

CHAPTER 5

THE BANK'S INVESTMENT SYSTEM

Gutkevych S. O., Plynokos D. D.

INTRODUCTION

The financial system emerges with the emergence of the state and develops with it improving its legal norms. Financial stability is important to ensure the efficient operation of the state's financial system.

From an economic point of view, the financial system represents a set of different spheres of financial relations related to the formation and use of centralized and decentralized funds of monetary resources; from an institutional point of view, it is the totality of the country's financial institutions.

The financial system of the state is a set of interacting elements that make up a coherent formation. It includes directions or elements that have its own functional purpose. These are:

- state finances (budgets of all levels and extrabudgetary funds);
- finance of business entities – enterprises;
- non-productive finance;
- population finances;
- internal and external financial obligations;
- financial infrastructure.

These elements of finance can properly affect the economy of the country only in a complex single system. The finances of economic entities are of crucial significance in this system.

The financial resources of an entity's economic activities are cash available to the entity. The finances of the entities reflect the turnover or cash flow. They are invested in the development of production facilities of non-productive sphere, consumption, may remain in the reserve of the enterprise.

The development of the banking system is a factor that influences primarily the attraction and inflow of foreign investments, as they characterize the level of intensification of investment activity in the country.

The functioning of the economy is impossible without the functioning of the banking system, which is a dynamic system, and especially in the market conditions cannot be in a static state. It

represents a single system that includes various banking institutions. The main task of the banking system at the present stage is to ensure its stability and effective performance of its functions.

5.1. Banking system in Ukraine

There are two main types of banking practice in the world systems:

- distribution, or centralized, banking system in which the state is sole monopoly owner of banks;
- a market banking system that assumes a variety of forms of ownership of banks, in the absence of a state monopoly.

A market economy involves the functioning of a two-tier banking system:

Level I – National Bank;

Level II – Commercial banks of private and public ownership.

Elements of the banking system are its constituent parts, form the unity, while expressing the specificity of the system, are carriers of its properties.

The elements of the banking system are: banks; some special ones: financial institutions perform banking operations but do not have bank status; institutions that form the banking infrastructure and ensure the viability of credit institutions.

The banking system is a system where the banks are main constituent or central element.

Central Bank performs the monetary functions and directly or indirectly regulates the size and price of credit nationwide.

The banking system is the basis of the market economic infrastructure. The normal functioning of the economy is influenced by the investment activity of banks. The level of banking system development is an important factor for the investment process, as the banks are the mediate between the investor and the investee. The bank is a special category of enterprises, monetary institute that does not participate directly in the production sphere but regulates money circulation¹.

Investments are important in the ensure of the balanced circulation of the money market.

In the banking system, investments are the funds of banks invested in these securities of enterprises, organizations and institutions of

¹Gukevych S. (2012). Investment: Theory and Practice. Poland, Volumina. PL Daniel Krzanowski. 193 p.

different ownership over a long period of time. Credit is a form of loan capital movement or an agreement with economic partners that acquires a form of loan, that is, granting property or money to another person for ownership on terms that are signs of a loan:

- urgency,
- reversibility,
- payments.

The lender gives the loan while the borrower gets the loan.

For any business, the benefit of bank loans is related to the size of the interest rate. With the rise in the nominal interest rate, the proportion of borrowers is falling.

Investments have qualities or characteristics that differentiate them from the economic category of “loan” (Table 1).

Table 1

Characteristics of features of bank investments and loans

| Features | Investmnets | Loans |
|---------------------------|-------------------------|-----------------------------|
| By terms of use | Short term Long-term | Short-term ones predominate |
| Bank as an investor | One of many investors | One of some lenders |
| Initiator of lending | Bank | The borrower |
| The purpose of investment | profit | Repayment of loan interest |

Commercial banking includes the loan and investment operations that allow credit institutions to profit from the circulation of their resources. Such transactions are the most profitable in the banking business and occupy a fairly large share in the assets of a commercial bank.

Unlike a loan that is provided for a relatively short period of time with a condition of repayment in excess of the original one by a loan, investing is, as already noted, the use of money for a long period of time. As an investor, the bank decides on its own investing in securities for profit. With the development of the securities market, the share of investments increases.

