INVESTMENT SIMULATION

A HANDBOOK FOR USERS AND INSTRUCTORS

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SPEKTRUM STU

The online handbook accompanying the simulation was published as an innovative resource for economics- and management-oriented courses at the Slovak University of Technology. It constitutes an output of the KEGA Project No. 011STU-4/2022, “Developing an Educational Model to Enhance Competences of Non-Economically Oriented University Students in the Field of Innovative and Entrepreneurial Thinking and Business Support,” undertaken at the Institute of Management, Slovak University of Technology in Bratislava.

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Introduction

In today's rapidly evolving world—where the economy and technology influence every aspect of our lives—the need for innovation in education has become a pressing challenge. Even academic disciplines that do not traditionally concentrate on economics or management cannot afford to disregard the importance of entrepreneurial, managerial, and economic knowledge and skills. The business environment is now intertwined with virtually every sector, from technology and healthcare to the arts. Consequently, it is essential to adapt educational systems so that even non-economically oriented programs provide students with the fundamental competencies required for success in the real world.

Traditional methods of teaching economics and management frequently focus on theory and models that are not always readily applicable in practice. Education should instead more closely align with the needs of real-world settings, where innovation, flexibility, and the ability to respond rapidly to shifting market conditions play decisive roles. For students who primarily focus on technical, artistic, or other specialized fields, it is imperative to develop not only discipline-specific skills but also an entrepreneurial mindset and economic competencies, which help them understand the broader context of their work and gain a competitive advantage in the job market.

Simulations, practical exercises, and interactive tools—such as our stock market trading game—offer innovative approaches by bridging theory and practice, helping students grasp the complexities of trading, management, and decision-making in uncertain environments. Such methods enable learners to experiment, analyze, and engage in critical thinking within a setting that closely mirrors real-life scenarios, thus equipping them with a solid practical framework for their future careers.

Educational innovation is crucial to preparing the next generation of leaders, managers, and experts who will effectively perform not only in traditionally economic roles but also in areas where economic and managerial skills play a vital, albeit sometimes less visible, part.

The authors of this handbook believe that this innovative resource will enable students to gain deeper insight into the functioning of financial markets, the dynamics of trading, and the economic factors influencing stock price movements. Our aspiration is for students—even those outside economics-oriented fields—to acquire foundational entrepreneurial and managerial skills that are indispensable in today's world.

The primary goal of both this handbook and the accompanying stock market trading simulation is not merely to enhance students' theoretical knowledge but, above all, to foster their critical thinking, decision-making abilities, and the skills required for analyzing market conditions. We trust that the interactive, hands-on nature of this educational tool will allow students to take an active role in simulated stock trading, thereby gaining valuable experience that can later be applied in real-world situations.

The Authors

Financial Market

1 Definition of the Financial Market

Market is a place, where the supply and the demand meet, that is, where goods are bought and sold.

A **financial market** is a place where the supply of available financial resources, in the form of savings from various economic agents, intersects with the demand from different economic agents for these resources, which are utilized as investments.

Additional Definitions and Characteristics of the Financial Market:

The financial market facilitates the transfer of resources from those who have a surplus of funds to those who need them but do not have them available in real-time.

Those providing financial resources receive a promise of repayment for the provided funds, along with additional financial claims in the form of dividends, interest, or other capital gains.

A financial market can be defined as a market where financial participants and intermediaries use financial instruments to facilitate the movement of short-term, medium-term, and long-term capital between various economic agents on both a national and international scale.

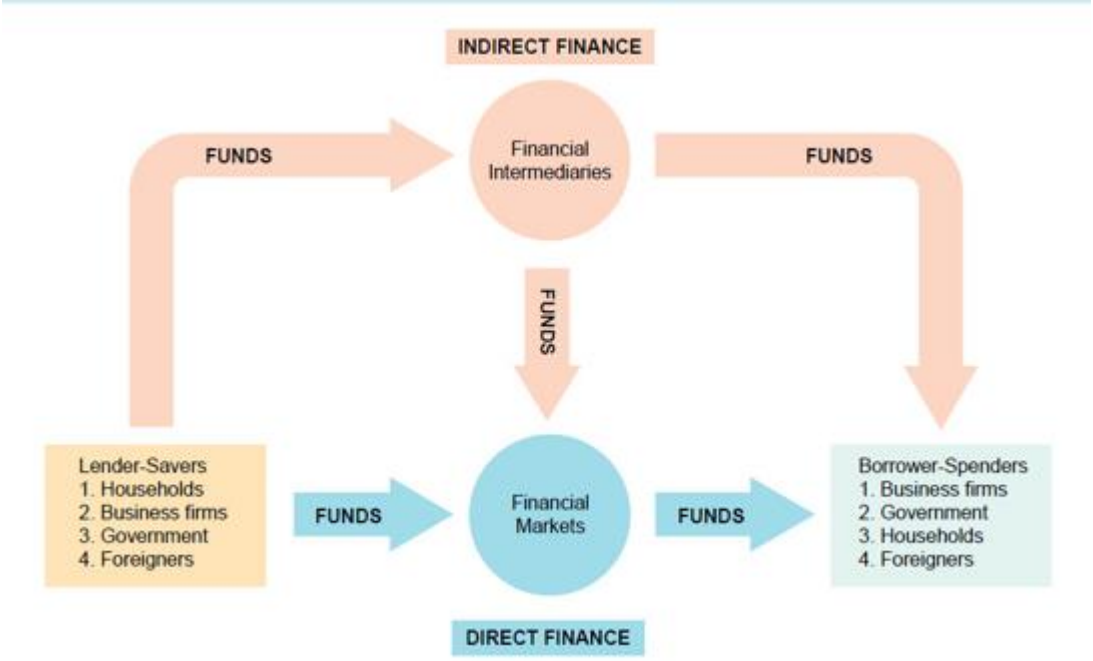

Figure 1: The Financial Market Cycle

It is a venue where creditors and investors—also referred to as the surplus side—form the supply of money, aiming to invest it to generate returns. Opposing them are debtors, recipients of investments, and issuers, collectively known as the deficit side, representing the demand for funds with the intention of borrowing for the purchase of production factors or consumer goods.

