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Faculty of Finance
Department of Investment and Banking Activity

MARIANA BUNU

INVESTMENT ACTIVITY

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CONTENT

INTRODUCTION.....	5
Study Unit 1. INVESTMENT ACTIVITY AND ITS FEATURES IN MODERN ECONOMY	7
1.1. Definition and elements of investment	7
1.2. Classification of investments	11
1.3. Role of investments in the sustainable economic development.....	14
1.4. Investment behavior under macroeconomic policies.....	16
Study Unit 2. THE INVESTMENT ENVIRONMENT	20
2.1. The concept of investment environment.....	20
2.2. Determinants of investment environment.....	23
2.3. Assessments of investment environment for investment decision.....	24
Study Unit 3. THE INVESTMENT PROCESS	28
3.1. Investment process' contents	28
3.2. The investment projects: definition and types.....	29
3.3. Stages of the investment project development process.....	32
3.4. The feasibility study of investment project.....	37
Study Unit 4. SOURCES OF FUNDS FOR INVESTMENT AND METHODS OF FINANCING	40
4.3. External sources for investment's financing.....	43
4.4. Methods (classic and alternative) of investment financing.....	49
Study Unit 5. CAPITAL ACQUISITION COSTS IN INVESTMENT PROJECTS.....	53
5.1. The concept of the cost of capital	53
5.2. The cost of each capital components	55
5.3. The weighted average cost of capital (WACC)	58
5.4. The marginal cost of capital and investment decisions	60
Study Unit 6. CASH FLOWS FROM INVESTMENT ACTIVITY PROCESS	63
6.1. The Financial Elements of Investment	63
6.2. Relevant Cash Flows for Capital Project Evaluation.....	65
Study Unit 7. TIME VALUE OF MONEY AND ITS INFLUENCE ON CASH FLOWS FROM INVESTMENT ACTIVITY.....	68
7.1. Time value of money concept.....	68
7.2. Present value and Future Value of Cash Flows.....	69
7.3. Annuities. Working with annuities	71
7.4. Uneven Cash Flows	73

Study Unit 8. INVESTMENTS' ECONOMIC EFFICIENCY EVALUATION	75
8.1. Concept of the investments' economic efficiency	75
8.2. Traditional (static) methods for investments' efficiency evaluation.....	77
8.3. Dynamic methods to evaluate investments' efficiency.....	79
Study Unit 9. INVESTMENT RISKS	89
9.1. Concept of investment risks.....	89
9.2. Classification of investment risks.....	90
9.3. Techniques and indices for investment risk analysis.....	93
9.4. Strategies for investment risk diminishing	97

INTRODUCTION


The course Investment Activity is an introduction to the most fundamental concepts, principles, analytical methods and tools useful for making investment decisions.

First of all, to develop a basic understanding of the investment. The study of investments and of their principles and practices is concerning with the investors attempt to make logical decisions about alternatives that have varying degrees of return and risk.

This course will focus on the basic building blocks: the “macro” level that pertains to national economy level and investment policy considerations, and the “micro” level, which pertains to firm level and individual investment project.

The course unit Investment Activity covers the entire investment process, from the investment idea to the finalization of the investment and obtaining useful results. It is divided into nine units of study, where students learn with the basic concepts related to investments, their classification, the most important elements of an investment project and ways to successfully manage given projects. The material is designed to introduce students to the most important elements and factors influencing the successful realization of an investment. The course will cover pre-investment study, investment programme development and investment project appraisal. Particular attention is given to investment project analysis and investment financing. Very important is investment appraisal and the criteria on which investment decisions are based.

The course aims at explaining and interpreting the rationale of the investment decision by means of the feasibility study; arguing and economic interpretation of the results obtained from the calculation of the indicators for evaluating the economic efficiency of investments; analyzing the results obtained and the rationale of the investment decision. It also aims at interpreting the relationship between training-education-action-practice through transdisciplinary analysis of concepts, practical models and ideas substantiated within the discipline.

 The course specific learning objectives are:

- to present the concept of investment and its implications for sustainable economic development;
- to classify the main elements on investment environment, including regulatory and institutional frameworks, investment policies;
- to present the mechanism of elaboration and substantiation of feasibility studies that underpin decision-making in the investment process;
- identifying sources of investment financing;
- learning the concepts of economic efficiency and economic effectiveness of investments;

- presentation of general and basic (static) indicators used to determine the economic efficiency of investments;
- analyzing the influence of the time factor on the investment process and presenting the main reference points of updating;
- updated indicators, proposed by the World Bank methodology, used in determining the economic efficiency of investment projects;
- capacity building on the identification of the influence of risk

Study Unit 1. INVESTMENT ACTIVITY AND ITS FEATURES IN MODERN ECONOMY

Learning Objectives:

After studying this topic, the student should be able to:

- Define the investment;
- Name the elements that identify an investment;
- To characterize the main features of investment;
- Distinguish between real investments and financial investments;
- Discuss the role of investment in the sustainable economic development;
- To characterize the main tools of macroeconomic policies and reflect on how they impact the investment behavior of entities and individuals.

Key terms: capital investment, financial investment, foreign investments, elements of investment, features of investment, sustainable economic development, tools of investment policy, the investment behavior etc.

1.1. Definition and elements of investment

The general idea of investment is that the investor accepts not using the available resources today, so that he would have a higher amount of resources in the future. Thus, investment is the activity of buying an asset to make a profit from its use. The resources involved are created from the savings of individuals and corporations, resulted as a difference between incomes and expenditures.

An investment may be defined as the purchase by an individual or institutional investor of a financial or real asset that produces a return proportional to the risk assumed over future investment period.

In other view, investment represents the totality of financial and material resources allocated to create, modernize or extend the economic activity with the reason to earn profit.

Investment definition may have several meanings, two most relevant:

1) An investment as a financial or tangible asset which is acquired on purpose to get a profit in the future. It is an instrument that promises some certain or uncertain return in the future.

2) An investment as a process (investing) of buying or acquiring of goods or assets on purpose to earn more money (or other material benefits) than was spent when investment was made.

If acquisition is made without an intention to profit from it, then it is spending but not an investment.

French economist P. Masse in the work "Criteria and methods of optimal definition of investment" defines investment as an allocation of capital. American scientist S. Fischer in the publication "Economics" provide the term "investment" (investment expenses) as the cost of creating new capacities for the production of machinery, financing housing, industrial or agricultural construction, as well as reserves. The Nobel prize winner J. M. Keynes gave a fairly broad definition of the term "investment", which means "...the current increase in the value of capital assets as a result of the production activity of this period"..., "that part of the income for a certain period that was not used for consumption".

Numerous economists tried to include in the definition more aspects related to the investments' content and mechanism and due to this fact, there can distinguished two approaches: the first one more restrained, and the second one more extended.

In the restrained approach, investment represents the total amount of expenditures which are made for creation or purchasing of new fixed assets, replacement of used ones, modernization of existing assets, implementation of innovations or financial placements made for a profit purpose.

In the extended sense investments represent not only a sum of money, but also an intention, a human action of directing some capital to create something new or something improved substantially with the goal of producing goods that will generate additional revenues.

Viewing investments only as expenditure is not complete, because in the modern theory, from the financial point of view investments are based on the diverse structure of resources, which can be: material, technical, financial, human, etc. As a result, the definition of investment comprises a wider significance in the accounting, economic, financial and psychological view.

In business context, investment is that activity of acquiring in new equipment or research and development to improve efficiency or create new products, in expectation that this will help the business to prosper in the long run.

In finance, an investment refers to allocating capital for an asset with the idea that the asset will provide income in the future or appreciate and be sold at a higher price.

In accounting terms, investments are assets held by an enterprise for earning income by way of dividends, interest and rentals, for capital appreciation, or for other benefits to the investing enterprise.

In a psychological perspective, investment refers to the intentional choice to give up immediate rewards or pleasures in order to achieve greater, though often uncertain, benefits in the future.

In all cases the investor is trading a known money amount today for some expected future stream of payments that will be greater than the current outlay. So, results that investment is considered to be a present expenditure, realized for the purpose of future effects in risk and uncertainty conditions.

A formal definition of investment can be specified as a current commitment of money for a period of time in order to derive future payments that will compensate the investor for the time funds are committed, the expected rate of inflation and the uncertainty of the future payments. Similarly, this definition includes all types of investments, including investments made by corporations in plant and equipment, also the investment of individuals in stocks, bonds, commodities, or real estate.

The legal definition of investment is formulated according to the Law of Republic of Moldova on investments in entrepreneurial activity nr. 81 from 23.04.2004¹. According to the Law, the “investment” means the aggregate amount of goods (assets) introduced in entrepreneurial activity on the territory of the Republic of Moldova, including on the basis of financial leasing contract, as well as within public-private partnership, for the purpose to obtain income. Also, the Law regulates the forms of investment.

 Investing is the process of committing money or other resources with the expectation of generating profit or capital growth in the future.

Key Elements of an Investment Activity:

- **The subject of investment.** This refers to who is investing the resources. An investor can be an individual, a government, a pension fund, or a corporation that is willing to invest its resources.
- **The investment object.** This represents what the investment is targeting. Can be businesses, buildings, plants, equipment or real estate, or financial assets;
- **Investment cost.** This is the total amount of resources committed to the investment that represents the financial, material (machinery, raw material, production space, and land), human effort made for the realization of the investment etc.
- **Returns** expected to be obtained by the end of the investment’s life span. Returns may come in the form of profits, dividends, capital gains, or interest.
- **Risk** is an inherent characteristic of every investment. Risk refers to loss of principal amount, delay or non-payment of capital or interest, variability of return etc. However, risks and returns are inseparable. Every investment differs in terms of risk associated with them.
- **Time horizon** funds are committed – represents the period of time during which the money or assets won’t be available to the investor. Time period depends on the attitude of investors: a day trader vs. someone investing in a 30-year bond, for instance.

Present economic theory emphasizes a series of aspects related to main feature of Investment Activity:

¹ <http://lex.justice.md/index.php?action=view&view=>

- **Delayed Gratification:** Investment is grounded in the principle of deferring present consumption to achieve greater benefits in the future. The investment is one of the optional forms using the capital. Investments are the opposite of immediate consumption. It deals with spending or allocating resources today in expectation of returns tomorrow. Whether it's funding innovation, expanding infrastructure, or saving for retirement, delayed gratification reflects a disciplined mindset - trading the comfort of “now” for the promise of “more” tomorrow.

- **Capital Commitment:** It requires committing resources (like money, time or assets) to assets or projects that are not immediately liquid - often for extended periods. Investments include activities of allocation of funds or elements of expenses for one period which is usually larger than a production cycle. Thus, investment refers to the expenditures in one particular initial moment in order to obtain later effect, through time.

- **Risk Assumption:** Since outcomes are expected in the future, every investment carries some degree of risk. Whether it's launching a new product, buying equipment, or entering a new market, there's no absolute certainty of success.

- **Value Creation:** At its core, investment activity aims to generate added value—be it profits, technological advancement, or competitive advantage. It's not just about spending, but about cultivating future benefit.

- **Novelty Character:** Many investments are made to support innovation, upgrade capabilities, or adapt to evolving conditions. That's why investment is also a driver of progress and transformation. Investment can generate spillover effects.

Investing activities meaning can be understood as the use of a company's or individual's funds to acquire assets or to develop activities that are expected to generate returns over the long term. These activities involve the purchase, sale, or disposal of long-term assets and investments, such as property, plant, and equipment, securities like stocks and bonds, and acquisitions or divestitures of subsidiaries or other businesses. Investing activities are essential for companies to grow, expand their operations, and enhance their competitive position in the market.

It is important to understand how investment activity functions within the broader economic landscape. In the modern economy, investment is fundamentally shaped by the dynamic interplay between two interconnected markets:

1. The Real Economy (Real Market)

- Comprises **tangible assets**: infrastructure, machinery, factories, innovation.
- Involves **economic investments** that directly contribute to production, employment, and long-term value creation.
- Seen as the primary generator of actual wealth, as these investments add material value to society.

2. The Financial Economy (Financial Market)

- Comprises **intangible assets**: stocks, bonds, derivatives, and other portfolio instruments.

- Facilitates the **allocation of accumulated savings** from the real economy into various investment vehicles.
- Enables liquidity, capital mobility, and portfolio diversification.

Though conceptually distinct, these two markets are mutually reinforcing: the real market needs financing from the financial market to grow and innovate and the financial market depends on the real market for the underlying performance of assets.

Note: Both markets are equally important and move in tandem. A decoupling such as financial markets growing disproportionately to real economic performance (by increasing stock market prices faster than the increase in sales and profits in the companies where those shares are listed on the stock exchange) can lead to economic imbalances and system-wide crises.

1.2. Classification of investments

Following the definitions, can be stated that the investment can be divided into several categories **according to the object of allocation:**

Capital Investments

Capital investment is the amount invested by the company in acquiring, upgrading or sustaining its long-term fixed assets which help the company reach its business goals and to ensure growth. They might be **tangible** assets, like land, plants and machinery, or **intangible** assets, such as technology and intellectual property.

These investments are typically long-term in nature, involve substantial risk, and are directed toward the real sector of the economy. They are integral to economic development, as they facilitate the creation of tangible productive assets.


Financial Investments

Financial investments denote the allocation of monetary resources into financial instruments with the expectation of generating income or capital gains. These typically include: acquisition of stocks, bonds, and securities; establishment of bank deposits etc.

Such investments are primarily characterized by their liquidity, income-generating potential, and involvement in the financial markets. They serve as vehicles for capital preservation and wealth accumulation.

In economic theory, there are many classification criteria, but a few are recognized as essential and are widely used by economists.

According to the **nature of investor's participation** investments are:

 **Direct**, those are equity investments such as acquisition of real assets or a stock package of a company, sometimes the acquisition of entire company or the establishment of its new subsidiaries. In case of the direct investment, suppose the possibility of control and decision over the activity of the enterprise.

 **Indirect or portfolio**, that represent a financial placement for purchasing securities or other assets in order to cash some future profits in form of dividends or

interests and also as a result of increasing the market value of securities. This type of investment does not intend the direct control over the company.

The distinguishing elements: management and control over the company and the share of ownership in it. Most investors interested in indirect investment would do so through a company or advisor who has experience in this type of investing.

Capital investment expenditures, **by purpose**, can be distinguished as:

- ✚ Replacement/Maintenance Investment. These are expenditures to keep existing assets in working order and maintain current production levels. Examples include replacing worn-out machinery or repairing a building's roof. It is the necessary investment in assets required to sustain business-as-usual operations and business running efficiently. Maintenance capital expenditures are prioritized by the need to replace depreciated assets when they approach the end of their useful life to avoid the risk of disruption to ongoing operations.

- ✚ Regulatory/Compliance Investments. These are expenditures required to meet legal or regulatory requirements.

- ✚ Expansion/Growth Investments. These are investments that expand a company's productive capacity or introduce new products or services. Growth capital expenditure is a discretionary investment that enhances an organization's capital base in pursuit of strategic objectives with new capacity, geographic reach, operating efficiencies and technology capabilities. Examples include building a new factory or investing in research and development.

- ✚ New/Innovation investments refer to investments decisions in order to promote the progress, meaning creation of new products, of improved or new technological processes, application of new methods etc. include high-risk investments and new growth efforts, e.g., innovation projects. These initiatives are probably the riskiest from the capital investment spectrum.

Additionally, investments can be categorized **according to the subject of investment or financing sources**:

- ✚ Private or Corporate investments. These are undertaken by business entities - such as firms or corporations. Such investments are aligned with the firm's strategic objectives and are directed toward enhancing operational efficiency, market competitiveness, or profitability.

- ✚ Public investments, financed through governmental budgets at the national or local level, public investments aim to support the development of public goods and services. These investments are designed to promote social welfare and economic stability.

- ✚ Individual investments. These are made by private individuals using personal financial resources. They may include: real estate acquisitions, investments in small businesses, participation in financial markets (e.g., stocks, bonds). Such investments reflect personal financial planning, wealth accumulation, and retirement strategies.

✚ Foreign investments originating from non-resident investors, these can take several forms: foreign direct investment (FDI): participation in the ownership or control of domestic enterprises; foreign portfolio investment (FPI): acquisition of financial assets without direct control; international financial assistance: loans or grants from global institutions (e.g., IMF, World Bank).

✚ Mixed investments. These involve combined financing from multiple sources - public and private, domestic and foreign. These are common in public-private partnerships (PPPs) or joint ventures.

According to **the investment period**, investments are:

- ✚ Long-term investments
- ✚ Medium term and
- ✚ Short-term investments (till 1 year).

Depending on **the regional affiliation** there are:

- ✚ Domestic (home) investments and
- ✚ Foreign investments. Foreign investments represent the resource and financial flows that cross juridical and economic boundaries. The criterion that differentiates foreign and domestic investments is the fact that investor and receiver have residence in different states.

In terms of **their relationship to the investment objective to be realized**, there are three categories of investment expenditure, namely:

✚ Direct (or core) investment. This investment comprises all the expenditure set out in the documentation drawn up by a given economic entity with a view to the immediate realization of new investment objectives, the replacement, modernization or development of existing enterprises in various branches of the economy;

✚ Complementary (or collateral) investment. Infrastructure investment (collateral) comprises expenditure for carrying out works linked territorially and functionally to a specific direct investment and refers specifically to: the construction or connection of pipelines for water, gas, sewage, heat, electricity, electricity transmission lines, telecommunications, including connections to public networks, paths and access roads, etc., necessary for the commissioning and operation of fixed assets created by the direct investment.

✚ Related investment is the investment expenditure necessary to be carried out in other branches or fields in order to make available to the direct investment machinery, raw materials, fuel, energy, means of communication, social and cultural facilities, etc.

Case Example: Green Energy Zones as Integrated Investment Ecosystems

A compelling illustration of interdependent investment strategy is offered by the establishment of Green Energy Zones (GEZs). These zones are strategically planned to attract capital through a combination of policy incentives, infrastructure readiness, and cross-sector collaboration.

The core investment within a GEZ typically involves the construction of energy-generating facilities such as solar parks, wind farms, or green hydrogen production plants. These are the anchor projects that define the zone's technological and environmental focus.

However, the success of these core investments is inherently tied to a series of complementary investments, including: the development of high-capacity transmission lines and smart electrical grids to efficiently distribute the generated power; installation of energy storage systems, such as battery banks or pumped hydro stations, to ensure grid stability; creation of water infrastructure in cases where hydrogen production or system cooling is necessary.

In addition to energy-specific infrastructure, GEZs require related investments that support long-term sustainability and regional development, such as: training and reskilling centers to cultivate a skilled labor force suited for green jobs; eco-industrial parks that rely on clean energy inputs for low-emission manufacturing; community engagement initiatives to ensure inclusive benefits and social cohesion among local populations.

As such, GEZs exemplify how a single investment in renewable energy can act as a catalyst for multidimensional development, sparking waves of economic, technological, and social transformation.

1.3. Role of investments in the sustainable economic development

Investments influence the economy through a variety of channels: by adding to invertible resources and capital formation; by transferring technology, skills, innovative capacity, and organizational and managerial practices between countries; and by accessing international marketing networks. Also can help stimulate employment, raise wages and replace declining market sectors.

Investments play a pivotal role in fostering **sustainable economic development**, serving as both a catalyst for growth and a mechanism for long-term resilience. Unlike traditional growth models that often prioritize short-term gains, sustainable development emphasizes economic progress that is environmentally responsible, socially inclusive, and economically viable over time.

According to the UN’s “Six Transitions” framework, investments in six key areas—food systems, energy, digital connectivity, education, jobs and social protection, and climate action—can generate catalytic effects across multiple SDGs. When aligned with the UN Sustainable Development Goals (SDGs), investments become powerful instruments for systemic transformation².



Figure 1.3.1. The global goals for sustainable development

Investments in infrastructure, industry, and innovation stimulate inclusive economic growth (SDG 8), promote decent work, and support industrialization and innovation (SDG 9). Capital allocation toward sectors such as renewable energy (SDG 7), sustainable agriculture (SDG 2), and climate resilience (SDG 13) contributes to structural transformation and economic diversification, particularly in developing economies.

Sustainable investments prioritize the preservation of natural resources and the reduction of ecological footprints. Projects in clean energy, waste management, and circular economy models help mitigate climate change and promote environmental stewardship. These investments align with global ESG (Environmental, Social, and Governance) standards and support the transition to a low-carbon economy.

Investments in education (SDG 4), healthcare (SDG 3), and gender equality (SDG 5) foster social equity and human capital development. Public and private funding for vocational training and digital literacy programs ensures that the workforce is prepared for the green and digital transitions. By targeting underserved communities and promoting decent work, such investments reduce inequality and enhance societal well-being. Moreover, community engagement and participatory planning ensure that development is inclusive and locally grounded.

² See more on <https://www.youtube.com/watch?v=0XTBYMfZyrM>

Sustainable investments generate **multiplier effects** across sectors. For example, investing in green energy zones not only creates jobs and reduces emissions but also stimulates innovation, attracts foreign capital, and strengthens regional supply chains. The synergy between public and private investment further amplifies these outcomes, especially when supported by transparent governance and long-term policy frameworks.

1.4. Investment behavior under macroeconomic policies

The investment decision of individual investor is influenced by so many macro/micro economic as well as behavioral factors. Interest rate, economic growth, inflation, government policy, technological developments are the macro-economic factors and firm size, book-to-market equity, cash flow yield, earnings yield, and dividend yield, etc. are the micro-economic factors. On the other hand, how an individual investor judge, predict, analyze and review the procedures for investment decision can be defined the behavioral factors.

Investor behavior refers to the way in which individuals make decisions about how to invest their money. The quality of investment policies directly influences the decisions of all investors, be they small or large, domestic or foreign.

Government investment policies significantly influence investor behavior by impacting risk perception, investment choices, and overall market participation. Policies such as tax incentives, interest rate adjustments, and regulations can encourage or discourage specific investment activities.

In essence, government policies act as a powerful force shaping investment behavior, influencing both the quantity and quality of investment decisions.

The investment policy represents set of principles and measures of organizational and economic influence, at a level of the country, region, city or the enterprise, in order to assure the optimum conditions directed on creation for investments.

An investment policy is related any government regulation or law that encourages or discourages the investment activity in the local economy. Transparency, property protection and non-discrimination are investment policy principles that underpin efforts to create a sound investment environment for all.

At macroeconomic level the investment policy is correlated with economic and social orientation established by decision bodies like: government, parliament, ministries etc.

It is very important that government creates proper conditions for the investment processes in an economy and at the same time participates as the main investor in social-oriented fields like: health, education, infrastructure etc.