One of the main tasks of banks is the need to maintain the optimal structure of their assets, taking into account the economic situation.

Banks must respond to the economic and political relations both within and outside the country. In a conditions of crisis, long-term investments and credit terms are reduced. The banking system in the conditions of state stability, ie risk minimization, intensifies its activity by regularly earning the interest income.

The main function of banks is the financial services to provide loans, first and foremost long-term. Borrowings are used by borrowers for consumer and investment purposes. At the regional level, investments make it possible to create jobs and provide a working population with employment, expanding the potential of enterprise investment resources in the future. The loan facilitates the concentration and efficient use of both cash and material resources available to enterprises.

Loan, credit are the most risky banking transactions as they tend to default. One of the negative factors that raised the desire to not repay was the existence of a planned economy. In times of planned economy debt was often written off, there was no clear control by the government over credit relations. This situation negatively affected the reproduction process in many. economic development, especially in agriculture. The development of a market economy involves the widespread use of bank loans in all sectors of economy on the basis of the high probability of their repayment i. Credit ceases to be a loan if it does not return.

Investor banks should provide savings based on the choice of: security of investments, profitability of bank investments, their liquidity and growth.

There is the scheme of the investment operations of the bank at the figure 1².

A bank's investment operations are a complex process that involves a complete set of bank investment instruments. Each financial instrument has different characteristics in terms of risk, sensitivity to inflation, and changes in government policy and economic conditions. The number of financial instruments of the bank's investment portfolio is large enough. It is a collection of securities acquired by a bank in the course of active transactions, stocks, bonds, promissory notes and so on. In analyzing the Bank's investment instruments, they consider, first of all, money market instruments with a maturity of up to one year, low risk and high level of liquidity and then – capital market instruments long-term and high-yield.

²Model' rozvytku haluzey ekonomiky Ukrainy (2011). Under edition of. S. Gutkevych. Kyiv: NUTU «KPI», pp. 68–71.

