtained. This is the way in which an algorithm for the application of the chosen class of econometric methods has been elaborated, and the separate stages of the elaboration of this algorithm are ordered in the above succession. The specific methodology of the study is realized at various levels.

At *the first level*, bilateral long-term dependencies have been sought for between financial and economic development on the basis of two indicators: one concerning the financial development and the other referring to the economic development respectively. In this way, by means of the tests enumerated above, all possible pairs of combinations (R_j ;F_i) have been explored, and their number in the particular case of this study is 49.

The second level is connected with the exploration and assessment of the role of investments in the capacity of a major transmission mechanism between economic and financial development. In this case, the dependent variable is economic growth: R_1 – Y or R_2 – YC, and investments are the constant independent variable: R_3 – IY, whereas the third variable is a financial variable and it takes all the forms of F_i (i= 1, 2, 3, 4, 5, 6, 7). The function arrived at in this case is an equation of the following type:

$$\begin{pmatrix} Y \\ \\ YC \end{pmatrix} = f_1\left[\begin{pmatrix} \\ IY \\ \\ \end{pmatrix}\begin{pmatrix} \\ F_i \\ \\ \end{pmatrix}\right]$$

This is the way in which seven combinations have been obtained with R_1 – Y and another seven with R_2 – YC, or 14 systems of three equations each, which aim at finding long-term dependencies between economic and financial development with the intermediation of investments.

At the third and fourth levels the model constructed thus far has been developed further by dividing the financial indicators into three sub-groups:

- first sub-group called “liquidity - L”: F_1 - QMY, F_2 - M2Y, and F_3 -LLY;
- second sub-group called “credit - C”: F_4 - DCY and F_5 - PCY;
- third sub-group “assets called - A”: F_6 - DFAY and F_7 - TFAY.

This is how at the *third level* the VEC model from the second level gets developed further on, and financial development here is presented in two dimensions by means of a variable from the “liquidity” sub-group and another variable from the “credit” sub-group, whereby the following system of equations has been obtained:

$$\begin{pmatrix} Y \\ \\ YC \end{pmatrix} = f_2\left[\begin{pmatrix} \\ IY \\ \\ \end{pmatrix}\begin{pmatrix} QMY \\ M2Y \\ LLY \end{pmatrix}\begin{pmatrix} DCY \\ \\ PCY \end{pmatrix}\right]$$

The task is to arrive at a relative particularization of the impact of liquidity and lending (i.e. credit) in the banking system, so that that they could be included in the model in the capacity of independent variables. In this way, 12 systems of four equations each have been arrived at and they are subjected to the Johansen test. As a consequence, we obtain twelve equations with long-term dependencies, meaning six equations for Y and YC each, which are treated as dependent variables.

On *the fourth level*, a yet another variable is added from the last sub-group of the "assets", and as a result what is obtained is a model with five equations, which contains five variables defined in the following way:

$$\begin{pmatrix} Y \\ \\ YC \end{pmatrix} = f_3 \left[\begin{pmatrix} \\ IY \\ \\ \end{pmatrix} \begin{pmatrix} QMY \\ M2Y \\ LLY \end{pmatrix} \begin{pmatrix} DCY \\ \\ PCY \end{pmatrix} \begin{pmatrix} DFAY \\ \\ TFAY \end{pmatrix} \right]$$

In this way, a new general financial characteristic, exemplified by the various types of banks assets, has been added to the separate impacts of liquidity and credit in the banking system that were established at the third level. In this case, 24 systems of five equations each have been obtained at the fourth level.

The last fifth level is connected with the activation of some of the remaining indicators characterizing the real sector and the target here is to look for and identify new dependencies between the financial sector and the real economy by means of the real growth factors (labor, capital, and foreign trade). It is thus that within the framework of the VEC methodology different variants of production functions have been created with the participation of the three real sector variables (or factors): R_3 – IY, R_4 – LF, и R_6 – XY, coupled with the participation of the already known financial variables (or factors). Following this line of logic, what is subject to a check-up is to what an extent each of these factors plays the role of a transmission mechanism between the real and financial factors. The general equation of this model follows the logic of the production function and looks as follows:

Y (YC) = F (IY, LF, XY, F_i), i = 1, 2, 3, 4, 5, 6, 7.

This general equation has a number of more specific manifestations obtained by means of the successive inclusion in it and exclusion from it of the financial variable and by the same inclusion and exclusion of each of the real sector variables one by one. Upon performing the empirical comparative analysis, discussed in greater detail in the second part of this research paper, this construction makes it possible to establish what is the independent role and impact on economic growth of each of the independent real and financial

variables in the sense of what the contribution of each variable is for the development of the real sector (and for economic growth in particular), and also – to establish what its contribution is in the interactions between the financial sector and the real economy and how it contributes to the development of the financial sector itself.