In a broad definition, government investment policy a set of goals and actions of organizational and economic matter, that are elaborated and realized by public

administration bodies in collaboration with commercial and noncommercial organizations oriented to investment increasing and their profitable use for the purpose of a stable social and economic development of the society, increasing of national economy's competitiveness and enhancement of its investment attractiveness.

The resources gathered under this topic look at the many different methods used by policymakers to attract FDI and their effectiveness. These approaches include:

- providing targeted fiscal incentives: tax concessions, cash grants, and specific subsidies;
- improving domestic infrastructure;
- promoting local skills development to meet investor needs and expectations;
- establishing broad-reaching FDI promotion agencies;
- improving the regulatory environment; and
- engaging in international governing arrangements.

The government investment policy at macroeconomic level can be classified under several principles:

✚ Under territorial criteria it can be divided on:

- national or
- regional investment policy.

✚ According to the methods of realization it can be:

- based on economic methods or
- based on administrative methods or
- mixed

✚ On the time period, investment policy can be:

- short-term
- medium term
- long term.

It is very important that government creates proper conditions for the investment processes in an economy and at the same time participates as the main investor in social-oriented fields like: health, education, infrastructure etc.

For the realization of the government investment policy there are economic (indirect) methods and administrative (direct) methods in order to influence on the investment activity of economic agents.

The economic methods are based on the tools of the following policies: trade policy, tax policy, customs policy, currency policy, money and credit policy. The most dynamic and efficient are considered measures of the trade policy. Policies relating to trade in goods and services can support more and better quality investment by global supply chains, boosting productivity and rates of return on investment.

Tax incentives remain a central strategy developing countries use to attract investment. Tax holidays are, for example, used in almost 90% of developing economies.

Actual investment policies place inclusive growth and sustainable development at the heart of efforts to attract and benefit from investment mainly done in infrastructure, renewable energy, water and sanitation, food security, health and education (sustainable development goals-related sectors). Broadly, “new generation” investment policies are characterized by (i) a recognition of the role of investment as a primary driver of economic growth and development and the consequent realization that investment policies are a central part of development strategies; and (ii) a desire to pursue sustainable development through responsible investment, placing social and environmental goals on the same footing as economic growth and development objectives. Furthermore, (iii) a shared recognition of the need to improve the effectiveness of policies to promote and facilitate investment. These three broad aspects of “new generation” investment policies translate into specific investment policy challenges at the national and international levels.³

The priority tasks of the investment policy of one state are specified in the relevant development strategies of the countries, taking into account the real national conditions of economic development.

The main acts that stipulate priorities of investment policy in the in the Republic of Moldova for the next period of time are:

- The National Development Strategy European Moldova 2030
- The National Program to attract investment and promote exports for 2024-2028
- Sectorial strategies, like The National Strategy for Agriculture and Rural Development of the Republic of Moldova (2023-2030) etc.

National Program to attract investment and promote exports focuses on National Development Strategy European Moldova 2030, and it is also envisaged to:

- ✓ to boost the country's economy by attracting foreign investment and promoting Moldovan exports, particularly in sectors like agriculture, automotive, ICT, and machinery
- ✓ access to capital will be made easier for companies that intend to be listed on foreign exchanges, primarily for ITC startups that develop products for the global economy.
- ✓ encourage advanced technologies by tax policy tools. For example, a 50 percent deduction rate will be applied for expenses related to investments in research and innovation and the purchase of production equipment.
- ✓ simplify exports through online trading, a possible reduction in income tax for equipment manufacturers, and private investors who invest directly in their projects will be able to receive co-financing in the form of direct government subsidies.

³Investment Policy Framework for Sustainable Development, UNCTAD, 2015
https://unctad.org/system/files/official-document/diaepcb2015d5_en.pdf

✓ prioritize investments in the production of machinery and electrical equipment, mechanical apparatus, pharmaceutical products, optical equipment and vehicles.

✓ Particular attention will continue to be paid to environmentally friendly industrial production and investments in closed-cycle production.

✓ intensify communications and positioning of Moldova as a country for investment with an ambitious economic agenda.

So, Governments need to carefully consider the potential impact of their policies on investor behavior and strive to create a policy framework that promotes sustainable and inclusive growth.

Knowledge Assessment Questions

- Explain the meaning of investment and describe how it differs from regular spending or consumption.
- What are the key elements that define an investment activity?
- What is the difference between real investments and financial investments? Use examples to support your explanation.
- Why is it important to consider both risk and time when making an investment?
- Discuss how investment policy can affect investor behavior.

Individual Work Tasks

Task 1: Name the guarantees offered to foreign investors according to the Law on investment in entrepreneurial activity in Republic of Moldova

Task 2: Describe 5 indicators of the investment behavior in of RM for last 5 years. (main source: https://statistica.gov.md/ro/statistic_indicator_details/16)

Task 3: Describe in 5 statements the evolution of foreign investments in economy of RM for last 5 years. (Main source: www.bnm.md)

Task 4: Set 5 statements that confirm the contribution of investment to both economic growth and long-term sustainability.

Task 5: Identify main priorities of Government in investment policy field

Task 6: List the main fiscal and financial incentives for investment activity in Republic of Moldova

Recommended Readings:

National Programme for Investment Attraction and Export Promotion (2024-2028) Hotarîrea Guvernului RM Nr. 479 din 03-07-2024. In Monitorul Oficial Nr. 341-343 art. 66506-08-2024.

Study Unit 2. THE INVESTMENT ENVIRONMENT

Learning objectives:

After studying this topic, the student should be able to:

- Explain the term investment environment
- Describe the main components of the investment environment
- Discuss the significance of investment environment in investment attraction process
- Give interpretation to few specialized assessments of the investment environment
- Discuss the investment environment of the Republic of Moldova
- Learn about the legal and institutional framework for investment activity in the Republic of Moldova

Key terms: investment environment, investment image, investment attractiveness, investment potential, investment risk, assessments of investment environment, favorable/risky investment environment, opportunities to invest

2.1. The concept of investment environment

An attractive business environment for the expansion of the investment activity and to attract potential investors is a component part of the investment strategy and economic policy of one country, especially of developing countries.

Investment environment relates to developments in the domestic and international economy, which have a positive or negative impact on investments (financial and real). The investment environment can be defined as a system of factors, influence of which can interfere in the investment process, modifying the investment behavior.

Developing this idea, we can say that the investment environment is a component of the economic situation of one country, region or branch which is formed under the influence of political, economic, juridical, social, geographical or demographical factors, which determine the conditions of performing the investment process in an economy.

By United Nations Economic Commission for Europe (UNECE REPORT 2004), the investment climate could be described as the conditions that make up the favorable environment in which private enterprises prosper (thrive) by investing and producing.

According to the World Bank definition, investment environment is a policy, institutional and behavioral environment, that influences the returns and risks, associated with investment.

Investment environment is combination of all external conditions that may influence and limit investment activities and the profits derived from them considered from the investor's point of view. These conditions are such elements as political factors, financial policy, basic infrastructure, socio-economic conditions, natural resources and the physical environment related to investments and which are within some spatial-temporal framework. A spatial scale needs to be specified if we want to explore the investment environment. It can be considered in different scales – country, region, municipal, branch, city, enterprise, etc. All these levels are correlated and interdependent. Depending on the scale chosen other factors of the environment are examined.

So, investment environment can indicate the level of attractiveness of one country or region or branch for the investments.

Because there are many elements that make up the investment climate, it is difficult to define it precisely, but the main elements which are the objective opportunities of one enterprise, region or country (investment potential) and conditions for investors' activity (investment risk) have been used to describe it. These elements are very connected, because it is insufficient to analyze only country's investment potential or only the occurring investment risks.

Investment potential represents a critical indicator of a country's, region's, or enterprise's ability to attract and utilize investment resources effectively. It is defined as the set of objective opportunities that support and stimulate investment activity within a given economic entity. The evaluation of investment potential typically involves a multifaceted analysis encompassing the following core components illustrated in Figure 2.1.1.

In contrast, **investment risk** refers to the probability of incurring a loss in expected returns or failing to achieve the projected outcomes of an investment due to the adverse impact of internal or external risk factors. These may include economic instability, political uncertainty, currency fluctuations, regulatory changes, and other unpredictable developments. The presence and intensity of such risk factors can undermine investor confidence, disrupt investment planning, and ultimately diminish the investment attractiveness of a given entity.

A high level of investment risk can lead to capital outflow, project postponements, or cancellations, thereby adversely affecting economic growth and development. Therefore, understanding and managing investment risk is essential not only for investors but also for policymakers.

The investment environment reflects the full picture of one country, of the country's ability to attract investments, develop ongoing investment process, etc.

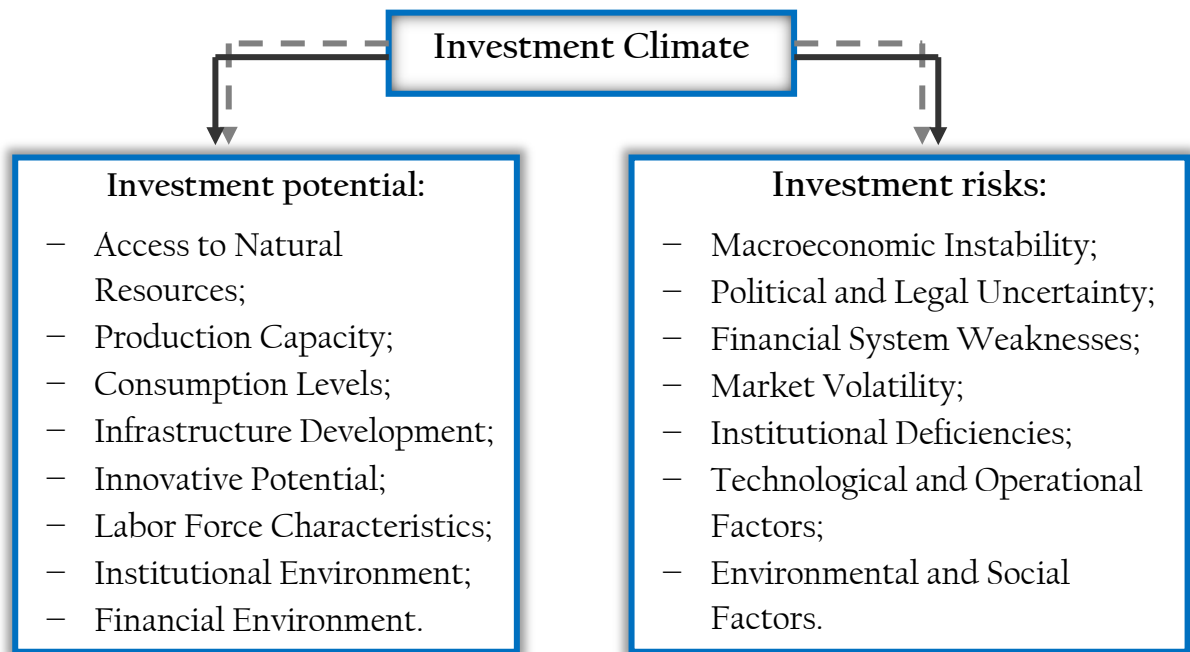


Figure 2.1.1. The main elements of investment climate

The investment environment serves as a key indicator of the overall **investment attractiveness** of a country, region, or specific economic sector. It reflects the extent to which the conditions within a given territory are conducive to initiating and sustaining investment activities. A favorable investment environment is typically characterized by macroeconomic stability, transparent legal and institutional frameworks, accessible financial markets, developed infrastructure, and a skilled labor force. A welcoming investment climate can help attract high quality, durable investment and support sustainable and inclusive economic growth.

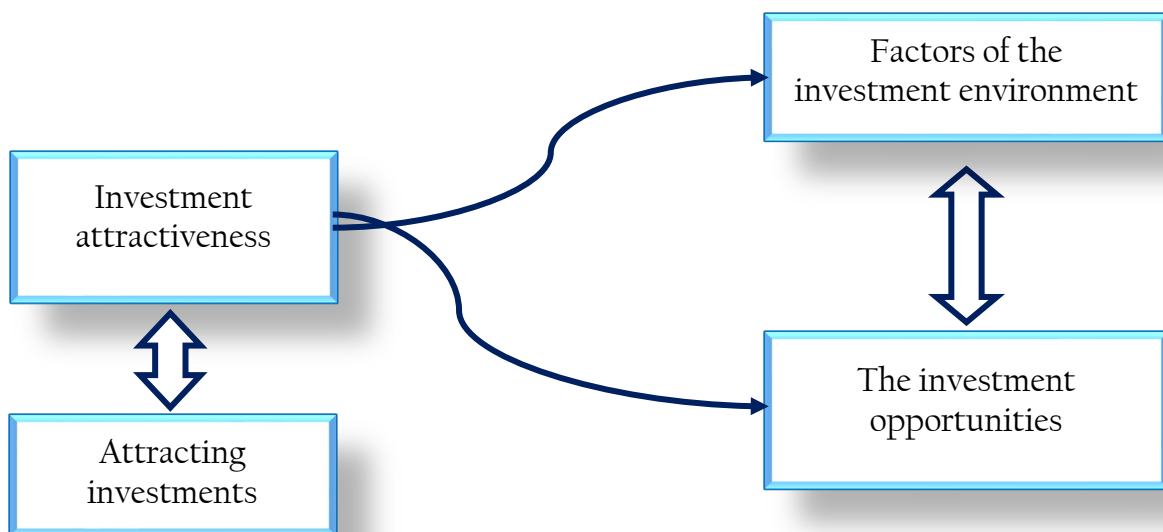


Figure 2.1.2. The interaction of investment attractiveness of one economy and attracting investment

Investment attractiveness determines the ability of an economy to satisfy the expectations, requirements, and strategic interests of both domestic and foreign investors. It involves the capacity to ensure a favorable balance between potential risks and returns, thereby encouraging the inflow of capital. This concept encompasses not only the objective conditions for doing business but also the perceived security, profitability, and long-term viability of investments within a particular context. Thus, the investment attractiveness of an economy plays a pivotal role in determining its capacity to attract and, also, to retain investment capital.

2.2. Determinants of investment environment

The investment climate of a country is shaped by a broad set of economic, political, legal, and institutional factors that collectively form the general conditions for investment activity. Together, they define the general **investment image** of a country as perceived by potential investors.

The investment image refers to the external perception of a country's investment environment, shaped by both objective indicators and subjective impressions. It is the outcome of real economic processes, policy decisions, reforms, institutional practices, and past investment experiences. Unlike formal indicators, the investment image is strongly influenced by investor sentiment, international reputation, and global media narratives.

Although the investment image is not a direct driver of investment flows, it serves as a critical precondition for attracting capital, particularly foreign direct investment (FDI). It plays a decisive role in the early stages of the decision-making process, especially for investors assessing unfamiliar markets. A positive and credible investment image reduces perceived risks and enhances trust, positioning the economy as a viable and attractive destination for capital allocation.

The factors that define a country's investment climate are typically identified through a comprehensive set of macroeconomic indicators reflecting the overall performance of the national economy. The aggregation of these indicators provides a holistic and coherent representation of the investment environment in a given country or region. These factors may be systematized according to several criteria.

I. According to the manifestation level can be:

- Factors on macroeconomic level, that refer to:
 - macroeconomic conditions (budget situation, balance of payments situation, public and external debts, inflation, exchange rate, interest rate);
 - politic and social factors (policy uncertainty, corruption and criminality, unemployment rate, the living standards);

- institutions (the legal and regulatory system that promotes competition, good governance and improves access to financial services);
 - physical and market infrastructure.
 - Factors on microeconomic level:
 - economic factors (access to resources, market advantages, cost reduction, overcoming trade barriers);
 - financial factors (enterprise financial situation, the efficiency of the enterprise activity, access to financing sources for investment);
 - factors which determine the market conjuncture (buyers, providers, competition);
 - administrative factors (the quality of management, the existence of experience and assessment of investment perspectives);
 - psychological factors (investment culture, individual preferences of investors, natural barriers like culture or language).
 - II. According to their nature are:
 - Economic factors
 - Social factors
 - Political factors: factors of internal policy situation (social structure, institutional framework, control mechanism); factors of external policy situation (instability of regional policy, geopolitical importance, belonging to one of the political groups, regional economic situation).
 - III. According to the risk-return relation:
 - Factors which determine the country potential of investment assimilation (resources, productive potential of the country, infrastructure, labor force, institutions efficiency).
 - Factors that describe the investment risks (political, economic, social risks etc.)
 - IV. According to the degree to which they are susceptible to societal influence, there are:
 - Objective factors, those include natural and climatic conditions, endowment with power raw material resources, geographical positioning, demographic situation, neighbor-countries etc.
 - Subjective factors are those related to human resources management.
- Nevertheless, a country investment climate quality represents the determinant indicator of rationality to invest or of the continuity of the investment activity.

2.3. Assessments of investment environment for investment decision

The assessment of the investment climate serves as a valuable analytical tool for a wide range of stakeholders. For governments and policymakers, it provides critical insights into the strengths and weaknesses of the national or regional business

environment. Through such evaluations, authorities can identify which specific dimensions require reform or targeted improvement. From the perspective of investors, both domestic and foreign, the investment climate assessment functions as a key input in the decision-making process. By evaluating the risk-return profile of a particular economy, investors can determine the feasibility, security, and profitability of their prospective investments. A transparent and favorable investment climate significantly increases the likelihood of investment engagement, while persistent deficiencies—such as bureaucratic barriers, legal uncertainty, or macroeconomic volatility—may deter capital inflows.

One of the most common ways to assess the investment climate is through the use of investment climate indices. These indices are designed to provide a quantitative measure of the investment climate in different countries or regions. They take into account a wide range of factors, including economic, political, and regulatory conditions, and provide a score that can be used to compare the investment climate in different locations. By comparing these elements across territories, ratings serve as an essential tool for guiding investors toward the most favorable and potentially profitable destinations for capital allocation.

The results of investment climate assessments are commonly presented in the form of rating tables. These ratings are designed to provide a structured overview of how different economies perform in attracting and supporting investment activity. Such ratings are typically compiled annually or within a defined time interval, using a comprehensive set of indicators selected by specialized rating agencies, international institutions, or research organizations.

The assessment of a country's investment climate on a global scale is carried out by various institutions, each using their own frameworks and methodologies. These include:

- ✚ Major Banking Institutions. Leading international banks such as Citibank, Bank of America, and American Security Bank conduct investment risk assessments as part of their global financial operations and services to investors.

- ✚ Firms specializing in Country Risk evaluation. Several professional organizations are dedicated to the analysis of country risk, including: Business Environment Risk Intelligence (BERI), The Economist Intelligence Unit (EIU), P.R.S. Group, Dun & Bradstreet.


These firms provide in-depth evaluations based on political, economic, and financial risk factors.

- ✚ Specialized financial magazines. Publications such as Euromoney, Forbes, and Institutional Investor regularly publish global rankings and country risk reports that are widely used by the investment community.

- ✚ International Credit Rating Agencies.

The main agencies responsible for sovereign credit and investment ratings include:

- Standard & Poor's Ratings Group (with approximately 40% of global market share)
 - Moody's Investors Service (about 39%)
 - Fitch Ratings (Fitch-IBCA) (approximately 15%)
- These agencies assess the creditworthiness of countries, which directly impacts their investment attractiveness.

 International Institutions. There are several well-known investment climate indices that are widely used by investors and traders. These include:

- the World Bank's Ease of Doing Business Index,
- the Heritage Foundation's Economic Freedom Index,
- the Transparency International's Corruption Perceptions Index.

These indices provide a valuable tool for assessing the investment climate, but they should not be used in isolation. They should be used in conjunction with other sources of information, such as economic data, political analysis, and on-the-ground research.

The ranking of investment climate includes a large classification, from favorable to risky.

A favorable investment climate led to revitalize the investment activity, to carry on investment processes of enterprises, stimulating domestic savings and economies, and attracting considerable amounts of foreign investments. It also gives investors' confidence in the market and encourages them to invest more capital.

An unfavorable or risky investment climate has an opposite action, fact that impedes the investment processes of domestic economic agents and also the interest of potential foreign investors for business activity in this environment.

Case Example: Estonia's Digital-First Strategy and Investment Climate Positioning

A clear example of how structured assessments of the investment environment inform national strategy is offered by Estonia's transformation into a digital investment hub. After regaining independence in the early 1990s, Estonia sought to reposition itself by building a business environment that prioritized transparency, efficiency, and innovation.

Drawing insights from global investment climate assessments—such as the World Bank's Ease of Doing Business Index, the Heritage Foundation's Economic Freedom Index, and Transparency International's Corruption Perceptions Index—Estonia identified key priorities: cutting red tape, enabling digital governance, and strengthening investor protections.

The cornerstone of Estonia's approach was its e-governance model, which digitized nearly all public services, including company registration, tax filing, and licensing. This initiative dramatically reduced administrative burdens, allowing businesses to be registered in under a day and encouraging international entrepreneurs to engage through the country's e-residency program.

To complement its digital infrastructure, Estonia introduced stable tax policies, including a flat corporate tax and deferred taxation on retained earnings, which created a predictable and investor-friendly fiscal environment. These reforms were supported by strong legal protections for property rights and a court system equipped to handle commercial disputes efficiently.

The results of these coordinated reforms were reflected in Estonia's strong performance in investment climate indices and consistent upgrades by credit rating agencies. These improvements bolstered the country's reputation as a low-risk, innovation-driven economy. By the mid-2010s, Estonia became a leading destination for investments in ICT, fintech, and digital services, attracting companies like Wise (formerly TransferWise) and Bolt.

Estonia's case exemplifies how the integration of investment climate evaluations into national reform strategies can foster credibility, transparency, and long-term investor engagement—especially in emerging sectors of the global economy.

Knowledge Assessment Questions

- What is the investment environment primarily defined as?
- What are the two main elements used to describe the investment climate?
- What does investment potential represent?
- What is the primary role of international credit rating agencies in informing about the investment climate?



Individual Work Tasks

Task 1: Analyze how the investment climate of a country influences its investment image.

Task 2: Provide a structured argument for why investment climate assessments are necessary.

Task 3: Choose one international institution (e.g., Forbes, EIU, Moody's, etc.) that assess the investment climate of countries and describe its rating or index methodology, including the key indicators it uses.