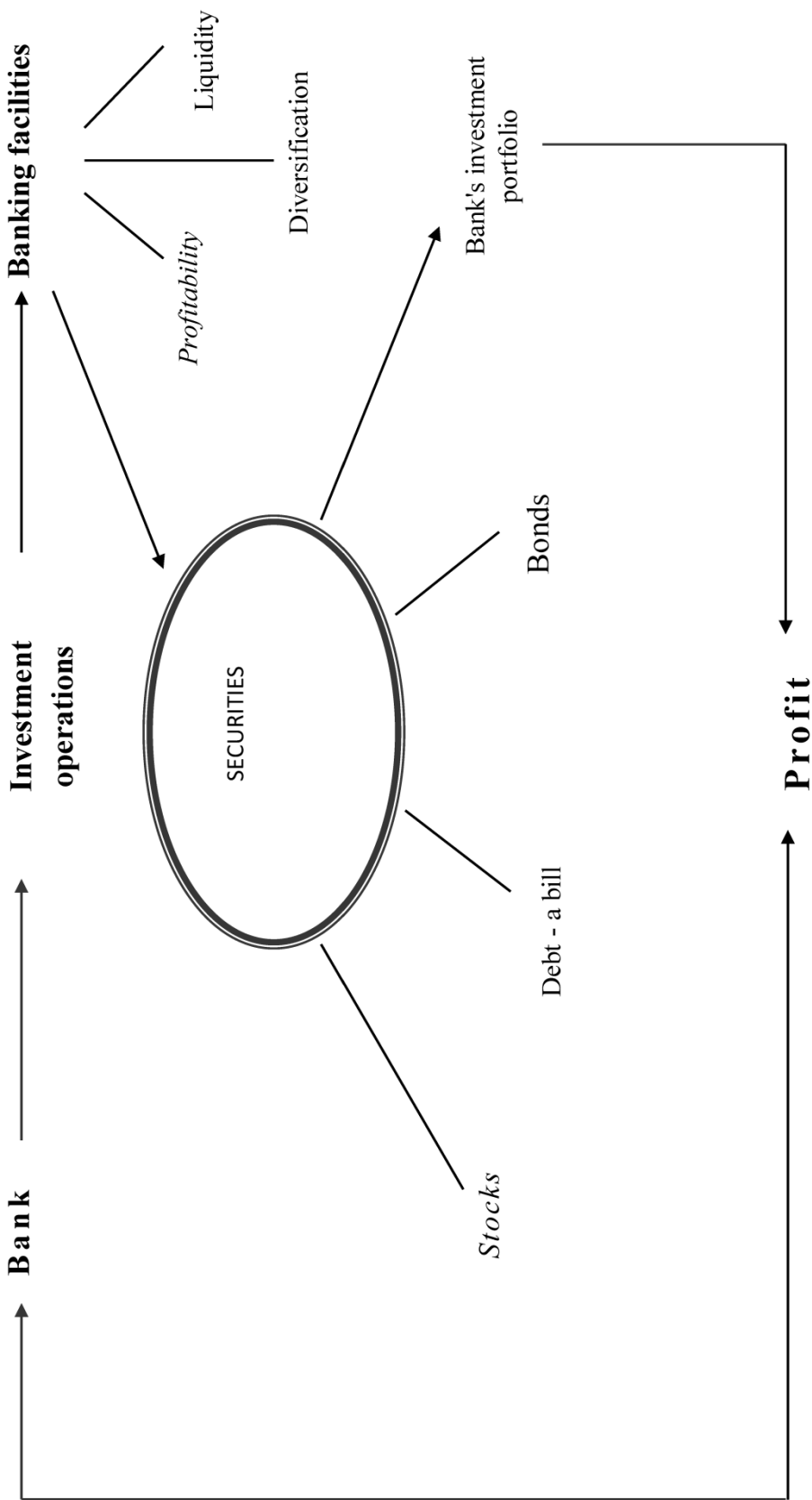


Figure 1. Scheme of the investment operations of the bank

Securities can be the object of a bank investment if they are traded on the securities market and serve debt. The Law of Ukraine «On Securities and Stock Exchange» stipulates that the main securities are stocks and bonds, others – derived from them.

Commercial banks may perform securities brokering. The bank's participation in the capital of a joint stock company makes it a co-owner of the company.

The Bank may purchase shares of commodity and stock exchanges created in the form of a joint stock company.

Banks are the founders of an insurance joint-stock company that conducts insurance for the activities of clients of these banks, thereby enhancing the loan repayment guarantee. Banks have the right to set up subsidiaries and to transfer to them part of the functions of banks. For example, some banks outsource their equipment leasing operations to subsidiaries.

A bond is a type of fixed income securities issued by an enterprise or a state, joint stock companies, funds, as a debt, under which the issuer undertakes to pay the holder a fixed amount of money within a specified period. Bond investments are considered less risky than equity investments.

At the world stock market the developed-country sovereign debts are the most reliable. Unfortunately, at this time in Ukraine, due to economic instability and the state budget deficit, the liquidity of government loans is not fully guaranteed.

The resolution of the Verkhovna Rada of 17.06.92 “On the application of promissory notes 3 to the economic turnover of Ukraine” introduced a promissory note. Further development of the application of bills was acquired with the adoption of the Law of Ukraine “On bills circulation in Ukraine”. Bill is one of the types of securities. Written debt of a clearly defined form, which gives its holder (the bill holder) the undisputed right after the expiration of the term to demand from the debtor the payment of the specified amount of money.

Commercial banks accept liquid bills at a discount price of discounted bills. The holder of the bill, in turn, has the opportunity to defend his rights. This is facilitated by normative legislative acts, including the the Bankruptcy Law of Ukraine.

The investment activity of a commercial bank is carried out by employees of the investment department, who perform the functions of analysis and reporting on investment activities. The ability of a bank to make investments is determined on the basis of: qualified supervision

and study of the securities market, taking into account the risk of the purchased securities, and carrying out an assessment of the quality of these securities.

The bank's management should take into account a number of significant factors (Figure 2) that determine a bank's investment choices include: expected rate of return; tax characteristics; mortgage requirements; risks.

Banking investment choice is influenced by many factors, including the risk factor. Consider the risk factors involved in the likelihood of an event related to potential financial costs or other negative consequences.