Based on the above, the financial market constitutes an indispensable mechanism responsible for the accumulation, redistribution, and allocation of financial resources, redistributing them to deficit entities while simultaneously selecting these entities based on their credibility and viability.

Functions of the Financial Market

Functions of the financial market are classified as follows:

a) **Depository Function** – The financial market, through institutions, creates opportunities for the public to save and deposit their funds in relatively low-risk opportunities. It mobilizes all savings so they can be used for various purposes.
b) **Selective Function** – Ensures a balance between savings and investments, meaning it accelerates the closure of unviable entities and supports the development of sustainable ones.
c) **Credit Function** – The financial market manifests itself through the provision of loans to finance consumption and investment expenditures. In this way, it allocates credit resources to where they are most needed.
d) **Informational Function** – The role of the financial market is to provide all necessary information regarding potential wealth acquisition, i.e., the appreciation of assets.
e) **Risk Protection Function** – The financial market offers businesses, consumers, and governments protection against risks (e.g., life insurance, supplementary insurance, pension schemes, property insurance, etc.). In addition to insurance contracts, it enables the creation of diversified portfolios as a safeguard against potential future losses.
f) **Political Function** – Financial markets have become the primary channels for implementing government policies.
g) **Liquidity Function** – Wealth in the form of various financial instruments can be quickly converted into cash with very low risk of loss.

These functions of the financial market play an integral role in the everyday lives of everyone around us.

1.1 Classification of the Financial Market

The financial market is differentiated in a number of ways. Each classification is simplified due to the complexity of the financial market and the factors operating in a market economy.

1) **Substantive classification:**
   - Money - is a short-term market where short-term securities are traded,
   - Capital - is a long-term market where long-term securities are traded,
   - Foreign Exchange - is a market where foreign currency (currencies, foreign exchange) is traded and dealt in,
   - Insurance - is a market where the basic instrument is insurance,
   - Precious Metals Market - is a market where precious metals are traded (gold, platinum, palladium).
2) **In terms of participants:**
   - Banking market - is the market where banking products are dealt with,
   - The stock market - is the market for trading on the stock exchange,
   - Inter-company market - is the market where businesses trade with each other.
3) **In terms of instruments:**
   - Credit market - the main instrument is credit,
   - Securities market - the main instrument is short-term and long-term securities,
   - Foreign exchange market - the main instrument is foreign currency (foreign exchange).

Money market:

The money market is the market for short-term financial instruments (bills, cheques, treasury bills, certificates of deposit, commercial paper and securities for goods such as bills of lading, bills of lading and warehouse receipts).

The money market thus meets the short-term cash requirements of corporations, financial institutions and governments, concentrating supply and demand for short-term money and securities with maturities of up to one year.

It consists of the following submarkets:

- a bank-organized money market, realizing demand and supply between banks and non-bank entrepreneurs,
- an unorganised money market between non-bank entrepreneurs with each other.

Capital market.

The capital market is the market where supply and demand for long-term and medium-term money (equities, long-term and medium-term government, municipal and corporate bonds and mutual funds or derivatives) meet.

The capital market provides entrepreneurs with a substantial part of the financial resources for investment - investment capital. A significant part of capital market transactions takes place on the stock exchange.

It consists of the following sub-markets:

- organized capital market, consisting of a bank-organized and an exchange-organized capital market,
- the unorganised capital market takes place between individual entities without the participation of an intermediary.

Breakdown in terms of securities sales:

- primary capital market (primary market), where new issues of securities are placed and the first sale of these securities is made.
- the secondary capital market trades previously issued securities and provides liquidity for investors in securities.

The foreign exchange market.

The foreign exchange market is the trading of currencies and foreign exchange of various currencies. These purchases and sales are triggered by international trade - the movement of goods, services and capital.

It is a market in which the buying and selling of money for foreign money is a foreign exchange transaction. The foreign exchange market allows for the exchange of individual foreign currencies (payments for imports, collections for exports) and other transactions, and influences the exchange rate of the domestic currency in relation to foreign currencies. In our case, it is the exchange rate of the Euro against other currencies (USD, GBP, etc.).

The function of the foreign exchange market is also to hedge against foreign exchange risks (hedging).

Hedging against foreign exchange risk can be done by:

- non-terminated trades: allowing for promoted spot trades such as foreign exchange conversions or foreign exchange arbitrage,
- futures: such as swaps, forwards, futures and options.

International foreign exchange market

FOREX is an abbreviation of the English words "Foreign Exchange", i.e. the exchange of foreign currencies, which is often referred to as the currency market or foreign exchange trading.

We also refer to it by the abbreviation FX. Profit is earned based on changes in the exchange rate between currencies. It is important to find the right time to buy but also to sell. These are risky trades that can be made through various apps that buy and sell on the stock exchange.

The insurance market

The insurance market represents the supply of and demand for a specific type of good - insurance protection (insurance and reinsurance).

This market deals with insurance and reinsurance.
Insurance focuses on:

- Property insurance (in the event of a casualty loss),
- Life insurance (for reaching a certain age).

The insurance market is a living, dynamically developing organism, which is influenced by a number of internal and external factors. The aim of insurance companies is to establish themselves on the market and to achieve a decisive position on it. The market actively influences the quality and range of services and their price.

The insurance industry is an extremely important sector of any market economy and its function and tasks are irreplaceable in modern market economies. In a market economy, insurance is understood as a branch of production that is focused on the provision of insurance protection and the creation of reserves, their management, valuation and use. The insurance industry includes all insurers, their clients, reinsurers, insurance intermediaries and possibly other entities in a given economy or region. Insurance belongs to the financial system or financial system and is a special branch of monetary services provided to citizens, businesses, government, municipalities and other companies. Commercial insurance companies carry out insurance protection and insurance operations for the benefit of their clients.

