METROPOLITAN UNIVERSITY PRAGUE

ANGLO AMERICAN UNIVERSITY

Conference Proceedings

11th International Scientific Conference

IFRS: GLOBAL RULES & LOCAL USE - BEYOND THE NUMBERS

organised by
Department of Financial Management at Metropolitan University Prague
and School of Business Administration at Anglo-American University

12 October 2023

Metropolitan University Prague
Dubečská 900/10, Prague 10, Czech Republic

Partners of the conference

Central European Economic Journal

University of Warsaw
Faculty of Economic Sciences

Editors

doc. Ing. Irena Jindřichovská, CSc., Metropolitan University Prague, Czech Republic
MSc. David John Muir, MBA, Anglo-American University, Prague, Czech Republic

Reviewers

doc. Ing. Marie Paseková, Ph.D., Tomas Bata University in Zlín, Czech Republic
doc. Ing. Jaroslav Wagner, Ph.D., University of Economics, Prague, Czech Republic

Authors only are responsible for the content, bibliographical references and language correctness of this publication.

Conference proceedings with ISBN will be published on the conference web. Online conference proceedings will be sent for evaluation to THOMSON REUTERS (CLARIVATE) to be entered on the Conference Proceedings Citation Index. Conference proceedings from the years 2014, 2015, 2016, 2017, 2018, 2019, and 2020 have been included in the Web of Science Core Collection which is integrated in the WEB OF SCIENCE THOMSON REUTERS (CLARIVATE).

ISBN (MUP) 978-80-7638-036-3
ISBN (AAU) 978-80-907602-9-5

CONTENT

INTRODUCTION

The 11th edition of the International Scientific Conference IFRS: Global Rules & Local Use – Beyond the Numbers was organized in a hybrid format at the Metropolitan University in Prague in cooperation with the Anglo-American University in Prague on October 12th, 2023.

This year, the conference proceedings mainly returned to face-to-face presentations, which enabled better mutual interactions, discussions, and networking opportunities. However, online participation and presentation of contributions was also offered, which some participants used. All participants participating in the conference in person and online appreciated and welcomed this combined solution.

The plenary part of the conference and the meetings in the individual sections were interesting and beneficial for all present, whether attending in person or online. The comprehensively positive results and responses to the conference proceedings in all areas were not affected by the relatively lower number of participants compared to previous years, which can be attributed to the repercussions of the SARS-COVID-19 pandemic.

In the conference's plenary session, we had seven domestic and foreign experts, both from practice and academia. Twelve presenters spoke in individual sections.

The contributions authored by conference participants presented during the conference are published in these proceedings. All the contributions first went through a desk review by the editorial team, followed by an international, double-anonymized peer review process by international external reviewers before being accepted by the conference editorial team.

The program was organized as follows:

Opening ceremony
Irena Jindřichovská, Jan Vašenda, Michal Klíma (MUP Rector), Jiří Schwarz (AAU President)

Keynote Speakers I – Chair: Irena Jindřichovská

- Prof. David Alexander – Biodiversity (presented by David Muir)
- Prof. Adriana Tiron-Tudor – Sustainability and Non-financial reporting – current trends
- Prof. Anna Białek-Jaworska – Investors´ Reaction to Banning IFRS Use by Domestic Firms in Alternative Markets
- Jiří Schwarz Jr. – The Impact of Price Levels, Energy Intensity, and Cost Shocks on Inflation: An International Comparative Analysis

Keynote Speakers II – Chair: Jiří Schwarz

- Petra Smejkalová – The significance of uniform accounting standards through IFRS across countries
- Prof. Erginbay Ugurlu (co-author Irena Jindřichovská) – Effect of COVID-19 on the Mutual Trade Between Germany and Visegrad Four
- Prof. Eva Jančíková – Belt and Road Initiative – Ten years after

Keynote Speakers Discussion

Individual sections

IFRS, Finance and Markets	Chair: Enikő Lőrinczová
Management and Economic Policy	Chair: Jaroslav Halík
Financial Management	Chair: Irena Jindřichovská
Non-financial Reporting and Financial Literacy	Chair: David Muir

IFRS, Finance and Markets

COST AND MANAGEMENT ACCOUNTING IN AGRICULTURE IN THE CZECH REPUBLIC

Enikő LŐRINCZOVÁ, Jitka ŠIŠKOVÁ
Czech University of Life Sciences Prague, Czech Republic
lorinczova@pef.czu.cz

Abstract: *The aim of this paper is to monitor the use of the traditional management and cost accounting tools in agricultural companies based on a questionnaire survey with the main focus on the valuation of products and by-products, cost allocation, budgeting and the use of variable/fixed costs. In the pilot phase of the research 25 Czech agricultural companies completed the questionnaire. The results show that most companies use production costs for a product costing and preliminary stated prices for the by-products. IAS 41 states the agricultural produce to be measured at fair value less costs to sell at harvest, which is used only by 1 company, others stating the fair value is volatile and fluctuating, not practical, also Czech accounting legislation does not allow the fair value valuation for own production. The most frequently used allocation base for the common overhead costs is the amount of material consumption. The results also show that not all companies utilize the basic tools of cost accounting or the division of total costs into fixed and variable and nearly half of the companies do not analyze the differences between the planned and actual costs. Most responding companies mainly use those instruments of cost accounting which are needed for the financial accounting and reporting purposes such as product costing and that other tools of cost and management accounting are neglected. Some responding companies´ reaction to the questionnaire shows that they percieve it as a sign of the intention of further regulation.*

Keywords: *agriculture production, cost accounting, cost allocation, fixed/variable costs, product costing*

1. INTRODUCTION

The use of management accounting in the agricultural industry has received very little attention by accounting researchers (Jack, Jones, 2008). Mocanu (2010) stated that accounting and the calculation of costs are approaches with a general character, especially concerning the industrial fields and references to this issue, concerning agriculture, are too few, both internationally and internally. A cost accounting system is concerned with accumulating costs for inventory valuation to meet external financial accounting requirements. A management accounting system accumulates, classifies, summarizes and reports information that will assists managers within an organization in their decision-making, planning, control and performance measurement activities (Drury, 2020). The users of the cost and management accounting information are internal users such as managers, economists and owners of the company to make economic decisions related to the performance of the company. Research on the the necessity of an independent cost accounting system had been carried out by Schweitzer (2005), where the spectrum of views involved ranged from a complete integration of cost accounting (internal income statement) into the profit and loss statement (external income statement) to as complete a separation as possible of the two income accounting systems. Schweitzer (2005) also recommended a theoretically substantiated separation of the two types of income statements.

The specifics of the agriculture industry for the cost and management accounting purposes are related to its main business activity dealing with biological assets (like living

animals and plants before harvest) and agriculture produce (like plant products or meat at the moment of harvest). The issues in agriculture are related to the valuation of products and by-products and also to the the long biological cycle in some cases when the biological cycle overlaps the financial year and the valuation of unfinished products is needed for financial accounting and reporting purposes. According to Drury (2020) joint products and by-products arise in situations where the production of one product makes inevitable the production of other products. By-products are those products that result incidentally from the main joint products. By-products may have a considerable absolute value, but the sales value is small when compared with the values of the joint products.

In the Czech Republic, the valuation of biological assets and agricultural produce is classified mainly as own production or long-term tangible assets and is regulated by the Accounting Law No. 563/1991 Coll. and the Decree of Ministry of Finances No. 500/2002, as amended. These national legal requirements state the valuation of own products at the production costs (direct costs and the possible overhead related to the production). The valuation of the agricultural by-products such as manure, straw, hay is not regulated but there are valuation approaches recommended by the Institute of Agricultural Economics and Information (IAEI) which is a state-subsidized organization established by the Czech Ministry of Agriculture in their publication by Poláčková (2010). On the other hand, as Drury (2020) points out, joint cost allocations are irrelevant for decision-making.

Other important internal accounting tool is budgeting. Wagner et al. (2019) states that budgets play a key role in business performance management and management control, and also points out the lack of empirical evidence concerning budgeting practice in Central and Eastern Europe.

Cost behaviour is important for a CVP analysis, which examines the relationship between changes in volume (activity), sales revenue, costs, and profit. As Moshchenko et al. (2020) state, one of the most important aspects of improving cost accounting is the correct classification of costs by items in management accounting and by elements in financial accounting. To optimize the management costs accounting and evaluation of the financial results of the responsibility centers, the costs of agricultural organizations must be grouped depending on the production output into variable, semi-variable and fixed costs. The traditional use of the gross margin system of accounting has tended to underline a notion that has had a powerful influence on farm business planning that most costs are fixed and that the best way of reducing them to achieve profit maximisation is to spread them by increasing the scale of operation (Jack & Jones, 2008).

Cost accounting have significantly changed, even though the roots of the cost accounting tradition of the late 19th and early 20th centuries are still visible in practice and teaching, which is true for both organisational practice and research (Becker et al., 2021).

2. AIM AND METHODOLOGY

The aim of this paper is to monitor the state and use of management and cost accounting instruments in agricultural companies with the main focus on the valuation of products and by-products, cost allocation, budgeting, responsibility centres and the use of variable/fixed costs.

An online questionnaire survey was used to obtain answers. The questionnaire is web-based on the Vyplnto.cz site and was distributed by email to the agricultural companies. 25 Czech agricultural companies completed the questionnaire by the summer of 2023. The questions were multiple-choice with a space for own formulations and possible comments at each question. The legal form of the responding companies was cooperatives (12 companies), joint-stock companies (7) and limited liability companies (6). Size of the companies also varied,

10–100 hectares (1 company), 500–1000 hectares (8) and 1000–5000 hectares (16). The main business activity of the companies was plant and animal production (22 respondents) and plant production (3). All the 25 responding companies use the Czech accounting standards for preparing their financial statements, only 2 of them also uses international accounting standards IFRS. The questionnaires were completed by accountants, economists, directors or owners.

The limitations of the paper are the low numbers of respondents so far and the reason for it can be a long average time of completing the questionnaire by respondents. Other limitation of the paper is that internal data of cost and management accounting are not easily accessible as they are not published as part of the financial reports of the companies mainly due to their competitive advantage and no general legal requirement. Also, the access to some full papers for literary research and comparison on the Web of Science is limited.