These are:

- credit risk associated with securities and caused by the deterioration of the economic position of the issuers of these securities that cannot fully bear responsibility for their financial obligations;

- market risk is possible due to unforeseen and serious disturbances both in the stock market and in the economy as a whole. The market quotation of some securities may fall to their par value and even lower;

- interest rate risk – change of interest rates – depends on the fluctuations in the market rates of debt, for which the percentage is agreed in the contractual order from the moment of their issue. Rate is an important instrument of banking policy, competition, its level largely depends on the efficiency of the banking system.

Banking investments in securities are carefully regulated due to the credit risk inherent in most securities, especially those issued by private corporations and individual local governments. The business risk of banks is reflected in the loan portfolio and is related to the changing economic situation in the country, falling sales, rising bankruptcy, unemployment, non-repayment of loans. Due to the risk of unbalanced liquidity, banks foresee the sale of investment securities before their maturity...

The risk of early withdrawal is reduced by banks through the purchase of bonds whose issuers cannot make their withdrawal for several years or do not purchase withdrawable securities. Inflation risk may impair the value of shareholders' investments in the bank, so the bank provides short-term loans and securities with a limited, non-prolonged, floating interest rate term.

Banks, while conducting investment transactions, monitor their level of profitability, since the return on invested funds should be proportional to the risk of investments.

