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## INTERACTION BETWEEN FINANCIAL INTERMEDIATION EFFICIENCY AND ECONOMIC GROWTH

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Financial intermediaries have the key role in making a connection between savings and investments. Given the fact that an efficient transfer of savings into investments is made more difficult by transaction and information costs, financial intermediaries are specialized in minimizing the said costs per unit of invested capital. They are also trained to identify productive and innovative investment endeavors which contribute to the growth of real output. Real output growth is the basis for increasing the financial potential, which creates the basis for the development of financial intermediaries. In connection with that, apart from the analysis of the relevant factors making the process of the mobilization and transfer of savings more difficult, the theoretical models that put an emphasis on the relationship between the efficiency of financial intermediation and economic growth are discussed in the paper. The research results are indicative of the fact that the improvement in financial intermediaries' business doing enables faster economic growth. Simultaneously, the growth of the economic activity increases the scope of the business operations conducted by financial intermediaries. Thanks to the effects of the economies of scale that contribute to a reduction in transaction and information costs, the efficiency of financial intermediations grows.

**Keywords:** financial intermediation, capital accumulation, productivity, economic growth

JEL Classification: E44, G21, O40

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### INTRODUCTION

In making efforts to explain the phenomenon of long-term economic growth, two theories have singled out to date: the first, neoclassical theory that points out that, except for changes in the amount of engaged capital and labor, economic growth is also the consequence

of exogenously determined technological progress, and the second, the theory of endogenous growth, which is indicative of the fact that economic growth is a result of the interaction of factors inside the economic system. The mentioned theories put an emphasis on the primary determinants of economic growth - capital accumulation and technological innovations. At the same time, in the neoclassical theory of economic growth and the theory of endogenous economic growth, savings are implicitly assumed to equal investments. That actually means that in the

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economy there is perfect financial intermediation, i.e. savings can be turned into investments free of any cost (Bogdan, 2010, 139).

Given the fact that the holders of savings and the holders of investments are not the same entities, certain difficulties occur in the process of establishing a connection between the two of them as a consequence of market imperfections. The costs of the conclusion and execution of financial transactions and the costs of collecting pertaining information about investment possibilities can have an unfavorable influence on the efficient capital allocation. Therefore, the elimination or at least mitigation of market imperfections is one of the basic operational goals of the functioning of financial intermediaries.

Financial intermediation is considered to be the primary function of financial institutions. In other words, they act as intermediaries between the entities which are in possession of a surplus of money (the savings) and the entities which lack money they need for the realization of their business endeavors (investments) (Bolton & Freixas, 2000). In fact, making a connection between savings and investment entities implies connecting the two key macroeconomic categories - savings and investments. For that reason, an efficient and uninterrupted flow of funds between the entities is sine qua non of contemporary economies (Parameswaran, 2011). If the allocation of funds is more efficient, greater are the possibilities that economic entities' needs will be satisfied and simultaneously greater is the probability of the growth of the aggregate output in the economy.

Taking into consideration the fact that, due to the presence of asymmetrical pieces of information and transaction costs, the financial market is not perfectly functional, in the early 1990's theoreticians in the field of developmental economics reached out for the deeper studying of the manner in which financial intermediaries and the organized securities market were able to contribute to the process of capital accumulation and technological innovations. Namely, they started including the elements of the financial sector in the model of economic growth. In economic theory, however, no uniform theoretical direction inclusive of the functioning of the financial

sector as a determinant of economic growth has been differentiated yet, in spite of the numerous scientific papers in which relationships between financial development, on the one hand, and economic growth, on the other, are subjected to analytical consideration.

In view of the foregoing, the subject matter of the theoretical research conducted in this paper is the causal-consequential connectedness of the efficiency of financial intermediation and economic growth. The goal of the paper is to clarify the role and significance of financial intermediaries and to indicate the complex and multidimensional nature of the connectedness of and interdependency between the efficiency of financial intermediation and economic growth through the presentation of an overview and an analysis of the conclusions of the previous theoretical research studies. In accordance with the defined subject matter and goal of the research, the concept of the below two hypotheses is as follows:

- H1: The improvement of the efficiency of the transfer of savings into investments leads to an increase in capital accumulation and productivity growth.
- H2: The growth of real output is contingent upon the expansion of financial intermediaries' activities and a decrease in the costs of financial intermediation.

In consideration of the complexity of the said problem area, the qualitative methodology founded upon the study and descriptive analysis of the research problem is going to be applied in the paper. In the conducting of the research, references are going to be made to the relevant literature based on theoretical generalizations made and practical experiences gained by the authors who did research in the subject matter problem area.

Being aware of the defined subject matter and goal of the research, as well as the defined hypotheses, the paper is structured into six parts. After the Introduction, the role of financial intermediaries in the elimination of the financial market imperfections is going to be discussed in the second part, with a special reference to banks as the oldest and, when assets are concerned, the biggest financial intermediaries at the global level. In the third part, the effect of financial innovations on capital accumulation in the context of the Solow

Model is going to be presented. The fourth part is going to present an elaboration of the AK Model of endogenous economic growth, within which the effect of a reduction in the costs of financial intermediation on investments is monitored. In the fifth part of the paper, a model of the analysis of the interdependency between the efficiency of the financial intermediation of banks, on the one hand, and economic growth, on the other, is going to be presented, whereas in the sixth part, appropriate conclusions are going to be drawn and the direction of future research studies is going to be proposed.