Task 4: Set a SWOT analysis of investment environment in the Republic of Moldova (support your analysis with data)

Recommended Readings

- World Investment Report 2024: Investment facilitation and digital government | UN Trade and Development (UNCTAD), online. Retrieve at: <https://unctad.org/publication/world-investment-report-2024>
- Moldova. Economic Update. <http://pubdocs.worldbank.org/en/466481588799156228/Moldova-Economic-Update-Spring-2020.pdf>

Study Unit 3. THE INVESTMENT PROCESS

Learning Objectives:

After studying this topic, the student should be able to:

- Define the investment project development process and identify its key phases
- Explain the purpose of investment projects and differentiate between major types
- Describe the main phases in the investment process
- Outline the core activities within the investment process
- Understand the role of feasibility studies in guiding investment decisions and summarize their essential components

Key terms: investment process, investment projects, investment life cycle, phases of the investment process, opportunity study, feasibility study

3.1. Investment process' contents

The capital investment process is an important aspect of strategic planning for businesses seeking to expand, modernise, or enhance their operations. It involves evaluating, selecting, and deploying financial resources to acquire assets or undertake projects that can generate long-term returns and drive organisational growth. From identifying investment opportunities to assessing risks and securing funding, the capital investment process encompasses various stages to maximise returns while minimizing uncertainties.

The whole set of actions, methods and mechanisms elaborated by the subjects of market relations to accomplish economic, social and other objectives with the aim of investing material, financial and labor resources, as well as time, into different sectors of the national economy, intended for a permanent capital reproduction and insurance of a long-lasting economic and social development is called **investment process**.

The realization of a project isn't spontaneously and by itself, it is accomplished in the frame of a whole cycle, being influenced both by the entrepreneur's qualities and abilities and the external factors: access to external financing, interest rate on the market, the level of development of the economic sector where the project is to be implemented, rate of inflation, qualification degree of the labor force, etc.

Investment process is related both to the level of development of the national economy and to the level of development of the firm.

At macro level the investment process emphasizes the integrity of the investment activity of the state and legal entities, expressed by the national policy, which has as prior objectives the economic growth and the population's welfare.

At micro-level the investment process is the whole set of financial, material and human resources involved in an investment project which in correlation with its mechanism of realization, has the final scope to increase the firm's profitability or to attend other useful results. The efficiency of investment process realization at micro-level determines the success of the investment process at macro level and vice versa.

The defining elements of the investment process are:

✚ **Subjects of the investment process.** The subjects of the investment process are considered to be the participants at the investment process, either the investor – being also the beneficiary (receiver) of the investment, or affiliated persons of the investment who can be the designer, executor, suppliers, creditors, banks, experts and consultants, supervisory bodies, etc. As subjects of the investment process also can be: public administration, corporations; financial institutions; individuals; foreign individuals and legal entities.

✚ **Object of the investment process.** The object of the investment process represents the investment project. Generally, investment process is based on the idea that investments are means for long-term development of the legal entity, increase of its efficiency and improvement of its activity. Actually, the objectives of the investment process are very extended, from the changes in technology and modernization of the firm till its complete restructuring.

✚ **Mechanisms of the investment process.**

○ The mechanisms of realization of the investment process are reflected in the investment policy of the state and the behavior of the legal entities when choosing the investment strategy.

✚ **Investment climate.**

The investment climate is a whole set of favorable and unfavorable factors, which have a direct impact over the investment behavior of legal entities. There are included, hereby, ways of estimation of the investment climate, economic and financial mechanisms of the investment activity increase, models of measuring economic, social, political risks and the elaboration of strategies to avoid or minimize these risks.

3.2. The investment projects: definition and types

The meaning of **investment project** is to organize the investment process, and it represents the fundamental document that determines the necessity of a real investment realization and that reflects both the main projects specific features and financial indices related to the investment activity.

The investment project must be flexible, clear, concrete, measurable, oriented for a specific period of time, grounded on documents and calculations. It should reflect the real price of creditor's objective.

It is very important for the investors or creditors to realize the strategic conception of the project; its dimensions; the indices of its economic, financial, marketing efficiency; the quantity of required investment efforts (expenditures), payback period and other characteristics. A properly and really developed investment project allows the managers and owners of the enterprise and also, the outside investors to estimate its rational implementation and to foresee the expected results.

For certain types of projects, a relatively detailed analysis may be necessary; for others, simpler procedures should be used. Accordingly, firms generally categorize projects and then analyze those in each category somewhat differently.

1. According to their objectives, investment projects are:

- Replacement: maintenance of business. One category consists of expenditures to replace worn-out or damaged equipment used in the production of profitable products. Replacement projects are necessary if the firm is to continue in business. The only issues here are (a) should this operation be continued and (b) should the same production processes be used? The answers are usually yes, so maintenance decisions are normally made without going through an elaborate decision process.

- Replacement: cost reduction. This category includes expenditures to replace serviceable but obsolete (outdated) equipment. The purpose here is to lower the costs of labor, materials, and oilier inputs such as electricity. These decisions are discretionary, and a fairly detailed analysis is generally required.

- Expansion of existing products or markets. Expenditures to increase output of existing products, or to expand retail outlets or distribution facilities in markets now being served, are included here. These decisions are more complex because they require an explicit forecast of growth in demand. Mistakes are more costly, so a more detailed analysis is required. Also, the go/no-go decision is generally made at a higher level within the firm.

- Expansion into new products or markets. These are investments to produce a new product or to expand into a geographic area not currently being served. These projects involve strategic decisions that could change the fundamental nature of the business, and they normally require the expenditure of large sums with delayed paybacks. Invariably, a detailed analysis is required, and the final decision is generally made at the very top—by the board of directors as a part of the firm's strategic plan.

- Safety and/or environmental projects. Expenditures necessary to comply with government orders, labor agreements, or insurance policy terms fall into this category. These expenditures are called mandatory investments, and they often involve nonrevenue-producing projects. How they are handled depends on their size, with small ones being treated much like the Category 1 projects described above.

- Research and development. For many firms, R&D constitutes the largest and most important type of capital expenditure. Although these expenditures can, conceptually, be analyzed in the same way as tangible asset investments, the cash flows they produce are often too uncertain to guarantee a standard discounted cash flow (DCF) analysis. What happens, generally, is that managers think in subjective DCF terms about R&D expenditures, then appropriate a certain amount of money to conduct research on a given project or set of projects. Since R&D results are almost always highly uncertain, and since continuing to fund a project will depend on results at earlier stages, the decision tree analysis and real options approach are often used.

- Long-term contracts. Companies often make long-term contractual arrangements to provide products or services to specific customers. For example, IBM has signed agreements to handle computer services for other companies for periods of 5 to 10 years. There may or may not be much up-front investment, but costs and revenues will accrue over multiple years.

- Other. This catch-all includes office buildings, parking lots, executive aircraft, and so on.

2. According to the volume of required resources:

- small investment projects (till 100 thousand monetary units);
- middle investment projects (100 thousand – 1 mln monetary units);
- large investment projects (more than 1 mln monetary units)

3. According to the level of the implementation dependence, investment projects are:

- independent investment projects are projects whose cash flows are independent of one another.
- mutually exclusive investment projects, means that if one project is taken on, the another must be rejected.
- complementary, these projects within a company are not competitive, following the same or different objectives, do not suppose the same space or financing from the same source but are gathered for reducing the investment risk.

Hereby, in the frame of the investment process there can be included a wide variety of independent, exclusive and complementary investment projects according to the investment strategy of the company.

4. After the degree of complexity:

- complex integrated projects or
- independent, simple projects.

5. After the financing source:

- private investment financing projects (with own resources and borrowed resources),

- public investment financing projects,
 - mixt public-private investment financing projects (public private partnership investment projects)
 - European Union funded projects, helps companies gain additional resources, promotes innovation, and increases their international competitiveness. European investment projects also contribute to the creation of a sustainable economy by promoting eco-friendly and socially responsible investments. Various funding opportunities for investment projects are under EU programs, such as Horizon 2030, EU4Business and InvestEU and other initiatives.
6. According to the volume of required resources:
- small investment projects (till 100 thousand monetary units);
 - middle investment projects (100 thousand – 1 mlln monetary units);
 - large investment projects (more than 1 mlln monetary units)
7. After the project scheduled time:
- long time project investment (more than 5 years),
 - medium time project investment (1-5 years),
 - short time project investment (under 1 year).

3.3. Stages of the investment project development process

The capital investment process helps turn innovative ideas into successful businesses. The process includes several important stages, from finding promising opportunities and developing investment plans to evaluating pitches, negotiating deals, and planning exits. Each step requires careful decisions and teamwork between entrepreneurs and affiliated subjects.

Understanding these stages can give entrepreneurs and professionals valuable insights.

The investment process comprises a chain of steps, actions and operations as well as factors involved in the investment activity. So, all the activities, which are performed to fulfill and implement investment objectives, involve material, financial, human, information resources and, finally, make up an **investment process**.

The implementation of investment projects entails a sequence of chronologically structured stages collectively referred to as the *project life cycle*. Although terminological nuances may vary among organizations, the overarching framework remains consistent and is widely conceptualized as a cyclical process. This process encompasses a series of phases, punctuated by key decision points, which guide the progression from project inception to completion.

The life cycle begins with **project identification and prioritization**, informed by economic, technical, and financial analyses. Subsequent stages include the selection

of the most optimal alternative, mobilization of funding sources, and **project execution**, followed by **monitoring and administration** to ensure resource efficiency and strategic alignment.

Rather than following a fixed linear path, the investment cycle functions as a dynamic spiral in which each project iteration enhances strategic capacity, improves implementation frameworks, and informs the design of future projects.

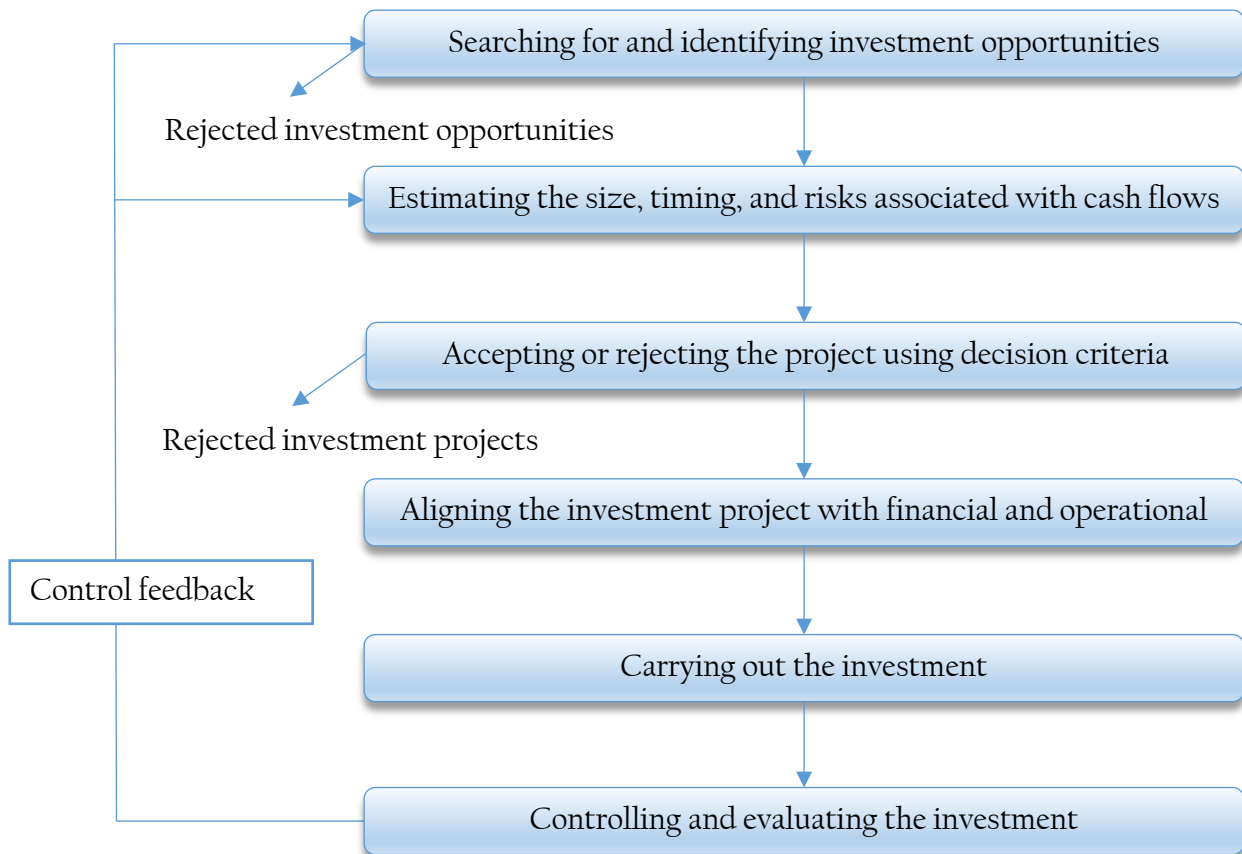


Figure 3.3.1. The investment project life cycle

According to the international practices, in order to evaluate the fundamental components of a business, the investment project cycle is generally divided into three distinct phases:

- the **pre-investment (initiation and planning)**,
- the **investment (implementation or execution)** and
- the **operational (post-investment)** phase.

I. The purpose of the initial stage is to identify the vision, strategy and objectives that a investor has over a specific timeframe, and thus to provide a framework within which projects can be identified and prepared. All the project's essential features are specified and so enables it to form the basis of the formal review and appraisal required.

The first phase is pre-investment with the following stages:

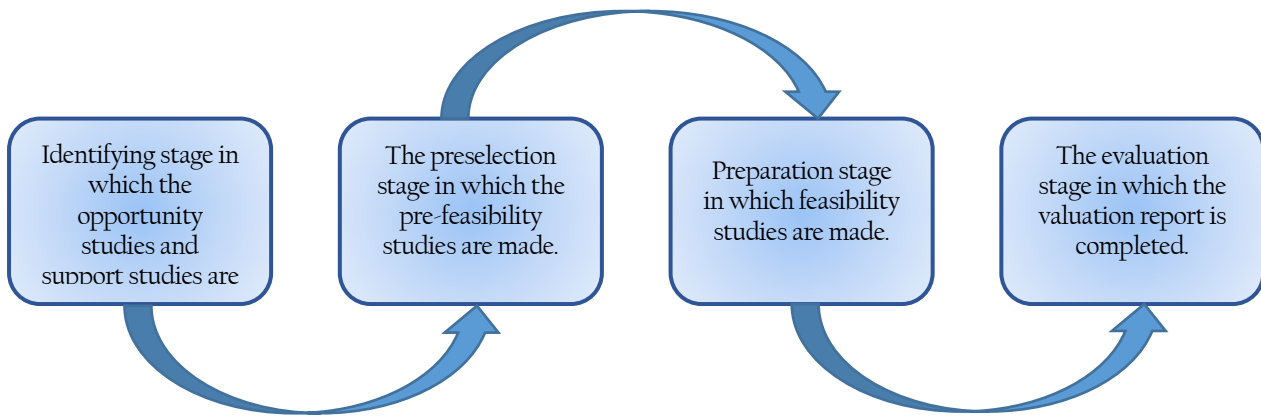


Figure 3.3.2. Stages of the preinvestment phase of the investment process

The **initiation process** begins with the determination of project's objectives and identification of possible investment opportunities. Determination of the project's objectives results from the general policy of the company in accordance with its investment strategy. The global objectives of the company can be getting more profit, long-run increase of revenues, more production volume, appearance of a new product as well as other elements such as image on the domestic and international market, holding an important share of the market, social objectives and so on.

These proposals include a description of the investment opportunity and the predicted effect of the investment on cash flows. This step includes the examination of investment possibilities and the elaboration of preliminary studies of feasibility. An important role at this stage does to getting information, which refers to possible alternatives and their way of realization. Initiation is a planning process. Technical, economic, financial and other information is necessary during the whole investment process. In such a way the investor, when taken the decision, uses different sources of information, and the rapidity, correctness, and its assimilation are the premises for a successful realization of investment objectives and avoidance of risks related to investment activity.

The end of this stage is the elaboration for each project of a commercial, technical and economical case, which would justify the investment opportunity.

Once the proposal has been developed, a **ratification process** begins. For control purposes, different individuals in the organization are likely responsible for determining which investment proposals to accept. The parties responsible for ratifying a long-term investment proposal first, determine the cost of the project and then verify the cash-flow estimates. They also analyze the risk of the proposal. The long-term investment proposal often involves a substantial amount of cash; therefore, the organization's economic viability may be at risk.

The parties responsible for ratification also should examine competitor realization to the proposal. Initiators of long-term investment proposals often do not identify competitors and assume that competitors will not change their behavior. In competitive markets, profitable projects are not easily found. Any investment project that

appears profitable will soon have many competitors, which will drive down the original organization's future cash inflows. Therefore, the effect of competition should be recognized in estimating future cash flows. Firms must have some competitive edge, such as low-cost manufacturing, excellent researchers, and quality customer service, to be able to consistently find profitable investment projects. When analyzing investment projects, it is important to understand the source, of the expected profits.

The final aspect of ratification is to ensure that the investment is consistent with the organization's strategic goals. An investment proposal may appear to be profitable but could shift the organization's emphasis away from its primary purpose. Ratification is a control process. In case if the firm identifies or create an investment opportunity with a present value grater than its cost, the value of the firm will increase.

II. If the investment proposal is ratified, the next phase - implementation follows. In this phase the project takes shape. **The implementation stage** starts with the signature of the contract (commencement date) and ends with the “take-over” of the goods or works requested.

At the investment phase cash and other resources are invested, and operations related to the investment begin. Implementation is a planning process. It involves activities related to the decisions that are necessary to be taken:

- decisions referring to establishment of the legal, financial, and organizational base for the project's realization;
- decisions referring to purchase and transmission of technologies;
- decisions regarding the optimal periods of realizing the projects;
- decisions regarding the purchase of land, realizing construction works and setting up of the equipment;
- decisions regarding hiring and training personnel;
- decisions regarding the period to start the activity.

During and subsequent to the implementation stage, the investment project is monitored. The monitoring process determines whether the investment proposal is fulfilling expectations; if it is not, the project may be closed down before the planned termination. This activity supposes the control over all those parameters of the investment objectives that had been foreseen in the investment decisions are respected in the exploration process.

III. **The Operational phase** can be divided into:

1. Initial period after start-up (short-term view), including:
 - Adaption of production techniques.
 - Operational difficulties with equipment.
 - Low labour productivity.
2. Full production (long-term view), including:
 - Review of chosen strategies and related production and marketing costs as well as sales revenues.

- Comparison of projections made in the pre-investment phase with reality, thus monitor capital allocation performance.

Capital projects need continuous oversight to ensure the investment stays on track and delivers expected returns. As part of this process, investor or financial manager will evaluate financial and operational metrics through variance analysis.

If the investment underperforms, management can reallocate resources, refine execution strategies, or even consider divesting. The insights gained from continuous monitoring are crucial for improving a company's decision-making process around capital investments.

Once the investment project is completed, an audit of the project is performed to evaluate the performance of its managers and to determine appropriate adjustments to the investment process in the future.

The post-audit is a very important aspect which involves comparing actual results with those predicted by the project's sponsors and explaining why any differences occurred.

The post-audit has three main purposes:

1. Improve forecast. When decision makers are forced to compare their projections to actual outcomes, there is a tendency for estimates to improve. People simply tend to do every thing better, including forecasting, if their actions are being monitored.

2. Improve operations. When a team has made a forecast about investment, its member are putting their reputation on the line. If costs are above predicted levels, sales below expectations, and so on, executives in production, sales and other areas will strive to improve operations and to bring results into line with forecasts.

3. Identify termination opportunities. Although the decision to undertake a project may be the correct one based on real information, things don't always turn out as expected. If initial operating results indicate that a project is not likely to achieve its expected profitability, it may be best for the firm to terminate rather than continue the project (disinvestment). Furthermore, most projects at some point in their lives lose their economic viability and should be terminated. Both post-audit and a continuing review of ongoing operations help identify the optimal point for the termination of a project.

The divestment is a reduction in capital expenditure, or the decision of a company not to replenish depleted capital goods. A company will likely not replace capital goods or continue to invest in certain assets unless it feels it is receiving a return that justifies the investment. If there is a better place to invest, they may deplete certain capital goods and invest in other more profitable assets. Alternatively, a company may have to divest unwillingly if it needs cash to sustain operations.

3.4. The feasibility study of investment project

The progress of the investment process depends on the subject of investment. No investor can invest capital in a particular target, without having enough information. In this respect, before proceeding to the investment decision, the investor carries on a research and forecasting, which will allow him to find out all the information about the possibilities given by the future exploitation of the investment target.

During the first of these phases, the initiation phase, the project objective or need is identified and this can be a business problem or opportunity. An appropriate response to the need is documented in a business case with recommended solution options. A feasibility study is conducted to investigate whether each option addresses the project objective and a final recommended solution is determined. Issues of feasibility (“can we do the project?”) and justification (“should we do the project?”) are addressed.

The feasibility study evaluates the project’s potential for success. This analytical tool used during the project planning process shows how a business would operate under a set of assumptions — the technology used (the facilities, equipment, production process, etc.) and the financial aspects (capital needs, volume, cost of goods, wages etc.). The study is the first time in a project development process that the pieces are assembled to see if they perform together to create a technical and economically feasible concept. The study also shows the sensitivity of the business to changes in these basic assumptions.

A feasibility study is an important tool for making the right decisions. A wrong decision at this point often leads to business failure. As data show, only 50% of startups are still in business after 18 months, and only 20% are in business after 5 years. Feasibility studies are commonly conducted before launching new businesses, expanding operations, investing in infrastructure, or developing new products and services. A feasibility assessment typically considers five core factors — technical feasibility, economic feasibility, scheduling feasibility, operational feasibility, and legal feasibility. They help stakeholders make informed decisions by identifying risks, estimating costs, analyzing market potential, and ensuring regulatory compliance.



Figure 3.4.1. Steps to conduct a feasibility study

A project manager or an internal team typically conducts a feasibility study. The project manager oversees the study, ensuring all areas are thoroughly covered. If the company lacks the necessary expertise, external consultants are hired. Time and money spent in choosing and using a good consultant is an important investment that will pay dividends later.

The setting up of the evaluation report take place after the feasibility study was accomplished. **Feasibility Study Report** defines the project under development. It presents a series of assumptions on the design of the technical, financial, and operational aspects of the project and supports them with figures and tables. It also includes the pro-forma financial statements to project income and expenses.

Feasibility report summarizes the results of a feasibility study and presents the findings from evaluating different aspects of a proposed project, such as market demand, technical capabilities, financial viability, and legal considerations. A feasibility report offers recommendations for decision-makers into one comprehensive document to help decide whether to proceed with the project.