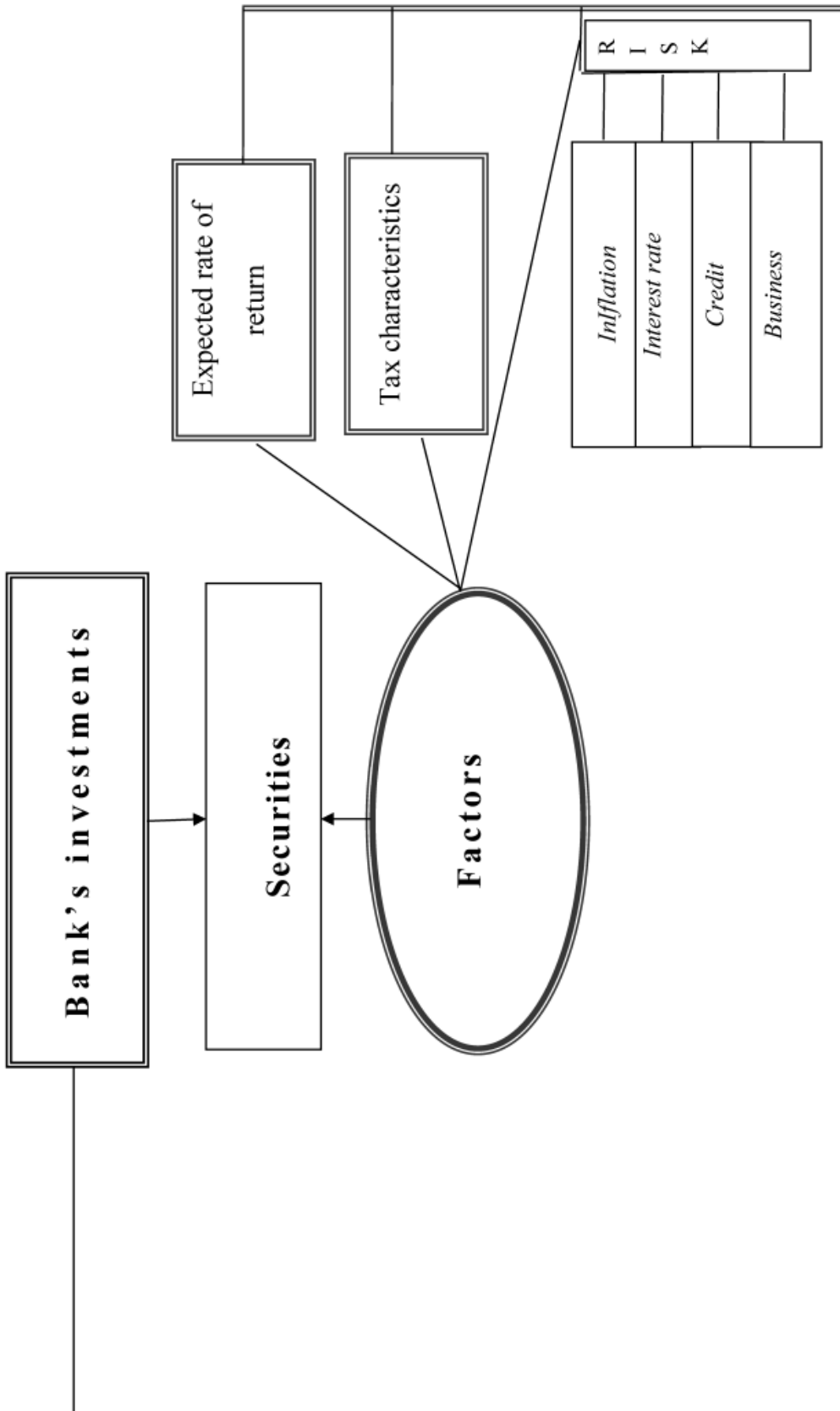


Figure2. Factors that determine a bank's investment choices

As the analysis of the activity showed, today banks, like other business entities, do not have sufficiently effective mechanisms for collecting overdue receivables, including the bankruptcy procedure of the defaulter. Based on this, as well as on the general accounts payable, the risk of insolvency or non-repayment of loans is repeatedly increasing and is shared among all other enterprises. That is why commercial banks are forced to raise lending rates and therefore reduce lending volumes.

In the investment field, banking institutions perform such functions:

- credit and settlement;
- cash services;
- deposit operations;
- servicing of business entities;
- analysis of the investment market;
- information and advisory services on effective investment.

Considering the above functions, banks can use their customers' resources more efficiently and influence their profitability. The National Bank of Ukraine controls the commercial banks activities. Banking infrastructure is an important element of the banking system. It includes enterprises, agencies, services that support the activities of banks, such as information, methodological, scientific, human resources, communications, communications and more. Banking infrastructure provides guarantees against insolvency and damages.

According to the international treaties of Ukraine, projects for the development of its economy are supported by international financial organizations: the International Bank for Reconstruction and Development, the European Bank for Reconstruction and Development, the European Union, the International Monetary Fund. According to the legislation of most countries on national banking markets are allowed to operate foreign banks. In some countries (such as France) the activity of foreign banks is not restricted. In Russia, Canada and other countries, a certain corridor has been introduced, within which they can conduct their operations quantitatively.

5.2. Cooperation with international financial organizations

The International Bank for Reconstruction and Development and the World Bank play the significant role in the investment activity of Ukrainian banks. For several years, the World Bank has been conducting monitoring studies of the country's economic condition and providing financial assistance to the government in carrying out market

transformations. Ukraine cooperates with the World Bank in the following areas:

- macroeconomic stabilization and structural adjustment;
- economic downturn and post-privatization development of enterprises;
- reforms in the financial sphere and formation of the institutional basis of market relations;
- improvement of the system of social protection of the population and development of infrastructure;
- rehabilitation and support of agriculture;
- reformation of the public sector of the economy;
- creation of a legal basis for a market economy, a project in energy and economic sectors;
- attractation of the foreign investors.

The key objective of World Bank's activity is providing the assistance to the countries-participants.

The World Bank provides the Government of Ukraine with annual financial support for comprehensive reforms. These funds are usually provided in the form of loans, ie on the basis of the obligatory security of the repayment of interest.

Investing in education, health care, the food industry or the human resources are most likely to achieve high economic performance. This is because it has to do with intellectual and physical performance.

For example, Ukraine's agriculture is ranked fourth in projects financed by the World Bank after:

- I – macroeconomics;
- II – financial sector reform and enterprise development;
- III – energy.

Each project determines its total cost, amount of funding, date of implementation, allocation of financial resources, location of project implementation and utilization of funds. The value of projects, their priority may change, and this is reflected in the financing depending on the investment banking policy.

The World Bank, together with the Ukrainian government, is working to attract foreign investments into the country. To this end, the Bank's specialists develop investment projects and conduct training on the involvement and cooperation of foreign partners.