3. RESULTS

The results of the pilot research regarding the state and use of cost and management accounting in agriculture are based on 25 respondents and the results are divided into 4 sub-sections: 3.1) valuation of the agricultural products and by-products, 3.2) cost-calculations and budgets, 3.3) monitoring the differences between the planned and real costs, 3.4) monitoring the cost behaviour in the companies – fixed and variable costs and their use.

3.1 Valuation of agricultural products and by-products

The main business activity of the responding agricultural companies is plant and animal production. Plant production includes production of wheat, barly, corn, oat, rye, oilseeds, potatoes, fruits and vegetables. The main by-products in plant production are straw and hay. Animal livestock production includes rearing of cattle, pigs, sheep and poultry (chickens, ducks, geese). The main by-product in animal production is manure.

Table 1 shows the valuation of products, unfinished products (work-in-progress) and animals. Unfinished production is related to the plant production, mainly to the production of winter wheat, when the biological process from planting the seed to the point of harvest overlaps the end of accounting period (which is a calendar year ending 31th of December in the monitored companies) and this presents the need for a valuation of unfinished products in the financial statements as well as the valuation of products and animals. For the unfinished production valuation, most of the responding agricultural companies (12 respondents) use the valuation level of the total direct costs (direct material+direct wages+other direct costs), followed by the valuation level of production costs (total direct costs + production overhead). For the finished products and animals' valuation, most of the responding agricultural companies (16 resp. 11 respondents) use the valuation level of production costs. Fair value is only used by 1 company (which is due to the Czech accounting legislation not allowing the fair value valuation for own production) and the company uses it for reporting to the mother company which is using the international standards IAS/IFRS for preparing their consolidated financial statements. Other companies stated that the fair value is too volatile and fluctuating, it is not practical.

Table 1. Valuation level of own production in agriculture

Valuation level / Number of responding companies	**Unfinished production**	**Products**	**Animals**
Direct material	0	0	1
Direct material + direct wages	0	0	0
Total direct costs	12	5	6
Production cost (direct costs + production overhead	9	16	11
Production costs + administrative overhead	3	3	4
Fair value	1	1	0

Source: own research based on the questionnaire survey, 2023

Direct material in agriculture includes seeds, seedlings, fertilizers, feed, chemical agents. Total direct costs (besides the direct material and direct wages) may include for example depreciation of a machine or shelter which is used only for one typ of product (single-purpose fixed assets) or veterinary expenses or fuel. Depreciation of the machines and buildings which are used for multiple type of products are included in the production overhead expenses. Production overhead costs may include a common energy, gas, fuel, water consumption in the production. Administrative overhead includes costs associated with the general administration of the organization such as office rent, wages of office staff, depreciation of office equipment, fuel use, etc.

For the valuation of by-products is possible to use the recommended methods of IAEA (Institute of Agricultural Economics and Information). Table 2 shows some examples of the recommended valuation when the total cost of the joint production is divided into % of cost of the main product and % of the by-product. Most of the responding companies use the by-products for fertilization (18 respondents), for feeding the animals (17 respondents), selling (10 respondents) or as a source for biogas plants (9 respondents).

Table 2. Examples of recommended valuation of joint plant production

Products	**Main product**	**By-product**
Wheat	Grain 88%	Straw 12%
Rye	Grain 88%	Straw 12%
Barley	Grain 85%	Straw 15%
Corn	Grain 85%	Straw 15%
Oil seeds	Seeds 90%	Straw 10%
Potatoes, vegetables	100%	x

Source: Poláčková (2010)

Table 3 shows the valuation of by-products by the responding companies. The main method of valuation of plant by-products are set amounts which are based mainly on the calculations done in the past and are not always or regularly updated to reflect the changes. By-products are in some cases undervalued (it can be seen if it is compared to the market price, for example in case of straw or hay). If there is no valuation separately for the by-products, the cost of the main product can be overvalued.

Table 3. Valuation of by-products in agriculture

Method of valuation of by-products	**Number of companies**	**% of the companies**
Methods of IAEI % of the total cost of the production (for example main product like seed 85%, by-product like straw 15%)	6	24%
Set amounts (not always updated)	9	36%
Methods of IAEI (valuation based on the nutritients and the price is derived from the price of nutritients in inorganic fertilizers)	1	4%
By-products are not valuated separately from the main products, they are considered a cost of the main product	7	28%

Source: own research based on the questionnaire survey, 2023

3.2 Managing the costs – cost calculations and budgets

Cost and management accounting uses 2 main lines of following the costs: cost calculation for a product (product costing) and budgets (cost planning for departments and the whole company for a period of time for a determined activity). These main lines are interconnecting as the product costing gives information about the direct costs for the budget planning and the budget planning (mainly the departments´ overhead budgets) gives information for the cost calculation of products (in areas of production, administrative and distribution overheads).

Preliminary cost calculations for a product are done by 12 of the responding companies from which 9 of them use cost calculations for a product for 1 year (to be used in the budget) and 3 companies only if there is a new product. Final cost calculations (using the real costs occurred) are created by 9 of the responding companies. The responses in some cases seem contradictory to responses to other questions related to the product costing which is mandatory for the asset valuation in financial accounting and for reporting purposes.

Overhead costs refer to costs generally related to different products. Table 4 shows what is the main cost allocation base used by the responding companies. Allocation of overhead costs amongst the products is the amount of direct material consumed (10 respondents), followed by the allocation by the amount of direct wages (5 respondents), number of hours of labor (5 respondents) and allocation based on the revenues from sales of different products (5 respondents). Other allocation bases included the hectares of plant production (4 respondents) and direct dividing of overhead costs when the products are considered very similar (2 respondents).

Table 4. Overhead allocation base in agriculture

Overhead allocation base (allocation of overhead costs amongst the products)	Number of companies	% of companies
Direct material (amount of consumption)	10	40%
Direct wages (amount of wages)	5	20%
Natural base (number of hours of labor)	5	20%
Natural base (hectares of plant production)	4	16%
Based on the revenues from sales of products	5	20%
Direct dividing of overhead when products are considered very similar	2	8%

Source: own research based on the questionnaire survey, 2023

The instrument of cost accounting of planning the overall costs of a company for a period and for a planned production is the budget. Only 15 of the responding companies create budgets at least for a period of one year, 5 of which create budgets also for the departments as well as for the whole company. 10 companies out of the 15 only creates the master budget for the company. 10 of the responding companies do not create budgets at all. The main method to create the budget by the responding companies is to use the real costs of the previous year (altered by the expected changes based on an expert judgement in some cases).

3.3 Managing the costs – monitoring the differences between the planned and real costs

Creating preliminary and final cost calculations or budgets are important for the analysis of differences and finding out the reasons of these differences so the company can improve their financial results. Table 5 shows the frequency of evaluation the differences and the points of investigation these differences. Most of the responding companies evaluate the differences once per year, at the end of accounting period (8 companies), other companies do it regularly monthly or quarterly (5 companies). Some of the responding companies do not analyse the differences at all or only randomly (12 respondents). The main points of analysing the differences between the plan (cost calculation or budgets) and the real costs are by the cause of the difference (6 respondents) and the nature of the cost where the difference occurred (5 respondents). Other points include analysing by responsibility (1 respondent) and by the department place (2 respondents).

Table 5. Differences between the planned and real costs

Frequency of analysing the differences and the point of view	**Number of companies**
Frequency – once in a year (end of accounting period)	8
Frequency – regularly (monthly, quarterly)	5
Frequency – randomly	3
Frequency – never	9
Point of analysis – the cause of differences	6
Point of analysis – the nature of the cost	5
Point of analysis – the responsibility	1
Point of analysis – the department	2

Source: own research based on the questionnaire survey, 2023

The main causes of the difference between the planned and real costs indicated by the responding companies (shown in Table 6) are the changes in the price of incoming materials, energy and gas (9 companies), the change of the supplier of material (3 companies), the incorrectly stated preliminary calculations and budgets (1 company), disorders caused by the not completed regular check-ups and maintenance on the machines (3 companies), extreme weather changes (2 companies), human error in administration and recording (2 companies), human error in production (3 companies), external changes like trade prices (1 company), not defined internal roles, competencies and responsibilities for tasks (2 companies), changes in law (1 company), losses on material an energy due to old equipments and machines (1 company).

Table 6. Main causes of differences between the planned and real costs

Main causes of differences between planned and real costs	**Number of companies**
Changes in prices of material, energy, gas	9
Change of the supplier of material	3
Maintenance of the machines not provided	3
Human error in production	3
Human error in administration	2
Not defined competencies and responsibilities for the task	2
Extreme weather changes	2
Other causes	3

Source: own research based on the questionnaire survey, 2023

Even if a company analyzes the differences between the planned and real costs, they mainly do it when the real costs exceed the planned costs and they do not analyse when there is an opposite situation, savings. While the most important thing is to analyse why the real costs exceeded the planned cost, analyzing the difference between planned costs and real costs resulting in savings is also important. Negative savings can include cost savings on a regular maintenance of the machines (in the production department) or saved advertisement costs in the selling department. Both examples can affect the future incoming revenues and thus the profit.

3.4 Monitoring cost behaviour – fixed and variable costs

Monitoring costs from the point of their behaviour depending on the amount (volume) of products produced is an important cost and management accounting tool.

The main questions are related to the method of dividing the overall costs into fixed and variable and the utilization of monitoring the fixed and variable costs in the company. From the 25 responding companies, only 14 of them are monitoring the costs behaviour, 11 companies do not follow, or the respondents were not sure. Table 7 shows the methods of dividing the costs into fixed and variable and the use of this division for different purposes. Most of the responding companies use the classification method where the incurred costs of the period are divided into fixed or variable (12 respondents) or estimation based on expert judgement (2 respondents). According to the results the companies do not use more specific or more accurate methods like statistical methods, or the High-Low point method. The classification method used may be too subjective, but the company knows their costs and their typical behaviour the best based on their experience.

Most of the responding companies use the division of total costs into fixed and variable for planning the cash flow (7 companies), estimating the future total costs based on the number of products (5 companies), cost calculation at the level of variable costs (5 companies) and decision making CVP (cost-volume-price) tasks such as “to produce or buy” or “to stop the produce or not” (4 companies). Not one of the responding companies indicated they use it for calculating the break-even point, even though it would be likely included in the CVP tasks.