A feasibility study report typically includes the following contents:

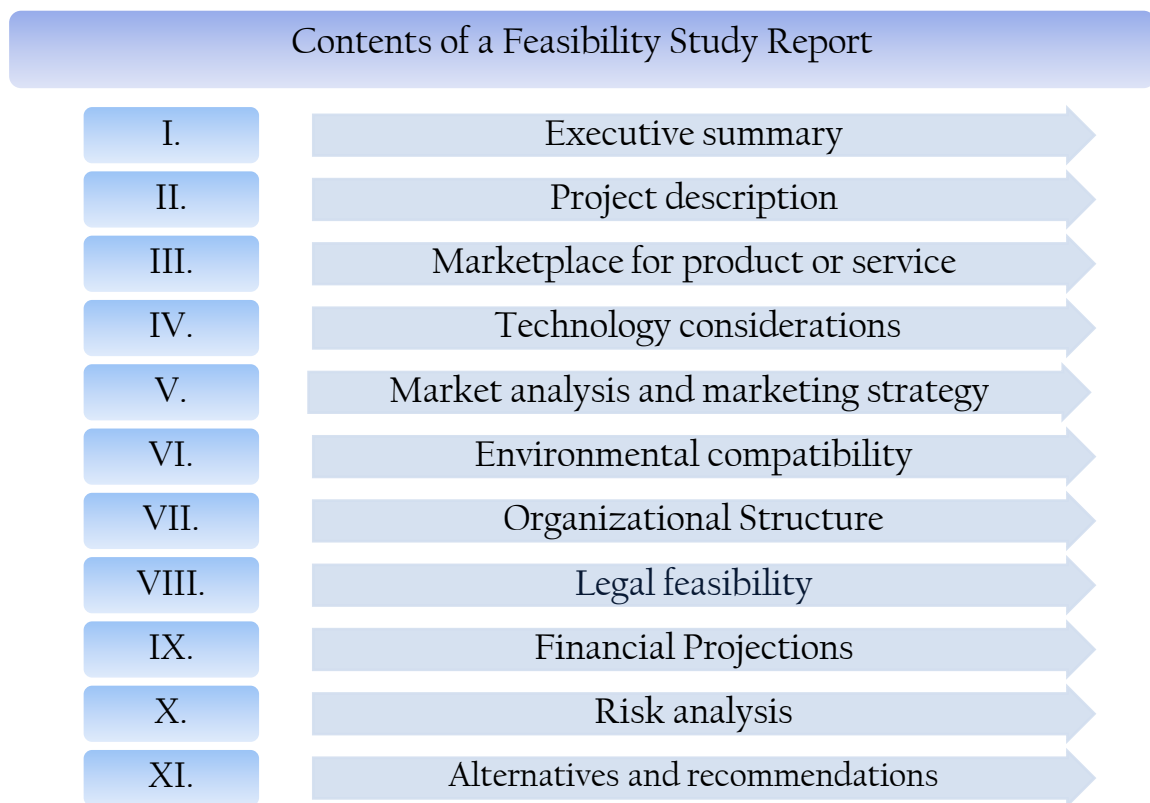


Figure 3.4.2. Contents of the feasibility study report

The document should describe project efforts to date and why it should be continued. There is no required length for a study report, but it should follow a simple format while still including the information required helping the group reach a decision. The primary points should be presented with supporting documentation in the appendices.

Most importantly, the feasibility study should enable members to make constructive, informed decisions on whether to proceed with, revise, or abandon the project.

Moreover, a bankable feasibility study acts as a communication tool between project sponsors and financial institutions. Bankability refers to the feasibility and attractiveness of a project from a lender or investor's perspective. A **bankable feasibility study** is specifically tailored to meet the requirements of financial institutions and investors who seek assurance that their funds will be invested in a viable and profitable venture.

Knowledge Assessment Questions

- From what starts the investment process?
- What is the meaning of investment project?
- What factors determine whether a detailed analysis is needed for an investment project?
- What are the 3 studies related to an investment project?
- When is feasibility analysis usually conducted?
- What the monitoring activity is so important during the investment project life time?



Individual Work Tasks

Task 1: Critical reflection on decision impact across investment project stages

Task 2: Characterize the stakeholders in the investment process based on the role they play during the development of the investment process

Task 3: Access and read the methodology for the feasibility study proposed by the World Bank Group or the United Nations

Task 4: An essay on the topic “The role of bankable feasibility studies in project financing”

Recommended Readings

Project Development: Overview of Pre-Investment Studies (Feasibility Studies Series Volume 1). UNIDO, 2015. Retrieved at:

https://hub.unido.org/sites/default/files/publications/Introduction_FSS_Vol1_Project_Development.pdf

Study Unit 4. SOURCES OF FUNDS FOR INVESTMENT AND METHODS OF FINANCING

Learning Objectives:

After studying this topic, the student should be able to:

- Identify and classify the main sources of investment financing.
- Explain the characteristics and role of internal financing sources such as retained earnings, depreciation, net profit, internal reserves, and special funds.
- Describe external sources of financing, including equity financing (stock issues) and debt financing (bank loans, bonds).
- Distinguish between conventional financing sources and special forms such as leasing, venture capital, and forfeiting, highlighting their advantages and limitations.
- Compare various methods of investment financing based on cost, risk, ownership implications, and suitability for different project types.

Key terms: equity, debt, own sources, self-financing, inside / outside capital to finance, direct / indirect financing

4.1. Characteristics and classification of financial sources used to fund an investment project

Financing investments represents one of the most important stages of the investment process following the decision of investments. This activity supposes the establishment sources of financing, the proportion of funding from its own sources and loans, the combination of sources that minimizes the total cost of funding. Then financing sources are included in investment budget and can be used to pay for achieving the project. Through a financing plan investment are put in a balance report the investment portfolio which consists in investment projects which are to be done and resources that the investor has or can mobilize. It is essential if the investor can mobilize the necessary resources from external funding or internal financing.

The decision to financing represents the enterprise's option for covering their needs or their necessities with financing sources. Taking the decision of financing represents the choice between own and borrowed funds for financing a project. The decision of financing depends on the enterprise because its goal is the obtaining the capital and the efficient utilization of the funds. But at the same time the financing decision is influenced by banks, shareholders (their willingness to give up dividends to finance projects in the enterprise).

The main sources of financing investments available to economic entities can be classified according to several criteria.

➤ From the point of view of effort to obtain it, sources of funding can be grouped into two categories:

- financing by firm's own sources (self-financing by net income, depreciation, transfer of assets etc.).
- financing by long-term arrangements (bank loans, leasing, loans from specialized financial institutions, growth of capital by incorporating reserves to capital through debt conversion).

➤ From the point of view of their structure (or funds belonging) exist:

- internal financing (self financing, increase of capital)
- external financing (different loans)

➤ From the point of view of their origin there are:

- public sources,
- private sources,
- foreign sources.

A finance manager must identify when, where and how the funds can be acquired to the firm's investment needs. In sourcing of finance, he should keep in view the cost of respective sources of funds, the advantages and disadvantages of various sources of finance, impact of taxation etc. The main factors in taking the decision of financing are:

- profitability of investment project, if it is higher than the interest rate, then it is opportunely to call the loans, in this case will increase profits and return on equity;
- solvency, the decision by financial indebtedness has a positive influence on the solvency, but in case of loss it diminishes quickly;
- liquidity, financing through indebtedness has positive effect on liquidity, but it have to take into consideration the fact that the borrowed resources are offered on a limited period.

4.2. Internal sources for investments' financing

Internal funding is based on resources generated in the economy of the economic entity and can be done through several sources:

- investor's and his partner's savings;
- personal investment from friends or family;
- revenue from early sales;
- goodwill amortization;
- reserves formed after distribution of profits,
- money from disposal of fixed assets,
- reinvested profits etc.

The most obvious funding source and often one of the first a startup considers, providing essential capital to move from concept to early development are: personal savings, own securities, real estate, inheritances, mortgage extensions (on a personal residence), and other personal assets.

Friends and relatives may provide additional sources of funds. 3Fs or FFF, standing for "Friends, Family, and Fools," is a widely used term in the startup world referring to early-stage financing obtained from friends, family members, and enthusiastic supporters who may not be traditional investors. This and possibly to a stage where the business can attract more formal investment.

In most cases, the small business owner must assume the largest share of the risk- this means making the largest investment in the business. Personal investment in the business by investor, his family, and his friends demonstrates a faith in, and a commitment to his/her business. This is important to other potential investors and lenders. In fact, banks and other lending institutions have established guidelines for the amount of investment that is required before they will lend money to a business. This is sometimes called the the investors own contribution, and it varies depending on the type and nature of business.

Following the launch of a project and and the establishment of consistent operational activities, a company often reaches a stage where it can sustain its growth and development through internally generated funds as:

- Accumulated depreciation of fixed assets during the period the realization of investments. Depreciation is the amount of money to be recovered from the income resulting from production and realization of rendering services, in accordance with moral and physical wear of fixed assets. Depreciation serves as a way of gradual recovery in the value of fixed assets input, by providing resources necessary funding replacement of fixed assets used, as well as upgrading them.

- Assets assigning is a occasional source of internal financing that occurs especially when enterprise renews their fixed assets by selling the old. The feed value of the transfer of assets is subject to taxation. The revenues of sale machines removed from service feeding development fund from which investment are financed.

- Reserves consist of profit which the enterprise collects in order to its activities. Reserves form of profit which remains to the company, this means the net profit left after the payment of dividends to shareholders. There are more types: reserves stipulated by the legislation, reserves provided by statute, other reserves.

- Net profit which follows to be reinvested (retained earnings). Net profit is formed from positive difference in income over expenditures which are supported in entrepreneurial activities. For investment is usually distributed only a part of net profit earned through the company's core business operations—whether that involves the sale of products, the provision of services, or other income-generating processes tied to its strategic objectives.

○ **Other** sources, like reduction on income tax etc. The company can obtain investment revenues under the form of dividends, interest rate or exchange rate differentials. These revenues can be used for the own investment financing in the moment when become actual the projects of extension, modernization, renewal included in the long-term strategy of the company.

Financing solely from internal sources presents both advantages and disadvantages.

Among the advantages, this method represents a reliable way to cover the financial needs of the enterprise. Entrepreneurs retain total control over the business, maintaining financial independence and autonomy. It helps avoid debt and the associated interest payments, which can be particularly burdensome for new businesses. Internal financing also provides a greater degree of independence and control over business decisions, allowing entrepreneurs to preserve full ownership and avoid the dilution of equity that typically comes with investor funding. Additionally, the funds invested do not need to be reimbursed, encouraging startups to focus on building a sustainable business model from the very beginning.

However, there are also disadvantages. The most significant is the limitation on available resources, which may cause the business to miss out on larger opportunities that require upfront investments beyond the startup's current means. There is also a lack of possibilities for extending investment activity during favorable market conditions. Furthermore, the entrepreneur must accept an increased level of personal risk. Growth may be slower, as reinvestment is limited to what the business can afford from its own revenue.

4.3. External sources for investment`s financing

External financing is an alternative for investors when capacity of self-financing is below the investment programs. Aims at the establishment by supplementing the budget required for financing the investment program adopted. This is provided by banks, investment institutions, public sector bodies and as well as private. Select any external sources of funding should have a serious argument, the investor has to predict the consequences of debt payment made and impact on the final results of its activity.

External Sources for investment`s financing comprise:

- **Equity Financing:** Raising capital by issuing new shares (common or preferred stock) dilutes ownership control.
- **Debt Financing:** Businesses can borrow funds with loans, bonds, and credit lines, but interest is due.
- **Venture Capital:** Investors are typically attracted to startups and innovative projects that they forecast will achieve high growth at the cost of equity or future returns.

- **Grants or nonrefundable funds.**

Each has advantages and disadvantages or risks, and each must be carefully scrutinized based on good fit and capacity to spend for the company in question.

Equity financing involves raising capital by selling shares of the company. Investors receive ownership interest in the company, sharing in its profits and losses. This type of financing is crucial for startups and growth stage companies that may not have the cash flow to support debt financing, offering investors the potential for significant returns. Equity Financing does not burden the company with debt repayments and offers additional resources and networking opportunities through the investor. However, it dilutes the founders' ownership and can be more expensive in the long run if the company's value increases significantly.

Financial tools for attracting equity are:

- ✚ Accelerators: programs designed to rapidly scale companies through investment,

- ✚ mentorship, and educational components over a fixed period.

- ✚ Angel Investment: Individuals who provide capital for business startups, often in exchange for equity.

- ✚ Shares: Units of ownership in a company, entitling shareholders to a portion of the profits and losses.

Accelerators typically provide a seed investment in exchange for equity in the startup. This immediate influx of capital can be crucial for early-stage startups looking to scale quickly. One of the benefits of accelerators is the access to experienced entrepreneurs, industry experts, and mentors. This guidance can help startups navigate common pitfalls and define their business strategies. Being part of an accelerator program opens up numerous networking opportunities with fellow entrepreneurs, potential customers, and investors.

Angel investment represents a critical source of early-stage financing for many startups, offering not just capital but also valuable business expertise and networking opportunities. Angel investors are typically individuals who provide capital for business startups, often in exchange for convertible debt or ownership equity. These investors are willing to take risks on emerging companies with the potential for high returns. Angel investment networks are platforms or associations that connect angel investors with entrepreneurs seeking funding. These networks play an important role in the startup ecosystem by facilitating the flow of capital to innovative projects that might otherwise struggle to secure financing through traditional channels like banks or venture capital firms.

The establishment and expansion of statutory capital through the **issuance of shares** has emerged as a pivotal mechanism of external financing for enterprises. From a technical perspective, this process may be accomplished either by issuing new shares—ordinary or preferred—or by increasing the nominal value of existing shares. The mobilization of financial resources from current or prospective shareholders is

contingent upon the financial attractiveness and viability of the investment project. Given that such investors may alternatively allocate capital to competing ventures or secure deposits in financial institutions, companies must ensure that investment opportunities present a compelling return profile.

This form of capital increase is particularly suited to firms whose shares are publicly traded, particularly when positive market expectations or favorable share price movements are anticipated. For these companies, share issuance enables access to substantial equity funding without the burden of debt or the dilution of ownership control through non-equity means.

Raising capital through share issuance represents a method of financing based on shareholders' equity, with the overarching aim of enhancing economic capacity and profitability. When initiating such a process, firms must decide whether to obtain additional capital from existing shareholders or to appeal to new investors.

Privately held companies often favor internal share placements—either through an increase in the nominal value of existing stock or by offering new shares to existing shareholders. This strategy tends to be well-received, as it preserves shareholder influence and avoids external dilution. However, in cases where a significant infusion of equity is necessary, companies may pursue a public offering. The act of offering company shares to the public for the first time is known as an Initial Public Offering (IPO), marking the firm's transition from private to public ownership.

The augmentation of statutory capital may result from a range of financial transactions, including:

- New cash contributions from shareholders
- Mergers, acquisitions, or public exchange offers
- Debt-to-equity conversions
- Capitalization of reserves

Among these, increasing capital through new cash contributions constitutes a direct financing mechanism, as it brings additional liquidity into the firm. This differs fundamentally from methods such as capitalization of reserves, which merely restructure existing equity without introducing new financial resources.

Unlike self-financing—where investment relies on internally generated profits—capital raised through share issuance reflects external equity contributions and is instrumental in supporting strategic growth, enhancing market competitiveness, and strengthening the company's financial structure.

Debt Financing involves borrowing funds that must be repaid over time, with interest. It's a common way for businesses to raise capital without giving up ownership. Debt can come in various forms, including bank loans, credit lines, and bonds, and is typically secured by the company's assets or based on its cash flow.

The most conventional type of debt is a loan provided by a financial institution (for example, a bank), at a specified interest rate which the entrepreneur or startup agrees to pay back after a certain period of time. Banks, microfinance institutions

(MFIs) and development banks are the most common source of debt financing, however, debt can also be obtained from family and friends, lending-based crowdfunding platforms, and other financial institutions.

Relevant debt instruments include lines of credit, which are essentially loans that provide cover for day-to-day expenses, as well as factoring or invoice discounting, which involve selling accounts receivables (money owed to a business) at a reduced price.

The primary advantage of debt is that it is a cash payment that allows entrepreneurs to avoid giving up equity and can therefore support businesses in expansion if they have stable cash flows and sound projections for growth. Debt does, however, represent varying degrees of risk and has requirements that not all entrepreneurs and startups can meet or afford. Cash is urgently needed at the early take-off stage of a startup to fuel growth, leaving little room to also take on debt. Debt providers need to ensure that the borrowing business can meet their obligations to repay the debt.

There are several ways for access to debt financing for medium or long term, secured, participative, debenture, etc. Among these the most used are:

- call on public savings as debenture loans,
- call on specialized financial institutions - bank loans, leasing,

Debenture loans. Recourse to public savings is an alternative to attract financial resources necessary to assure economic growth and observance of obligations assumed payment.

Access to debenture loans can be supported by strong companies individually or grouped through association of several economic agents with the condition that each one of them guarantees the loans or through several institutions or collective investment using attracted sources in the form of loans to enterprises with financing needs.

Usually for most of the enterprises is insufficient capital and increase of it present difficulties. On the other hand the call to finance bank loans proves to be difficult to achieve as a result of high cost and restrictive conditions of the credit. In consequence companies are forced to resort to debenture loans, which present the essential advantage that remuneration it is deducted from taxable profit, making it more accessible. Debenture loans grouped are recommended when large enterprises have reduced financing needs and do not want to consume their capital from the public trust.

Lending for investment as an operation with financial character integrates the long-term financing because credit usually appears as a complementary resource for coverage of the investment projects. The companies appeal to bank loans when own resources are insufficient in some activities with less profitability and in other cases with prosperous activity they propose large scale projects.

Credit conditions are negotiated between the bank and the borrower: interest rate, term of reimbursement, possible grace period, penalties for failure to contract terms etc. The level of interest of bank loans is higher than that used by the specialized financial bodies.

There can be enumerated several financial tools for contracting loans:

- Microfinance: Loans aimed at small businesses who lack access to conventional banking and related services
- Asset-Based Lending: Loans secured by company assets like inventory or receivables.
- Leasing: Financing that allows businesses to use equipment or property in exchange for regular payments.
- Trade Financing: Short-term financing to support trade transactions, improving cash flow.
- Cash-Flow Lending: Loans based on the borrower's projected cash flows.
- Working Capital: Loans designed to finance everyday business operations.

Another category of credit in developing is the mortgage. It consists in providing loans by mortgaging of assets acquired through loan. Mortgage is the warranty for transferring ownership rights in case of nonpayment of obligations arising from the loan contract.

Mortgage loans are the main form of finance real estate industry. Duration is usually 20-30 years and carries fixed interest. The possibility of contracting loans is determined by the activity of enterprise, its effectiveness, and experience working with banks in investment projects.

Leasing is a form of rent made by specialized financial companies (leasing companies) of capital equipment to companies that do not have own funds or are unable or unwilling to use bank credits to buy them from producers.

From economic point of view engagements arising from leasing take part from debts in the medium term or long term. The enterprise obtains the utilization at the beginning then became owner of the fixed assets in exchange for regular payments.

Leasing is an operation which does not change the financial structure of the enterprise (indebtedness) but only its engagement annual payments. Own equity remains legally neutral and this creates the possibility of the company for some bank loans.

From advantages of leasing may be mentioned that can be obtained integral financing of an investment in case of lack of own resources, the technology contracting is simpler than in the bank credit, rates paid by the leasing contract are deductible making the income tax paid by the company to be less.

Reimbursement schedule of credits and afferent interest rate have an important influence on the efficiency of the investment project. This indicator may be increased in the case when can be find an optimal way to organize the reimbursement of credits by a graph under the availability of cash.

International experience shows that the share of bank credits is 20-30% when are financed new projects which means that about 70% of financial needs should be met from other sources such as the issue of securities.

As a special form of investment financing is **Venture Capital** which is investing in companies whose shares are not listed at the stock exchange but are distributed among shareholders. Venture capital funds offer companies a way of financing in order to develop them, usually done by changing the capital on a considerable part of the package of shares in a proportion which can vary between 20-49%, or a certain share from the capital of the company. Also, capital may be granted in form of investment credit for a period of 3 up to 7 years, the interest rate does not establish. In practice, it is most often used mixed form of venture investment through which a part of financing is allocated to capital and shareholder, another in the form of investment credit.

The investment is usually for medium-term and involves through its nature a high level of risk. As a holder of shares or a package of shares, the investor with venture capital will share the afferent risk of the business. This type of funding is made after the distribution of risk between owners of capital. Taking into account the high degree of risk the investor will manifest itself interest only in case when he will be convinced that there are real chances of obtaining a high profitability of its investments. For comparison may be noted that shareholders with a simple low-risk profit every year obtain profit in size by 10-15%, while in case of venture investment this indicator may reach 80%. Thus, the principle of “the higher is the risk the higher the expected profit” fits with the essence of venture capital.

Grants and subsidies as sources for investment financing, especially from government or international institutions, support specific sectors or innovation without requiring repayment. Grants are non-repayable funds provided by governments, organizations, or foundations to support specific projects, initiatives, or startups. Unlike loans or equity financing, grants do not require repayment or relinquishment of equity, making them an attractive funding source for early stage companies or nonprofit ventures.

Grants can help startups in their early stages as they struggle to obtain other sources of funding, including debt and/or equity investments, due to the small size of their operation, the absence of required financial statements and/or audits, and the limited current profitability of their idea or business. It is mainly for this reason that grants are usually smaller in size in comparison to loans or equity buy-ins, and are generally disbursed in stages according to more stringent milestone requirements, requiring greater and more detailed reporting by grantees.

Grants are usually disbursed by foundations, public or private bodies, including the government or private sector companies, and national and international organizations. They are usually dedicated to specific expenses, such as capital purchases, marketing costs, consultant salaries, etc. A grant can also be provided in the form of an award or as part of a competition. Applicants here will need to show how their business or idea is relevant to the grant.

One of the most significant sources of financing investment projects in Republic of Moldova are the external loans and grants offered by international financial

institutions (IFI). Among the IFI, the biggest lenders that have been investing in Republic of Moldova are, first of all, the World Bank (WB), the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), the International Fund for Agricultural Development (IFAD), the Council of Europe and others.

The World Bank provides low-interest loans, interest-free credits and grants to developing countries for a wide array of purposes that include investments in education, health, public administration, infrastructure, financial and private sector development, agriculture, and environmental and natural resource management. The term “World Bank” is used mainly to refer to both the International Bank for Reconstruction and Development (IBRD) and its affiliate, the International Development Association (IDA). There are two other affiliates to the World Bank, namely the International Finance Corporation (IFC) and the Multilateral Investment Guarantee Agency (MIGA).

4.4. Methods (classic and alternative) of investment financing

Investment financing methods, as opposed to sources of financing, represent the mechanism for mobilizing, monitoring the use of, and, in some cases, repaying the attracted funds.