The European Bank for Reconstruction and Development is an international financial institution established in 1991 to financially support projects to assist Central and Eastern European countries in their

transition to a market economy. The EBRD is based on an agreement signed in 1990 and is based in London. In 1994, the EBRD had 60 shareholders, 58 countries, the European Union and the European Investment Bank. The institution acts as both a business and an investment bank. According to the charter, at least 60% of its obligations must be related to private sector financing. The Bank provides loans (up to a maximum of 10 years for businesses and 15 years for infrastructure development projects) at market rates. It also acquires participating shares, provides loan guarantees and subscriptions for bonds and equities, and participates in joint operations with other private and public financial institutions³.

The European Investment Bank is an institution set up by the European Economic Community to promote development, integration and cooperation through the provision of investment loans.

In the economic sphere, the European Union develops towards the creation of a single internal market, a single banking system and a common currency.

The cooperation of Ukraine with international financial organizations is carried out in accordance with the statutory documents of these organizations, international treaties of Ukraine, in accordance with the legislation in order to obtain external financial resources for the implementation of systemic and investment projects. Thus, the International Finance Corporation provides advisory and technical assistance to Ukraine in its investment activities. IFC implements such technical support projects as: privatization of property of non-state agricultural enterprises and land, development of private enterprise, reform of agricultural enterprises. At the macroeconomic level, systematic projects aimed at conducting economic reforms in Ukraine are being implemented.

Investment projects aimed at the development of individual industries, sectors of the economy, production are carried out on the principles of financing under conditions of self-payment and obligatory internal self-financing.

At the level of individual countries, the export (import) of private and public capital is distinguished. In the system of international capital movement. In the system of international movement of capital in various forms (loans, investments, assistance), the capital of international

³Gutkevych S.O., Korin'ko M.D. (2003). Veksel' u systemi tsinnykh paperiv: problemy stanovlennya ta rozvytku: Navch. posibn. K: Vyd-vo Yevrop. un-tu. Pp.27-28

organizations and funds and mixed capital (private, state, international organizations) also function.

The basis of entrepreneurial capital as a form of international capital movement is foreign direct and portfolio investment.

5.3. Investments and financial institutions

Institutional principles of regulation of investment activity are carried out both through the public sector of the economy and through state institutions. The institutional role of the state in carrying out the functions of state regulation as a subject of investment activity is determined through regulation of financial investments, system of taxes, carrying out of depreciation policy, investing outside Ukraine, allocation of subsidies, subsidies, subsidies.

One of the forms that determine public investment policy is the investment activity of financial institutions.

Financial investments are investments in various financial instruments (assets). Financial investments are called portfolio investments. Investments include investments in the development of projects, in the purchase of shares, bonds and other securities issued by the state or private legal entities, targeted cash deposits, costs for the acquisition of securities and bank deposits. Investments are made during the sale and purchase of securities in the stock market.

Direct investment is a capital investment driven by long-term economic interest and provides investor control over an investment object in order to generate entrepreneurial profit (income). Direct investment is both initial investment and reinvestment (the share of the investment entity's profit that is neither distributed nor made to the direct investor). In addition, direct investment includes all intra-corporate transfers of capital in the form of loans and loans between the direct investor and the affiliates, subsidiaries and associates. In world economic practice, a subsidiary is a wholly-owned subsidiary. In a subsidiary, a non-resident direct investor holds more than 50% of the capital and in an associate less than 50%⁴.

Portfolio investments is the investing in securities for profit (dividends). Such investments do not provide real control of the investor on the investment object.

The quantitative criterion for the distinction between direct and portfolio investment in a developed market economy is considered to

⁴Investment: Theory and Practice. Poland, VOLUMINA.PL Daniel Krzanowski, 2012. 193 p.

be 10% of the investment object. However, an investment may be a direct investment with a smaller participation rate, but it has a real impact on the decision making of the investee. Conversely, if the investor's share is more than 10%, but he has no real control over the object, then the corresponding investment is not recognized as direct.

An investment portfolio is a purposefully formed set of financial and real-estate investment assets that are designated to implement a pre-developed strategy in accordance with the investment objectives defined in that strategy.

The implementation of the investment strategy in accordance with the objectives is achieved by selecting the most effective and secure financial instruments in the portfolio. Basically, their theory is based on investing in financial instruments such as securities. However, under the present circumstances, a portfolio can be formed either as a combination of a certain amount of real or financial investment, or at the expense of a certain type of financial instruments. That is, the subjects of investment activity are conditioned to be able to form investment portfolios of a certain type (types)⁵.