The exchange market

The exchange market is a two-sided auction, with flexibility of supply, demand and prices. These features make it substantially different from conventional trades or one-sided auctions.

Exchange - the seller is flexible, can sell below the price and can also be a buyer. The buyer is also flexible, can offer, overpay, sell. It is part of markets but subject to government regulation. They offer liquidity hedging of investment instruments and their pricing.

The stock market has the character of a two-sided auction (flexibility of supply, demand and prices). An exchange, whether physical or electronic, offers its members the possibility to place orders. These members can pass on this possibility to their clients for a fee. The orders of all exchange participants then form the exchange price. No one has exclusive control over the exchange price.

The over-the-counter market is also called the OTC market and its name comes from the English Over-The-Counter, which can be translated as off-the-counter. Thus, the OTC market

is an over-the-counter market that is typically made up of one or more large players. Unlike the stock exchange, where the market price is created by the orders of all market participants, the OTC market is usually dominated by one market maker, the market maker. The market maker collects buy and sell orders from a large number of its counterparties or clients and then creates its own price according to them.

2 Financial market instruments - securities

The first securities originated in the Alexandrian era, bankers issued written certificates of deposit to depositors and debtors confirmed their obligations by issuing and signing promissory notes. Later, in the Middle Ages, there was a further development, when so-called general letters appeared, i.e. issuers of securities, such as popes, princes, kings and others, undertook to repay their creditors, including interest, and they could be sold to another person if necessary. The perfection of the technique of banking operations and the deficit financing of the national debt and the development of the stock form of business expanded extensively from the turn of the 19th and 20th centuries.

Economic agents are interested in securities for at least 2 reasons, the first is that they are an instrument through which they can obtain cash to finance needs and the second is that they are one of the options for investing free cash, speculation but also "hedging" (i.e. hedging). The essential feature of securities, whatever their type or form, is a record of a monetary claim or of property rights or other rights attached to it. In addition to evidencing a property right or a pecuniary claim of the owner to a certain consideration against the issuer, securities are the bearer of a legal right, the creation, existence, transfer and extinction of which are, in principle, irreplaceable. Simply put, a security is a legal representation of a right to receive an expected future benefit under specified conditions.

Securities may be in certificated and dematerialised (book-entry) form. Securities in certificated form are held in a central depository and are referred to as immobilised securities. This form requires high costs for guarded transport to the central depository and well guarded custody facilities. Transactions in immobilised securities are carried out by account transfers in a similar way to dematerialised securities. Dematerialised securities are stored in computer memory, in the SR they are book-entry in the Securities Centre. The dematerialised form means considerable savings on the costs associated with printing on special paper with special printing supervision, protection against loss, destruction, theft, management, safekeeping, trading, etc., ensuring greater transparency. On the other hand, the dematerialised form of securities requires high demands on the provision of high-quality computer technology and involves certain risks which cannot be eliminated in the case of technology.

A **security** is a deed that embodies a property right (or other legal claim) of the one who holds the deed against the one who issued the deed. The creation, duration, exercise, transfer and extinguishment of the legal right is linked to this paper.

Primárny trh na ktorom sa umiestňujú nové emisie cenných papierov, ktoré emitent vydáva po prvýkrát. **Sekundárny trh** je trh už emitovaných, resp. „starých“ cenných papierov, t.j. obchoduje sa tu so všetkými cennými papiermi, ktoré boli získané na primárnom trhu. Sekundárne trhy sa môžu organizovať ako burzy alebo ako voľne prístupné sekundárne trhy (tzv. over-the-counter market OTC), na ktorých sú rozmiestnení obchodníci vybavení základnou zásobou CP a sú „v pohotovosti“ predávať a kupovať každému, kto prijme ich cenu.

The primary market on which new issues of securities are placed by an issuer for the first time. The secondary market is the market for already issued or 'old' securities, i.e. all securities that have been acquired on the primary market are traded here. Secondary markets may be organised as exchanges or as over-the-counter markets (OTC), where dealers are stationed with a basic stock of securities and are 'on standby' to sell and buy to anyone who accepts their price.

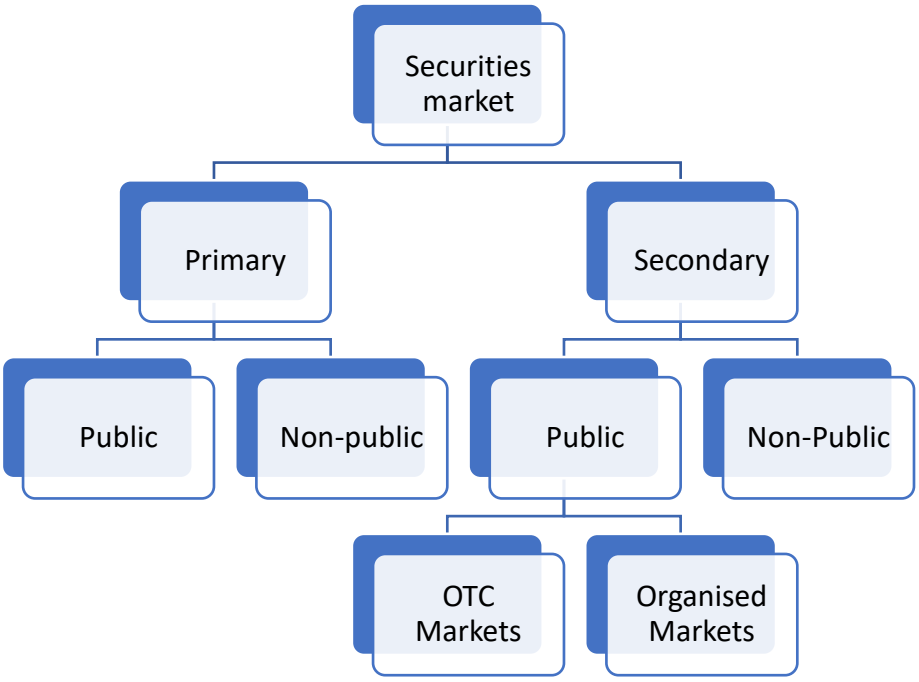

Figure 2: Basic breakdown of the securities market

The most common criterion for the classification of the financial market is the classification in terms of time and in terms of the purpose of the use of the funds that are raised in it, i.e. the money market as a market for short-term financial instruments with a maturity of less than 1 year. This market is primarily entered by those who are temporarily short of funds and need to borrow. It provides better liquidity and quality of securities and a capital market that is designed to finance long-term investments by businesses, governments and households.