Investment financing methods, depending on the access to source include:

- **Direct methods** (from the enterprise’s own funds, from resources attracted from the state budget, from specialized financial institutions);
- **Indirect methods** (through depositary institutions such as commercial banks, savings and loan associations, mutual savings banks, credit unions; and non-depositary institutions such as investment banks, mutual funds, private pension funds, insurance companies, finance companies, venture capital funds, and securities companies; as well as international financial institutions and government agencies).

Financial intermediaries are public or private entities specialized in operating on money, currency, or capital markets, mobilizing significant financial resources from those who hold them and making them available to those in need. In practice, depending on the involvement of these institutions in business financing, we can distinguish between **direct financing** (where the beneficiary has direct contact with fund holders) and **indirect financing** (where the entity in need of capital resources addresses a specialized financial institution that mediates the contact between the user and the fund holders).

Depending on the mechanisms used, investment financing can be classified into several categories:

- Self-financing involves the use of internal resources, such as retained earnings, depreciation funds, or personal savings of the entrepreneur to finance investments without relying on external sources.

Bootstrapping is just a term used to describe self-financing a business without outside funding. A bootstrapped company relies on internal resources — e.g. the founder's savings, revenue from early sales, and personal investment from friends or family — to grow and sustain operations. Unlike companies backed by venture capital or other financial foundations, a bootstrapped startup retains full ownership and decision-making authority but takes on all the financial risks.

The bootstrapping method requires business owners to be highly resourceful – in other words, they need to minimise expenses and really focus on generating revenue early on. It's an approach that can foster business growth, however it does tend to translate to slower expansion because of no large-scale funding.

Bootstrapping can allow entrepreneurs to maintain control over their ventures while fostering a lean and efficient approach to business growth. Bootstrapping also can involve innovative ways to stretch resources as far as possible to maximize a company's potential. Initially, you can optimize your cash flow for bootstrapping by carefully managing expenses, bartering for goods and services, and taking advantage of promotional offers, among other things.

Self-financing implies that the functioning enterprise ensures the development with their own forces, call for the following sources of financing: initial capital, part of the profits obtained in the expired exercise and the depreciation fund, covering both the needs of replacement and development of fixed assets as well as increase circulating assets.

Manager's option for self financing is influenced by various legal and financial market restrictions and taxation. Thus, relative to the legal constraints are countries where the legislative framework require enterprises a minimum self financing and banks providing credit to only those companies that have own equity in a certain amount. Opportunities for access to funds from the financial market are limited for unlisted companies in stock market which are forced to call to self financing or to some sources attracted. Regarding taxation observes that a big taxation increase the self financing because capitalization of profit reduces taxes owed to the state while fiscal policies that increase the deductible base with expenditures of depreciation, reimbursement of credits or interest payment will diminish the interest for self financing.

- Financing through the mechanisms of the capital market refers to raising funds by issuing shares or other equity instruments. This method is commonly used by companies seeking to attract investors through stock exchanges or private equity placements.
- Financing through the mechanisms of the credit market involves borrowing funds through loans, credit lines, or issuing debt instruments such as bonds.

This type of financing requires repayment with interest and is typically provided by banks or other financial institutions.

- Mixed financing combines various sources, such as both equity and debt, to diversify funding and balance the risks and benefits of each method. It allows enterprises to optimize their capital structure based on specific needs.
- Other methods may include alternative financing options such as leasing, factoring, venture capital, crowdfunding, business angel investment, and public or private grants. These approaches are particularly useful for startups or businesses operating in innovative or high-risk sectors.

Traditionally banks, institutional investors, and governments have been the main and dominant sources of financing in the economic system. It should be noted, however, that also other funding sources and instruments exist. These forms of funding, often labelled as alternative forms of funding. Alternative finance refers to forms of finance that are outside the institutional finance system of banks and capital markets. Fintech is the ecosystem within alternative finance made up of companies, technology, and processes that aim to improve traditional methods of finance.

Due to the rise of digital solutions at fintech companies, some online sources of finance that overcome these hurdles are:

Crowdfunding provides an alternative funding route for projects and startups that might not qualify for traditional bank loans or attract angel investors or venture capitalists. Crowdfunding has emerged as a revolutionary way for startups, entrepreneurs, and creatives to raise funds by tapping into the power of the internet and social media. This method involves soliciting small amounts of money from a large number of people, typically via specialized online platforms. Crowdfunding has democratized the funding landscape, allowing individuals and small businesses to access capital.

Peer-to-peer lending means that borrowers can take loans from individual investors who are willing to lend their own money at an agreed interest rate. A peer-to-peer lending service essentially cuts out the middleman, such as a traditional financial institution. Technically, peer-to-peer lending is a form of debt-based crowdfunding since a borrower can raise funds directly from multiple investors. Peer-to-peer lending is one of the fastest growing segments in the financial services industry, with hundreds of sites across the world.

Knowledge Assessment Questions

- What are some capital sources available for businesses?
- What factors should businesses consider when choosing a financing source?
- What is an example of equity financing for investment?
- What is an example of debt financing for investment?

- Describe an example of a government program that provides financing for investment projects?
- Why might an investor explore alternative financing options?



Individual Work Tasks

Task 1: Study the structure and dynamics of investment according to financing sources in the Republic of Moldova in the last three years (www.statistica.md)

Task 2: Describe an alternative way for investment financing in which you would be interested.

Task 3: What are the main constraints in accessing funding in the Republic of Moldova?

Task 4: Do a research on crowdfunding as alternative financing for start up projects.



Recommended Readings

Fintech and SME Finance: Expanding Responsible Access World Bank; International Finance Corporation. 2022. Online. Retrieve at: <https://openknowledge.worldbank.org/server/api/core/bitstreams/d157af2e-ad06-558f-8e1b-5bf52841d34a/content>

Study Unit 5. CAPITAL ACQUISITION COSTS IN INVESTMENT PROJECTS

Learning objectives

By the end of this unit, students will be able to:

- Define the concept of the cost of capital and its relevance in investment decision-making.
- Explain the opportunity cost of own capital and how it impacts capital budgeting.
- Identify and calculate the component cost of various sources of capital such as equity, debt, and preferred shares.
- Determine the Weighted Average Cost of Capital (WACC) and understand its importance in evaluating investment returns.
- Analyze the Marginal Cost of Capital (MCC) and its role in evaluating additional financing.
- Evaluate different financing mixes to identify the optimum capital structure for minimizing cost and maximizing firm value.
- Apply theoretical concepts to case studies involving real or simulated capital structure scenarios.

Key Terms: component cost of capital, weighted average cost of capital (WACC), cost of debt, cost of equity, marginal cost of capital (MCC), the optimum capital structure.

5.1. The concept of the cost of capital

Investment funding mechanism involves actions regarding:

- determining the necessary funding,
- establishing appropriate structure of the invested capital,
- evaluating the cost of financing sources for medium and long term,
- optimization of the capital structure.

In order to make long-term investments in new product lines, new equipment and other assets, managers must know the cost of obtaining funds to acquire these assets.

The cost associated with different sources of funds is called the cost of capital.

The long-term investments made today will determine the value of the business tomorrow. In order to make long-term investments in new product lines, new equipment and other assets, managers must know the cost of obtaining funds to acquire these assets.

Cost of Capital represents the rate a business must pay for each source of funds - debt, preferred stock, common stock, and retained earnings. This is from the firm's

point of view; where the cost of capital is what the firm must pay for the funds needed to finance an Investment.

Also, the cost of capital represents the return that must be provided for the use of an investor's funds. If funds are borrowed, the cost is related to the interest that must be paid on the loan. If the funds are equity, the cost is the return that investors expect, both from the stock's price appreciation and dividends. So, from the investor's point of view, the cost of capital is the same as the required rate of return.

The cost of capital may be an explicit cost (for ex., the interest paid on debt) or an implicit cost (for ex., the expected price appreciation of shares of the firm's common stock).

The cost of capital is a critical element in investment decision. It acts as a major link between the firm's investment decision and the wealth of the owners as determined by investors. It is the number used to decide whether a proposed investment will increase or decrease the firm's stock price. Only those projects expected to increase stock price would be accepted. The cost of capital is the minimum rate of return that a project must yield in order to be accepted by a company. This minimum rate of return is sometimes called the discount rate or the required rate of return.

The required rate of return is determined by the opportunity cost, which is the return which could have been received on an investment with similar risk. In other words, the cost of capital represents the investors' opportunity cost of taking on the risk of putting money into a company.

The opportunity cost of capital is a term used to describe the forgone opportunity of using cash. It depends on whether the cash has another use and whether it is replaceable. Cash always has another use. If no other investments are available, it can be used to retire debt or pay dividends to the owners. Therefore the opportunity cost of capital is the replacement cost of cash or the cost of borrowing that is the interest payment or cost of issuing shares that is the expected return to shareholders. It also represents the return that could have been received on an investment with similar risk. The opportunity Cc is described in terms of percentage return or interest rate.

When we refer to the cost of capital for a firm, we are usually referring to the cost of financing its assets. In other words, we mean the cost of capital for all the firm's projects taken together and, hence, the cost of capital for the average project risk of the firm.

When we refer to the cost of capital of a project, we are referring to the cost of capital that reflects the risk of that project. So, determining the cost of capital for the firm as a whole it is essential for two reasons.

First, the cost of capital for the firm is often used as a starting point for determining the cost of capital for a specific project. The firm's cost of capital is adjusted upward or downward depending on whether the project's risk is more or less than the firm's typical project.

Second, many of firm's projects have risk similar to the risk of the firm as a whole. So the cost of the capital of the firm is a reasonable approximation for the cost of capital of one of its projects that are under consideration for investment.

A firm's cost of capital is the cost of its long-term sources of funds: debt, preferred stock, and common stock. And the cost of each source reflects the risk of the assets the firm invests in. A firm that invests in assets having little risk will be able to bear lower costs of capital than a firm that invests in assets having a high risk. Moreover, the cost of each source of funds reflects the hierarchy (pecking order) of the risk associated with the seniority over the other sources.

The specific pecking order (in increasing order of their cost) is as follows:

1. Internal sources of capital – income before taxes, depreciation
2. External sources of capital – debt (credits, bonds, treasury securities)
3. Internal sources of capital- retained earnings
4. External sources of capital - preferred stock
5. External sources of capital - common stock

This hierarchy is determined by the risk of each source of capital, the priority in taking promised interests and the size of required return.

5.2. The cost of each capital components

Most firms employ several types of capital, called capital components, which have one feature in common: The investors who provided the funds expect to receive a return on their investment. The required rate of return of each capital component is called its component cost, and the cost of capital used to analyze investment decisions should be a weighted average of the various components' costs.

Cost of Debt (K_d). The **explicit cost of debt** for a firm may be defined as the discount rate that equates the net proceeds of the debt issue with the present value of interest and principal payments. The rate applied to determine the cost of debt (K_d) should be the current market rate the company is paying on its debt.

As companies benefit from the tax deductions available on interest paid, the net cost of the debt is actually the interest paid less the tax savings resulting from the tax-deductible interest payment. Calculate the after tax cost of debt based on the effective interest rate. Therefore, the after-tax cost of debt is $K_d = I \times (1 - T)$, I - interest rate, T - corporate tax rate.

Example 1 - Calculate the Cost of Debt

Cantor Corporation borrowed \$100,000 at an interest rate of 10%. The tax rate is 35%.

$$\text{Cost of Debt} = 10\% \times (1 - 0.35) = 10\% \times 0.65 = 6.5\%.$$

If it would imply flotation cost, then $K_d = I \times (1 - T) / (1 - f)$,

Cost of Preferred Stock (Kps) - If the capital structure includes preferred stock, the cost of preferred stock is calculated by the amount of dividends in relation to the market price of the preferred stock. The formula is

$$Kps = \text{Dividends of ps} / \text{Net issuing Price of ps.}$$

Example 2 - Calculate the Cost of Preferred Stock

Assume we have preferred stock selling for \$100 per share and dividends per share are \$10. The cost of preferred stock is:

$$Cps = \$10 / \$100 = 10\%$$

If it would imply flotation cost of \$ 2.50 per share (net \$ 97.50), the cost of ps is 10.3%.

$$Cps = \$10 / \$97.5 = 10, 3\%$$

The company can raise common equity in 2 ways: by issuing new shares and by retaining earnings. There are costs associated with both internally and externally generated capital.

Cost of Retained Earnings (Ke) - After paying off creditors and preferred shareholders, the remained funds are owned by the common shareholders. The firm may either retain these funds (investing in assets) or pay them out to the shareholders in the form of cash dividends.

If some earnings are retained, then the stock holders will acquire an opportunity cost. Thus, the firm should earn on its reinvested earnings at least as much as its stockholders themselves could earn on alternative investments of equivalent risk.

The cost of retained earnings within a capital structure is similar to the cost of common stock. Generally, the cost of retained earnings is slightly less than the cost of common stock since no issuance cost is incurred.

Cost of Common Stock (Kcs): The cost of issuing common stocks is more difficult to estimate because of the nature of the cash flow streams to common shareholders. They receive their return in the form of dividends and the change in price of the share they own and these streams of payments are difficult to determinate and to estimate.

There are three methods commonly used to estimate the cost of common stock.

1. *Dividend Valuation Model*. This model states that the required rate of return on equity is the discount rate that equates the present value of all expected future dividends per share with the current price per share.

Dividends paid to common shareholders along with the overall expected growth rate is used to calculate a cost for the common stock. The formula for calculating the cost of common stock is: **(Dividends expected on the stock / Current Price of the Stock) + Overall Growth Rate.**

Example 3- Calculate the Cost of Common Stock based on Dividend Valuation Model

Cantor Corporation expects to pay a \$6.00 dividend this year to common shareholders. Historically, dividends have grown by 2% each year. Cantor's common stock is currently selling for \$45.00 per share.

$$\text{Cost of Common Stock} = (\$6.00 / \$45.00) + 0.02 = 15.3\%.$$

2. An alternative approach to the dividend valuation model for the cost of capital is the *Capital Asset Pricing Model (CAPM)*. This is the most commonly accepted method for calculating cost of equity. The CAPM specifies the expected return on an asset in terms of the expected return on the risk free asset plus a premium for market risk.

If a market is in equilibrium, the expected rate of return on an individual security (j) is stated:

$$R_j = R_f + (R_m - R_f) * \beta_j$$

where R_j - the cost of common stock or the expected rate of return on security j;

R_f - riskless rate of interest;

R_m - expected rate of return on the market, (such as the Standard & Poor's 500 Composite Index)

β_j - is the beta coefficient which expresses the risk of the common stock j in relation to the market.

- ◆ **R_f - Risk-free rate** - This is the amount obtained from investing in securities considered free from credit risk, such as government bonds from developed countries. The interest rate of U.S. Treasury Bills is frequently used as a proxy for the risk-free rate.
- ◆ **β - Beta** - This measures how much a company's share price reacts against the market as a whole. A beta of one, for instance, indicates that the company moves in line with the market. If the beta is in excess of one, the share is exaggerating the market's movements; less than one means the share is more stable. Occasionally, a company may have a negative beta (e.g. a gold-mining company), which means the share price moves in the opposite direction to the broader market. For public companies, you can find database services that publish betas of companies.
- ◆ **$(R_m - R_f)$ - Equity Market Risk Premium** - The equity market risk premium (EMRP) represents the returns investors expect to compensate them for taking extra risk by investing in the stock market over and above the risk-free rate. In other words, it is the difference between the risk-free rate and the market rate.

Once the cost of equity is calculated, adjustments can be made to take account of risk factors specific to the company, which may increase or decrease company's risk profile of the company. *Such factors include the size of the company, pending lawsuits, concentration of customer base and dependence on key employees.* Adjustments are entirely a matter of investor judgment and they vary from company to company.

Example 4 - Calculate the Cost of Common Stock based on CAPM

Cantor Corporation has common stock with a listed beta of 1.35. The estimated market return is 12% and the risk free rate based on Treasury Bonds is 6.5%.

$$K_{cs} = 6.5\% + 1.35 (12\% - 6.5\%) = 13.9\%$$

3. Bond Yield Plus Model- A simple approach to calculating the cost of common stock is to add a risk premium to the cost of debt. The formula is $K_{cs} = C_d + \text{risk premium}$. The risk premium is the additional rate that must be paid to common shareholders above what is paid to bond holders. It consists of 3 to 5 points to the interest rate of the firm's own long-term debt.

Example 5 - Calculate the Cost of Common Stock based on Bond Plus

Referring back to Example 1 we calculated a cost of debt of 6.5%. We have estimated a market risk premium on common stock of 4%.

$$K_{cs} = 6.5\% + 4.0\% = 10.5\%$$

5.3. The weighted average cost of capital (WACC)

The weighted average cost of capital (WACC) is the average of the costs of these sources of financing, each of which is weighted by its respective use in the given situation. By taking a weighted average, it can be seen how much interest the company has to pay for every dollar it finances.

WACC is normally used as the firm's cost of capital for a number of reasons. First, if a single component cost is used as a criterion for acceptance, projects with a low rate of return may be accepted while projects with a high rate of return may be rejected. Some low-return projects would be accepted because they could be financed with a cheaper source of capital, such as debt. Some high-return projects would be rejected because they have to be financed with an expensive source of capital, such as equity. Second, if a firm accepts projects that yield more than its WACC, it can increase the market value of its common stock. In this situation, the market value of the common stock increases because these projects are expected to earn more on their equity-financed portion than the cost of equity.

Investors use WACC as a tool to decide whether or not to invest. The WACC represents the minimum rate of return at which a company produces value for its investors. Let's say a company produces a return of 20% and has a WACC of 11%. That means that for every dollar the company invests into capital, the company is creating nine cents of value. By contrast, if the company's return is less than WACC, the company is shedding value, which indicates that investors should put their money elsewhere.

All capital sources - common stock, preferred stock, bonds and any other long-term debt - are included in a WACC calculation in which each category of capital is proportionately weighted. Also, each of capital components has a cost.

WACC is calculated by multiplying the cost of each capital component by its proportional weight and then summing:

$$\text{WACC} = W_d K_d + W_{ps} K_{ps} + W_{ce} K_{cs}$$

Or

$$\text{WACC} = \sum_{i=1}^m W_i K_i, \quad \text{where } W \text{ is the share of each source } i \text{ in total capital}$$

K is the component cost of each source i .

Example 6.

Suppose that Cantor Company has a target capital structure calling for 30% debt, 10% preferred stock, and 60% common equity with respective costs.

Capital Component	Cost	% of capital structure	Total
Common Equity	14.5%	60%	8.70%
Preferred Stocks	10.3%	10%	1.03%
Bonds	6.6%	30%	1.98%
TOTAL			11.71%

So the WACC of this company is 11.71 %

By taking a weighted average, we can see how much interest the company has to pay for every dollar it borrows.

Two points should be noted here. First, the WACC is the weighted average cost of each new, or *marginal*, dollar of capital - it is not the average cost of all dollars raised in the past. We are primarily interested in obtaining a cost of capital for use in capital budgeting, and for this purpose the cost of the new money that will be invested is the relevant cost. On average, each of these new dollars will consist of some debt, some preferred, and some common equity.

Second, the percentages of each capital component, called weights, could be based on (1) accounting values as shown on the balance sheet (book values), (2) current market values of the capital components, or (3) management's target capital structure, which is presumably an estimate of the firm's optimal capital structure. *The correct weights are those based on the firm's target capital structure, since this is the best estimate of how the firm will, on average, raise money in the future.* Recent survey evidence indicates that the majority of firms do base their weights on target capital structures, and that the target structures reflect market values.

The appropriate cost of capital. The inflation-adjusted discount rate may have to be used as an appropriate cost of capital if the analyst wishes to reflect inflation for projects. However, inflation tends to be built into the cost of debt and equity for a company because the WACC reflects such anticipated price changes. When lenders and equity holders anticipate price increases, they will demand a rate of return higher than in ordinary cases so that the WACC reflects inflation. Thus, the company should not add an increase to the discount rate derived from the cost of capital in order to adjust for inflation.

5.4. The marginal cost of capital and investment decisions

The cost of capital is a marginal cost – the cost of an additional money unit of new capital at a given level of financing. When companies raise funds for new investment projects and in determining the optimal amount to spend on investments, they are concerned with the marginal cost of new funds. Investment in a project is allowed until the marginal cost of funds to invest is equal to the marginal benefit the project provides. The benefit of an investment is its return; which refers to as its internal rate of return.

The point where marginal cost of investment funds equals marginal benefit from investment (at this point total profit is maximized), results in the optimal capital budget.

Should our analysis focus on historical (embedded) costs or new (marginal) costs?

The cost of capital is used primarily to make decisions that involve raising NEW capital for NEW projects. So, focus on today's MARGINAL costs (for WACC).

The marginal cost of new funds is used when companies raise funds for new investment projects and in determining the optimal amount to spend on investments.

The cost of capital is a marginal cost. The marginal cost of capital (MCC) is defined as the cost of the last unit of new capital the firm raises, and the marginal cost rises as more and more capital is raised during a given period.

$$MCC = \Delta WACC / \Delta C$$

Investment in a project is allowed until the marginal cost of funds to invest is equal to the marginal benefit the project provides.

The benefit of an investment is its return; which refers to as its internal rate of return.

The point where marginal cost of investment funds equals marginal benefit from investment (at this point total profit is maximized), results in the optimal capital budget. The optimum capital budget is defined as the amount of investment that maximizes the value of the company.

The intersection of the investment opportunity schedule with the marginal cost of capital curve identifies the amount of the optimal capital budget.

The optimum capital budget is defined as the amount of investment that maximizes the value of the company. The company's optimum capital structure simultaneously (a) minimizes the company's WACC, (b) maximizes the value of the company, and (c) maximizes the company's share price. As debt is added to the capital structure, the WACC falls. This increases the value of the firm. Because this increase in the company's value accrues to the owners of the company, the price of the company's stock rises.

When making financial decisions, firms could first analyze a number of factors, and then establish a target capital structure. The target may change over time as conditions change, but at any given moment, management should have a specific capital structure in mind. If the actual debt ratio is below the target level, expansion capital should generally be raised by issuing debt, whereas if the debt ratio is above the target, equity should generally be issued.

However, as their capital budget expands in absolute terms, their marginal cost of capital (MCC) will eventually increase. This means that companies can tap only the capital market for some limited amount in the short run before their MCC rises, even though the same optimum capital structure is maintained.

Managers should choose the capital structure that maximizes the firm's stock price, and this generally calls for a debt ratio that is lower than the one that maximizes expected earnings per share. The maximum value occurs with the capital structure that minimizes WACC, assuming the capital structure doesn't change the free cash flows. Because it is usually easier to predict how a capital structure change will affect the WACC than the stock price, many managers use the predicted changes in the WACC to guide their capital structure decisions. It is necessary to mention that the component cost of equity is always higher than that of debt, using only low-cost debt would not maximize value because of the feedback effects on the cost of debt and equity. Finally recall that the capital structure that minimizes the WACC is also the structure that maximizes the firm's stock price.