The essence of the factor analysis methodology employed in this study, which also serves the purpose of registering and assessing the transmission mechanisms between financial and economic development, mainly consists in the comparison of free members and statistically significant coefficients preceding the independent variables for each one of the specific equations. Upon the successive inclusion and exclusion of a given real and financial variable, the coefficients preceding the rest of the variables and the free member of the given function also change. It is both the dynamic development and magnitude of these differences that make it possible for us to establish the presence of a factor impact and a respective transmission mechanism, and to assess the strength of their effect at the same time.

Conclusion

The contents of this research paper introduces a general theoretical and methodological basis for the empirical study discussed in the subsequent second part of this study, which focuses on the interconnection between the development of the real economy and the banking sector in Bulgaria after 1990. This first part lays the foundations of the subsequent comprehensive fact-based analysis and is connected with the critical interpretation of the existing concepts about the dependency between financial development and economic growth, with the construction and substantiation of a system of indicators intended to measure the interaction between the banking system and the real sector of the economy, and with the selection of an econometric methodology capable of assessing the interrelatedness between them. Because the process of shedding light on the specificity of the interrelationship subject to this study is primarily a methodological issue, which cannot possibly be resolved to the necessary comprehensive extent without employing econometric techniques, the paper is mainly focused on such aspects of the development of the banking system, for which we have available the needed sufficient length of time series making it possible for us to perform the respective econometric analysis.

On the basis of the theoretical and methodological prerequisites, displayed in the second part of the research paper, a descriptive and econometric analysis has been held of the interaction between the development of the banking system and the dynamic development of the real sector of the economy in Bulgaria, whereby major conclusions have been formulated concerning the peculiarity of this relationship in the periods of time before and after the implementation of the currency board mechanism in the country.

Attachment

A System of Indicators for the Analysis of the Interaction between the Banking System and Economic Growth

Group One: Indicators for the Depth (Size) of Bank Intermediation – Bank Depth

1. **BD1 = TLL / Y**
2. **BD2 = TA / Y = TL / Y**
3. **BD3 = DA / Y**
4. **BD4 = M2 / Y**
5. **BD5 = QM / Y**
6. **BD6 = QM / M2**
7. **BD7 = DC / Y**
8. **BD8 = DC / TA**
9. **BD9 = DC / DA**

Group Two: Indicators for Central and Commercial Banking – Bank

10. **B1 = CBTA / TA = CBTL / TL**
11. **B2 = BNBTA / TA = BNBTL / TL**
12. **B3 = CBTA / Y = CBTL / Y**
13. **B4 = BNBTA / Y = BNBTL / Y**
14. **B5 = CBDA / DA**
15. **B6 = BNBDA / DA**
16. **B7 = CBDA / Y**
17. **B8 = BNBDA / Y**
18. **B9 = CBTA / BNBTA = CBTL / BNBTL**
19. **B10 = CBDA / BNBDA**
20. **B11 = CBTA / DC**
21. **B12 = BNBTA / DC**
22. **B13 = CBDA / DC**
23. **B14 = BNBDA / DC**
24. **B15 = CBDC / (CBDC + BNBDA)**
25. **B16 = CBLL / Y**
26. **B17 = BNBLL / Y**

Group Three: Indicators for the Private Sector Banking – Privy + Private

27. P1 = CNGS / Y
28. P2 = CNGS / DC
29. P3 = CNGS / (DC - CFE)
30. P4 = CNGS / CBTA
31. P5 = CNGS / CBDA
32. P6 = CNGS / CBDC

Group Four: Indicators for the Banking System Efficiency – Bank Efficiency

33. BE1 = ROA = NP / AA
34. BE2 = ROE = NP / BCR
35. BE3 = CROA = NECA / AA
36. BE4 = IRM1 = NIR / AA
37. BE5 = IRM2 = NIR / AIA
38. BE6 = NIRE1 = NIC / AA
39. BE7 = NIRE2 = NIC / ECA
40. BE8 = NPLR = NPL / NFITL

Group Five: Indicators for the Banking System Market Structure – Bank Structure

41. BS1 = 3BMSN = CB3 / CBTN
42. BS2 = 3BMSA = CB3TA / CBTA
43. BS3 = 5BMSN = CB5 / CBTN
44. BS4 = 5BMSA = CB5TA / CBTA
45. BS5 = GBMSN = GCBN / CBTN
46. BS6 = GBMSA = GCBA / CBTA
47. BS7 = FBMSN = FCBN / CBTN
48. BS8 = FBMSA = FCBA / CBTA

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