Money market securities are short-term securities through which economic agents can obtain short-term credit (trade or bank), invest temporarily available cash or serve as a means of payment.

Money market securities are characterised by a high degree of liquidity, low risk, lower price fluctuations, but also lower yields compared to capital market securities and, under normal conditions, do not increase the possibility of significant capital losses.

The most widely used money market securities include certificates of deposit, treasury bills, commercial paper, bills of exchange, acceptances, cheques, etc.

Capital market securities are securities that are medium- and long-term in nature and have a maturity of more than 1 year.

They are divided into equity and credit securities.

Equity securities represent the owner's interest in a joint stock company or fund. These include: shares, temporary certificates, units.

A **share** is a type of security that carries with it the rights of its holder (shareholder) to participate in the management, profits and liquidation balance of a joint stock company.

A share entitles the holder to an equity interest in the company and also a share in the profits. The share is in the form of dividends, i.e. earnings on the share. Dividends are not subject to taxation and can be paid several times a year. However, shares are very risky investments and their values can change several times a day, both up and down.

The yield on a share is actually the difference between the price at which the share was bought and the price at which it was sold. The share price is the current price at which the share is sold on or off the stock exchange. It is volatile and depends on the stability of the company's share price, the company's earnings performance, the average interest rate in the financial market, the general economic and political situation of the country and other factors. It varies throughout the day.

Temporary certificates are securities in registered form, which a joint stock company issues to a shareholder if he has not paid the full issue price of the subscribed shares before its registration in the commercial register. They carry the same rights as shares.

Unit certificate are securities that entitle the investor to a corresponding share of the assets in the mutual fund and to a return on those assets.

Credit securities represent an arvo of the buyer to repay the amount due from the issuer at an agreed time, including the proceeds. This includes bonds and mortgage bonds.

A bond is a security that carries with it the right of the purchaser / security holder / to demand payment of the amount due at par and the yield at a specified date and the obligation of the issuer to meet those obligations.

All securities are part of investing and investments.

Investing, saving, insurance

3 Basic concepts and definitions

Investing, or investing, is a commonly available way to make a profit today by passively using your funds. These are longer-term monetary operations, which are distinguished according to what they are aimed at. The focus may be on asset creation, expenditure, disposition or future profit.

Saving is the setting aside of funds, mostly short-term, for immediate consumption, i.e. for current expenditure, which we can define precisely during the year.

Insurance is the need to secure a supply of funds in the event of an unforeseen event.

Investment decision-making cannot be separated from the capital market. Investment decision-making is the spending of funds (investment expenditure) in order to acquire the fixed assets of an enterprise. It is one of the most important decisions of an enterprise because it determines how the enterprise will operate in the future. Investment decision-making is part of financial decision-making.

Investing is the long-term commitment of capital (i.e. the use of financial resources) in order to make a profit.

The general characteristics of the investment are:

Investment is the acquisition (or change in the structure) of an asset (i.e. approximately an asset).

It is the tying up of capital (the use of capital), i.e. the conversion of free capital (capital in the narrower sense, financial resources, i.e. approximately liabilities) into tied-up capital (property, assets).

By investment is meant only the acquisition of non-current assets; the acquisition of current assets is then referred to as acquisition.

Investments are broken down according to what they will be used for. That is, what they will bring us in the future.

Breakdown by investment focus into:

- Investment aimed at future expenditure: this is (the company's) expenditure on equipment, raw materials and services. Thus, an investment is a series of payments that starts with negative payments (expenditure) and has mostly positive payments (income) at the end.
- Disposition-oriented investment: thus, it is a condition that restricts the dispositional freedom of the management of the enterprise regarding other uses of financial resources once they have been converted into assets. E.g. if I buy a flat on mortgage, I can only dispose of it if I have permission from the bank from which I borrowed the money.
- Investment with a view to future profit: expenditure today is made with a view to future income. E.g. today a business buys technology that will make large profits in the future.

We must not forget the basic breakdown of investments according to:

Type of investment objects:

- real,

- financial,
- intangible.

Purpose:

- establishment,
- reproductive,
- rationalizing,
- expansion,
- disinvestment.

Functions:

- research,
- production,
- sales.

Each of us, if we decide to make our own investments, which consist of several types of investments, creates an investment portfolio.

A portfolio is a collection of shares and other securities held by a single investor.

The portfolio should not consist only of equities, but long-term and short-term time deposits or money market mutual funds are suitable complements. It is important to remember that investing is risky. The following figure shows an example of a possible investor's portfolio.

Figure 3: Investment risk pyramid

As mentioned, every investment comes with a risk that we take, but it also brings us a return. These basic concepts are characterised in the magic triangle of investing.

The vertices of the magic triangle form the three basic criteria that need to be evaluated in any investment. These are yield, risk and liquidity.

Everyone would like an investment that yields a high return, carries no risk and can be converted into cash quickly and without unnecessary cost at any time. The bad news is that such an ideal investment is a utopia, it simply does not exist. The good news is that the trade-off between the required return, tolerable risk and necessary liquidity is decided by the investor and there is a wide range of solutions available, so there is bound to be one that can meet the individual investor's needs. The magic triangle is depicted in Figure 4.