Table 7. Fixed and variable costs

Method of division of total costs into fixed and variable and the use of it	**Number of companies**
Method – classification of the actual costs in accounting into fixed and variable	12
Method – expert judgement in estimated %	2
Method – statistical evaluation	0
Method – high and low point	0
Use – cashflow planning	7
Use – estimating future total costs	5
Use – product costing at level of variable costs	5
Use – decision making CVP tasks	4
Use – break-even point calculation	0

Source: own research based on the questionnaire survey, 2023

Fixed and variable costs in agriculture are mainly the same as in any other industry. Typical fixed costs are the time-based depreciation of the agricultural machines and buildings, rent (although most agriculture companies have their buildings and offices) and leasing payments. Typical variable costs are the food consumption in the animal production and also the consumption of seeds and fertilizers in the plant production.

Table 8. Cost classification examples in agriculture

Examples of costs in agriculture companies	**Fixed / Variable**	**Direct costs**	**Production overhead**	**Administrative overhead**
Seeds for sowing, seedlings	V	x		
Feed for animals	V	x		
Fertilizers, soil nutritients	V	x		
Wages of plant pickers*	V	x		
Wages of livestock workers*	V	x		
Harvester depreciation	F		x	
Office equipment depreciation	F			x
Wages of the office staff	F			x
Energy, gas, water	mixed		x	x
Rent of offices	F			x
Depreciation of stables	F		x	
Fuel consumption*	F or V	x	x	x
Auxiliary material (cords)	V		x	
Office stationery consumption	F			x
Medicament for animals	V	x		

Source: own processing based on overall literature

In case of field workers (like fruit and vegetable pickers, livestock workers) their wages can be variable if it is unit or hour based, or it can be also fixed depending on the company. Energy, gas, and water consumption is mixed as the heating and lighting of the buildings is fixed (not dependent on the production volume), but for example water consumption for watering the plants can be dependent on the volume of the plant production. Fuel consumption can be

variable and direct cost, if the agriculture machines have GPS which is connected to the information system of the company and the fuel consumption can be tracked down to specific plants. If the field work is more general, such as plowing or soil preparation, it can be included in the production overhead. If the fuel consumption is related to managing the company (fuel consumed by the car of the chairman of the cooperative) it would be included in administrative overhead. In this case there can be an average limit (for cost planning purposes) and it would be a fixed cost.

4. DISCUSSION

Common topics of discussion in cost accounting are mainly related to the level of product costing, the overhead cost allocation, the level of valuation of product transfer between departments or cost behaviour regarding fixed and variable costs and their use for decision-making.

Companies in the Czech Republic use the Czech accounting law and the Decree of Ministry of Finances 500/2002 Coll. for the valuation of own production. This legal accounting framework bases the valuation of own production at the level of direct costs plus a possible overhead related to the activity. The Decree also allows to use the the actual costs or the preliminary product costing (cost calculation in advance) for the valuation, for recording and reporting the own production amounts. According to the international accounting standards IAS 41, *"agricultural produce is measured at fair value less costs to sell at harvest, and this measurement is considered the cost of the produce at that time (for the purposes of IAS 2 Inventories or any other applicable standard)"*. [IAS 41.13]. So far, only 1 company from the responding agricultural companies uses fair value (even though 2 companies stated they also use IAS/IFRS for preparing their financial statements). On the other hand, the by-products valuation (mainly at the level of "stated price" (see Table 3) is the level of these by-products´ market price (more likely not updated and used for years even though it is not relevant at the moment). The market price of straw and hay (the main by-products of plant production which are sellable) is volatile. As Argilés Bosch et al (2012) stated, most authors are critical of using fair value for agriculture. Most responding agricultural companies in this research stated in the questionnaire that they think the use of fair value for the valuation of agricultural products is not practical, that the fair value is fluctuating, that it is administratively demanding and even financially demanding (in case of an expert judgement which is not needed in the author´s opinion as most agricultural companies trade with products what they can sell and their products are almost always traded in the market). But using the fair value valuation (ie. mostly the market price for the agriculture produce) is really volatile and actually may not give a fair representation of the company's assets or revenues to the external users.

Creating preliminary and final cost calculations is important for the analysis of differences to find out the reasons for these differences and also for better remunerations of the employees and departments based on their performance.

Part of the cost and management accounting is the calculation of the break-even point. The results show that the responding companies are not using it as a tool. While the importance of the break-even point calculation may be overrated and it can be problematic and too complex to give the right results if multiple different products and services are included, it is still a valid tool.

Some papers suggest a regulation of cost accounting (Zhang, 2017), but there may be an issue of the complexity and differences amongst the industries and the companies. Also, some companies being rather hostile in the free comments in the questionnaire show that some

of the responding companies are not keen on any questioning and are afraid as they percieve it as an intrusion to their internal workings and a sign of further regulation.

The results gained from the pilot sample of respondents show that traditional tools are not fully utilized in the agricultural companies. Further research will also include questions related to the modern strategic management accounting tools like strategic costing, life-cycle costing, balanced scorecard, etc. as the research is ongoing already in the Czech Republic. The research question for the future research can be a statement, that companies which fully utilize the traditional cost and management accounting tools are likely to use or more readily adapt the strategic management accounting tools to further their competitive advantage.

5. CONCLUSIONS

The aim of the paper was to monitor the state and use of the traditional management and cost accounting tools in agricultural companies with the focus on the valuation of products and by-products, cost allocation, budgeting and the use of variable/fixed costs, based on a questionnaire survey in pilot research which was completed by 25 agricultural companies.

The results show that most companies use production costs for product costing and preliminary stated prices for the by-products. IAS 41 states a fair value less cost to sell for the agricultural produce valuation at harvest. Fair value valuation for the agriculture produce is used only by 1 company, others stating the fair value is volatile and fluctuating, not practical. The most frequently used allocation base for the common overhead costs is the amount of material consumption. The results also show that not all companies use the basic instruments of cost accounting or the division of total costs into fixed and variable and nearly half of the companies do not analyze the differences between the planned and actual costs.

Cost and management data and information are intended for the internal users and there is definitely a reluctance in place to share internal data even in an anonymous questionnaire survey. The reluctance can be also caused by the fear of the respondents to be further regulated by law if their answers may cause a base to introduce some more mandatory requirements (as one of the respondents commented).

The results so far show that most responding companies mainly use those instruments of cost accounting which are required for the financial accounting and reporting purposes such as product costing and other instruments are neglected maybe due to the fact that there are no mandatory legal requirements to use them.

Creating preliminary and final cost calculations and budgets is important for the analysis of differences between the planned and real costs for finding out the reasons of these differences to improve the financial results of a company. Based on the results, nearly half ot the responding companies do not compare and analyse the planned and real costs.

One of the reasons for not using all the instruments of cost and management accounting may be also caused by the specific state of agriculture when companies rely on subsidies and state interventions and that may alter the usual decision-making process.

Future research will focus on expanding the number of respondents as proper conclusions and patterns are possible to derive only if there is enough data and the goal is also to extend the research to other industries so the results can be used for statistical evaluation and comparison of the state and use of the instruments of cost and management accounting in different industries. Future research will also investigate the use of the more modern strategic management accounting tools and will also investigate if companies which fully utilize the traditional cost and management accounting tools are likely to use or more readily adapt the strategic management accounting tools to further their competitive advantage.

BIBLIOGRAPHY

Becker, A., Pedell, B., & Pfaff, D. (2021). Management accounting developments in German-speaking countries: An overview and editorial reflections. *Journal of Accounting & Organizational Change*, 17(4), 457-470. https://doi.org/10.1108/JAOC-03-2021-0046

Bosch, J. A., Aliberch, A. S., & Blandón, J. G. (2012). A comparative study of difficulties in accounting preparation and judgement in agriculture using fair value and historical cost for biological assets valuation. *Journal Revista de Contabilidad-Spanish Accounting Review*, 15(1), 109-142.

Czech Accounting Law No. 563/1991 Coll., as amended (Zákon o účetnictví 563/1991 Sb.).

Decree of the Czech Minitry of Finances No. 500/2022 Coll (Vyhláška Ministerstva finance 500/2022 Sb).

Drury, C. (2020). *Management and cost accounting*. 11th Ed. Cengage Learning.

IAS 41 Agriculture. https://www.iasplus.com/en/standards/ias/ias41

Jack, L., & Jones, J. V. H. (2008). Facing up to new realities: The case for using relevant cost and target cost approaches in agriculture. *Journal of Applied Accounting Research*, 8(3), 116-145.

Mocanu, M. (2010). Some hypothesis regarding the expenses´ accounting and calculation in the Romanian agriculture. Proceedings paper in *17th International Economic Conference (IECS) Economic World destiny: Crisis and Globalization?* 495-498. Universitatea Lucian Blaga Sibiu.

Moshchenko, O. V., et al. (2020). Main areas of improvement in losses accounting and cost calculation in agricultural production. *Revista Gênero e Direito*, 9(3), 714-725.

Poláčková, J. et al. (2010). *Metodika kalkulace nákladů a výnosů v zemědělství* [Methodology of cost calculation and revenues in agriculture]. Ústav zemědělské ekonomiky a informací.

Schweitzer, M. (2005). The theoretical substantiation of of cost accounting in the light of conflicting approaches. *Journal De Computis – Revista Española de Historia de la Contabilidad*, 2(3), 124-146.

Wagner, J., Petera, P., Popesko, B., & Novak, P. (2019). Budgeting practices in Czech manufacturing companies: An empirical study. In P. Doucek, G. Chroust, & V. Oškrdal, *IDIMT 2019: Innovation and Transformation in a Digital World*. 343-351. Trauner Verlag Universitat.

Zhang, Q. (2017). Practical Problems in Enterprise Cost Accounting and Management and the Countermeasures. *Journal Agro Food Industry Hi-Tech*, 28(1), 2999-3001.