In the world practice of commercial banks, credit (loan) and securities portfolios have much in common. First of all, these are the most important types of banking activities aimed at launching own resources for profit. The main criterion in the formation and further functioning of both types of portfolios is their profitability, and since lending and investment transactions are the most profitable in banking, they have the highest share in the assets of a commercial bank. However, the ownership of these assets to different portfolios is explained by their significant differences.

Loan is an investment for a relatively short period of time, subject to their repayment or equivalent, in excess of the original amount of interest on the loan. Investing, unlike a loan, is the use of money to make a profit over a long period of time, until the time when the investment is returned to the bank.

The portfolio of real investments can be considered as a certain type of investment portfolio, which can be formed by separate entities of investment activity: corporations, investment funds and companies.

The principle of compliance of the portfolio with the investment strategies of the company involves involvement in the portfolio of

⁵Sharpe W.(1999). Investments: 6th (sixth) EditionPaperback, 962 p.

such projects, which should ensure the investor realizes its strategic goals.

The portfolio of real projects is formed, in the vast majority, by medium- and long-term investments. In some cases, the portfolio may include short-term projects – the acquisition of businesses and industries, equipment that does not require installation, unfinished objects, other real estate. Short-term real investments include enterprises with a maturity of less than one year.

In accordance with the objectives of investing in the portfolio include equity instruments, investing in which has a different purpose and the formation of which is influenced by many both subjective and objective factors, in particular:

- investor's financial capabilities (internal source of financing);
- opportunities for attracting external sources of financing for investment purposes (domestic or foreign);
- investment climate in the country;
- investment market conditions;
- personal qualities of the investor (aggressiveness of economic strategy, tendency of the investor to take risks, ability to effectively manage the portfolio, ability to react instantly to changes and make appropriate decisions, etc.).

The motivation behind international portfolio investment is generally close to that of direct investment. However, despite the much higher liquidity of portfolio investments compared to direct ones, the main goal of an investor in portfolio investing is to seek to maximize profit at an acceptable level of risk (to place capital in certain countries and in certain securities).

International portfolio investment requires its participants to carry out numerous securities transactions that are not limited to sale and purchase of assets. It is necessary to carry out the whole spectrum of operations. Here are the main ones: purchase of securities at your own expense; purchase of securities on behalf and at the expense of the customer; sale of own securities; sale by proxy; information, analytical and advisory services, including analysis of the securities market and the portfolio of financial assets; organizational activities accompanying securities transactions (eg, issue registration, stock exchange approval, etc.); mediation in the organization of issue and initial placement of securities (development of documentation and terms of issue, preliminary evaluation of securities, advertising, selection of investors, etc.); securities purchase and sale calculations;

registration of securities owners during the sale and purchase operation; security, storage and transfer of securities; in case of withdrawal of the bonds by the issuer of the bonds by the maturity date, the withdrawn bonds shall be returned; repayment of securities with maturity; payment of stock dividends and coupon payments on bonds; convertible preference shares and debentures into shares; delegation of voting power to the trustee; guaranteed placement of securities (underwriting); reinvestment of securities dividends and income from market value gains; placement of securities as collateral; managing the securities portfolio; granting and obtaining securities loans; currency risk insurance.

International investment activity is a set of practical actions of entities to invest abroad. It redistributes in space and time the resources between individual entities that make the decision to invest their own, borrowed or attracted property or intellectual property in the investment objects, is an investor. There are individual and institutional investors. The differences between them lie in the scale of the resources they manage, the nature and methods of decision-making.

An individual investor is a legal or natural person who independently (without intermediaries) carries out investment activities.

An institutional investor is a financial intermediary that accumulates the funds of individual investors and conducts specialized investment activities, as a rule, in securities transactions. Institutional investors include investment funds and companies, pension funds, insurance companies, mutual funds, and banks. Corporate investors and the government are distinguished as separate entities.

By defining the goals, directions and volumes of investments, the investor may, on a contractual basis, involve any participants in international investment activity,

Investor resources consist of resources obtained from all available sources of investment resources – internal, attracted and borrowed. Different investment entities have different sources of attracting resources (see Table 2).