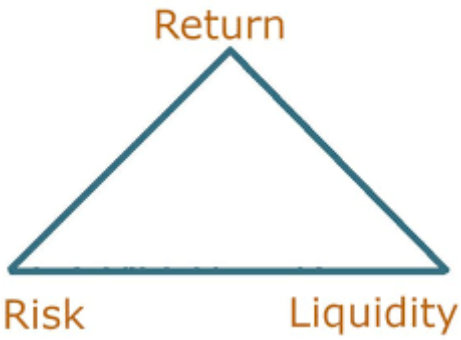

Figure 4: The magic triangle of investing

Every investment has risk, return and liquidity associated with it, forming the magic (investment) triangle. It illustrates that as yield increases, risk increases and liquidity (availability of money) decreases over time. Cash is the most liquid asset (Cash is the King), less liquid assets include real estate (buying and selling is calculated in weeks). Yield can be in contractual form (bank deposits, bonds) or as a share of success (stocks). In general, the higher the return potential, the higher the fees associated with the product.

The **risk** is the variability of the amount of return, its non-achievement or decline in the value of savings. Zero risk does not exist.

There is another concept related to investing and that is volatility.

Volatility is characterized as the volatility, the fluctuation of prices of securities and funds in financial markets. Volatility is also often used to measure risk in financial markets.

The higher the volatility, the higher the risk. As a general rule, the higher the return we seek, the higher the risk associated with investing.

Suggested exercises to repeat before solving the simulation

Financial market tasks:

1. Locate and explain the basic functions of the financial system.
2. Search the internet for current exchange rate changes:
   - precious metals - gold, silver, platinum, palladium
   - foreign exchange market - major currencies compared to the Euro
   - capital market – shares.
3. Search the internet for the current situation in specific markets:
   - real estate market
   - commodity market - oil, grain, coffee, cocoa, sugar.

Securities tasks:

1. Find and compare services related to current accounts of commercial banks in Slovakia. Which commercial bank offers the most favourable conditions? Where do you find the risks?
2. Define and compare different forms of financial loans - term, mortgage, revolving, export, supplier
3. Provide your own practical example for each of the banking products:
   - Term loan, mortgage loan, revolving loan, export loan, supplier loan
   - Special forms – factoring, forfaiting, franchising, leasing (financial, operational)
   - Trade liabilities, permanent and non-permanent liabilities, overdraft, purpose-specific loan, Lombard loan, bill of exchange/discount loan
4. Graphically represent the segmentation of the securities market.
5. Define and briefly describe the various money market instruments.
6. Define and briefly describe the various capital market instruments.

Investment Tasks:

1. What are the fees associated with investing and saving?
2. Find out how much Slovaks save annually on average. Provide general data for the entire territory of Slovakia.
3. What do the vertices of the magic triangle represent?
4. What is the procedure for creating the levels of the investment pyramid?
5. Graphically represent the investment pyramid and explain the hierarchy of its levels.
6. Graphically represent the magic triangle and explain the relationships between its elements.
7. Search online for companies whose shares are included in the SAX index. Analyze the development of the SAX index from 1.1.20XY to the present date and evaluate its progress.
8. Research online which insurance companies operate in Slovakia.
9. Find specific types of insurance provided for each mentioned type.
10. Set up insurance at any insurance company for injuries or health issues during a long-term stay abroad.

Simulation application for investing and trading on the Stock Exchange

The Stock Trading Simulation is an interactive educational tool that allows users to experience hands-on how the stock market works and understand how stocks are traded. The model is based on a series of trading rounds in which users make decisions to buy and sell shares of different companies (different industry segments) based on current market conditions and predictions about future trends.

4 Principle of simulation

Each participant or team has an initial capital of €10,000 to invest in shares of selected companies. The aim is to achieve the largest possible total assets at the end of the simulation, which is made up of the remaining cash and the value of all the shares owned.

In the simulation, the user has the choice of investing in four industry segments:

- chemical industry,
- food industry,
- engineering industry,
- armaments industry.

The simulation consists of several trading periods, with each period characterised by a change in share prices and predictions of future market developments. At the beginning of each period, users are made aware of the changes in the share prices of the different sectors and are given indications of how the market might develop in the following periods.

The simulation proceeds in steps, with users having the option to buy or sell shares in each round (step). Information on current market developments, the change in the share price of each sector and predictions for the next period are available to users in the form of specific slides presented by the lecturer.

Users have to evaluate the predictions provided and assess the macroeconomic and microeconomic factors that could affect each sector. In the simulation, they have to realise that the predictions may not always translate into reality or may not have any impact on the share price at all. They therefore work with a degree of uncertainty.

One of the important principles of simulation is fair play. Users have an excel file in which they enter their decisions. It is important that users only enter data for the specific period they are currently in and do not change their decisions for a previous period. It is up to each user to respect this basic rule and not to act dishonestly in the simulation. The tutor also acts as a check on the compliance with the rules.

5 Simulation objectives

The main objective of the simulation is to teach students how to analyse economic data and market trends. To explain the principles of investing, the basic rules of investing, which they will then use when investing on the stock market. The main objective is supported by secondary objectives such as:

- to encourage critical thinking in investment decisions,
- to understand how external factors (e.g. economic crises, political events) affect stock prices,

- to learn the basic principles of fundamental and technical analysis when trading stocks,
- to learn how to work with uncertain information and apply it practically,
- to acquire competencies and skills in dealing with stock market investing.

This stock trading simulation model provides a practical framework for understanding the complex world of investing and trading, while supporting the development of managerial and economic competencies in a safe, simulated environment. It helps to build skills and competencies that students can translate into real investments in the future.