Knowledge Assessment Questions

- How does comparing WACC to expected investment returns help determine the viability of external financing?
- How does CAPM incorporate risk into the decision-making process for allocating capital?
- How does WACC serve as a benchmark in determining whether to allocate capital to internal projects or external securities?
- How might fluctuations in WACC affect a firm's long-term investment strategy and risk appetite?



Individual Work Tasks

Task 1: Calculate the cost of common stocks based on CAPM if the common stock listed beta is 1.2. The estimated market rate is 16% and the risk free rate is 8%.

If a company that is implementing an investment project has 3 sources of capital financing, which weight and specific cost are specifies in the following table and computed above.

Capital component	Weight of component	Cost of capital component
Long term debt	32%	23.5%
Common stock	31%	?
Preferred stocks	17%	14%
Retained earnings	20%	12%

Compute the WACC.

Task 2: An enterprise that realizes an investment project uses investment capital from 4 resources: bonds, ordinary shares, preferred shares and bank credit.

The bank credit was signed at 25% interest rate. The corporate income tax rate is 15%. Flotation costs concerning credit contract are 3% from its value. The book value of enterprises' capital components and their specific cost are presented in the table.

Source	Book Value (mil. m.u.)	Specific Cost (%)
bonds	15,0	9
ordinary shares	10,0	28
preferred shares	20,0	6,9
bank credit	5	?

Determine the Weighted Average Cost of Capital.

Recommended Readings

1. Bodie Z., A. Kane, and A. Marcus, 2007, Essential of Investments, McGraw-Hill
2. Myers S.C., R.A. Breatley, 2000, Principles of Corporate Finance, McGraw-Hill

Study Unit 6. CASH FLOWS FROM INVESTMENT ACTIVITY PROCESS

Learning objectives

By the end of this unit, students will be able to:

- To identify the main element that characterize the investment from financial point of view
- To estimate the future cash flows associated with potential investments
- How to determine whether these cash flows are the result of expansion or replacement decisions

Key Terms: Capital cost, expected annual after-tax cash flows, initial after-tax cash flow, ending (or terminal) after-tax cash flow, marginal or incremental cash flows, expansion projects, replacement projects, discount rate, useful life

6.1. The Financial Elements of Investment

The Financial Elements of Investment that characterize the efforts made for and effects of investment are:

- Estimate of initial investment cost (CF_0)
- Net incremental after-tax cash flows (CF_n)
- Ending Cash flows (ECF_n)
- Estimated useful life (n)
- Discount Rate (r)

There is an initial investment at $t = 0$ (CF_0) consists of:

- C_0 the initial capital cost of the asset
- ΔNWC_0 the change in net working capital
- OC the opportunity costs associated with the project

There follows an annual stream of after tax cash flow benefits (CF_n) consisting of:

- Operating after-tax cash flow benefits
- Tax shield benefits from Depreciation

At the end of the useful life, ending cash flow benefits received (ECF_n) in the absence of tax issues include:

- SV_n the estimated salvage value in year n for the asset purchased
- ΔNWC - the net working capital investment released at the end of the project

During the investment process the cash flows are delivered across the time with varying degrees of uncertainty. That why future cash flows are discounted at a rate that

represents investors' assessments of the uncertainty that these cash flows will flow in the amounts and the timeframe expected.

The discount rate is defined as the expected rate of return that the market requires in order to attract funds to a particular investment. It reflects the lost opportunity to spend or invest now (opportunity cost) and the various risks assumed because we must wait for the funds.

The appropriate discount rate can be established as:

- Opportunity Cost of Capital
- Required Rate of Return
- Weighted Average Cost of Capital

Opportunity cost of capital is the yield that could be earned on alternative investments with similar risk and maturity.

Ex: interest rate on bank deposits, interest rate of creditor, average rate of return of industry.

As a discount rate can be used the Required Rate of Return (RRR) determined as:

$RRR = E_{\min} + I + r$, where

E_{\min} – minimal rate of return, considered USA government bonds of 4-5% annual income,

I – inflation rate,

r – investment risk premium. In other situations, as a discount rate, which determines the time value of money, depending on the situation can participate the following: interest rate on bank deposits, interest rate of creditor, interest rate on financial market, return on firm's assets, WACC, average rate of return of industry.

The discount rate selected for the financial analysis is critical to accurate valuation. On the level of discount rate depends the amount of the present value of cash flows, thus this, in fact, represents the cost of the done business. So, the discount rate serves as a criterion used to select profitable investment proposals and to reject those unprofitable.

Thus, as a discount rate, which determines the time value of money, depending on the situation can participate the following: interest rate on bank deposits, interest rate of creditor, interest rate on financial market, return on firm's assets, WACC, average rate of return of industry.

The discount rate selected for the financial analysis is critical to accurate valuation. On the level of discount rate depends the amount of the present value of cash flows, thus this, in fact, represents the cost of the done business. So, the discount rate serves as a criterion used to select profitable investment proposals and to reject those unprofitable.

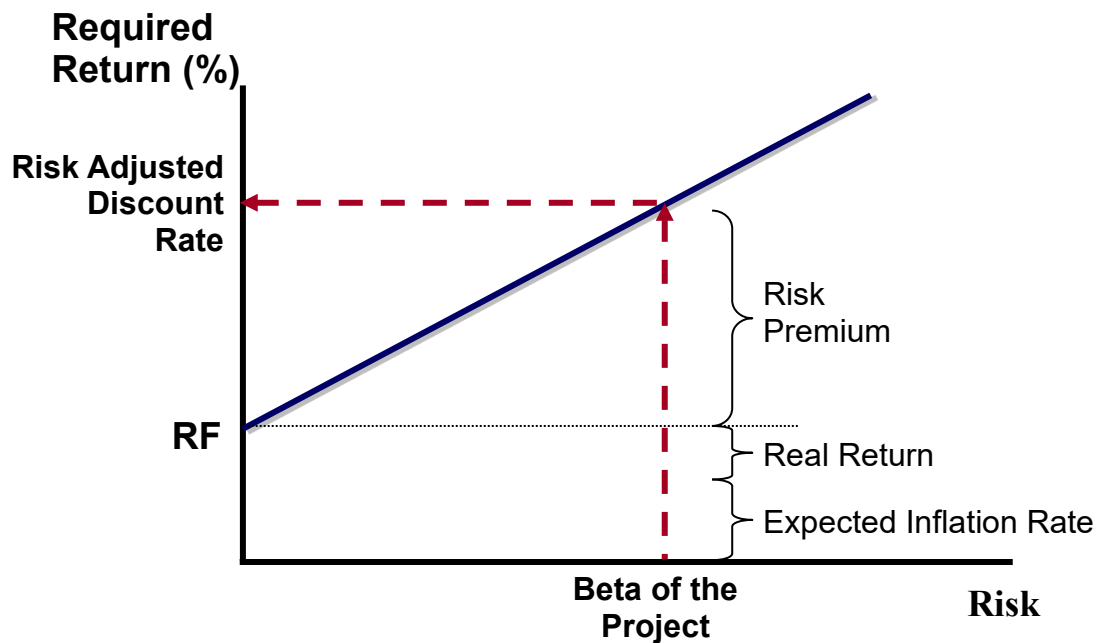


Figure 6.1. The Required Rate of Return (RRR)

6.2. Relevant Cash Flows for Capital Project Evaluation

When we refer to *capital investment*, we are referring to the firm's investment in its assets. Managers must evaluate a number of factors in making investment decisions. Not only to estimate how much the firm's future cash flows will change if it invests in a project, but also must evaluate the uncertainty associated with these future cash flows.

The first step in investment analysis process is to identify the relevant cash flows, defined as the specific set of cash flows that should be considered in the decision. *The relevant cash flow* for a project is the additional free cash flow that the company can expect if it implements the project. The value of a project depends on its free CFs. First, it is necessary to understand better the origin of these future cash flows. They come from:

- assets that are already in place, which are the assets accumulated as a result of all past investment decisions, and
- future investment opportunities.

The project's cash flows are the investment outlays and the annual net cash inflows after an investment project does into operation.

The basic cash flow pattern can be deconstructed into:

- Initial investment (CF_0)
- Annual stream of after-tax cash flows throughout the project life (CF_n)
- Ending cash flows (ECF_n)

For each year of the project's life, the *net cash flow* is determined as the sum of the cash flows from each of the three categories.

Some of these cash flows are estimated in the initiation phase, others in the exploitation phase and others after the exploitation, in the liquidation step of the investment.

In evaluating a project, it is necessary to focus on those cash flows that occur if and only if the investment project is accepted. These cash flows, called *incremental cash flows*, represent the change in the firm's total cash flow that occurs as a direct result of accepting the project. This fact supposes the differentiation in the analysis process between the investment project and the company that realizes these investments.

A potential project creates value for the firm's shareholders if and only if the net present value of the incremental cash flows from the project is positive. In practice, however, estimating these cash flows can be difficult.

Incremental cash flows are affected by whether the project is an expansion project or a replacement project. A new *expansion project* is defined as one where the firm invests in new assets to increase sales. Here the incremental cash flows are simply the project's cash inflows and outflows. In effect, the company is comparing what its value would be with and without the proposed project. By contrast, a *replacement project* occurs when the firm replaces an existing asset with a new one. In this case, the incremental cash flows are the firm's additional inflows and outflows that result from investing in the new project. In a replacement analysis, the company is comparing its value if it takes on the new project to its value if it continues to use the existing asset.

Self-check questions

- How does the choice of discount rate—whether based on opportunity cost of capital, required rate of return, or WACC—impact the valuation and selection of investment projects?
- Explain the components of initial investment (CF_0), annual cash flows (CF_n), and ending cash flows (ECF_n).
- What are incremental cash flows, and why are they central to capital budgeting decisions?
- How do the incremental cash flows differ between expansion and replacement projects, and what challenges might arise in estimating them accurately?

Individual Work Tasks

Task 1: Illustrate with examples of how different discount rates might lead to different investment decisions.

Task 2: Corporation A is analyzing an investment project that will work over 6 years. The cost of the project is 100 000 m.u (which include machinery cost, employee

costs and training costs). Cash outflows for years 1-6 are expected to be 5 000 m.u. per year. Cash inflows for the years 1-6 are expected to be 30 000 m.u. per year. All cash flows are before-tax and there are no cash flows expected after year 6. The tax rate is 12%.

Determine the value of the projected cash flows for the proposed project.

Recommended Readings

1. Bodie Z., A. Kane, and A. Marcus, 2007, Essential of Investments, McGraw-Hill
2. Shapiro A., 2005, Capital Budgeting and Investment Analysis, Prentice Hall

Study Unit 7. TIME VALUE OF MONEY AND ITS INFLUENCE ON CASH FLOWS FROM INVESTMENT ACTIVITY

Learning Objectives

After studying this topic, student should be able to:

- Understand what is meant by "the time value of money" and discuss its role in finance
- Understand the relationship between present and future value.
- Calculate both the future and present value of: (a) an amount invested today; (b) a stream of equal cash flows (an annuity); and (c) a stream of mixed cash flows.
- Use interest factor tables and understand how they provide a shortcut to calculating present and future values.
- Distinguish between an "ordinary annuity" and an "annuity due."
- Understand the effect that compounding interest more frequently than annually has on future value and the effective annual rate of interest
- Conduct a single payment discounting/compounding to see how the value changes
- Work with annuities and uneven cash flows

Key Terms: Time Value of Money, Discounting, Compounding, Future Value, Present value, Discount rate, Effective annual interest rate, Annuities, Perpetuities, Uneven Cash Flows

7.1. Time value of money concept

To value an investment it is necessary to determine how much this package of cash flows is worth today. This process employs a fundamental finance principle – **the time value of money**.

To calculate the future value of a single amount we must first understand how money grows over the time. Once money is invested it earns an interest rate that compensates for the time value of money and for default risk, inflation and other factors. Often the interest earned on investment is the compound interest, which is interest earned on interest and on the original principal. In contrast, simple interest is interest earned only on the original principal.

The idea that money available at the present time is worth more than the same amount in the future is due to its potential earning capacity. This core principle of finance holds that, provided money can earn interest and any amount of money is worth more the sooner it is received. The time value of money is based on the premise that one

will prefer to receive a certain amount of money today than the same amount in the future, because Money received today is more valuable than money received in the future by the amount of interest we can earn with the money. If \$90 today will accumulate to \$100 a year from now, then the present value of \$100 to be received one year from now is \$90.

The time value of money establishes a relationship between cash flows received at different times. Time value means that cash on hand is worth more than cash in the future because of the opportunity to earn a return. Financial managers adjust for the time value of money by calculating the future value and the present value. Formulas for the present value and future value of money quantify this time value, so that different investments can be compared. Future value and present value are mirror image of each other.

7.2. Present value and Future Value of Cash Flows

Future value is the value of starting amount at a future point in time, which represent the initial amount plus interest that is earned during the interim period.

Present value is the value of a future amount today assuming a specific required interest rate for a number of years until that future amount is realized.

Money that are paid or received at two different points in time is different, and this difference is recognized and accounted for by the time value of money analysis. This includes compounding and discounting.

To calculate the Future value (FV) and Present value (PV) of a single amount there can be used algebraic, table or calculator methods.

Compounding is the process of determining the FV of a single amount, a cash flow or a series of cash flows. Future value can be computed by the following formula:

$$FV = PV \times (1+r)^n = PV \times (FVIF_{r,n}), \quad \text{where}$$

r – required rate of return of investor (interest rate) per period;

n – number of time periods

PV – present value of a single amount or the cash flow and

FVIF – future value interest factor (which can be found in financial tables).

The $(r+1)^n$ component of equation, called compounding factor, is the value time component because it compounds the rate of interest.

So, Future Value is value in the future of a present cash flow compounded at a specified interest rate.

Discounting is the process of finding the present value of a future a single amount, a cash flow or a series of cash flows. Present value is a today's money value of a specific future amount. With an investment in new plant or equipment certain cash

receipts are expected. When the present value of a future promised or expected cash payment is calculated, it is discounted because it is worth less if it to be received later.

In present value analysis the interest rate used in this process is known as discount rate. The PV formula is:

$$PV = FV \times \frac{1}{(1 + r)^n} = FV \times PVIF_{r,n}, \text{ where}$$

r – discount rate per period;

n – number of time periods, and

PVIF – present value interest factor (which can be found in financial tables).

The discount factor, $\frac{1}{(1 + r)^n}$, is the number by which a future cash flow to be received at time n must be multiplied in order to obtain the current present value.

Discounting is the inverse to compounding. Compound factor causes the value of beginning amount to increase at an increasing rate, because it is always greater than 1 and discounting causes the present value of a future amount to decrease at an increasing rate because the discount factor is always less than 1.

Ex: \$1000 compounded for 1 year at 4 % interest rate: $FV_1 = 1000(1+0.04)^1 = 1040$

\$1000 discounted back for 2 years at 4 % interest rate: $PV_2 = 1000(1/1+0.04)^2 = 924, 60$

In cases when the discount rate differs from year to year, the discount factor is

calculated as follows:
$$\frac{1}{(1 + r_1) \times \dots \times (1 + r_t)}$$

Compounding more than once per year

An investment's annual effective rate of interest is necessary when compounding occurs more often than once a year. In this case raises the effective annual interest rate. It is calculated as the following:

$$r_e = \left(1 + \frac{r_{nom}}{m}\right)^m - 1$$

r_{nom} – nominal interest rate;

m – number of compounding periods per year;

Ex. Consider a stated annual rate of 10%. Compounded yearly, this rate will turn \$1000 into \$1100. However, if compounding occurs monthly, \$1000 would grow to \$1104.70 by the end of the year, rendering an effective annual interest rate of 10.47%. 10 % is the nominal rate.

In all formulas that compute either the present value or future value of money or annuities, there is an interest rate that is compounded at certain intervals of time. This interval of time is assumed to be 1 year, but, if it is less than 1 year, as it frequently is, then there are 2 adjustments that must be made to the formulas:

1. The number of time periods must be changed to represent the number of times that interest is compounded. *The number of years must be multiplied by the number of compounding periods within a year.* Thus, Periods = Years × Periods per year.

2. The interest rate itself must be changed to reflect the interest rate per time period. *The annual interest rate must be divided by the number of compoundings in a year.* Thus, $i_{\text{per}} = \text{Annual rate} / \text{Periods per year}$.

Note also that most of the solutions to these formulas are rounded.

In this case the previous formula for computing FV and PV become the following:

$$FV = PV \times \left(1 + \frac{r_{\text{nom}}}{m}\right)^{mn},$$

$$PV = FV \times \frac{1}{\left(1 + \frac{r_{\text{nom}}}{m}\right)^{mn}}, \text{ where}$$

r_{nom} – nominal interest rate;

m – number of compounding periods per year;

n – number of years.

7.3. Annuities. Working with annuities

The present value and future value of an investment is a lump sum payment. A series of equal lump sum payments over equal periods of time is called an **annuity**. Like the present value and future value of a single amount, the present value and future value of an annuity allows comparing investments. Understanding annuities is crucial for understanding investments that require or yield periodic payments.

An **annuity** is a series of equal payments in equal time periods. Usually, the time period is 1 year, which is why it is called an annuity, but the time period can be shorter, or even longer. These equal payments are called the **periodic rent**. The **amount of the annuity** is the sum of all payments.

An **annuity due** is an annuity where the payments are made at the beginning of each time period; for an **ordinary annuity**, payments are made at the end of the time period. Most annuities are ordinary annuities.

Analogous to the future value and present value of a unit, which is the future value and present value of a lump-sum payment, the future value of an annuity is the value of equally spaced payments at some point in the future. The present value of an annuity is the present value of equally spaced payments in the future.

The **Future Value of an Annuity** is simply the sum of the future value of each payment.

The equation for the future value of an *ordinary annuity* is the sum of the geometric sequence: $FV_{OA} = \sum_{t=1}^n Pmt_t(1+r)^{n-t} = Pmt_1(1+r)^{n-1} + Pmt_2(1+r)^{n-2} + \dots + Pmt_n$

The future value of an annuity is the sum of the geometric sequences shown above, and these sums can be simplified to the following formulas:

The **future value of an ordinary annuity** is:

$$FVOA = Pmt \times \frac{(1 + r)^n - 1}{r}$$

$\frac{(1 + r)^n - 1}{r}$ is called future value interest factor of an annuity and is used to find the future value of annuity with the table method, for different combinations of r and n. So, $FVA = A \times FVIFA_{r,n}$

The **Present Value of an Annuity** is the sum of the present value of each annuity payment. Since the present value of a lump sum payment is simply the future value of that payment divided by the interest factor $(1 + r)^n$, the present value of an annuity is the sum of the present value of each of those payments:

$$PVOA = Pmt \times \frac{1 - \frac{1}{(1 + r)^n}}{r}$$

PVA - Present Value of Annuity Amount

A - annuity payment

r - discount rate per time period

n - number of time periods.

The financial table also can be used for the **present value interest factor for an annuity** (PVIFA) to solve present value of annuity problems. So, $PVA = A \times PVIFA$

It is known that for *annuity due*, in contrast to ordinary annuities, annuity payment occur to the beginning to each period. Annuities due are more likely to occur when doing future value of annuity problems than when doing PVA problems. Evaluating the present value of a promised or expected series of annuity payments that began today would be a present value of an annuity problem. This is less common because annual car or real estate payments usually start at the end of first period, making them ordinary annuities.

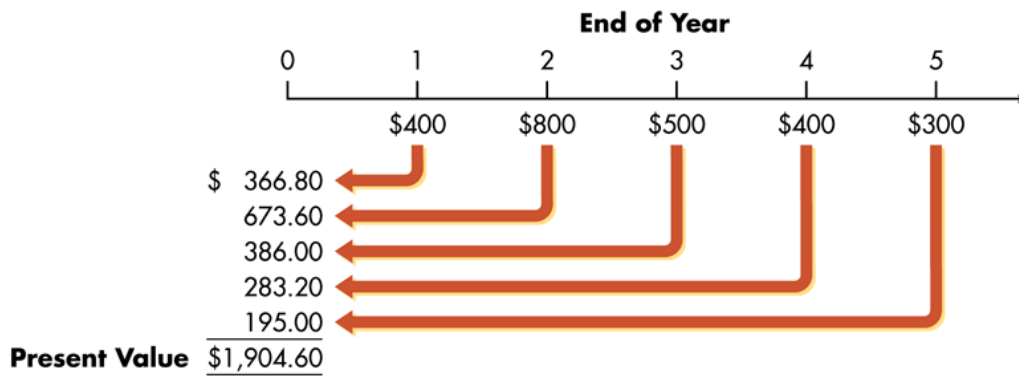
A **perpetuity** is an annuity in which the periodic payments begin on a fixed date and continue indefinitely. Permanently invested (irredeemable) sums of money are prime examples of perpetuities. Scholarships paid perpetually from an endowment fit the definition of perpetuity.

Perpetuity contains an infinite number of annual payments.

A cash flow stream is a finite set of payments that an investor will receive or invest over time.

7.4. Uneven Cash Flows

Very often an investment offers a stream of cash flows which are not either a lump sum or an annuity. We can find the present or future value of such a stream by using the principle of value additivity, means that to calculate the PV of an uneven series of cash flows by finding the PV of a single amount for each series and then sum the totals.



? Knowledge Assessment Questions

- Does the statement "Time is money" in the context of investment project evaluation?
- Is the statement "The higher the discount factor, the higher the present value of cash flows" true or false?
- How does compound discounting reflect the time value of money in investment analysis?
- Why is discounting used when evaluating the financial viability of investment projects?
- If the first payment comes immediately instead of at the end of the first year, will the Annuity Due be MORE or LESS?



Individual Work Tasks

Task 1: Develop the idea: TIME is MONEY. Write an essay about the importance of time value of money concept in the business world

Task 2: Compute to what value will grow \$10000 if it is invested at 15 percent annually for 4 years. What would the future value be if the interest were compounded annually, semiannually, quarterly, and monthly?

Task 3: Compute the present value of a 5 year ordinary annuity of \$200 if the interest rate is 10% annually? What would the future value of annuity would be if the annuity were an annuity due.

Task 4: Compute the future value of a 3 year ordinary annuity of \$100 if the interest rate is 10% annually? What would the present value of annuity would be if the annuity were an annuity due.

Task 5: A company invests \$12000 in rental property and expects the price to appreciate 8% annually for 6 years. Calculate the expected price of the property at the end of 3 years and at the end of 6 years.