## ON THE EFFICIENCY OF FINANCIAL INTERMEDIATION

Direct investment is the simplest method of the transfer of funds from savings entities to investment ones and it is also likely to be the most efficient, if conditions are appropriate (Rose & Marquis, 2011). That implies the conditions of a perfect market, where transactions are made free of costs and where participants are knowledgeable of complete information. One of the problems in the process of direct investment, however, lies in the non-compliance of savings entities' and investment entities' preferences and economic needs (Schmidt & Tyrell, 2003). Savings entities, i.e. investors, have at their disposal relatively low amounts of funds, want to invest in the assets inclusive of a relatively low level of risk and are all but ready to renounce control over their savings funds. Differently from them, investment entities are in need of relatively greater amounts of funds, given the fact that investment endeavors mainly require huge investments which are beyond the possibilities or preferences of any one particular investor. Besides, investment projects are implicative of a longer period for tying up the funds that have been freed from a threat of their being withdrawn in a short term.

Transaction costs, i.e. the time and money necessary for concluding a financial transaction, are yet another additional problem at transfer of money from savings units to investment ones. Small savings holders would, for example, need a lot of time to find the borrowers who necessitate the same amount of such funds. Apart

from that, if savings entities and investment entities were directly concluding transactions, the costs of the conclusion of such contracts would possibly be higher in comparison with the expected return from investment.

In the process of savings mobilization, i.e. the uniting of free funds for the purpose of investing, an important role is played by financial intermediaries, who can make transaction costs lower and enable savings entities to indirectly put their free funds at the disposal of those entities that are capable of developing productive investment endeavors (Greenwood, Sanchez, & Wang, 2010).

Financial intermediaries can to a great extent reduce transaction costs thanks to the advantages arising from their size (Wheelock & Wilson, 2012), information technologies and expert knowledge. By uniting the funds of a larger number of investors, financial institutions realize the effect of the economies of scale. The effect of the economies of scale reflects in the fact that the total costs of the execution of transactions on the financial market are relatively little increased as the number (volume) of transactions increases. In other words, an increase in the value or volume of transactions leads to a decrease in the transaction cost as per the monetary unit of such a transaction. It is exactly efficiency in using information technologies and other innovations that enables a big scope of business operations. Financial institutions are in the position to draft standard contracts they can use when concluding a large number of financial transactions. The greater the number of the transactions realized through the form of a particular contract, the proportionally lower the costs of their conclusion.

In order to attract savings, financial intermediaries offer different manners for savings that correspond to different investors' needs. In the process of savings mobilization, banks are primarily oriented towards the collection of different types of deposits (sight deposits, savings and fixed-term deposits), which represent a financial potential for granting loans. In order to attract clients, banks develop a wide network of branches and pay interest on deposits, whereas from within the deposit potential, they provide for much higher amounts of loans. The uniting of individual deposits

and banks' capabilities of lending funds eliminates many problems associated with direct funding.

A general trend in contemporary banking is oriented towards the diversification of the products and services offered by a bank to the bank's clients, simultaneously realizing the economies of scope. It concerns the expansion of commercial banks' traditional activities to the activities of investment banking, investment and pension funds, leasing and broker-dealer activities, which has a positive effect on savings mobilization.

Savings holders' trust in financial institutions, which makes them ready to temporarily renounce control over their own money, is of special significance for savings mobilization. Therefore, financial intermediaries aspire to build their reputation on the financial market, which simultaneously obliges them to dedicate to their proper management of numerous individuals' savings (Dolar & Meh, 2002). On the other hand, being aware of the indivisibility of investments, it is simpler and more economical for the users of funds to do business with financial intermediaries than with a large number of small savings holders.

The significance of financial intermediaries in the process of savings mobilization is also demonstrated by historical facts. J. C. Berthélemy and A. Varoudakis (1996) assert that, in the early 19th century, there was a sufficient amount of accumulated money in many parts of the world for the purpose of funding industrialization. The primary challenge was to mobilize those funds and direct them towards and for the most productive purposes. The process required that a mechanism for the collection of the unused funds and their distribution to entrepreneurs who would have them invested in industrial enterprises should be established. In connection with that, R. Levine (2004) points out that the basic difference between England and poorer countries lies in the fact that England's financial system was capable of mobilizing funds for „big deals“, for which reason productive investments did not fail due to a lack of capital. R. Levine (2004) is very explicit in his perceiving that the prosperity of England's economy is not a consequence of the amount of the national savings rate, but rather of the capability of uniting the existing free funds and using them in the most productive manner.