6 Simulation procedure

The simulation consists of several types of periods, each specific in its own way. Participants in the simulation are provided with an excel file in which fields are marked in green in which they enter their decisions on the actual changes in the exchange rates. A sample blank file is shown in Figure 5 and also forms Appendix 2 of this publication.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	**Period**		**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**End 11**
2	**Share**	**Cash €**	10 000 €	10 000 €	10 000 €	10 000 €	10 000 €	10 000 €	10 000 €	10 000 €	10 000 €	10 000 €	10 000 €	10 000 €
3		*Change in share price (€)*	-											
4		*Share price (€)*	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €
5	a) chemical industry	*Purchase of shares (pcs)*												
6		*Sale of shares (pcs)*												
7		*Number of shares (pcs)*	0	0	0	0	0	0	0	0	0	0	0	0
8		*Value of shares (€)*	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €
9		*Change in share price (€)*	-											
10		*Share price (€)*	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €
11	b) food industry	*Purchase of shares (pcs)*												
12		*Sale of shares (pcs)*												
13		*Number of shares (pcs)*	0	0	0	0	0	0	0	0	0	0	0	0
14		*Value of shares (€)*	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €
15		*Change in share price (€)*	-											
16		*Share price (€)*	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €
17	c) engineering	*Purchase of shares (pcs)*												
18	industry	*Sale of shares (pcs)*												
19		*Number of shares (pcs)*	0	0	0	0	0	0	0	0	0	0	0	0
20		*Value of shares (€)*	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €
21		*Change in share price (€)*	-											
22		*Share price (€)*	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €
23	d) armaments	*Purchase of shares (pcs)*												
24	industry	*Sale of shares (pcs)*												
25		*Number of shares (pcs)*	0	0	0	0	0	0	0	0	0	0	0	0
26		*Value of shares (€)*	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €
27		**Total assets (€)**	**10 000 €**	**10 000 €**	**10 000 €**	**10 000 €**	**10 000 €**	**10 000 €**	**10 000 €**	**10 000 €**	**10 000 €**	**10 000 €**	**10 000 €**	**10 000 €**

Figure 5: Excel file for recording user decisions

Period 0 - Starting period

This is an introductory period where each user has the same starting conditions. In this period, users allocate their initial capital of €10,000 by purchasing one or more shares from one or more industries. They are limited only by the amount of their initial capital. Even if the capital is set to €10,000 in the simulation, the trainer can adjust the amount of the capital at will before running the simulation, thus adapting the simulation to their needs.

They make the actual purchase by entering the number of shares they decide to buy on the line labeled "Sale of shares (pcs)". Only whole numbers are entered; partial share purchases are not allowed in the simulation. In this round, they write only in column C, which is labeled as period 0. There are formulas in excel that automatically calculate the value of assets, the value and number of shares the user owns in the industry, and the remaining cash. In this period, the user only makes purchases. He is not allowed to sell because he does not own any shares from previous periods, since this period is the starting period.

The share price in each sector is the same at the beginning of the simulation, i.e. €100. It gradually changes in subsequent periods. In period zero there is no prediction for the next period and users buy purely on the basis of their own preferences.

Period 1-10 – Trading periods

V obdobiach 1 – 10 prebieha nákup a aj predaj akcií. Zároveň dochádza k zmene kurzu akcií jednotlivých odvetví priemyslu a nachádzajú sa tu aj predikcie na ďalšie obdobia. Príklad informácie o období 1 sa nachádza na Obrázku č. 2.

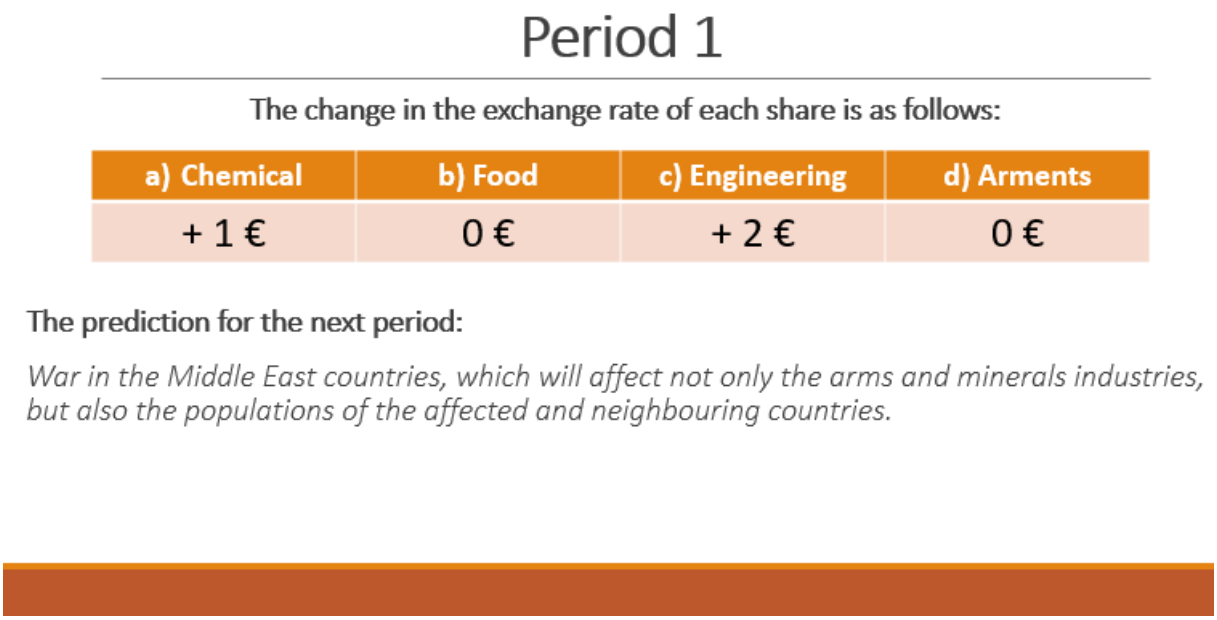

Figure 6: Information on period 1

By default, this information is projected for the simulation participants by the trainer. He/she may use the pre-prepared presentation included in this manual. The individual rate changes, predictions and the number of trading periods can be changed at the trainer's discretion. He can also modify the types of industry sectors at will. He can thus adapt the simulation to the specific conditions he wants to simulate. However, it is advisable that he also incorporates any changes into the user excel, which is also an appendix to this manual.

The information in Figure 6 is not displayed to users at the same time. First, the information about the change of the exchange rate is projected to the user, which all users must mark in the corresponding cells of the excel table. They enter the exchange rate change information in the cells located in the row titled 'Share price change (€)'. Excel automatically recalculates the current value of the share in the current round, the value of the shares owned by the user as well as the value of the user's total assets.