In modern conditions, the investor has access to both national and international investment resources, which are accumulated and redistributed mainly through international (world) markets.

National and international investment resources together are a global investment asset that has financial and material components.

Financial wealth is accumulated in the form of securities and cash, and material wealth in real estate and metals.

Table 2

Investors' resources

| Investors | Resources (sources) | |
|------------------------------|--|---|
| | Own | Borrowed |
| Physical individuals | Savings, unused portion of individual income | Loans |
| Corporations (organizations) | Company stocks, retained earnings, depreciation and other funds, know-how, non-operating income, etc. | Funds raised through the sale of stocks, bonds, other securities, long-term loans and loans |
| State | Profit of state-owned enterprises, tax receipts, contributions to state funds, state reserves, credit and monetary issues, privatization funds | Internal and external loans |

CONCLUSIONS

In the conditions of increasing the independence of enterprises and their transition to self-financing, there was a need to create a financial market. The economic basis and market for which the enterprise needs is additional financial resources. Shortage of working capital impedes the development of production and attraction of material resources. This largely explains the shortcomings in the work of attracting financial resources of enterprises. Becoming a financial market is possible only with the elimination of imbalance between financial and material resources.

There are many factors influencing the motivation, volume and direction of international investment. At the level of the relationship “basic country –country receiving”, the following factors are crucial:

- political and economic: political stability; degree of government intervention in the economy: relation to foreign and foreign investments; adherence to bilateral and multilateral agreements;
- resources: geographical location; availability of natural resources; demographic situation;

– general economic: the rate of economic growth; ratio of consumption and savings; loan interest rate; the rate of net profit; the level and dynamics of inflation; balance of payments status.

In a broader context, international investment processes are influenced by: the state of development of the world economy, international factor and investment markets; stability of the world monetary system; development of international investment infrastructure and the like. In the context of globalization, international investment is influenced by the interacting processes of trans nationalization and regional economic integration. The effects of global economic factors, on the one hand, offset some of the differences between countries, and on the other, it creates a macro environment for large-scale activity of international entities and investment institutions.

SUMMARY

The article considers the investment system that is determined by the investment activity of financial institutions. The banking system is a dynamic system, the basis of the economic infrastructure of the market. The bank's investment operations are a complex process because the bank can be both an object and an investor. The bank's investment choices are influenced by the following major factors: expected rate of return, tax characteristics, mortgage requirements, risks. The stability of the banking system depends on the general equilibrium conditions between accumulation and investment demand. The state of the banking system affects investment. The structure of the modern banking system in Ukraine is in line with Western counterparts, and the domestic legal framework in the banking sector is perfect enough to regulate banking processes and ensure the stability of the banking sector.

REFERENCES:

1. Gukevych S. (2012). Investment: Theory and Practice. Poland, Volumina. PL Daniel Krzanowski. 193 p.
2. Gutkevych S.A., Koryn'ko N.D. (2010). Praktyka sovernennoho veksel'noho obrashchenyya v Ukrayne. Razvytye byznesa v uslovyakh perekhodnoy ékonomyky v stranakh Tsentral'no-Vostochnoy Evropy: Monohr. CH. 2. Baku, Kyev, Kaunas.

3. Gutkevych S.O., Korin'ko M.D. (2003). Veksel' u systemi tsinnykh paperiv: problemy stanovlennya ta rozvytku: Navch. posibn. Kyiv: Vyd-vo Yevrop. un-tu. 119 p.
4. Model' rozvytku haluzey ekonomiky Ukrayiny (2011). Under edition of. S. Gutkevych. Kyiv: NUTU «KPI», 472 p.
5. Synergetic Bases of Investment in Economy Sectors (2003). Under gen.ed. S. Gutkevych. Kyiv, 200 p.
6. Sharpe W. (1999). Investments: 6th (sixth) Edition Paperback, 962 p.

Information about the author:

Gutkevych S. O.

Doctor of Economic Sciences, Professor,
Head of the International Economics Department,
National University of Food Technologies, Ukraine

Plynokos D. D.

Candidate of Economic Sciences, Associate Professor
Economics and Customs Department
National University "Zaporizhzhia Polytechnic", Ukraine