Financial intermediaries' role reflects in the removal of the ex ante information asymmetry and a reduction in the adverse selection risk. Not only are the participants in financial transactions uninformed in full, but the information they possess are asymmetrically distributed. To be more precise, each one of the parties possesses private (hidden) information which the other party is unfamiliar with. Entities in deficiency of funds have more precise and more complete pieces of information about the value of an investment in comparison to savings holders, and in connection with that, an incentive to overestimate to a certain extent the value of a business endeavor. Therefore, when making a decision on investing in a certain investment endeavor, investors are faced with the problem of negative selection. The problem of negative selection emerges prior to making a transaction and is represents a risk that money will be entrusted with someone who is incapable of fulfilling the obligations arising from such a financial transaction.

Given the fact that the activity of information collecting and processing is potentially complicated, long-lasting and expensive, thanks to information technologies and various expertise in their business doing, financial intermediaries can lower the costs of the collection and processing of information and contribute to a better allocation of capital by doing so (Boyd & Prescott, 1986; Dhaliwal, Li, Tsang, & Yang, 2011). With the aim to reduce their being exposed to the problem of negative selection, financial intermediaries rely on different instruments, i.e. mechanisms. In that sense, banks perform the screening of potential borrowers. That implies checking financial documentation, only to be followed by the loan history of the client and an assessment of the economic conditions in the economic branch and the geographical region in which an enterprise does business (Valev, 2006). On the basis of the variables reflecting the loan history and the financial standing, by applying credit scoring techniques, the bank performs the evaluation of the future risk of the loan-user's non-performance of obligations. More precisely, credit scoring is a system of scoring the borrower aimed at obtaining the numerical value showing the probability of such a borrower's delay in loan repayment (Mays, 2001, 89). The advantages of credit scoring are reflected in better

risk management, a reduction in operational costs and timesaving, and the implementation of a consistent system of making loan decisions (Rowland, 1995).

The bank can also possess certain information about the loan applicant on the basis of the bank's prior cooperation with him/her. The establishment of a long-term relationship with clients (if the potential borrower has been a depositor in the bank for a long time, or if he/she has a savings and/or transaction account, or if he/she has already been a loan user) enables the bank to have an easier insight into the business operations of such a client performed so far. Long-term relationships with clients reduce the costs of data collection and the bank's exposure to credit risk. Certain banks frequently specialize in crediting enterprises in certain industrial branches (local ones in particular). In that case, the bank has information about the other enterprises belonging to the same economic branch, on the basis of which it can calculate the average of the performances which the performances of the enterprise applying for a loan are comparable with. Such pieces of information can be used for the assessment of the quality of not only the current projects, but they can also be beneficial in the case of an evaluation of future projects. That makes screening simpler, more precise and cheaper when banks are establishing repeated cooperation with their former borrowers (Karapetyan & Stacescu, 2012).

Except for collecting information *ex ante*, financial intermediaries also perform the monitoring of the enterprise's managers and control over corporate governance *ex post*, namely after having funded a business activity. Namely, investing capital in a certain investment endeavor bears a threat of the occurrence of the problem of moral hazard. Moral hazard happens as a consequence of asymmetrical information. It becomes evident after a financial transaction has been made, when there is a possibility of the borrower's keeping pertaining information hidden, engaging him-/herself in the activities considered as undesirable by the investor.

The mitigation of the problem of moral hazard is implicative of the active engagement of banks in the monitoring or surveillance of the business done by the investment entity. To put it more accurately, after

a decision is made on granting a loan, banks do not only carry out the technical activities connected with the collection of borrowers' loan obligations come due, but they also monitor the loan. By surveilling the borrower's activities, the bank establishes the fact whether the restrictive clause and other provisions of the contract are observed. Given the high costs of investment project monitoring, in other words it is referred to as „costly state verification“ in the literature (Townsend, 1979; Nielsen, 2009; Popov, 2016). Banks, however, can efficiently organize and carry out the actions for relevant data collecting and analyzing. In this case, the bank plays the role of the so-called delegated monitor, given the fact that the borrower is only controlled by the bank, not by all the savings holders whose funds are directed to a certain institution (Levine, 1997; 2004). By transferring authorization to a specialized intermediary, savings are made at the system level because the multiplication of the costs of information collection and processing is avoided. Also, private contracts typical of intermediation protect the economic value of information.

Given the fact that, as one of the conditions for using a loan, banks require that borrowers should open a transaction account with the creditor bank, they simultaneously have a large number of data about the borrower's financial standing at their disposal. Changes in the transaction account, first of all a significant reduction in the funds, signal to the bank that the borrower is being faced with financial difficulties or that he/she has become involved in some risky activities.

Frequently, banks execute agreements with certain clients, who undertake the agreed-upon loan-related obligations (Mishkin & Eakins, 2012). They undertake to (in a certain period) grant loans to enterprises up to a certain amount at the interest rate connected with a certain market rate. The majority of commercial and industrial loans are approved in compliance with loan agreements. An enterprise has the advantage because it has the source of a loan when it needs funds. The bank also has the advantage because through such undertaking of the agreed-upon loan-related obligations it promotes a long-term relationship, which reduces data collection costs. The agreement of undertaking the agreed-upon loan-related obligations

requires that the enterprise should constantly provide the bank with the data about its return, assets and liabilities, business activities and so forth. The agreement of undertaking the agreed-upon loan-related obligations is a good way for the bank to reduce the costs of checking and collection of data.