Subsequently, information about the forecast for the next period is projected to the user. Based on this, users can decide whether to buy or sell some shares If they decide to sell shares, they enter their decision on the number of units to be sold in the corresponding cell of the row titled "Selling shares (pcs)". Only whole numbers are entered; partial sale of a share is not possible. Users may only sell the number of shares they actually own from the previous period. Should they try to sell more shares than they own, excel will highlight the corresponding rows in red. This is an indication for the user to adjust their decision. An example of an incorrect share sale is shown in Figure 7.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	**Period**		**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**End 11**
2	**Share**	**Cash €**	4 500 €	450 €	450 €	450 €	450 €	450 €	450 €	450 €	450 €	450 €	450 €	450 €
3		*Change in share price (€)*	-	1 €										
4		*Share price (€)*	100 €	101 €	101 €	101 €	101 €	101 €	101 €	101 €	101 €	101 €	101 €	101 €
5	a) chemical	*Purchase of shares (pcs)*	50	60										
6	industry	*Sale of shares (pcs)*		10										
7		*Number of shares (pcs)*	50	100	100	100	100	100	100	100	100	100	100	100
8		*Value of shares (€)*	5 000 €	10 100 €	10 100 €	10 100 €	10 100 €	10 100 €	10 100 €	10 100 €	10 100 €	10 100 €	10 100 €	10 100 €
9		*Change in share price (€)*	-											
10		*Share price (€)*	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €
11	b) food	*Purchase of shares (pcs)*	5											
12	industry	*Sale of shares (pcs)*		10										
13		*Number of shares (pcs)*	5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
14		*Value of shares (€)*	500 €	- 500 €	- 500 €	- 500 €	- 500 €	- 500 €	- 500 €	- 500 €	- 500 €	- 500 €	- 500 €	- 500 €
15		*Change in share price (€)*	-											
16		*Share price (€)*	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €
17	c) engineering	*Purchase of shares (pcs)*												
18	industry	*Sale of shares (pcs)*												
19		*Number of shares (pcs)*	0	0	0	0	0	0	0	0	0	0	0	0
20		*Value of shares (€)*	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €
21		*Change in share price (€)*	-											
22		*Share price (€)*	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €
23	d) armaments	*Purchase of shares (pcs)*												
24	industry	*Sale of shares (pcs)*												
25		*Number of shares (pcs)*	0	0	0	0	0	0	0	0	0	0	0	0
26		*Value of shares (€)*	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €	- €
27	**Total assets (€)**		**10 000 €**	**10 050 €**	**10 050 €**	**10 050 €**	**10 050 €**	**10 050 €**	**10 050 €**	**10 050 €**	**10 050 €**	**10 050 €**	**10 050 €**	**10 050 €**

Figure 7: Incorrect sale of shares - the user sold 5 more shares of the food industry than he owned

It is important that they record sales and purchase data only for the current period and do not change their previous decisions. In this way the principle of fair play is guaranteed. The very motivation of the user to change previous decisions can be used as a teaching example by the trainer and to develop in discussions with users the reasons for this motivation, the importance of fair play behaviour and the impossibility of changing decisions retrospectively in the real world.

If the user were to try to buy shares and does not have enough cash to buy them, excel will automatically color the row titled "Cash" red. The user has to modify his decision. An example of an incorrect stock purchase is shown in Figure 8. It is recommended that the tutor encourages all users and checks that no user has red fields at the end of the round. If he identifies them, he will prompt the user to change the decision so that these fields are not colored red.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	**Period**		**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**End 11**
2	**Share**	**Cash €**	4 500 €	460 €	- 540 €	- 540 €	- 540 €	- 540 €	- 540 €	- 540 €	- 540 €	- 540 €	- 540 €	- 540 €
3		*Change in share price (€)*	-	1 €	4 €									
4		*Share price (€)*	100 €	101 €	105 €	105 €	105 €	105 €	105 €	105 €	105 €	105 €	105 €	105 €
5	a) chemical	*Purchase of shares (pcs)*	50	20										
6	industry	*Sale of shares (pcs)*												
7		*Number of shares (pcs)*	50	70	70	70	70	70	70	70	70	70	70	70
8		*Value of shares (€)*	5 000 €	7 070 €	7 350 €	7 350 €	7 350 €	7 350 €	7 350 €	7 350 €	7 350 €	7 350 €	7 350 €	7 350 €
9		*Change in share price (€)*	-											
10		*Share price (€)*	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €	100 €
11	b) food	*Purchase of shares (pcs)*	5		10									
12	industry	*Sale of shares (pcs)*												
13		*Number of shares (pcs)*	5	5	15	15	15	15	15	15	15	15	15	15
14		*Value of shares (€)*	500 €	500 €	1 500 €	1 500 €	1 500 €	1 500 €	1 500 €	1 500 €	1 500 €	1 500 €	1 500 €	1 500 €
15		*Change in share price (€)*	-	2 €	2 €									
16		*Share price (€)*	100 €	102 €	104 €	104 €	104 €	104 €	104 €	104 €	104 €	104 €	104 €	104 €
17	c) engineering	*Purchase of shares (pcs)*		10										
18	industry	*Sale of shares (pcs)*												
19		*Number of shares (pcs)*	0	10	10	10	10	10	10	10	10	10	10	10
20		*Value of shares (€)*	- €	1 020 €	1 040 €	1 040 €	1 040 €	1 040 €	1 040 €	1 040 €	1 040 €	1 040 €	1 040 €	1 040 €
21		*Change in share price (€)*	-		7 €									
22		*Share price (€)*	100 €	100 €	107 €	107 €	107 €	107 €	107 €	107 €	107 €	107 €	107 €	107 €
23	d) armaments	*Purchase of shares (pcs)*		10										
24	industry	*Sale of shares (pcs)*												
25		*Number of shares (pcs)*	0	10	10	10	10	10	10	10	10	10	10	10
26		*Value of shares (€)*	- €	1 000 €	1 070 €	1 070 €	1 070 €	1 070 €	1 070 €	1 070 €	1 070 €	1 070 €	1 070 €	1 070 €
27	**Total assets (€)**		**10 000 €**	**10 050 €**	**10 420 €**	**10 420 €**	**10 420 €**	**10 420 €**	**10 420 €**	**10 420 €**	**10 420 €**	**10 420 €**	**10 420 €**	**10 420 €**