CHARACTERISTICS OF CONSUMERS ON THE MARKET OF FINANCIAL PRODUCTS

Kateřina FOJTŮ
Anglo-American University, Prague, Czech Republic
katerina.fojtu@aauni.edu

Abstract: *Technology and its development bring change to everyday life. Technologies also influence how we pay, what products and functions of the financial market we use. This scientific article provides an insight into the development of consumers' perception of cash and non-cash payments since the digitalization of the banking sector began to rise. The effort is to show how consumers' view of the use of non-cash payments and other payment instruments has changed. Here, the author compares Czech consumers with the USA and Australia. It is based on several studies that dealt with this issue and thus provides an insight into the change in consumer behavior in this market since 2017. The study itself states that there is a greater use of cashless payments and online tools provided by the bank, but at the same time it is clear from the studies that consumers are not yet ready to completely give up cash.*

Keywords: *cash, cashless, payment methods*

1. INTRODUCTION

Digitization brings with it changes in our consumption behavior. The development of technology and its integration into our daily lives is changing our lives in almost every area and the way we pay is one of them. With digitalization, new forms of payment, the use of banking, and other products that related to finances also appear. We first started controlling our financial products "remotely" through computers and internet banking, nowadays everything is moving to mobile phones and tablets. Just as we were unable to imagine 20 years ago, what the market for financial products and payment methods will look like today. So I believe that many of us have no idea where it will go in the next 20 years. This expert article discusses the period from 2017 to 2021 and methods of payment and use of banking. The information drawn from it is the output of the following surveys: All aboard for the cashless society (2017), Mobile banking – the next generation (2017), How do you prefer to pay? (2018), Savings comfort – a path to happiness (2018), Saving woes stretch retirement outlook (2019), Cracking the code on cryptocurrency (2018), Srinivas & Ross (2018), Průzkum ČBA: Češi, digitalizace a el. bankovnictví 2021 (2021), Průzkum ČBA: Češi a platební styk 2021 (2021).

2. PAYMENT METHODS

People in Europe, the USA and Australia use mobile devices far more often for shopping, payments, and banking. The reason for the higher use of mobile devices in commerce and banking is the growth in the number of smartphone owners and better Internet coverage. Important reasons for using smartphones are convenience, availability, absence of fees, help in managing finances, security, and device compatibility.

Fifty-eight percent of Europeans then use their bank as the first instance when making their payments. One in five (21%) said they used a method other than a bank to move money in the past twelve months – 15% used P2P payments, 13% digital banking services, 9% borrowed money. People then used institutions other than their banks because they wanted to

be able to pay at any time and because these payments were more convenient. The third most common reason was that they had no other choice. Americans also primarily use the bank as an intermediary for their payments, with 54%. The most conservative are the Australians (69%). The Czech Republic is close to Australia in this regard, as 68% of Czechs only use bank services. If they already decide to use other organizations, then it is primarily for money transfer (18%), P2P payments (11%), digital banking services (5%), money lending (8%), financial management (5%). Most respondents (80%) were then interested in receiving notifications on their mobile phone about the balance on their account. For only 11%, such warnings are not beneficial in any way.

Whether people pay cash or cashless also differs based on whether they pay in a store or online. In Europe, payments are divided as follows. When paying in a store, 32% of people use cash payment, 31% of people use credit card payment and 29% use debit card payment, 8% then combine cash and card payment. In Australia, debit card payment is the most popular (38%), followed by credit card payment (29%), cash payment is less popular (27%) and only 5% of Australians combine cash and card payment. Americans use debit cards (44%) and credit cards (30%) the most for their in-store payments. 19% of Americans pay in cash, which is the lowest of all monitored groups. 8% of Americans use a combination of cash and card payment. In the Czech Republic, payment in cash prevails (37%). Only 22% of Czechs pay with a debit card, while 34% use a credit card. Only 7% of Czechs use a combination of card and cash payment.

When paying online, people use multiple methods, with card payment being the most common (42%) in Europe. The second most common way (32%) when paying online is using PayPal, 11% of people pay for goods on delivery and the same number of people use local payment methods. Only 1% of Europeans pay with Amazon Pay, the same number of people use Google Pay and 1% said they pay with Apple Pay. In the Czech Republic in 2020 almost 80% of people used debit or credit card for payments, 55% of Czechs were using cash and 21% used the opportunity to pay with their phones or their watches (Google or Apple pay).

Today's people are still not open to payment methods other than the classic ones (cash payment, card payment). 13% of Europeans would never use PayPal and 52% would never use Facebook payment. Europeans are also not very open to payments via Google Pay and Apple Pay, where 31% and 32% respectively would not use these services. Only 25% of respondents said they would never use Amazon Pay. And 20% of respondents would not use local payment methods. 18% of respondents said that they would not even pay through their bank's mobile application. The reasons given by the respondents are: 1) they have cash or a card with them (44%); 2) they do not see any added value in the use of these services (42%); 3) they are concerned about who stores this information and where (36%); 4) they do not consider these payment methods safe (27%). Payment via Facebook was the least popular among Czechs, as among Europeans (50%). Czechs are less willing to pay via Google Pay (27%) and Apple Pay (26%) than in Europe. In the case of Amazon Pay, 25% of respondents said they would not be willing to use this option. The less popular payment option compared to the European average is PayPal, which 18% of Czechs would not want to use. Conversely, only 16% of Czechs do not want to use a mobile banking application for payments.

The most common reasons for using mobile banking are checking the account balance or information about the last payment (65% of respondents). The second most common method of checking account status is using a computer (32%). Australians use smartphones (68%) more often than computers (29%) and to a greater extent than Europeans. However, the majority are Americans, who use smartphones most often (76%) and computers less often (18%). Czechs also prefer mobile phones (64%) to computers (35%).

Other actions that respondents do on their mobile devices are, for example, paying bills. The general trend in Europe is that 40% of people use mobile devices to pay their bills, 42%

use computers for these payments, 9% of Europeans have never made such a payment and the same number of respondents used another payment method. In Australia and the USA, the ratio of use of individual methods differs from Europe. 49% of Australians use smartphones for these purposes, 44% use computers, only 4% of Australians have never paid their bills and 3% choose another payment method. In the US, 53% of people use smartphones, 31% of people pay their bills from a computer, 8% of Americans have never paid their bills, and the same number of respondents use other payment methods. The Czech Republic is doing better than the European average in the use of technology for banking purposes. 41% of Czechs said that they use a mobile phone to pay their bills, 51% use a computer, 7% of respondents have never paid their bills, and only 1% use other methods. It is therefore obvious that 92% of Czechs use modern technology to pay their bills these days.

With COVID-19 pandemic entering the world there has been a change in the payment methods and the pandemic caused the acceleration in the digitalization, see more in Kotkowski & Polasik (2021), Yakean (2020), Lu & Kosim (2022), Schlossberger & Soldánová (2022).

3. USE OF TECHNOLOGY IN RELATION TO FINANCE

Bank account management, purchases and payments using a smartphone, tablet or other mobile devices are becoming popular. However, this raises the question of the relationship between humans and technology, and what humans will be willing to let computers do for them. Here, respondents indicated that they wanted to maintain control over their finances. And this, even if they prefer the benefits that automated services bring them, such as online access to robo-advisory.

38% of Europeans would not mind if a computer sent birthday wishes to their friends for them. 34% of Europeans are okay with a computer transferring money from their savings for them. A similar number of Europeans (32%) said they would have no problem with a computer ordering milk for them. 21% of Europeans would not mind if a computer applied for a new health insurance for them. 13% of respondents would not mind if he invested money equal to their monthly salary, 12% of people would have no problem if the computer invested money equal to their 6 months salary. Australians have far lower confidence in computer decision-making. 26% of Australians would have no problem with a count sending greetings to friends for them. Three percent less, or 23% of Australians, would have no problem moving money from savings. 20% of Australians would be fine with a computer ordering their milk for them. Only 12% would feel comfortable applying for a new health insurance policy for them. For approximately 10%, the investment of monthly/half-yearly wages is represented. On the contrary, Americans are much more open to such a decision. This is also indicated by the fact that up to 41% of Americans have no problem with sending birthday wishes to friends for them to count. 39% then agree with a computer transferring money from savings, 33% agree with a computer ordering milk, 27% feel it is okay to have a computer handle a new health insurance policy for them, 22% and 20% respectively agree, for the computer to invest their monthly or semi-annual salary for them. The Czech Republic moves around the European average in its decisions. 35% of Czechs have no problem with a computer sending birthday wishes for them, which is three percent below the European average. On the contrary, five percent more Czechs (40%) than Europeans agree to have a computer transfer money from their savings for them. 29% of Czechs agree to have a computer order milk for them, and 26% agree to have a computer arrange a new health insurance for them. In general, women and the older generation agree less with the intervention of technology than men.

When asking how the respondents would decide on an investment in the amount of their monthly income, they had the option of choosing between the advice of a professional financial

advisor or a bank; finding information on the Internet and specialized sites; they would never invest the money; they would ask family and friends for advice; they would consult an online computer program; he doesn't know The European average indicates that 40% of Europeans would turn to a bank or financial advisor, 16% would look for information on the Internet; 15% would not invest at all; 14% would turn to family and friends; 4% would use the advice of an online program and 11% do not know what to do with the money. Australians and Americans differ from Europe in this. 31% of Australians would seek advice from a bank or financial advisor; 18% would use the Internet; 11% would not invest at all; 17% would turn to family and friends; 3% would use an online program and 20% don't know what it would do. Americans would use a financial advisor or bank in 42% of cases; 12% would find information on the Internet; 10% would not invest the money; 20% of Americans would turn to family and friends; 4% would use an online program and 14% of Americans don't know what they would do. The Czech Republic is again close to the European average – 34% of Czechs would use the advice of a bank or financial advisor; 18% would look for information on the Internet; 16% of Czechs would not invest at all; 14% would turn to family and friends; 4% would use the online program, 14% do not know what it would do.

When investigating how people are equipped with smart devices, it was found that 87% of Europeans own a smartphone and 48% use it for mobile banking. More than 55% of Europeans own a tablet and 26% use it for mobile banking. A survey in the USA and Australia also achieved similar results.

More than half of Europeans (54%) who use mobile banking say that the main reason for doing so is convenience. Convenience is also the reason why Czechs (46%) also use mobile banking. Other reasons for the Czechs are that the bank started offering this service (17%) and that they have a device that is compatible with this application (17%). These three reasons were given by 79% of all respondents. The Czech Republic thus falls within the global average here. Which also confirms that we are beings that prefer simple and readily available solutions that are able to move us from our status quo.