The long-term relationship between the bank and the client additionally facilitates the monitoring process and makes it cheaper. If the borrower has already borrowed from the bank, in that case the bank has already established the procedures for monitoring that particular client. Therefore, the costs of monitoring the client with whom a long-term relationship has already been established are lower than the costs of monitoring new clients.

Banks are incapable of predicting all difficulties when concluding a loan agreement. So, there will always be risky activities which the borrower can become involved in, which are not otherwise specifically stipulated in a loan agreement. In the case when the borrower wants to maintain a good relationship with the bank, since in the future he/she will be granted a loan more easily and at favorable interest rates, he/she will be avoiding risky activities, even though the same are not stipulated as such in the loan agreement.

## THE EFFECT OF FINANCIAL INNOVATIONS ON CAPITAL ACCUMULATION

In the 1950's, progress in the development of the theory of economic growth represented an analytical framework known as the Solow Growth Model (Solow, 1956). In the basic Solow Model, the focus was on the output ( $Y$ ), in whose production capital ( $K$ ) and labor ( $L$ ) are engaged. In describing the causality between the costs of production inputs and outputs, which is obtained by transforming them, the conventional Cobb-Douglas production function is used:

In Equation (1),  $t$  indicates the time, whereas  $\alpha$  and  $1-\alpha$  are the production elasticity coefficients. Given the fact  $Y_t = F(K_t, L_t) = K_t^\alpha L_t^{1-\alpha}$ , where  $0 < \alpha < 1$  (1)

that the output per capita stands for a better indicator of the prosperity of the economy and upon assumption that it equals the output per worker, the foregoing aggregate production function can be written in the form in which dependent variable is the output per worker or productivity ( $y_t \equiv Y_t/L_t$ ) and the independent variable is capital per worker or capital equipment ( $kt \equiv K_t/L_t$ ). The production function then has the form as follows: In compliance with Equation (2), an increase in the output per worker is only possible if capital per worker increases. As a consequence of the specific form of the production function, however, each additional unit of capital as per one single worker generates an increasingly lower increment to production. That speaks about a decreasing marginal product of capital.

$$y_t = k_t^\alpha \quad (2)$$

The output per worker ( $y_t$ ) is divided into consumption per worker ( $c_t$ ) and investments per worker ( $i_t$ ). Taking the said into consideration, the production function can be defined as:  $y_t = c_t + i_t$ . It is assumed in the model that every year the population saves a constant percentage of their income ( $s$ ), and the remaining part is directed to consumption ( $1-s$ ). At the same time, the consumption function has the form  $c_t = (1-s)y_t$ . By its replacement in the pattern for the output per worker, a new expression is obtained:  $y_t = (1-s)y_t + i_t$ , from which it is possible to determine the values of investments after simplifying it:  $i_t = sy_t$ . So, investments equal savings.

New capital is accumulated from investments, but old capital is depreciated, which means that it is partly spent and partly becomes obsolete. The depreciation rate ( $d$ ) grows proportionally to capital growth per worker. Therefore, change in capital ( $\Delta k$ ) in the period  $t$  is determined by an increase in investments ( $sy_t$ ) in that period and by a reduction in capital, caused by such depreciation ( $dk_t$ ), which can be expressed in the following manner:

$$\Delta k = sy_t - dk_t \quad (3)$$

Apart from the mentioned factors, change in capital inventories per worker is influenced by the number of employees, so in connection with the said growth in the number of employees leads to a reduction in capital

per worker. In the model, the number of workers is assumed to be growing at a constant rate  $n$ , which stands for the population growth rate. The condition for capital accumulation now has the form as follows:

$$\Delta k = sy_t - dk_t - nk_t = sy_t - (d + n)k_t \quad (4)$$

Expression (4), the so-called Solow Capital Accumulation Equation, accounts for a change in capital equipping as the difference between the savings ( $sy_t$ ), or investments, on the one hand, and break-even investment ( $(d+n)k_t$ ), on the other. Break-even investment implies that investments should not only compensate for the depreciated capital, but also generate the capital inventories that will be used by newly-employed workers. The foregoing is a condition for the unchanged fund of capital per worker.

As already mentioned, the Solow Model implies that savings are always equal to investments. That of course is possible if the financial market is assumed to be perfect. In that case, the process of savings transfer to investments is also fully efficient. In the presence of transaction costs and information asymmetry, however, the total savings are not available for enterprises to fund investments in new plants and equipment. The costs of the institutionalization and allocation of financial savings are, *inter alia*, contingent upon by the level of the development of financial intermediation (Folawewo & Tennant, 2008). Pursuant to the said, the entities averse to risk invest their money in liquid and non-productive assets. In an extreme case, especially in less developed countries, the population makes a decision to keep money at home rather than entrust such keeping of money with banks and other financial intermediaries.

In an effort to point at the significance of financial intermediaries in the economic growth process, Y. K. Chou (2007) incorporates the financial sector into the basic Solow Model. He considers the development of the financial sector to be implicative of the continuous growth of the efficiency of financial intermediation. More precisely, the model is expanded by the inclusion of the financial intermediation efficiency coefficient, including a note that a more efficient transfer of

savings into investments is importantly influenced by financial innovations.