Recommended Readings

- Marcus Alan J., Kane Alex, Zvi Bodie. Investments. The McGraw-Hill Companies, Inc. Boston, 2007
- Brigham Eugene F., Gapenski Louis C. Financial management: theory and practice. The Dryden Press, 2007
- Brealey, Myers. Principles of Corporate Finance. Sixth Edition. The McGraw-Hill Companies, Inc., 2003

Study Unit 8. INVESTMENTS' ECONOMIC EFFICIENCY EVALUATION

Learning objectives

After studying this topic, students should be able to:

- Understand the major simple methods of project evaluation and selection – the accounting rate of return (ARR), the payback period (PP) method, including its: (a) calculation; (b) acceptance criterion;
- (c) advantages and disadvantages.
- Understand the three major discounted cash flow (DCF) methods of project evaluation and selection – internal rate of return (IRR), net present value (NPV), and profitability index (PI), the discounted payback period (DPP) method.
- Explain the calculation, acceptance criterion, and advantages for
- major DCF methods.
- Understand why ranking project proposals on the basis of IRR, NPV, and PI methods “may” lead to conflicts in ranking.

Key Terms: Investments economic efficiency, Accounting Rate of Return (ARR), Payback Period (PP), Net Present Value (NPV), Internal Rate of Return (IRR), Modified Internal Rate of Return (MIRR), Profitability Index (PI), Discounted Payback Period (DPP)

8.1. Concept of the investments' economic efficiency

Note that the term "efficient" is very much confused and misused with the term "effective". In general, efficiency is a measurable concept. Compare "effectiveness", which is a vague, non-quantitative concept, mainly concerned with achieving objectives.

The *efficiency* as a word is well known, too. It is coming from the latin word “*efficere*” that means to do well what are you doing, at time and with optimum consume of resources either human, material or financial.

Effectiveness is coming also from the latin word “*efficacere*” and means to do the right thing, to do with the lowest consumption of resources either human, material, technical or financial. In a practical way it means that an investment is effective if it is the most adequate for the purpose involved and it is done with the lowest (or optimum) consumption of resources.

To economists, efficiency is a relationship between results and consumed resources. When a situation is called inefficient, they are claiming that desired results could achieved with less resources, or that the employed resources could produce more

of the results desired. Less and more in this context necessarily refer to less and more value. Thus, economic efficiency is measured not only by the relationship between the physical quantities of effects and efforts, but by the relationship between the value of the results and the value of the consumed resources.

A slightly broader model of efficiency in many cases is to say that efficiency corresponds to the ratio $e = P / C$ of the amount P of some valuable resource produced, per amount C of valuable resources consumed.

So, the efficiency can be computed as a relationship between effects value and the value of made efforts and vice versa. These two relations can be presented as:

$$\begin{aligned}
 a. \quad e &= \frac{\text{EFFECTS}}{\text{EFFORTS}} \rightarrow \text{maxim}_{\text{more than 1}} \\
 b. \quad e' &= \frac{\text{EFFORTS}}{\text{EFFECTS}} \rightarrow \text{minim}_{\text{less than 1}}
 \end{aligned}$$

where,

e și e' – economic efficiency coefficients;

E – effects (results) obtained;

ϵ – made efforts (consumed resources).

The efficiency coefficient e help us to select a variant of a project investment from others taking as a base the ratio effects/ efforts there were seen as profit/ costs, for instance, or products made / optimum quantity consumed resources.

Efficiency is the potential of acting or producing effectively with a minimum amount or quantity of waste, expense, or unnecessary effort. If we deal with the economic efficiency of investments that means to put in balance efforts (financial, human, technical etc.) with effects (gains as turnover, profit, production, services, products, impact on environment etc.).

It's known that the primary motivation of each business is to obtain the maximum efficiency and the highest possible income. That's why it's too important to estimate the efficiency and to evaluate the project fairly and thoroughly, in order to make the optimal decision.

There exist many methods of investment project financial evaluation that, generally, are classified as:

1. Traditional methods (static);
2. Modern methods (dynamic).

The static methods of investment project evaluation are characterized by a statistical approach of phenomena analysis. They simplify the real situation, use average results in analysis and deny the eventual instability and the terms of these results, (for example, a certain income obtained whether during a year of exploitation or 5 years, is estimated in the same way).

Modern methods are characterized by a dynamic approach of the investment project analysis, considering the timing of the project. Also, these methods imply both risk and uncertainty.

A combination of the traditional and modern methods might be used for the evaluation of short-run or middle-run investment project. But the dynamic analysis, based on rational modern methods is recommended for the evaluation of important with large money amount projects.

8.2. Traditional (static) methods for investments' efficiency evaluation

The complex analysis of the projects and the estimation of the investment efficiency cannot be realized without processing the primary information concerning costs and economic effects and without calculating the indices of economic efficiency.

Every index of economic efficiency has a certain cognitive information capacity and characterizes a separate aspect of the investment project efficiency. It determines, in specific measurable units, the level of the economic efficiency of the project, considering each specific form, the class of economic effects investors are interested in.

1. Simple or accounting rate of return (ARR)

This index ensures the compatibility between the annual values of project's economic advantage, on the one hand, and the investment effort, on the other hand. The optimal project will be with a higher value of this coefficient. The formula:

$$ARR = \frac{E_h}{I_t}, \text{ or } ARR = \frac{\overline{PN}}{I_0} \text{ or } ARR = \frac{\overline{CF}}{I_0} \text{ where:}$$

I_t – net investment; or I_0 – initial investment

E_h – annual economic advantages;

CF_h – annual average cash flow

It reflects the volume of the advantage (in monetary units) obtained by one monetary unit of invested capital.

From this formula, we can conclude that there is a feedback between the payback period and the ARR. That's why, being complementary, only one of these indices is used in the efficiency calculations.

This index is quite understandable and easy to be computed.

Average accounting profit/CF is the arithmetic mean of accounting income/CF expected to be earned during each year of the project's life time.

Initial investment is sometimes replaced by average investment due to the reason that the book value of the project usually declines over its life time.

Average investment = (Initial investment + Ending book value of the project) / 2

- Accept the project only if its ARR is NOT less than the required accounting rate of return.
- In case of mutually exclusive projects, accept the one with highest ARR.

Advantages and Disadvantages of ARR Method

Advantages of ARR Method:

- Is that it is easy to understand and calculate.
- Is a simple capital budgeting technique and is widely used to provide a guide to how attractive an investment project is.
- It considers the return over the entire economic life of the project.
- Is a familiar concept to return on investment (ROI), or return on capital employed.

Disadvantages of ARR Method:

- It does not take account of the timing of the profits from an investment. It implicitly assumes stable cash receipts over time.
- It is based on accounting values.
- It takes no account of the length of the project.
- It ignores the time value of money.
- Does not adjust for the risk to longer term forecasts.
- It can be calculated in a wide variety of ways and hence lead to different outcomes.

2. The payback period of the investment

The payback period represents the period during which the investment effort is recovered from the annual net incomes.

Using this index, the investor determines the time period during which the investment costs are compensated from the future economic advantages, obtained after the implementation of the investment project.

The payback period can be calculated both by static and dynamic approaches of economic processes.

As a static method, the payback period can be computed for several cases:

$$T = \frac{I_t}{E_h} \quad \text{or} \quad T = \frac{I_t}{CF_h}$$

where,

I_t – total net cost of investment;

CF_h – annual average cash flow;

E_h – annual economic advantages;

That is the theory, but in practice the economic advantages (annual profits) are not constant in time. On the one hand just after the project implementation was provided, there comes the period of scheduled parameters achievement, during which

the expected profit is under the planned level. This divergence leads to the prolongation of the payback period. On the other hand, there are cases when some partial production capacities are put into practice even during the implementation period of the objective. So, a certain level of profit will be obtained till the integral implementation of the objective occurs and this profit will diminish the investment effort during the respective period.

Sometimes, the investment value should be adjusted to a number of elements like: the sums gained due to the capitalization of some equipment, due to undepreciated value of the fix capital that is to be liquidated, and to the losses generated by the production interruption, etc.

8.3. Dynamic methods to evaluate investments' efficiency

Capital budgeting involves the decision-making process with respect to investment in fixed assets; specifically, it involves the measurement of the incremental cash flows, associated with the investment proposals, and the evaluation of the attractiveness of these cash flows.

Modern (dynamic) methods for investment projects evaluation are:

- Net present value (*NPV*);
- Profitability index (*PI*);
- Internal rate of return (*IRR*);
- Discounted payback period (*DPP*);
- Modified internal rate of return (*MIRR*).

They are used to evaluate the respective worth of two or more investment alternatives.

1. The Net Present Value method (*NPV*).

The *NPV* represents a fundamental criterion for the economic and financial evaluation of the projects.

This method of evaluating investments is the preferred framework because it takes into account the time value of money. It explicitly recognizes that a monetary unit today (present value) is worth more than a monetary unit to be received at a future time. The present value of that monetary unit depends on time when it will be received (or spent) and the appropriate interest rate representing the time value of money. The *NPV* method allows one to compare alternative investments of different durations and different levels of risk on a uniform basis.

The *NPV* method to evaluate a project is applied on several steps, in order to:

1. Determine the net investment required to initiate the project.
2. Select the discount rate.
3. Identify the costs benefits to be considered in analysis.
4. Establish the timing of the cost / benefits.

5. Calculate net present value of all cash flows.
6. Compare this investment with alternative investment opportunities and select that with the best net present value.

Essentially, it helps to find the present value in “today’s currency” of the future net cash flow of the project. Then, one can compare that amount with the amount of money necessary to implement the project.

NPV analysis must consider the all relevant cash flows throughout the life cycle of the project.

It characterizes the contribution of economic advantage of an investment project, the investor return, the recompense for the employed capital, expressed either in the form of cash flow at a present value or as a total discounted net value.

Defined in the form of cash flow, *NPV* ensures the degree of comparison between the total discounted cash flow (*CF*), generated during the investment’s life-span and the total employed effort, at a present value (*I*) either.

The timing for calculating the discounted value of investments and cash flow is the start moment of the activities ($t_a = 0$).

The math relation for *NVP* will be:

In the case when the investment’s implementation period (*d*) is less 1 year, and the exploitation of investments, equipment, services starts during the same year:

$$NPV = \sum_{n=1}^{D_e} CF_n (1+r)^n - I_t \quad (1)$$

$n = 1, 2, \dots, D_e$

where:

D_e – exploitation period;

CF – obtained cash flow;

r – discount rate;

I_t – value of total investments;

According to the *NPV* criterion, only those investment projects are to be accepted, that are characterized by a $NPV > 0$.

From the economic and financial point of view a positive *NPV* means that:

- the initial outlays are paid back and a surplus is obtained;
- the project has a global capacity of the employed capital equal at least to the considered discount rate (r);
- the investment project generates high cash flows, ensuring the gain of a certain net value volume.

An investment project that generates a negative net present value ($NPV < 0$) is loss-making to the enterprise and must be rejected. Its efficiency is less than the

discount rate. In this case the respective capital might be reinvested with a efficiency equal to the discount rate and that might generate greater returns.

If comparable projects are properly analyzed, the selected project will be the one with the largest *NPV*, because it will maximize the investor's wealth.

To summarize what was just illustrated, the *NPV* would be higher if:

- the income amounts are larger;
- the income amounts come sooner;
- the discount rate is lower.

NPV analysis should be used in any analysis supporting decisions to initiate, renew and expand projects, which would result in a number of measurable benefits or costs lasting further for three or more years.

Nevertheless, there is a whole range of disadvantages referring to this index:

- *NPV* analysis is generally used to evaluate the project's cash flows rather than the income from the project.
- *NPV* determines whether the projects is profitable or not, but it doesn't reflect the comparative importance of this project contribution.
- *NPV* does not consider the payback period;
- *NPV* badly depends on the discount rate value, that's why it must be settled in a proper way.

2. Profitability Index (PI).

As a rule the profitability index is used together with the *NPV*. It takes into consideration the investment scope, the needed investment costs, that are not determined by *NPV*. Profitability index reflects the ratio of total *NPV* to investment funds.

$$PI = \frac{NPV}{I_t} \times 100 \quad (2)$$

PI is expressed either as a percentage or a coefficient. The following relation is used to calculate the profitability index as a coefficient.

$$PI = \frac{DCF_t}{DI_t} = 1 + \frac{NPV}{DI_t} \quad (3)$$

where:

PI – profitability index;

DCF_t – total discounted cash flow;

DI_t – total discounted investment;

NPV – total net present value.

An investment project will be accepted only if $PI > 1$. A project with the profitability index which will generate a null NPV and the investor will treat this project with no interest.

The higher value of PI , the more efficient is the project. The optimal alternative will be the one that respects the criterion:

$$PI \rightarrow \text{maximal}$$

So, for mutually exclusive projects, choose the one with the highest PI . The advantages of this method are the same as those for the NPV . They will support the same accept-reject decisions to a project.

3. Internal Rate of Return (IRR)

The internal rate of return is the discount rate that equates the present value of the project's future net cash flow with the project's initial outlay. Respectively, it's the discount rate that makes the net present value equal zero.

IRR is the limit discount rate, for which the project's total NPV won't be generated.

$$NPV(a = IRR) = 0 \tag{4}$$

Essentially, IRR allows finding the interest rate that is equivalent to the returns you expect from your project. Once you know the rate, you can compare it to the rates you could earn by investing your money in other projects or investments.

It is "internal" to the investment because it is determined by only cash inflows and outflows of the investment with no information drawn externally from the market or other investments, such as the riskless or risk-adjusted return.

Graphically, IRR is represented in the next figure.

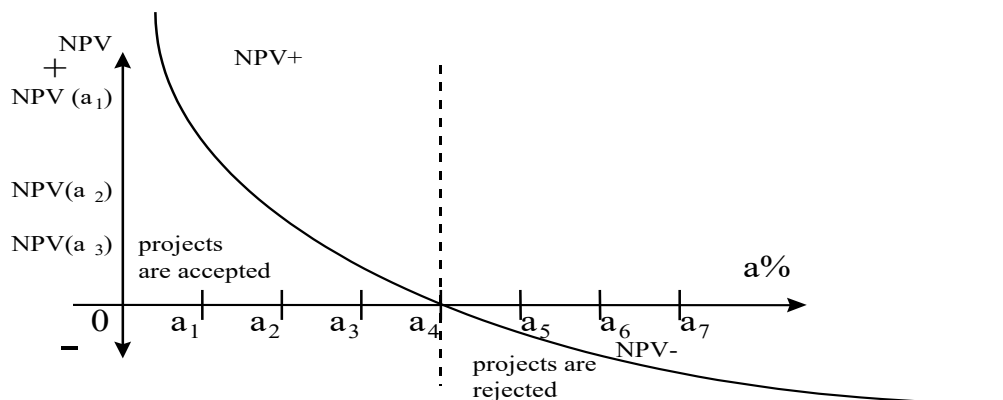


Figure 8.1. The evolution of discounted cash inflows at different discount rates.

IRR acceptance criteria depends on the discount rate r :

- accept if $IRR > r$, because DI_t (cash outlays) are less than DCF_t (returns) and NPV is positive;
- reject if $IRR < r$; in this case $DI_t > DCF_t$ and, respectively, NPV will be negative;
- if $IRR = r$, the project is treated with no special interest because the cost of employed capital (DI_t) equates the income amounts (DCF_t). So, $NPV=0$.

So, only those projects are accepted, which are characterized by an IRR higher than the cost of capital.

In order to compute IRR it is required a positive NPV (V_1) that corresponds to a minimal discount rate (r_{\min}), and a negative NPV (V_2), that corresponds to a maximal discount rate (r_{\max}). The values of the net value at those two discount rates are placed on two axes: the horizontal one that expresses different discount rates and the vertical axe that reflects the NPV evolution.

Analytically, IRR is determined when:

$$DI_t = DCF_t$$

Respectively $NPV = DCF_t - DI_t = 0$

In general there is no form solution which is closer to IRR . One must find it iteratively. The following formula is used:

$$IRR = r_{\min} + (r_{\max} - r_{\min}) \frac{NPV_{r_{\min}}}{NPV_{r_{\min}} + |NPV_{r_{\max}}|} \quad (5)$$

where:

r_{\min}, r_{\max} – max and minimal discount rates;

$NPV_{r_{\min}}$ – positive NPV , discounted with r_{\min} ;

$NPV_{r_{\max}}$ – negative NPV , discounted with r_{\max} ;

The rule is that:

- the acceptable difference between r_{\min} and r_{\max} shouldn't be higher than 5 points.
- r_{\min} and r_{\max} are chosen in such a way to ensure a positive NPV for r_{\min} and a negative NPV for r_{\max} ;
- while r_{\min} and r_{\max} are determined by using the iteration method.

In its essence, the IRR is a fundamental criterion for projects' acceptance. Usually a business owner will insist on that, in order to be acceptable, project must be expected to earn an IRR that is at least several percent higher than the cost of borrowing to compensate the company for its risk, time and trouble associated with the project. In case of comparable projects, the selected one will be with a higher IRR .

IRR remains to be a significant criterion for projects selection, because it:

- uses cash flows;

- recognizes the time value of money.

Theoretically, *IRR* is less valuable than *NPV*, the fact that is determined by the following disadvantages:

1. For the start, if the expected cash flows vary greatly from year to year, it's very difficult and time-consuming to calculate the interest rate. Unfortunately, for investments with an floating sequence of negative and positive cash flows, more than one positive solution to the internal rate of return may exist, with no clear rule for deciding among them.

It often happens with the projects with a long exploitation period (D_e), during which new investments are employed to replace periodically to replace parts of equipment.

2. Unlike *NPV*, that suggests the reinvestment of gained cash inflows at a efficiency rate equal to the discount rate (the cost of capital), *IRR* foresees the reinvestment of cash flows, generated during the exploitation period, at a unique rate equal to *IRR* that does not correspond to the reality adequately.

3. *IRR* does not take into consideration the score of investment effort.

For consistent accept-reject criteria, other indices should be used besides *IRR*, such as: net present value (*NPV*), discounted payback period (*T*), profitability index (*PI*).

4. Discounted payback period (DPP)

It is similar to the payback period (the static one), except one thing: it uses more often discounted net cash flows rather than actual undiscounted net cash flows in calculating the payback period. It is defined as the number of years needed to recover the initial cash outlay from the discounted net cash flows.

The discounted payback period is determined, starting with the relation:

$$I_t' = E_t' (T')$$

where:

I_t – present value of the investments;

E_t' – discounted value of the returns, gained during the discounted payback period (T').

The fundamental idea referring to the payback period balance is the possibility to operate with comparable measures from the point of view of time factor influence.

So, the annual cash inflows are successively subtracted from the total volume of discounted investments (I_t') till the moment of investment compensation. Both cash inflows and investments are discounted at the same discount moment.

To use this evaluation method, a maximum acceptable (required) payback period is settled, by which discount payback periods for different projects are compared to.

- if $T < T_{\text{required}}$, then the project is accepted;

- if $T > T_{\text{required}}$, the project is rejected;
- if $T = T_{\text{required}}$, then the project is treated with no obvious interest.

Under the payback method of analysis, the projects with shorter payback periods rank, are higher than those with longer paybacks. The theory is that the projects with shorter paybacks are much more liquid, and thus less risky – they allow to return the investment sooner, so money can be reinvested elsewhere. Moreover, any project implies a lot of variables that grow increasingly fuzzy as you look into the future. With a shorter payback period, there's a less chance that the market conditions, interest rates, the economy, or other factors affecting your project will greatly change.

Generally, a payback period of three years or a less one is preferred. Some advisors say that if the payback period is less than a year the project should be consider reliable.

Comparative Analysis.

The selection of investment business has a direct impact on the firm value. That's why it is very important to be competent with the techniques used to estimate incremental project cash flows as to understand the strong and weak points of various alternative decision rules. Analyzing the advantages and disadvantages of each methods, one may wonder which method is the best one.

- Discounted payback period – gives equal weight to all cash flows even to those far in future, which is still short – sighted. Nevertheless, it is the easiest one to be computed.
- Internal Rate of Return picks a set of cash flows; thus settles the discount rate of *IRR* that equals it with the initial investment. The *IRR* rule is to accept the project if the opportunity cost of capital is less than the *IRR*. What might be wrong with *IRR* ?
 - a) If the *IRR* is greater than the opportunity cost, one have to check as to make sure that is making and not loosing money at the cost-of-capital;
 - b) a complex pattern of cash flows can have a lot of *IRRs*. There can be as many *IRRs* to a project as signs of changes are. One has to look at *NPV* once again to make a fair conclusion.
- *NPV* clarifies the things. The mutually exclusive projects with the highest *IRR* does not lead to highest *NPV*. In general, the *NPV* is considered theoretically much more superior.

Most accountants would prefer to look at the *NPV* and *IRR*, either. These methods take into account the greatest possible number of factors, and particularly, they are designed to determine the time value of money. But all being said on investment evaluation, *IRR*, *NPV* and the like ignore one basic important aspect of investment – the risk.

Financial experts differ as to which method should be the decisive one. The investor may be able to provide some insight research as to determine which method is the most appropriate in a certain particular situation.

5. Modified internal rate of return (MIRR)

The *modified internal rate of return* technique is similar to the IRR, but using a more realistic reinvestment assumption. The modified internal rate of return is a return on the investment, assuming a particular return on the reinvestment of cash flows.

A way to think about the modified return is to consider breaking down the return into its two components:

1. the return you get if there is no reinvestment (our mattress stuffing), and
2. the return from reinvestment of the cash inflows.

We can also represent MIRR in terms of a formula that combines terms we are already familiar with. Consider the two steps in the calculation of MIRR:

Step 1: Calculate the present value of all cash outflows, using the reinvestment rate as the discount rate.