Among the three most common reasons why people do not use mobile banking are that they do not believe that the application is sufficiently secure (56% of Europeans, 60% of Australians, 63% of Americans, 52% of Czechs); the application does not offer anything new (22% of Europeans, 37% of Australians, 32% of Americans, 27% of Czechs); have trouble understanding this application (11% of Europeans, 14% of Australians, 10% of Americans, 9% of Czechs).

4. CASH VERSUS NON-CASH PAYMENTS

As humanity evolves, so does money and banking. In recent years, the amount of cash payments has been decreasing and the volume of non-cash payments has been increasing. In the beginning, it was card payments, but in recent years, mobile phone payments have also come to the fore. Although cashless transactions are on the rise, cash remains a daily part of many of us. This situation was very succinctly summarized in the article by Bindseil & Schneeberger (2023): "*Digitalisation has changed, and will continue to change, the way people make payments. Today's payment options are in some ways unrecounrecognizable what was available a decade ago. Using a device or app, you might pay for your groceries with your watch today and use an app tonight to share costs and settle up with your dinner date before your plates are even cleared. But to be clear: cash remains the most frequently used means of payment. More than half of all day-to-day transactions in shops, restaurants, etc. are made using coins and banknotes."*

One in five Europeans (21%) say they would be able to do without cash. In the Czech Republic, 16% of people say this. Which is below the European average. 27% of Australians and 34% of Americans then said they could live without cash. Although there are people who can imagine their life without cash, it is still a part of our lives. The average European pays with cash most often once every three days (82%), in the Czech Republic cash is used even more often during this period (88%). Much less is paid in cash in the USA (63%) and in Australia (76%).

34% of Europeans could live without cash in Europe, while the Czechs, with 36%, are above the European average. In Australia, 24% of people can imagine life without cash, followed by 38% in the US.

As people start using more cashless payments, this ratio will start to increase. Almost one in eight respondents (79%) said they expect to need less cash in the next 12 months than they have now.

If people use cash, they most often pay with it for lunch/coffee/snacks (67%); they carry some change "just in case" (61%); they pay for taxis (57%) or public transport (57%) or lend them to family (47%). Respondents pay cashless more often than cash in restaurants (54%); regular grocery shopping (66%); gifts (65%); rent/mortgage (63%) and utilities – gas, electricity, petrol, etc. (83%).

People paying with cash believe that this payment is safer (you have to physically have the money with you, it's hard to track who paid for what, etc.) and they have a greater sense of privacy than if they paid cashless. This is also one of the reasons why governments actively discourage households and companies from paying large sums in cash, some states even prohibit this by law. Due to this, even the abolition of high value notes would affect few people. Within Europe, the abolition of such banknotes would affect the finances of 6% of Europeans. In Australia, 9% of people's finances would be affected. Americans would be most affected (18%). In the Czech Republic, the abolition of the highest denomination banknotes would affect 4% of people, which is two percent below the European average.

Although large payments and regular payments are becoming cashless, people still cannot imagine giving up cash completely. 78% of Europeans, 75% of Australians and 79% of Americans hold this view. The Czech Republic is above the European average because 82% of Czechs cannot imagine using only cashless payments.

5. DIGITAL TRANSFORMATION OF BANKING

Digital transformation and digitization bring new challenges and opportunities in all areas of our lives. Banking is no exception. It is important for a bank to acquire customers who develop an emotional relationship with it rather than being loyal to it through satisfaction with its services. Emotionally involved customers are 35% more beneficial to banks than customers who are only very satisfied with their services (Magids et al., 2019). The research then showed that banks are lagging brands such as Apple, Google, Amazon, Samsung or Microsoft in this regard. Consumers feel banks are lagging behind these companies in delivering quality, convenience, and value through an exceptional, digitally-driven consumer experience.

The company is ready for the arrival of digitization in banking. Although 86% of consumers still visit bank branches or use ATMs as the primary way to communicate with their bank, at the same time 84% use online banking services and even 72% use mobile applications to work with online banking. Although the number of people still visiting bank branches is high, it is true that digital paths are used more often than in-person visits. However, as mentioned earlier, digital communication with the bank is limited and primarily used to check account status, change personal data, and execute payment orders. These are services that have been

available in online banking for a good 15 years. Consumers are used to these services, and if they need to make more complex decisions about their finances, they prefer to still visit a brick-and-mortar branch and consult with bankers.

The company is divided on whether they should visit the branch in person, if they should apply for a short-term loan, a new card or start new banking products such as current and savings accounts. Nowadays, some banks allow you to open a current or savings account online, as well as apply for a short-term loan. However, they are much more conservative in this than other financial institutions that allow loans to be processed online.

Today, customers are still looking for banks to meet their needs. It is not yet so common that banks themselves come to customers, offer them tailored products (based on their consumption behavior), or alert them to suspicious movements on their account, etc. However, with this comes Fintech companies that evaluate the consumption behavior of an individual and based on this offer of goods in the vicinity is "tailored" to their persons, or information about discounts at their favorite retailers. Banks have taken one of the few steps towards digitization by allowing customers to connect securely via smartphones as well.

In connection with the digitization of banking, three groups of customers can be defined:

1. **Traditionalists**, who make up about 28% of respondents, are people who rarely use digital technologies. They do most of their banking either directly at the branch or using ATMs. Almost one quarter of traditionalists have never used online banking and 44% have never worked with mobile banking. Only one tenth used online banking or mobile banking at least ten times a month. Traditionalists are also known to use fewer banking products than the rest of the market segment.
2. The second group is **online embracers** (people accepting the online environment), who with 43% occupy the largest part of the market. They use more modern technology to communicate with banks than traditionalists. In this communication, they prefer online banking over mobile banking. Around 20% of online embracers used online banking services ten or more times per month, and 25% used the mobile application ten or more times per month.
3. **Digital adventurers** make up 28% of the examined sample. Millennials, i.e. generation Y, have the largest representation in this group. Like online embracers, they mainly use mobile devices and online channels to check their account, send payments, pay bills. Most often, they use smartphones for these actions. Digital adventurers also make P2P payments using smartphones, either online or via mobile apps. Digital adventurers then own more products and also transact much more frequently than the previous groups. Digital adventurers also prefer the online environment when communicating with the bank, i.e. they do not like to go to branches to apply for products such as a new credit/debit card or check the status of their accounts. They also prefer the possibility of applying for a loan through digital channels, and not by visiting a bank. Digital adventurers are then the group that is most satisfied with their bank and has the greatest emotional attachment to it, even if this attachment is not as strong as to their favorite brands.

A step towards deepening the emotional bond between an individual and his bank is to transfer the real into the digital world and the digital back into the real world. Customers will be willing to use more digital channels as banks increase their security; provide real-time problem solving; and will allow more banking transactions to be done digitally. On the contrary, the attendance of real branches could increase when self-service panels are placed in them; or customers could virtually connect with bank staff from these locations. Another way to convince traditionalists to use more digital banking is to emphasize convenience. This group of customers' needs to be shown how easy it is for them to use online banking, either through training for selected

customer groups or online tutorials that demonstrate this fact. It is also necessary to simplify mobile banking applications so that they are easy to use both for online embracers and, possibly, for traditionalists. Conversely, for digital adventurers, mobile banking applications need to be made the starting point for functioning in the financial market. They would then be able to use it to contact their banker; real-time solutions would be available; the ability to request additional products online; the application would automatically send the selected amount to a savings account, etc. The last recommendation for digitizing banking is to connect banks (branches, ATMs, online and mobile banking, call centers) with third-party digital assistants such as Google Home or Amazon Alexa.

6. CONCLUSION

As today's world, which is becoming more and more digitized, is changing, banking itself needs to change as well. The human factor will still be important when a client wants to interact with their bank, but this interaction will be virtual rather than personal at a branch, and it will be important especially for important client decisions. To win the hearts, minds and wallets of customers, banks must accelerate their digital transformation and reconfigure every customer journey to meet their needs. This is one of the most important keys to strengthening the emotional ties between the client and their bank, which will ensure them leading positions among customers' favorite brands.

BIBLIOGRAPHY

All aboard for the cashless society: But most say they will never be completely cash free. (2017). ING Bank N.V. Retrieved April 10, 2019, from https://think.ing.com/reports/mobile-banking-2017-cashless-society/

Bindseil, U., & Schneeberger, D. (2023). *Cash or cashless? How people pay*. European Central Bank. Retrieved August 30, 2023, from https://www.ecb.europa.eu/press/blog/date/2023/html/ecb.blog230206~1ea270a762.en.html

Česká bankovní asociace. (2021a). *Průzkum ČBA: Češi, digitalizace a el. bankovnictví 2021*. Retrieved August 30, 2023, from https://cbaonline.cz/pruzkum-cba-cesi-digitalizace-a-el-bankovnictvi-2021

Česká bankovní asociace. (2021b). *Průzkum ČBA: Češi a platební styk 2021*. Retrieved August 30, 2023, from https://cbaonline.cz/pruzkum-cba-cesi-a-platebni-styk-2021

How do you prefer to pay?: Mobile money trends in Europe, the USA and Australia. (2018). ING Bank N.V. Retrieved April 10, 2019, from https://think.ing.com/reports/mobile-banking-2018-ing-survey-how-do-you-prefer-to-pay/

Kotkowski, R., & Polasik, M. (2021). COVID-19 pandemic increases the divide between cash and cashless payment users in Europe. *Economics Letters*, *209*, 110139. https://doi.org/10.1016/j.econlet.2021.110139

Kubiczek, J. (2022). Effects of COVID-19 on payment method preferences of Poles. *Financial Internet Quarterly*, *18*(4), 35-49. https://doi.org/10.2478/fiqf-2022-0026

Lu, M.-P., & Kosim, Z. (2022). An empirical study to explore the influence of the COVID-19 crisis on consumers' behaviour towards cashless payment in Malaysia. *Journal of Financial Services Marketing*. https://doi.org/10.1057/s41264-022-00182-9

Mobile banking – the next generation: How should ways to bank and pay evolve in future? (2017). ING Bank N.V. Retrieved April 10, 2019, from

https://think.ing.com/uploads/reports/IIS_Mobile_Banking_2017_Newer_Technologies_FINAL.pdf