Generally speaking, financial innovations imply the creation of completely new types of financial products, the modification of the existent products and a combination of the characteristics of several existing products, the so-called spectrum filling (Chou & Chin, 2001). In connection with that, the rationalization of the costs of financial intermediation is contributed by cheaper ways of savings mobilization (such as shifting from banks' branches to Internet banking), only to be followed by innovative methods for risk reduction (e.g. using sophisticated credit scoring techniques when granting a loan). Apart from the need to decrease transaction and information costs, financial innovations can be motivated by the need to protect due to the application of regulations, then change in the monetary and fiscal policies and the need for an intertemporal or spatial transfer of wealth.

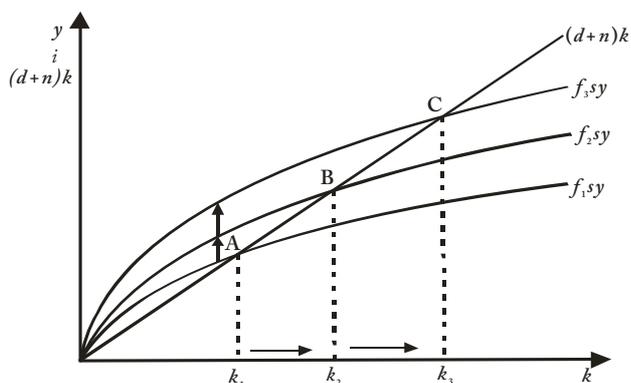
So, instead of assuming that investments equal savings, a more precise investment equation is (Chou, 2007):  $i_t = fsy_t$ , where  $f \in (0,1)$  indicates the efficiency of financial intermediation. Consequently, the capital accumulation function as per capita can be accounted for in the following form:

$$\Delta k = fsy - (d + n)k \quad (5)$$

Figure 1 is a graphical presentation of the capital accumulation equation, i.e. the adapted basic Solow Diagram. Increment to capital ( $\Delta k$ ) is determined as the difference between the investment curve ( $fsy_t$ ) and the break-even investment line ( $(d+n)k_t$ ). The growth of financial intermediation efficiency implies the growth of the coefficient  $f$ , *ceteris paribus*.

As presented in Figure 1, the growth of the financial intermediation efficiency coefficient is conditioned by the growth of investments, i.e. it results in the shifting of the investment curve  $f_1 sy$  upwards to the position  $f_2 sy$ . At the point of the initial economic balance (Point A), capital per worker is at the level  $k_1$ . Due to the growth of financial intermediation efficiency,  $f_2 sy$  becomes greater in comparison to  $(d+n)k$ . Therefore,  $\Delta k$  is a positive magnitude in new conditions and the

amount of capital per worker begins to grow. Capital per worker grows over time because the value of investments is greater than the one needed for capital per worker to remain unchanged. Capital per worker increases up to the level  $k_2$ , i.e. as long as the economy has reached its new balance or steady state (Point B). In the state of balance, capital per worker and the output are constant. Every next increase in the coefficient  $f_i$ , conditioned by the growth of the scope of financial innovations, implies the shifting of the curve  $f_i s y$  to a higher level. It means that, temporarily, capital and the output achieve growth.



**Figure 1** The effect of the growth of financial intermediation efficiency in the basic Solow growth model

Source: Chou, 2007, 81

On the basis of the foregoing, two conclusions can be drawn:

- if the financial intermediation efficiency coefficient is high, the economy is characterized by better capital equipping and a greater output in the state of balance and
- the growth of financial intermediation efficiency has an influence on the growth of the level of balance of capital equipping and the output, but only on a temporary basis, until a new balance has been achieved in the economy.

## THE EFFECT OF THE GROWTH OF FINANCIAL INTERMEDIATION EFFICIENCY ON INVESTMENTS

With the aim to model the connectedness of financial intermediation efficiency and economic growth, M. Pagano (1993) starts from the production function and the assumptions on which the  $AK$  model of endogenous economic growth is based.

The general form of the production function in the  $AK$  model is as follows:  $Y_t = F(K_t, L_t) = AK_t^\alpha L_t^{1-\alpha}$ . By introducing the assumption that the production elasticity coefficient ( $\alpha$ ) equals 1 (one), the possibility of the occurrence of falling returns is eliminated. Then, the capital marginal product is constant and equals the technological level coefficient ( $A$ ), whereas the total output is the linear function of the engaged amount of capital. Therefore, the production function receives the following form:

$$Y_t = AK_t \tag{6}$$

according to which the model itself was named. Taking into consideration the fact that the capital depreciation rate has the value  $d$  at the annual level, then the equation of capital accumulation has the form as follows:

$$\Delta K_t = K_{t+1} - K_t = I_t - dK_t \tag{7}$$

In compliance with equation (7), investments can be expressed in the following manner:

$$I_t = K_{t+1} - (1-d)K_t \tag{8}$$

In the conditions of a closed economy, balance on the financial market is implicative of the fact that savings ( $S_t$ ) equal investments ( $I_t$ ). M. Pagano (1993) remarks that yet it is not the case, given the fact that one part of savings in the amount of  $1-m$  is „lost“ in the financial intermediation process. Pursuant to the said, the condition of balance on the financial market receives the following form:

$$mS_t = I_t \tag{9}$$

Namely, in the process of the transformation of savings into investments, financial intermediaries first of all unite free funds (savings). However, as presented in Equation (9), not the total amount of mobilized savings, but rather a certain amount, is transformed into investments, marked with  $m$ . The remaining part of  $1-m$  accounts for the costs of financial intermediation, which are encompassed as the difference between the active and the passive interest rate at banks, or commissions for stock-exchange intermediaries. The amount of the part of savings which is retained by financial intermediaries as the costs of financial intermediation services can be influenced by their (in) efficiency and market power (Pagano, 1993). Therefore, the development of financial intermediaries enables a reduction in the intermediation commission, i.e. an increase in the part of savings directed to investments ( $m$ ). The strengthening of competition among banks and stock-exchange intermediaries also contributes to a reduction in the amount of funds, which is recorded as the costs of financial intermediation.

In view of the above-mentioned, the equation of capital accumulation can be written as follows:

$$\Delta K_t = ms(AK_t) - dK_t \tag{10}$$

Starting from equation (6), the economic growth rate in the period  $t+1$  is:

$$g_{t+1} = \frac{Y_{t+1}}{Y_t} - 1 = \frac{K_{t+1}}{K_t} - 1 \tag{11}$$

By leaving out the indices of time, equation (11), i.e. the economic growth rate, in compliance with the  $AK$  model, can be expressed in the following form:

$$g = A \frac{I}{Y} - d = Ams - d, \text{ pri čemu je } s = S/Y \tag{12}$$

In compliance with equation (12), a greater  $m$ , assuming that  $s$  is constant, implies a greater economic growth rate.

Apart from the arithmetic illustration of the financial intermediation efficiency growth effects on economic growth, it is also possible to geometrically monitor the said influence. Namely, the graphical presentation

of the model is given in Figure 2. The production function is linear and the output grows at the constant rate until the net investments are a positive magnitude. As we have already shown, net investments ( $I$ ) equal gross investments ( $msAK$ ) less the amount of the depreciation of the existing capital inventories ( $dK$ ). In compliance with Equation (12), the economic growth rate in Figure 2 accounts for the difference between the  $\beta$  and  $\gamma$  angles. The higher the efficiency of financial intermediation ( $m$ ), the greater the slope of the investment function is.

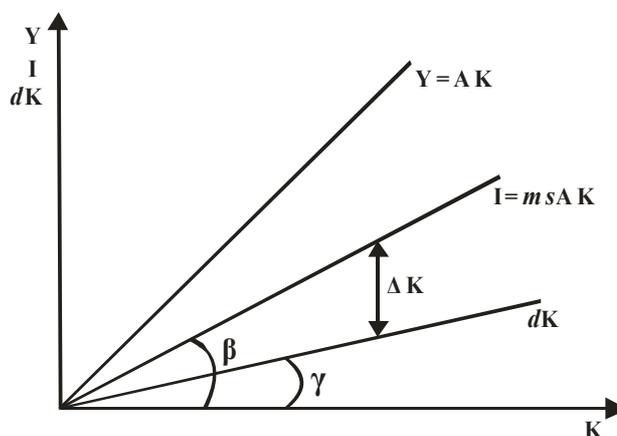


Figure 2 The effect of the growth of financial intermediation efficiency in the  $AK$  model

Source: De Haas, 2001, 19

Differently from the Solow Model, in the  $AK$  model the marginal productivity of capital is constant, i.e. independent of capital equipping. No state of balance is established in the economy, but rather if financial intermediation efficiency growth enables a permanent increase in investments, *ceteris paribus*, the economic growth rate will permanently be increasing.

### BANKS' EFFICIENCY AND ECONOMIC GROWTH

Starting from the fact that contemporary economies' priority is to mobilize and allocate savings at as low costs as possible, Z. Becsi and P. Wang (1997) developed a model which tried to explain the manner in which

efficient financial intermediation can contribute to economic growth and vice versa. Essentially, the model consists of the analysis of how the interaction of the economic decisions made by enterprises, households and financial intermediaries (banks) determines the long-term rate of economic growth and the real interest rate.

One of the starting assumptions in the model relates to the fact that enterprises do business in a competitive environment and maximize their profits in the conditions of the equality between the marginal productivity of capital and capital marginal costs. The capital marginal cost is represented by the real interest rate paid by enterprises for borrowed capital ( $R^L$ ).

$$R^L = A \quad (13)$$

Pursuant to that, the condition for the maximizing of profits of enterprises can be written in the following form:

Capital productivity ( $A$ ) does not depend on the capital inventories growth rate at the level of an individual enterprise, or at the level of an economy, but it is rather under the influence of technological progress and innovations. The productivity of capital can significantly be influenced by the financial sector and the state. Financial intermediaries contribute to the growth of productivity by funding quality investment alternatives. On the other hand, by increasing tax on capital, the state influences a reduction in capital productivity, whereas an enterprise's productivity can be increased by making investments in the infrastructure.