Figure 8: Incorrect purchase of shares - the user bought shares in round 2 for more money than he had available

It is advisable that, after publishing the prediction for the next period, the lecturer should leave room for users to analyse this prediction and implement their buying or selling decisions. Users need to evaluate the information available, analyse it and decide whether to trust it or to proceed more cautiously. Predictions include macroeconomic events such as industrial

expansion, political instability, natural disasters or technological innovation. After a set period of time has elapsed, space is left to discuss with users the possible implications of this prediction for the market as a whole. At the same time, a discussion will be held on how individual sectors may be affected if this prediction comes true and how this will affect the share price. The trainer may remind users that this is only a prediction and may not come true in the future. This introduces a degree of uncertainty into the simulation that is common in the real world. It is common for predictions to be made in financial markets about the development of stocks and many times they are wrong or do not come true.

The instructor encourages students to develop an investment strategy based on their own preferences. Here, the lecturer can go back to the basic knowledge of investing, describing stocks and their market value. At the same time, he will develop a discussion with the idea of when it is appropriate to buy and sell stocks. It is appropriate to sell when stocks are thought to be at their peak and to buy when they are at their lowest.

End of simulation

The simulation ends after a predetermined number of trading periods (except for the zero round there are 10, the final round). This manual includes a presentation and an excel where the number of trading periods is set to ten, if necessary and if the simulation develops, the trainer can create additional periods. Once the prediction for period eleven is displayed, users implement their last decisions, which they write down in period ten. The tutor then projects a slide with the last period (eleven), which contains information about the change in the exchange rates of each sector over the last period. Users enter these values in the appropriate cells of the eleventh period. In this round, they are no longer allowed to buy or sell.

The lecturer will also disclose one last piece of information, namely the value of shares that each industry should have at the end of the simulation. This value is pre-calculated by the lecturer based on the exchange rate changes during each period. Users check if they have the same share values (they check the corresponding values for all industries, which are in the row called "Share price (€)"). If any mismatch is identified, the tutor encourages the user concerned to correct it.

The winner of the simulation is the one who achieves the highest asset value (cash + stock value). This value is listed in the last row of the excel spreadsheet called "Total Assets (€)" and is automatically calculated.

Final discussion

The last part of the simulation is an open discussion with the users where the tutor can use some of these themes:

- What factors led you to buy or sell shares?
- Which decision do you consider your most successful, and why?
- Were there any decisions you would make differently? If so, what would you change?
- How were you influenced by predictions about trends and events during the simulation?
- How would you evaluate the impact of macroeconomic events on your decisions (e.g., political crises, technological innovations, inflation)?
- Which events do you think had the greatest impact on changes in stock prices?
- To what extent did you use fundamental analysis during the simulation (e.g., monitoring long-term economic factors and company values)?

- Did you use technical analysis, such as chart or trend analysis? How did these tools help you in making decisions?
- Which approach (fundamental or technical) did you find more effective in this simulation?
- How did you approach risk during the simulation? Did you prefer a more conservative or aggressive approach?
- To what extent did you diversify your investments? How did diversification help or harm you?
- What are the advantages and disadvantages of diversification in real stock market trading?
- Did you feel pressure or stress while making decisions during the simulation? How did you manage it?
- Were there any situations where emotions influenced you, leading to impulsive decisions?
- How can you apply these lessons in emotional management to real trading decisions?
- How did you collaborate as a team when making investment decisions?
- Were there differing opinions among team members? How did you resolve conflicts and differing viewpoints?
- What important skills did you develop during team collaboration?
- Which concepts and experiences from the simulation can you apply to real stock market trading?
- What did this simulation teach you about how financial markets work in real life?
- How can you use the knowledge and skills gained in this simulation in your future professional life, even outside the field of finance?
- What did this simulation teach you about stock market trading?
- What are the biggest lessons you are taking away from this experience?
- If you had the chance to repeat the simulation, what strategies would you use this time?

Conclusion

The guide is an introduction for students to the world of financial market and stock trading. It is an interactive tool that can be used in all areas where students are introduced to the financial and capital markets, not only for economic majors, but also for technical fields.

The manual contains basic theoretical knowledge which along with exercises will guide students to understand the field of investing, saving in the financial market. After mastering the theoretical material, the lecturer himself will explain the functioning of the stock market trading simulation and the students will start trading.

The stock trading simulation gives participants an insight into the workings of financial markets, investment processes and economic decisions. The user has the opportunity to experience authentic situations in which investors, traders and managers commonly find themselves, thus gaining practical experience in decision-making and investment management. This experience allows the user to better understand the complexity of financial markets, the dynamics of stock prices and the broader context of investment strategies, thereby improving analytical and decision-making skills.

We believe that the interactive nature of this simulation effectively linked theoretical knowledge with practical skills, allowing users to better understand the realities of the financial world. The knowledge and experience gained will benefit not only those planning to pursue a career in the financial sector, but also students from other disciplines where business, managerial and economic competencies are key to success. The simulation also enhanced the ability to work under pressure, assess risks, analyse market trends and make informed decisions under conditions of uncertainty.

After using this simulation, the user will have a better understanding of the functioning of the platforms in the field of investing not only in stocks, but also in gold, other types of securities.

In conclusion, it is worth emphasizing the importance of continuous education in financial markets and investment strategies, which are essential for effective functioning in a dynamic and ever-changing global environment. The participants in this simulation have gained a solid foundation on which they can further build on to develop their professional skills and careers in different spheres of professional life.

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Annexes

Annex nr. 1: Excel file with calculations

Excel
simulation_eng.xlsx

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