Schlossberger, O., & Soldánová, M. (2022). Cashless payment system and Covid-19 on the example of the Czech Republic. *Financial Internet Quarterly*, *18*(1), 31-43. https://doi.org/10.2478/fiqf-2022-0003

Srinivas, V., & Ross, A. *Accelerating digital transformation in banking: Findings from the global consumer survey on digital banking*. Deloitte Insights. Retrieved April 11, 2019, from https://www2.deloitte.com/insights/us/en/industry/financial-services/digital-transformation-in-banking-global-customer-survey.html

Yakean, S. (2020). Advantages and Disadvantages of a Cashless System in Thailand during the COVID-19 Pandemic. *The Journal of Asian Finance, Economics and Business*, *7*(12), 385-388. https://doi.org/10.13106/jafeb.2020.vol7.no12.385

Management and Economic Policy

DO INSURANCE STRESS TESTS MATTER? EVIDENCE FROM THE EU-WIDE INSURANCE STRESS TESTS

Petr JAKUBIK
Charles University in Prague, Czech Republic
jakubik@fsv.cuni.cz; petrjakubik@seznam.cz

Saida TELEU
Anglo-American University, Prague, Czech Republic
Charles University in Prague, Czech Republic
saida.teleu@aauni.edu; saida.teleu@fsv.cuni.cz; teleusaida@gmail.com

Abstract: *Since the global financial crisis in 2007, stress tests have become standard tools for regulators and supervisors to assess the risks and vulnerabilities of financial sectors. This paper investigates returns and systemic risk implications of stress tests in the European insurance sector by looking at equity prices reactions to the EU-wide exercises in 2014, 2016 and 2018. The results show that while the market does not strongly respond to the disclosure of insurance stress test information, the public disclosure seems to have impact on systemic risk. We present evidence that the public consultation in 2018 contributed to the decline in systemic risk. On the contrary, the publication of recommendations in 2018 contributed to its increase, which could be attributed to the follow-up supervisory actions at the national level rather than the stress test itself.*

Keywords: *European insurance sector, EU-wide insurance stress test, systemic risk, event study, equity prices*

JEL Codes: G23, G12, G14, G18

Financial support from the Czech Science Foundation (Project No. GA 23-05777S) is gratefully acknowledged. The views expressed in this paper are exclusively those of the authors and do not necessarily reflect those of the institutions with which the authors are affiliated.

1. INTRODUCTION

Over the past decade, system-wide stress tests have been fully established as a key tool for financial stability risk assessment. How stress tests are implemented has evolved since the financial crisis in 2007. As they may affect market participants' behaviour, supervisors, policy makers and academicians continue to discuss the long-term strategy for their use. Up to today, most of research on stress test has been focused on banking sector. There are different findings on the impact of stress tests on banks' behaviour. While some research papers find that stress tests contribute to banks' more prudent behaviour (i.e. Acharya et al., 2014; Kohn & Liang, 2019), others argue that stress test results do not reduce interbank borrowing and lending, neither evidence that stress tested banks significantly change the loan portfolio composition (i.e. Kohn & Liang, 2019). Cornett et al. (2018) find that banks involved in stress test lower their dividend pay-outs significantly more in comparison to non-stress tested banks. Finally, Sahin et al (2020) conclude that stress tests move equity prices and credit markets following the disclosure of stress test results and contribute to decline of systemic risk.

Insurance sector-wide stress tests share some similar characteristics with banking exercises. They are forward looking and focus on tail risks by putting weight on highly adverse scenarios. Additionally, the same scenarios are applied to all insurance and re-insurance

companies to obtain consistent supervisory risk assessments across (re)insurers. However, there are also many differences in insurance and banking exercises. While bank system-wide stress tests typically use a 3-year horizon, insurance stress tests use the concept of static exercise with instantaneous shocks. The reason is that an insurance business is much more complex with the main challenge of modelling liabilities reflecting a long-term business. Contrary, bank stress tests focus primarily on asset side as liabilities typically reflect deposits that do not require any modelling for solvency exercises. Furthermore, system-wide bottom-up banking stress tests were extensively used to determine the level of capital needed after the financial crisis in 2007 that changed in later years using stress test exercises as a supervisory tool. In the case of EU-wide bottom-up insurance stress tests conducted by the European Insurance and Occupational Pensions Authority (EIOPA), it has never been considered as a pass-or-fail or capital exercise. Instead, the exercises have been tailored to assess the resilience of the European insurance sector to market adverse scenarios and insurance specific shocks with potential negative implications for the stability of European financial markets and the real economy. As the main evaluation metric is typically used not only a solvency capital ratio (SCR), but also an asset over liabilities ratio.

Contrary to banking stress tests, European wide insurance stress tests have never been used to determine capital needs. It was also driven by the fact that the European insurance sector have been well capitalised not experiencing a major crisis so far. However, even outside of a period of crisis, the disclosure of stress test results might provide valuable information to market participants and the public, enhances transparency, and promotes market discipline (Bernanke, 2013). In this respect, contrary to EU-wide bank stress tests conducted by the European Banking Authority (EBA), EIOPA does not have a legal power to enforce such a disclosure of individual insurance stress test results. Although, EIOPA has extensively discussed voluntary disclosures with stress test participants to address all of their concerns, the vast majority has remained strongly against any individual disclosure.

Literature suggests potential endogenous costs associated with disclosure of unique information (Goldstein & Sapra, 2014). It might induce sub-optimal behaviour by insurers that will develop an incentive to pass the tests rather than engage in prudent risk-taking behaviour. Moreover, the main issue might be potential adverse implications as a panic of market investors leading to drops in insurers' equity prices. This was also one of the main arguments of insurance companies participating in the EU-wide insurance exercises not to disclose individual results. Moreover, the companies have argued that an insurance is more complex than banking business due to complicated liabilities' structures and the results might be potentially misinterpreted by the markets. Additionally, their original argument was also that the Solvency II directive have been in place only since 2016 and the market participants including analysts and journalists need more time to fully learn and understand the results in the context of regulatory framework. However, this argument seems to be less relevant as time has passed since the introduction of Solvency II regime. Given all mentioned, the exercises should be designed to reduce such endogenous costs by providing more transparency and necessary information that the results are correctly interpreted by the market.

The first EU-wide insurance stress test was conducted in December 2009 by the Committee of European Insurance and Occupational Pensions Supervisors (CEIOPS) for large and important insurance groups in Europe as a response to the 2007 financial crisis.[1] The second EU-wide insurance stress was conducted in 2011 by EIOPA and employed a market-based valuation framework. However, this paper examines the impact of insurance stress tests in the EU on insurers' stock prices and systematic risk after those exercises, in particular over the

[1] On 5 November 2003, the European Commission adopted the decision, to establish the Committee of European Insurance and Occupational Pensions Supervisors, which entered into force on 24 November 2003.

2014–18 period. The reason is that the exercises in 2009 and 2011 were conducted at the time when the existing regulation did not allow a market-based assessment. We consider the effect of disclosure of the results of stress test, but also stress test-related announcements as consultation, scenario, launch, and follow-up recommendations of the exercises. Our research distinguishes analytically between the stress tests exercises as the focus of stress test exercises were different. For the analysis we considered three stress test exercises from the years 2014, 2016, and 2018. The first fully-fledged EU-wide insurance stress test exercise using the Solvency II framework was conducted in 2014 and tests the resilience of insurers regarding market risk under a combination of historical and hypothetical scenarios. Additionally, the persistent low yield environment and insurance risk has been tested. (EIOPA, 2014a; EIOPA, 2014b). The 2016 exercise was tailored to assess the insurance sector's vulnerabilities to a combination of market adverse scenarios. It was based on a sample of solo insurance undertakings most vulnerable in a persistently low-interest-rate environment and a double hit scenario where, in addition to the low-interest rates, the prices of the assets were also stressed (EIOPA, 2016). The 2018 exercise was designed to assess the resilience of the European insurance sector to a prolonged low yield environment (yield curve down scenario) as well as of a sudden reversal of risk premia (yield curve up scenario), which were identified as key risks across financial sectors at the time of conducting the exercise. In total 42 (re)insurance groups, representing a market coverage of around 75% based on total consolidated assets, participated (EIOPA, 2018). Since 2018, EIOPA has extended to a three-year frequency of stress test exercises in order to allow for sufficient follow-up with national supervisors on the identified vulnerabilities to utilise the full potential of the exercises.[2] In this respect, EIOPA has further worked on methodologies to be used according to objectives selected for the particular stress test exercise. Supervisory stress tests can have various objectives which drive the design, methodology and application of each stress test exercise. The most important distinction is between microprudential and macroprudential objectives (EIOPA, 2019). Based on a constructive dialogue and feedback received from stakeholders in the preparation of the first methodological paper (EIOPA, 2019), EIOPA has followed the same approach and has engaged with stakeholders to enrich the stress test toolbox with additional elements that may be applied in future exercises (EIOPA, 2020). Apart from the main aim of EU-wide stress test exercises to assess the resilience of financial institutions to adverse market developments, these exercises should also contribute to the overall assessment of systemic risk in the EU financial system.