Households distribute their income into consumption and savings, in a manner which enables them to maximize usefulness throughout the lifecycle. Namely, households adapt their consumption and savings over time until they have become indifferent between consumption today and consumption in a future time, namely until the market return on savings becomes equal to the return they require in order to sacrifice their current consumption for future one. The required return on savings consists of two parts. The first part depends on the consumer's preferences to spend now instead of at some future moment, i.e. on the marginal propensity to consume. All those who prefer to spend more today than in the future, in order

$$R^D = I + G + P \quad (14)$$

to renounce their current consumption in exchange for savings, want a bigger return ( $I$ ). The second part of the required return consists of the premium that individuals demand so as to save more than they usually do. The premium rate, marked as  $G \times P$ , is the product of the consumption-*per-capita* growth rate ( $G$ ) and the rate of change in the household's preferences ( $P$ ) over time. The condition for the optimal growth of consumption and savings can be written in the form of the following equation:

where  $R^D$  is the real interest rate on households' deposits.

$$R^L = R^D + C \quad (15)$$

When financial intermediaries are concerned, for the purpose of a simpler interpretation of the model, the analysis is limited to banks and savings in the form of deposits. The bank maximizes its profit once the difference between the active and the passive interest rates (the interest-rate collar) become equal to the unit cost of intermediation ( $C$ ). Therefore, the condition for balance in the banking sector is as follows:

There are numerous costs of financial intermediation. Some of them are administrative costs of banks' business doing. Other costs are specific to financial intermediation, such as the costs of information collection. Irrespective of the fact whether the costs of financial intermediation of banks relate to making financial transactions or information collection, the greater scope of activities performed by banks mainly implies a reduction in intermediation costs. For example, big banks are capable of spreading risk through the diversification of investment and thus reduce the degree of their exposure to credit risk, or protect themselves from the risk of a sudden withdrawal of deposits. Their effectiveness in both cases implies a lower interest-rate spread in comparison with the competitors who are incapable of doing that. On the other hand, it is important to mention that the amount of the interest-rate spread is not exclusively influenced by the costs of financial intermediation. Major banks, especially on a small or local market, have a market power to influence the amount of the active and the passive interest rates. Consequentially, there is an increase in the interest-

rate collar, which is mainly justified by an increase in the costs of financial intermediation. In connection with that, a larger number of empirical studies have determined a significant positive correlation between the interest-rate spread and the market concentration in the banking sector (Berger & Hannan, 1998; Gelos, 2006; Poghosyan, 2012; Were & Wambua, 2014).

The graphical presentation of the above-mentioned conditions for the balance of the three sectors is given in Figure 3. On the  $x$  axis, there is the economic growth rate ( $E$ ), whereas on the  $y$  axis, the real interest rate on loans ( $R^L$ ) and the real interest rate on deposits ( $R^D$ ) are presented. The condition for an enterprise's balance accounted for in Equation (13) is represented by the  $FF$  line. This function is horizontal in relation to the  $x$  axis, which means that an enterprise's productivity does not depend on economic growth. The function that shows the rule of the consumption/savings optimal ratio is marked with  $CS$  and represents the graphical presentation of Equation (14). In accordance with the said Equation, the position of the  $CS$  function is determined by the vertical cut-off  $I$ , i.e. the amount of the return on savings that is a compensation for the current consumption and the positive coefficient of the  $P$  slope, i.e. the rate of change in the marginal propensity to consume. In the end, the  $LD$  function represents the graphical presentation of Equation (15). It takes the position immediately above the  $CS$  function, and is obtained by adding the interest-rate spread to the  $CS$  function which only incorporates the interest rate on deposits.

As can be seen in Figure 3, the balancing interest rate on loans and the balancing economic growth rate are determined at the intersection of the  $LD$  function and the  $FF$  function at Point A, whereas the balancing interest rate on deposits is consistent with the balancing rate of economic growth ( $E^*$ ).

Banks' efficiency is directly related to an increase in productivity in an economy (Ikhida, 2008). By improving banks' important functions, namely by introducing sophisticated techniques for screening and monitoring, banks are capable of making a more precise difference between good and bad investment projects and of mainly funding the projects whose

marginal productivity is the biggest (Laeven, Levine, & Michalopoulos, 2015). In fact, with the aim to eliminate negative selection, banks produce information which enables the selection of only those projects that ex ante seem to be the most productive. Also, with the aim to minimize moral hazard, banks control and encourage debtors to make their maximal effort in order to implement the started projects. Such projects at least lead to an increase in the productivity of individual enterprises which invest in innovative technology and to an increase in the average productivity at the level of the economy.