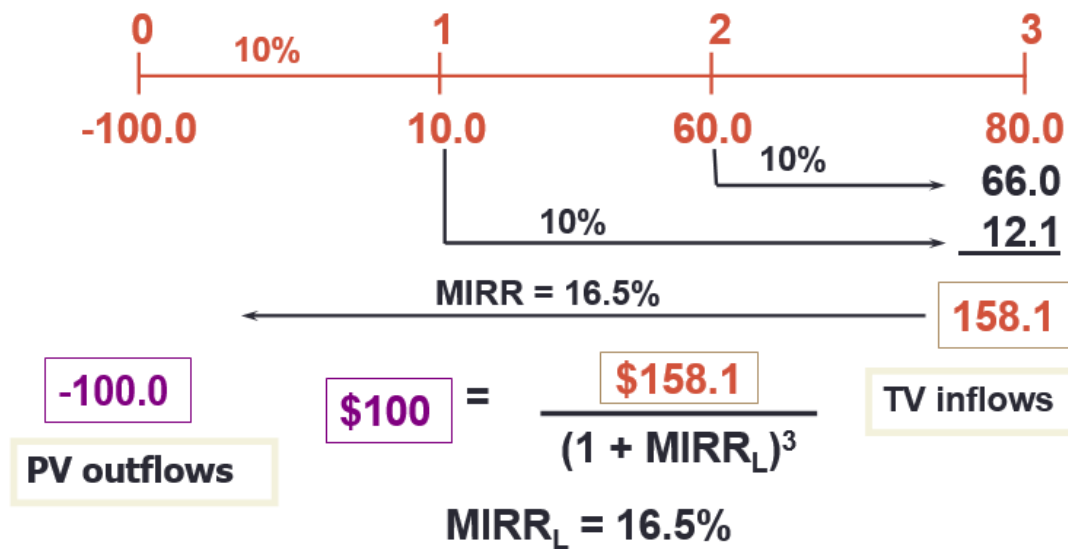
Step 2: Calculate the future value of all cash inflows reinvested at some rate.

Step 3: Solve for rate—the MIRR—that causes future value of cash inflows to equal present value of outflows:

$$\sum_{i=0}^n \frac{COFi}{(1+r)^i} = \frac{\sum_{i=0}^n CIF(1+r)^{n-1}}{(1+MIRR)^n} \quad (6)$$

As long as the MIRR is greater than the cost of capital—that is, $MIRR > \text{cost of capital}$ —the project should be accepted. If the MIRR is less than the cost of capital, the project does not provide a return commensurate with the amount of risk of the project.

Calculating MIRR



Modified Internal Rate of Return (MIRR)

- Compute IRR of modified cash flows
- Controls for some problems with IRR
- Discounting Approach – Discount future outflows to present and add to CF0
- Reinvestment Approach – Compound all CFs except the first one forward to end
- Combination Approach – Discount outflows to present; Compound inflows to end
- MIRR will be a unique number for each method, but is difficult to interpret; discount/compound rate is externally supplied

Comparative analysis

- Most would prefer to look at the NPV and IRR, either. These methods take into account the greatest possible number of factors, and particularly, they are designed to determine the time value of money. But all being said on investment evaluation, IRR, NPV and the like ignore one basic important aspect of investment – the risk.

In practice:

- You should consider several investment criteria when making decisions
- NPV and IRR are the most commonly used primary investment criteria
- Payback is a commonly used secondary investment criteria.

🔍 Knowledge Assessment Questions

- Which indicators are commonly applied in practice?

- How does this evaluation influence decision-making and resource allocation?
- How do the indicators to assess investment efficiency support rational investment decisions?
- What are the disadvantages or limitations of economic efficiency indicators?
- How do the dynamic indicators in evaluating investment efficiency differ from static indicators in terms of accuracy and relevance?



Individual Work Tasks

Task 1: An investment opportunity that costs 100000 lei generates 30000 lei in 1 year, 40000 lei in the 2, 20000 in the 3, 50000 lei in the 4 and 20000 lei in the 5 year as cash inflows. What is the payback period for the investment?

Task 2: Project S has a cost of a 10000 and is expected to produce cash flows of \$3000 per year for 5 years. Project L costs 25000 and is expected to produce cash flows of 7400 per year for 5 years. Calculate the two projects' NPVs, IRRs, PIs, assuming the cost of capital of 12 %. Which project should be selected, assuming that they are mutually exclusive?



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Study Unit 9. INVESTMENT RISKS

Learning Objectives

After studying this topic, student should be able to:

- Identify and define various types of investment risks (macroeconomic, microeconomic, market, corporate, international).
- Differentiate between stand-alone, corporate, and market risk in investment contexts.
- Evaluate the impact of different risk types on investment decisions and investment performance.
- Justify risk mitigation strategies based on risk classification and investor profile.

Key Terms: Time Value of Money, Discounting, Compounding, Future Value, Present value, Discount rate, Effective annual interest rate, Annuities, Perpetuities, Uneven Cash Flows

9.1. Concept of investment risks

Risk is an inherent part of investing. Generally, investors must take greater risks to achieve greater returns. Those who do not tolerate risk very well have a relatively smaller chance of making high earnings than do those with a higher tolerance for risk.

The Risk means a situation in which the project's objectives haven't been reached partially or totally because of different causes such as economical, social, political, technological evolution or environmental to which the probability of appearing may be estimated or is already known.

Uncertainty has the same definition as risk has, with the difference that the probability of appearance of up mentioned causes (economical, environmental, human, social, political, technological etc.) is not known.

Risk is defined as an exposure to loss and injury. Thus risk refers to chance that some unfavourable events will occur. If you invest in something you are taking a risk in the hope of making an appreciable return.

Every investor understands that investment risk is inextricably linked to potential returns. While we all want to find that perfect zero risk, high return investment, we know that in order to make money, we need to speculate a little. There is an inescapable trade-off between investment performance and risk: Higher returns are associated with higher risks. At the other extreme, short-term cash

investments are among the safest of investments when it comes to price stability, but they have provided the lowest long-term returns.

Risky assets rarely produce their expected rates of return – generally, risky assets earn either more or less than was originally expected. Indeed if assets always produced their expected returns, they would not be risky. No investment should be undertaken unless the expected rate of return is high enough to compensate the investor for the perceived risk of the investment.

So, *investment risk* is related to the probability of actually earning a different return. The greater the chance of a low or negative return - the riskier is the investment.

9.2. Classification of investment risks

An asset's risk can be analyzed in two ways: (1) on a stand-alone basis, where the asset is considered in isolation, and, (2) on a portfolio basis, where the asset is held as one of a number of assets in a portfolio. Thus, an asset's stand alone risk is the risk an investor would face if he held only this one asset. Obviously, most assets are held in portfolios, that's why it necessary to understand risk in a portfolio context.

All the investments risks can be divided on 2 major groups:

- Macroeconomic risks, which do not depend on investor or enterprise and
- Microeconomic risks that include production risks, financial risks, marketing risks, legal risks, default risk and informational risk.

According to the **level of appearance** there are three separate and distinct types of risk that can be identified:

✚ Stand-alone or individual risk is the project's risk disregarding the fact that it is but one asset within the firm's portfolio of assets and that firm is but one stock in a typical investor's portfolio of stocks. Stand-alone risk is measured by the variability of the project's expected returns. It is a correct measure of risk only for one-asset firms whose stockholders own only one stock.

✚ Corporate or within-firm risk is the project's risk to the corporation, giving consideration to the fact that the project represents only one of the firm's portfolio of assets, hence some of its risk effects will be diversified away. Corporate risk is measured by the project's effect on uncertainty about the firm's future earnings.

✚ Sector risk;

✚ Market or beta risk is the riskiness of the project as seen by a well-diversified stockholder who recognizes that the project is only one of the firm's assets and that the firm's stock is but one part of his total portfolio.

✚ Regional risk;

✚ International risks.

Stand-alone or Individual Risk. This category of risk deals with the personal level of investing. The investor is likely to have more control over this type of risk compared to others.

Timing risk is the risk of making the right investment at the wrong time. It also refers to selling the right investment at the wrong time. For example, there is the chance that a few days after you sell an asset it will go up several dollars in value. There is no surefire way to time the market.

Tenure (possession) risk is the risk of losing money while holding on an investment asset. During the period of holding, markets may go down, inflation may worsen, or a company may go bankrupt. There is always the possibility of loss on the company-wide level, too.

Corporate Risks There are two common risks on the company-wide level. The first, *financial risk* - is the danger that a corporation will not be able to repay its debts. This has a great effect on its bonds, which finance the company's assets. The more assets financed by debts (i.e., bonds and money market instruments), the greater the risk. Studying financial risk involves looking at a company's management, its leadership style, and its credit history.

Management or business risk is the risk that a company's management may run the company so poorly that it is unable to grow in value or pay dividends to its shareholders. This greatly affects the value of its stock and the attractiveness of all the securities it issues to investors.

The *total risk* is the combination of first two risks.

Market Risks. Fluctuation in the market as a whole may be caused by the following risks:

Market risk is the chance that the entire market will decline, thus affecting the prices and values of securities. Market risk, in turn, is influenced by outside factors such as embargoes and interest rate changes. See Political risk below.

Liquidity risk is the risk that an investment, when converted to cash, will experience loss in its value.

Interest rate risk is the risk that interest rates will rise, resulting in a current investment's loss of value. A bondholder, for example, may hold a bond earning 6% interest and then see rates on that type of bond climb to 7%.

Inflation risk is the danger that the dollars one invests will buy less in the future because prices of consumer goods rise. When the rate of inflation rises, investments have less purchasing power. This is especially true with investments that earn fixed rates of return. As long as they are held at constant rates, they are threatened by inflation. Inflation risk is tied to interest rate risk, because interest rates often rise to compensate for inflation.

Exchange rate risk is the chance that a nation's currency will lose value when exchanged for foreign currencies.

Reinvestment risk is the danger that reinvested money will get returns lower than those earned before reinvestment. Individuals with dividend-reinvestment plans are a group subject to this risk.

National and International Risks. National and world events can affect investment markets.

Economic risk is the danger that the economy as a whole will perform poorly. When the whole economy experiences a downturn, it affects stock prices, the job market, and the prices of consumer products.

Industry risk is the chance that a specific industry will perform poorly. When problems plague one industry, they affect the individual businesses involved as well as the securities issued by those businesses. They may also cross over into other industries. For example, after a national downturn in auto sales, the steel industry may suffer financially.

Tax risk is the danger that rising taxes will make investing less attractive. In general, nations with relatively low tax rates, such as the United States, are popular places for entrepreneurial activities. Businesses that are taxed heavily have less money available for research, expansion, and even dividend payments. Taxes are also levied on capital gains, dividends and interest. Investors continually seek investments that provide the greatest net after-tax returns.

Political risk is the danger that government legislation will have an adverse effect on investment. This can be in the form of high taxes, prohibitive licensing, or the appointment of individuals whose policies interfere with investment growth. Political risks include wars, changes in government leadership, and politically motivated embargoes.

If the project has highly uncertain returns and if those returns are highly correlated with returns on the firm's other assets and with most other assets in the economy, then the project will have a high degree of all types of risk. Of the three measures, *market risk* is theoretically the most relevant because of its direct effects on investments. Unfortunately, the market risk for a project is also most difficult to estimate. In practice, most decision makers consider all three risk measures in a judgmental manner, and they group projects into subjective risk categories.

These risks can be also classified under the **reasons of appearance** criteria. Here can be distinguished diversifiable (specific, corporate) and nondiversifiable (market, systematic) risks.

Diversifiable risk means that the result of investment project may be affected by the management of the company or by the project management team, a non adequate policy and strategy of the company, time delaying in project activities, overcosts, overpays etc. It is caused by such random events as lawsuits, strikes, successful and unsuccessful marketing program, winning or losing a major contract, and other events that are unique to a particular firm. Because these events are random, their effects can be eliminated by diversification – bad events in one firm will be offset by good event in another.

Nondiversifiable (market risk) stems from factors that **systematically** affect most firms. This means that the result of investment project could be affected by factors such as the modification of the interest rate, inflation with direct influence in prices changing, changes in demands on the internal and external markets for certain products and services, climate change, earthquake, flood, wars, raw material and energy resource depletion, new restrictions from laws changes, new eco-efficient and cheaper technologies that makes existent technologies to be morally obsolete etc. Since most investment projects are affected by these factors, market risk cannot be eliminated by diversification.

According to *the levels of risk*, in management and economic books concerning risks there are mentioned three levels of risk: low, medium and high, as well as five categories of risk (very low, low, medium, high, very high). The categories of risk are:

- *Very low risk* (5-7%) – for example the risk of governmental bond acquisitions,
- *Low risk* (10 %) – investments in making known products from food industry,
- *Medium risk* (15%) – investments in developing the range of existent products (passing from Pentium 4 to Pentium 5 microprocessors),
- *High risk* (20-25 %) – the launch of a new product on the market (i.e a new type of car),
- *Very high risk* (over 25-35 %) – research and development activities for new products or fundamental research, new inventions.

Also, investment risk can be classified in dependence on the level of threats (danger) for the participants of the investment project. It can be: minimal, medium, acceptable, critical and shattering (devastating).

Up to now we have simply assumed that projects will produce a given set of cash flows, and we then analyzed those cash flows to decide whether to accept or reject the project. Obviously, though, cash flows are not known with certainty.

9.3. Techniques and indices for investment risk analysis

In order to examine, there can be used qualitative and quantitative techniques to analyse a project's risk and then to decide whether its profit potential is worth the risk.

The qualitative analysis is done on the existing information about the realization of investment project. It consists on risk classification according to different criteria, point to origin and factors that cause the appearance of risks, as well as indicate the possible consequences and identify the measures to minimize the potential lost.

The quantitative analysis consists of determining the indicators for measuring risk and based on the estimations to decide on the economic feasibility to realize the investment project.

Qualitative Risk Analysis assesses the impact and likelihood of the identified risks in a rapid and cost-effective manner. By evaluating the priority of risks with

consideration to impact on the project's cost, schedule, scope and quality objectives, Qualitative Risk Analysis provides a foundation for a focused quantitative analysis or Risk Response Plan.

Quantitative Risk Analysis is completed on the prioritized risks from Qualitative Analysis studying the affect of risk event deriving a numerical value. Quantitative Risk Analysis is performed to access the probability of achieving specific project objectives, to quantify the affect of the risk on the overall project objective, and to prioritize the risk based on significance to overall project risk.

The quantitative analysis, which determines the probability of unfavourable happening, can be based on 2 methods: subjective (based on different assumptions) and objective ones (based on determining the frequency that event happens).

The subjective methods permit to obtain a complex evaluation of investments taking into account the profitability (NPV) and risks. Two methods are used to incorporate project risk into investment analysis. One is called the *certainty equivalent* approach. Here every cash inflow that is not known with certainty is scaled down, and the riskier the flow, the lower its certainty equivalent value. The certainty equivalent (α) is the relation between the required cash flows, as being known (CF_k) and expected cash flows, considered unknown (CF_{uk}) at a specified moment (t), so

$$\alpha_t = \frac{CF_{k_t}}{CF_{uk_t}}, \text{ after that } NPV = -I(\alpha) + \sum_{h=1}^n CF_h(\alpha_t) \times \frac{1}{(1+r_{r_f})^t}$$

The other method is *the risk-adjusted discount rate* approach, under which differential project risk is dealt with by changing the discount rate. Average-risk projects are discounted at the firm's average cost of capital including a risk premium. Higher-risk projects are discounted at a higher risk-adjusted discount rate, and lower-risk projects are discounted at a rate below the firm's average cost of capital. Unfortunately, there is no good way of specifying exactly how much higher or lower these discount rates should be.

The nature of the individual cash flow distributions, and their correlations with one another, determine the nature of the NPV **probability distribution** and, thus, the project's stand-alone risk. An objective method that can **measure** the risk of an investment project aiming on probability is the method of standard deviation and coefficient of variation.

Standard deviation is a statistical measure that uses past performance of an investment to determine the potential range of future performance and assess the probability of that performance. **Standard deviation** expresses the degree that a single value of investment efficiency in a group of values varies from the mean (average) of the distribution. Risk may be measured by the dispersion of alternative returns around the average (probabila) return. The average expected result (\bar{R}) is the value of project's efficiency indicator multiplied on probability if that situation appears, i.e.

$$\bar{R} = \sum_{i=1}^n \Sigma(P_i \times R_i)$$

Standard deviation, being a measure of dispersion, can be calculated using the formula:

$$\sigma = \sqrt{\sum_{i=1}^n (R_i - \bar{R})^2 \times P_i}, \text{ where}$$

n – number of observations,

R_i – annual returns for the project i ;

\bar{R} – the average expected annual return;

P_i – probability, corresponding to R and it is determined as follows:

$$P_i = \frac{K_i}{\sum_{i=1}^n K_i}, \text{ here } K_i \text{ – number of happenings of respective situation;}$$

n – total number of analysed results.

Standard deviation is an absolute measure of dispersion. It shows the amount of risk per 1 monetary unit of average return. A relative measure of dispersion is **the coefficient of variation**, which is the standard deviation divided by the average return, thus $CV = \frac{\sigma}{\bar{R}}$. This method is preferably to use when assessing risk of 2 or more projects. It measures risk. Higher is the variation, higher is the average divergence, i.e. higher is the uncertainty and risk.

If variation equals 0, than efficiency doesn't diverge from the expected value, meaning that risk do not exist.

There are three **analytical techniques** for assessing a project's stand-alone risk: (1) sensitivity analysis, (2) scenario analysis, and (3) Monte Carlo simulation.

Sensitivity analysis. Intuitively, we know that many of the variables that determine a project's cash flows could turn out to be different from the values used in the analysis. We also know that a change in a key input variable, such as units sold, will cause the NPV to change. Sensitivity analysis is a technique that indicates how much NPV will change in response to a given change in an input variable, other things held constant.

Sensitivity analysis begins with a *base-case* situation, which is developed using the *expected* values for each input. Sensitivity analysis is designed to provide decision makers with answers to questions such as “What if”.

In a sensitivity analysis, each variable is changed by several percentage points above and below the expected value, holding all other variables constant. Then a new NPV is calculated using each of these values. Finally, the set of NPVs is plotted to show how sensitive NPV is to changes in each variable.

If we were comparing two projects, the one with the sheerer sensitivity lines would be riskier, because for that project a relatively small error in estimating a variable

such as unit sales would produce a large error in the project's expected NPV. Thus, sensitivity analysis can provide useful insights into the riskiness of a project.

Scenario Analysis. Although sensitivity analysis is probably the most widely used risk analysis technique, it does have limitations. Scenario analysis provides these extensions - it brings in the probabilities of changes in the key variables, and it allows us to change more than one variable at a time. In a scenario analysis, the financial analyst begins with the base case, or most likely set of values for the input variables. Then, he or she asks marketing, engineering, and other operating managers to specify a worst-case scenario (low unit sales, low sales price, high variable costs, and so on) and a best-case scenario. Often, the best case and worst case are set so as to have a 25 percent probability of conditions being that good or bad, and a 50 percent probability is assigned to the base-case conditions. Obviously, conditions could actually take on other values, but parameters such as these are useful to get people focused on the central issues in risk analysis.

Scenario analysis provides useful information about a project's stand-alone risk. However, it is limited in that it considers only a few discrete outcomes (NPVs), even though there are an infinite number of possibilities.

Monte Carlo simulation represents a more complete method of assessing a project's stand-alone risk. It ties together sensitivities and probability distributions. While Monte Carlo simulation is considerably more complex than scenario analysis, simulation software packages make this process manageable. Many of these packages are included as add-ons to spreadsheet programs such as *Microsoft Excel*.

In a simulation analysis, the computer begins by picking at random a value for each variable—sales in units, the sales price, the variable cost per unit, and so on, then those values are combined, and the project's NPV is calculated and stored in the computer's memory. Next, a second set of input values is selected as random, and a second NPV is calculated. This process is repeated perhaps 1,000 times, generating 1,000 NPVs. The mean and standard deviation of the set of NPVs is determined. The mean, or average value, is used as a measure of the project's expected NPV, and the standard deviation (or coefficient of variation) is used as a measure of risk.

Excepting these methods there can be used such methods as: break - even point, method of “decision tree”, cash flows coefficients of correlation, *Bayes-Laplace* criteria, *Maximin* criteria, *Maximax* criteria, *Hurwicz* criteria etc.

Another approach is the CAPM, which assumes that the expected rate of return on an investment (R_i) is stated as follows: $R_i = R_{\min} + (R_{\text{average}} - R_{\min}) \times \beta_i$

R_{average} - average rate of return on similar investments;

R_{\min} - risk free rate;

β - coefficient, that expresses risk.

9.4. Strategies for investment risk diminishing

Management of investment Risk supposes the following activities:

- Risk identification;
- Analysis and assessment of risk;
- Elaboration of strategies to manage the risk.
- Depending on results obtain on the first 2 stages, there can be undertaken the following Risk supervise strategies:
 - Refuse the investment project,
 - Accept the risk
 - Decrease the risk
 - Anticipate the investment risk.

Anticipate the investment risk includes:

a. Measuring country risk

- Country risk ratings: Euromoney Magazine's Country Risk ratings and the Business Environmental Risk Index (BERI) rank countries according to the weighted average of a large number of factors. There is a large amount of analysis on country risk (and opportunities). For example, those provided by the Economist Intelligence Unit and the Political Risk Services (PRS) Group.

- b. Credit ratings (Moody, Standard and Poor): These rank the creditworthiness of the government.

- c. Corruption indices. Transparency International publishes corruption rankings

b. Project evaluation: when deciding on new projects, require higher returns on investments for risky projects.

The ***Decrease Risk Strategy*** includes the following strategies:

1. Diversification of investment portfolio
2. Distribution of risk between partners
3. Limitation of investment expenditures
4. Hedging of financial risks
5. Making reserves
6. Insure the investment risk.

A company might buy insurance for specific events. The World Bank's Multilateral Investment Guarantee Agency (MIGA), the U.S.'s Overseas Private Insurance Corporation (OPIC) and Canada's the Economic Development Corporation, EDC, (Canada) are government agencies providing insurance.

MIGA, EDC and OPIC insurance cover inconvertibility of funds, expropriation, and political violence. MIGA also covers non-payment by a foreign government. The

EDC will only insure projects that “benefit Canada”, OPIC only U.S. nationals. MIGA provides insurance to World Bank Members.

Also there is a small private insurance market covering political risk. Insurance is expensive and unavailable in some places. There can be made insurances that cover the deterioration of equipment, production stagnation, commercial risks, health and life of employees etc.

Knowledge Assessment Questions

- What are the main factors that contribute to a higher level of investment risk in the Republic of Moldova?
- In what ways does uncertainty differ from risk in the context of investment decision-making?
- According to the recommended literature, what are the primary criteria used to classify investment risks?
- What types of investment risks are considered macroeconomic, and how do they impact investor decisions in Moldova?
- How can investment risks be mitigated through diversification, and which types of risks remain unaffected by this strategy?

Individual Work Tasks

Task 1: Prepare a detailed report evaluating the investment climate in Moldova. Identify key financial risks (e.g. inflation, currency volatility, interest rate fluctuations) and suggest strategies for mitigating them.

Task 2: A project with an initial cost of 25.000 m.u. is expected to produce net cash flows of 8.000 m.u., 9.000 m.u., 10.000 m.u., 15.000 m.u. and 11.000 m.u. for each of the next five years. The firm’s cost of capital is 12 percent, but the financial manager estimates the risk rate is 8 percent.

- a. Compute the risk-adjusted net present value of the project.
- b. Compute the discounted payback period (DPP) of the project.

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