From theoretical standpoint, the market reaction to the disclosure of stress test information is not clear given two main reasons. First, the response may depend on the type of information being disclosed (Petrella & Resti, 2013). Supervisory stress tests can have various objectives which drive the design, methodology and application of each stress test exercises (EIOPA, 2019). Second, the financial stability condition and circumstances under which the stress test has been conducted may affect how markets respond to the disclosure of the stress test results, stress test-related information. For instance, Schuermann (2014) argues that there is a higher uncertainty during financial crises in relation to quality and valuation of assets held by financial institutions than under normal circumstances. This implies that the release of information about individual insurance company may provide new information to which market participants respond under higher uncertainty. Under stable financial environment, the release of stress test outcome may not surprise market (Sahin et al., 2020). In this context, Ahnert et al. (2018) conclude that the results of stress tests are to a high degree predictable. The authors examine US bank' asset quality and return of equity are significant predictor of the results of stress test. Finally, a well-established institutional framework and efficient communication of

[2] EIOPA is not a direct supervisor of the European insurance sector. Hence, all contacts with participating insurance companies are hold via national supervisors.

the scope, methodology, scenario design, the granularity of disclosed information, and the planned follow-up may play a greater role than the technical specifications of the stress test (Candelon et al., 2015)

Our research adds to the literature in the following ways. First, we apply an event study approach to examine the impact of the disclosure of stress test information on individual insurance companies' stock prices. Previous studies have analysed financial market effects of the disclosure of stress test results in the EU and U.S. banking sector (the section 2 provides an extensive overview and discussion of previous research). To our best knowledge, this is the first paper that investigates this topic for the insurance sector, particularly the European insurance sector. The research papers that come closest to our paper in terms of scope and methodology are Sahin et al. (2020), Flannery et al. (2017), and Fernandes et al. (2017), however they consider a wide range of U.S. banking stress tests. Second, we contribute to the literature by assessing not only market reactions to the disclosure of stress test results, but also investigate the financial market impact of the disclosure of other stress test related information, i.e., their announcement (see also Sahin et al, 2020; Ahnert et al., 2018; Schuerman, 2014; Candelon et al., 2015) and the disclosure of the stress test scenario, launch, technical specifications, and recommendations. We included these events into the research as they also provide information on stress test to market participants (Petrella & Resti, 2013). The third contribution, our research is not limited to measuring the impact of the disclosure of stress test-related information on equity returns but also considers the impact of stress tests on insurance company betas. Sahin et al. (2020) find that betas are particularly relevant for understanding the effects of stress tests, as they capture systematic risk based on the co-movement of equity returns with the overall market. Hence, following Nijskens and Wagner (2011) approach, we investigate whether the change in betas is due to changes in individual insurance company risk, or due to changes in "systemic risk", defined by Sahin et al. (2020).

Our research paper is related to the following strands of literature (see Section 2 for a detailed discussion of previous research). The first strand examines the optimal level of disclosure (Goldstein & Sapra, 2014; Carboni et al., 2017; Georgescu et al., 2017). Some of these research papers find that there is no optimal disclosure strategy. Additionally, the disclosure of too much information may not always be optimal. Second strand of related literature examines whether the stress test related information reduces the opacity of financial institutions (Beltratti, 2011; Ellahie, 2012; Fernandes et al., 2017; Flannery et al., 2017; Sahin et al., 2020). These studies offer different perspectives on the disclosure of stress test results and the opacity of financial institutions. Nonetheless, most of them agree that stress tests provide valuable information for markets, and hence, reduce the opacity of financial institutions. Third strands contribute to the analysis of the impact of the release of stress test related information and results on equity returns in insurance and re-insurance sector.

The paper is organised as follows. First, we present the literature related to this study. Second, we describe the data and methodology used. Third, we provide the results of our empirical analysis. The last section concludes based on the obtained results.

2. LITERATURE REVIEW

This paper contributes to the recent research stream on regulatory stress tests as well as the more established literature on financial stability and regulation of financial institutions.

There is a small but emerging literature on stress test disclosures and their implications, offering both theoretical and empirical angles. Theoretical studies mainly cover the optimal level of disclosure. Following Bernanke (2013), the disclosure of information related to stress tests promotes transparency by providing investors and market participants with consistent and

comparable information on financial institutions' (particularly banks') financial conditions. Other authors recognize the benefits of disclosure, but also shed light on potential related issues (Schuermann, 2014; Goldstein & Leitner, 2018; Gick et al., 2012). Carboni et al. (2017) highlight the so-called Hirsh-Leifer effect related to the disclosure of too much information, which consequently destroys risk-sharing opportunities and reduces liquidity in the interbank market. During a crisis, when the risk-sharing arrangements are compromised by public perception that financial institutions are opaque and under-capitalized, the disclosure, at least partial, of regulatory stress tests can produce a stabilizing effect. To reinforce this effect, it is critical that regulators provide new and valuable information to market participants by increasing transparency on their financial conditions. Similarly, based on a game-theoretical framework, Gick and Pausch (2012) claim that macro stress tests can improve welfare if the methodology and results of the stress test are communicated effectively. In the case of the banking sector, Spargoli (2012) argues in favour of disclosing banks' capital shortfalls under the assumption that regulators are able to ensure banks' recapitalizations. Some theoretical papers investigate the trade-off implied by the disclosure of stress test results. Goldstein and Sapra (2014), for example, find that disclosure of regulatory information and stress test results can have an inimical effect on the ex-ante incentives of financial institutions. In this context, Georgescu et al. (2017) argue that in the absence of information frictions, more information always improves market discipline. In reality, financial institutions are opaque, and their reactions are endogenous to the regulatory environment. Furthermore, the results of Morris and Shin (2002) suggest that if the precision of the disclosed information is not sufficiently high, market participants may place unnecessary weight on the public signal, causing market overreaction and coordination failures.

There is a limited but growing number of empirical papers assessing market reactions to stress tests or similar regulatory exercises. Some of these studies assess whether those exercises were able to increase transparency. The results of these empirical assessments have contributed greatly to the discussion of designing an optimal level of disclosures of stress tests. Financial institutions are generally considered to suffer from a degree of opaqueness, specifically the inaccessibility of financial data to outsiders (Carboni et al., 2017). Hence, the market reaction to the disclosure of stress test results is to some extent proof of the existence and the reduction of opaqueness. However, the scale and timing of stress test information provision are challenged by scholars and regulators as a trade-off between restoring confidence in financial institutions and risk of destabilising the financial system by signalling-out institutions failing the exercise (Golstein et al., 2015). Studies that assess the impact of the released information related to stress tests can be used to modify stress test design and to improve stress test-related communication.

There is an emerging literature that provides an empirically oriented impact assessment of the effectiveness of the disclosure of European regulatory institutions, specifically, EU-wide stress test by the European Banking Authority (EBA) (Georgescu et al., 2017; Ahnert et al., 2018; Georgoutsos & Moratis, 2020) and Comprehensive Assessment by the Single Supervisory Mechanism (SSM) (Sahin et al., 2016; Lazzari et al., 2017; Carboni et al., 2017). Our study takes a different perspective from the existing papers on the European cases, since we analyse the market reaction related to the EIOPA insurance wide stress tests covering not only the dates of results' disclosures, but also other intermediate steps of the exercises.

Moreover, the aforementioned literature concentrates on the financial sector or the banking industry, with minimal emphasis on the insurance sector. Traditionally, insurance sectors are not deemed to be of systemic relevance to destabilise the overall financial system. Insurers, in contrast to banks, are typically not subject to a "bank run" type of event and

therefore do not face the potential of unexpected liquidity risk.[3] Nonetheless, the seminal theoretical work of Arrow (1963), Akerlof (1970), and Rothschild et al. (1976) shed light on the potential for market failures arising from asymmetric information in private insurance markets. Research in this direction has advanced, beginning with theoretically motivated attempts to test if asymmetric information exists in insurance markets, and in what form (Cohen, 2005; Finkelstein et al., 2006; Einav et al., 2010). More recently, Bierth et al. (2015) assess the exposure and contribution of 253 insurance companies operating worldwide to systemic risk between 2000 and 2012. The authors suggest that the rise of interconnectedness within the financial sector increases insurers' systemic risk exposure, and highly leveraged insurance entities contribute more to systemic risk. Moreover, Chotibhak et al. (2018) explore how systemic risk may arise from the inter-connectedness of the asset side of financial institutions' balance sheets. In particular, they show that asset similarity across insurers arises from insurers' business models might generate ex post fire sale externalities that will propagate systemic risk.

Garcia and Tsur (2021) analyse the optimal information structure in competitive insurance markets with adverse selection from a regulatory perspective. They suggest that the optimal rating system minimises ex-ante risk subject to participation constraints, which proves the existence of a unique optimal system under which all individuals trade.

The main contribution of this paper is that, to the best of our knowledge, this is the first study providing empirical evidence of market reaction to the EIOPA EU-wide stress tests and their impact on systemic risk in the sector. By observing market reactions from the announcements of the EU-wide insurance stress tests, this is the first paper that investigates whether the insurance stress test increased transparency and confidence in the insurance sector. The results have important policy implications for regulators, since they shed some light on investors' perceptions on the use of this important supervisory tool applied to the European insurance sector.

3. DATA DESCRIPTION AND METHODOLOGY

We collect daily data for all listed insurance companies at the group level participating in the EIOPA EU-wide stress test in 2018 and 2014.[4] There are 42 (out of which 20 are listed) and 31 (out of which 19 are listed) insurance groups participating in the 2018 and 2014 exercise, respectively. Overall, 29 insurance groups are included in our sample for both the 2014 and the 2018 stress test. Moreover, we collect daily data for all listed insurers at the solo level for both the 2014 and the 2016 exercise. However, only a few solo insurers are listed. Out of the 236 solos which participated in the 2016 EIOPA insurance stress test, only 6 are listed, and 24 solos are listed out of the 327 that participated in the 2014 EIOPA stress test. However, some of those listed solos participating in the 2014 exercise were traded with only a few transactions. In fact, their market value changes were very limited. Hence, we also select a subsample of those solo insurers whose equity prices changed on at least 85% of the trading days included in the sample. In this respect, we ensure sufficient liquidity of those titles in stock exchange markets but reduce the sample to 7 solo insurers only. The results for solos thus must be interpreted very carefully due to their limited representativeness. The list of insurers included in the sample are provided in the Annex – Table 5.

We measure market reaction around all announcements related to the mentioned EIOPA

[3] However, similar situation as bank run was experienced by several life-insurance companies steaming from mass lapse events. Hence, the need to monitor and assess liquidity risk is currently widely debate (EIOPA, 2020).

[4] Apart from the 2014 and 2018 exercise, there has not been any further stress test exercise that would be conducted at group level. The exercise in 2016 was performed on insurance solo basis and the 2021 exercise was ongoing at the time of writing this study.

insurance EU-wide stress tests. Table 1 reports the list of the considered events related to the stress tests. Further details on the reported announcement days can be found in the Annex – Table 6.