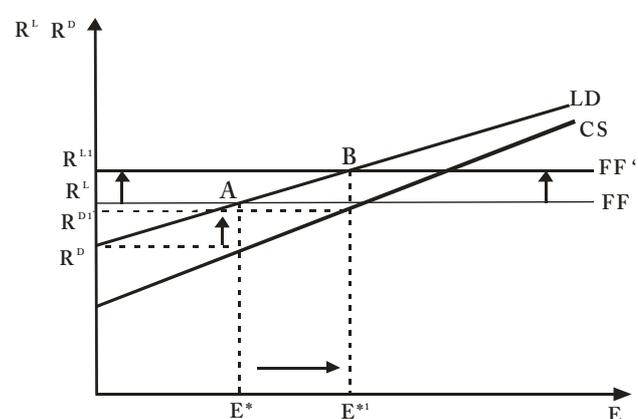


Figure 3 The interdependency of banks' efficiency and an enterprise's average productivity

Source: Becsi & Wang, 1997, 55

Due to an increase in productivity, the  $FF$  function shifts upwards to the position  $FF'$  (Figure 3). Consequentially, the balancing rate of economic growth increases ( $E^* \rightarrow E^{*1}$ ). Simultaneously, there is an increase in the interest rate on loans and the interest rate on deposits. In fact, the funding of productive investments offer banks a possibility to charge higher interest rates on loans approved. Having in view the fact that the scope of banks' activities grows as the economy grows, thanks to the effects of the economies of scale, the costs of financial intermediation decline. For the reason of the said, banks are also capable of paying out higher interest rates on deposits. So, what can clearly be perceived is that the growth of

the economy leads to a gradual decrease in the cost of financial intermediation ( $C$ ), i.e. the interest-rate spread.

On the basis of the presented, a conclusion can be drawn that, as long as the growth of the scope of banks' activities conditions a decrease in the costs of intermediation and the growth of banks' efficiency, we should expect negative correlation between the amount of the interest-rate spread and the economic growth rate. The introduction of financial innovations is implicative of the fact that the long-term rate of economic growth is negatively correlated to the interest-rate spread and positively correlated to the interest rate on loans and the interest rate on deposits individually. Also, there is a feedback causal connection between the development of the banking sector and economic growth, i.e. the efficiency of the financial intermediation of banks depends on the rate of the output growth at the level of the economy and *vice versa*.

## CONCLUSION

If the financial market were assumed to be perfectly efficient, then financial intermediaries would not necessarily have to provide their services because cost-free savings could be transferred into investments. When, however, market imperfections are taken into consideration, the establishment and development of financial intermediaries seems to be absolutely justified. Information costs and the costs of the conclusion and execution of financial transactions, as the expression of market imperfections, have an unfavorable influence on savings mobilization and their productive allocations, i.e. they potentially reduce the volume and quality of investments. Financial intermediaries are capable of minimizing transaction and information costs thanks to the number of transactions made, their employees' expert knowledge and information-communication technologies, in which manner they contribute to the more efficient transfer of savings into investments.

It is exactly the analysis of the theoretical models presented in the paper that is indicative of the fact that

the improvement of cash flows from savings entities to investment ones, i.e. a reduction in transaction and information costs, leads to an increase in that part of savings which is directed to investments. More accurately, financial innovations and competition growth in the financial sector enable a reduction in the costs of the provision of financial services and create possibilities for the diversification of the risks immanent to financial business doing. In connection with that, the bigger the volume of investments, the better capital accumulation is. Apart from a positive influence on capital inventories growth, financial intermediaries contribute to an increase in productivity. Namely, the innovative investment screening and monitoring methods, i.e. the elimination of ex post and ex ante information asymmetries, enable financial intermediaries (banks) to identify and grant loans to the enterprises that have the greatest outlooks for the successful innovation and implementation of a new production technology. Consequentially, capital accumulation and productivity growth in the real sector contribute to the aggregate output growth. This being so, the first hypothesis set in this paper has been confirmed. On the other hand, the output growth in the real sector leads to an increase in the scope of financial intermediaries' business doing. Thanks to the effects of the economies of scale, there is a reduction in the costs of financial intermediation. In other words, the growth of the economic activity contributes to an increase in the number and value of financial transactions, which consequentially produces an improvement of financial intermediation efficiency. This also confirms the second hypothesis defined in this paper.

Given the conclusion that financial intermediaries' efficiency growth boosts economic growth, it is important that we mention that efficient financial intermediation is the needed, but not sufficient, condition, i.e. real source of economic growth. Actually, efficient financial intermediation is something that facilitates economic growth. The real cause must be looked for in the real sector, i.e. the factors such as: capital accumulation, factor productivity growth, the discovery of natural resources or alternative ways of using the existing resources, technological innovations and innovative products and services. So, an efficiently functioning financial sector enables the real sector

to successfully realize productive and profitable investments.

The critical reconsideration of the role played by financial intermediaries and indicating the complex mechanism of the interdependency of financial intermediation efficiency and economic growth can also be considered as a contribution of this paper. Simultaneously, it is important to indicate the limitation of the paper. Given the fact that a qualitative research study is in question, a quantitative analysis is missing. In the future, the researcher's attention will be directed towards the empirical determination of the direction of the cause-consequence connection between financial intermediation efficiency and economic growth, first of all on the example of the Republic of Serbia. The results obtained through the analysis can particularly be useful for those responsible for the imposition and implementation of the measures of the economic policy as well as the creators of developmental strategies.

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