Table 1. EIOPA Stress Test events

2014		2016		2018	
		Invitation to the workshop with stakeholders	14-Mar-16		
Consultation	13-Mar-14	Scenario	17-Mar-16	Scenario	09-Apr-18
Scenario	08-Apr-14	Consultation	13-Apr-16	Consultation	16-Apr-18
Launch	30-Apr-14	Launch	24-May-16	Launch & technical specifications	14-May-18
Technical specifications	28-May-14	Technical specifications	01-Jun-16	Results	14-Dec-18
Results and Recommendations	01-Dec-14	Results and Recommendations	15-Dec-16	Recommendations	26-Apr-19

Daily stock market data are obtained from Reuters. We estimate abnormal returns (ARs) as the difference between actual stock returns and expected returns. Following a common procedure to estimate (e.g. DeLong & DeYoung, 2007), we use the market model (MacKinlay, 1997) in which expected returns for an insurer ($R_{i,t}$) are obtained as a function of the market portfolio returns (Rm_t), represented by the European equity index (i.e. STOXX 600).[5] Market model parameters are obtained with daily logarithmic returns of insurance stock prices over a year period (255 working days) preceding 10 days before the announcement date. ARs are then cumulated over a period around the announcement date. Following Morgan et al. (2014) and other articles measuring market reaction to policy announcements (e.g. Flannery et al., 2017; Sahin et. al., 2020) we have considered the following event windows: (-1;+1), (-1;+2), (-1;+5), (-1;+8), (-2;+2), (-2;+5), (-2;+8) to ensure the consistency of our findings. We test the hypothesis of a market reaction significantly different from zero using a standard event study methodology. A recent study by Korali and Pynnonnen (2010) proposes a new test statistic that adjust t-statistics to consider possible cross-sectional correlation among abnormal returns. Furthermore, as a robustness check, we also use the non-parametric rank test proposed by Corrado (1989) for a single day and further elaborated by Campell and Wasley (1993) for a multiday event period.

Following Nijskens and Wagner (2011), we decompose the beta into a volatility component and a market correlation component to measure the possible changes in systemic risk related to stress test events using equation (1).

$$R_{i,t} = \alpha_i + \beta Rm_t + \sum_j \delta_j D^j + \sum_j \zeta_j D^j * Rm_t + \varepsilon_{i,t} \quad (1)$$

where α_i is the insurer's fixed effect, and D^j is a dummy variable with value of 1 after the event and up to 10 trading days of the following stress test event *j* that refer to all events listed in Table 1. Furthermore, we introduce novelty into their methodology through the adjustment of the decomposed beta, following the methodology of Jakubik and Uguz (2021) that deliver higher estimation efficiency. In the first step, we estimate beta for each insurance company *i* in the sample. In the second step, we create a new variable as follows.

$$\widehat{Rm}_{i,t} = \hat{\beta}_i Rm_t \quad (2)$$

Then we substitute the original variable for market return in equation (1) by the newly created variable. Formally,

[5] Alternatively, the insurance market sub-index of STOXX could be used as a proxy for the market return. However, it is not very suitable as the most of the insurance companies that composed the index are also those being stress-tested by EIOPA.

$$R_{i,t} = \alpha_i + \theta \widehat{Rm}_{i,t} + \sum_j \delta_j D^j + \sum_j \varphi_j D^j * Rm_t + \varepsilon_{i,t} \quad (3)$$

Systemic risk is represented by the interacted term between event date and market return. Negative coefficients of this term imply a reduction of systemic risk as a reaction to the specific stress test-related event, while positive coefficients suggest an increase in systemic risk.

Furthermore, we could add some additional explanatory variables on top of the equity index to control for the macro-financial environment and company specific conditions. Specifically, we could consider both macroeconomic indicators reflecting macro-financial context at the given period and variables measuring the quality of institutions. At the same time, specific conditions at individual company level should be already captured by the model (3) via the insurer's fixed effect. Moreover, as the main results are related to groups that operate across many European countries, it is difficult to employ any specific country conditions as the businesses in home countries do not necessarily need to dominate the overall businesses of groups. In fact, we have some cases in the sample where the businesses in home countries, where the companies are registered, are relatively limited compared to the overall business activities of those group. However, the main obstacle for control variables is related to daily frequency that we use in the equation (3). Macroeconomic variables as GDP are available only quarterly, other variables as unemployment or inflation on monthly basis. The only available relevant daily variables are probably yields. In this respect, we opt for German 10-year government bond yield that could also serve as a good proxy for the risk free rate in Europe that is extremely important for insurers affecting not only assets, but also liabilities. Moreover, there were historical periods affecting our sample when yields dropped to ultra-low/negative levels adversely affecting insurers' equity prices due to the negative effect to long-term liabilities related to life insurance business. Similarly, as for some macroeconomic indicators, company specific variables as SCR ratio, profitability or loss ratio are available only quarterly. However, those indicators might be to some extend captured by the insurers' fixed effects. Moreover, given that stress tests and their parameters might be known a bit in advance, we further modify the dummy variables to $D^{j'}$ with value of 1 corresponding to 10 days before the event and up to 10 trading days of the following stress test event j that refers to all events listed in Table 1. Hence, we can extend the equation as follow.[6]

$$R_{i,t} = \alpha_i + \theta \widehat{Rm}_{i,t} + \sum_j \delta_j D^{j'} + \sum_j \varphi_j D^{j'} * Rm_t + \sum_k \theta_j X^k + \varepsilon_{i,t} \quad (4)$$

Where X^k is k[th] control variable. As discussed, we include only one control variable – German 10-year government bond (Yield) ($k = 1$). Nevertheless, the other variables that are not included should be partially reflected in the equity price index that should be, in particular, forward-looking indicator for GDP growth and overall reflects the macro-financial environment.

4. EMPIRICAL RESULTS

Our study covers three EU-wide stress tests based on the market-based Solvency II regime that were conducted so far, namely the exercises performed in 2014, 2016 and 2018. The 2021 exercise was ongoing at the time of conducting this study, therefore it could not be included in this research. The empirical results obtained should be assessed in the context of the different

[6] However, even this modification of the model does not necessary need to fully capture a potential earlier incorporation of stress tests' announcements into equity prices when some market relevant information related to the exercises are leaked and transmitted more in advance of the public announcements.

attributes and aims of past exercises. The stress test in 2014 that was performed for insurance groups was the first exercise that employed the Solvency II framework at a time when its main attributes were already agreed on, despite the regulatory regime still not being in place. Hence, it could be seen as the first exercise providing a vulnerability assessment under the Solvency II valuation regime. In contrast, the 2016 exercise was the first stress test when the new Solvency II regulatory regime was in place. Unlike in 2014 and 2018, the 2016 exercise was conducted for insurers' solos, having two modules. The first was a standard module assessing the impact of an adverse market scenario on insurance solvency position. The second one assessed the impact of low yields on European solo insurers. Finally, the 2018 exercise was again conducted for insurers' groups. It was also the first time EIOPA asked groups for their consent to publish individual results, as EIOPA does not have the legal power to enforce it. However, only four groups agreed to publish their results. For most stress test participants, therefore, only aggregate results were published, as in the previous two exercises investigated in our study.

Our analysis covers the launch of public consultation of the exercises, publication of stress test scenarios, launch of stress test exercises, publication of a revised version of technical specifications based on a question & answer process, publication of results and issuance of supervisory recommendations. Furthermore, for the 2016 exercise, we also test a public invitation to the workshop with stakeholders meant to initiate the process of public consultation. In some cases, the two events took place on the same day, such as launching the exercise together with the final version of the technical specifications in 2018, and publishing the results together with supervisory recommendations in 2014 and 2016.

Results of the conducted event studies for the 2014 and 2018 exercises with event windows (-1, 2) and (-1, 8) are provided in Table 2. Results for the remaining tested event windows (-2;+2), (-2;+5), (-2;+8), (-1;+1), (-1;+5) do not bring any additional information and are reported in Annex – Table 8.

Overall, the results reveal no significant market reactions to the 2014 and 2018 stress tests that would be robust through different specifications and employed statistical tests. The significant positive impact of publishing the final version of technical specifications for the 2014 stress test only applied to some event windows when using the rank test for (-1,2) and (-1,+1) or simple t-test for (-1,+1). On the contrary, a statistically significant positive impact could be observed for the publication of the 2018 stress test for (-1, 8) event windows that is robust across different test statistics.

We further investigated the results at individual group level. A significant market reaction was obtained only for a few insurers. The results for the event window (-1, 2) and both the 2014 and 2018 exercises are provided in Annex – Table 7. In particular, for the 2018 stress test, the market reacted positively on the stress test results in case of 3 insurance groups, respectively on the scenario announcement for 1 group. Moreover, no significant market reaction could be seen for those insurers that agreed to publish their individual results. On the contrary, negative reaction can be observed for 1 group (Standard Life Aberdeen plc) in case of the scenario announcement and 1 group (Legal & General Group Plc) for the recommendations. For the 2014 exercise, we can record only 3 negative market reactions for the launch and 1 negative market reaction for the scenario.

For the 2016 exercise, the sample is very limited. The results seem to be in line with the outcomes for the 2014 and 2018 exercise, as the analysis does not point to any significant impact that would be robust across all tests. However, given that so few companies were used for this sample, we cannot draw any strong conclusion from this.

Table 2. Cumulative abnormal market returns (CAR) and their statistical significance

Stress Test	Events	CAR	t-test st.	Adjusted t-test st.	Rank test st.
Event window		(-1,2)			
2014	Consultation	0.7379%	0.7480	0.7303	0.1114
	Scenario	-0.4714%	-0.5040	-0.4920	-0.5173
	Launch	-0.7543%	-0.8298	-0.8097	-0.1706
	Technical Specifications	1.2231%	1.5622	1.5242	2.0895**
	Results and recommendations	-0.7506%	-0.9062	-0.8827	-0.0727
2018	Consultation	0.2848%	0.3035	0.2949	0.3321
	Scenario	0.5803%	0.6160	0.5985	0.6853
	Launch & technical specifications	-0.8248%	-0.8720	-0.8468	-0.9965
	Results	0.8379%	0.8248	0.8020	0.6818
	Recommendation	0.2969%	0.2836	0.2759	0.6791
Event window		(-1,8)			
2014	Consultation	0.8085%	0.4942	0.4826	0.3343
	Scenario	-1.0511%	-0.7108	-0.6938	-0.4876
	Launch	-2.3475%	-1.6332	-1.5936	-1.0167
	Technical Specifications	1.5926%	1.2456	1.2153	0.9201
	Results and recommendations	-0.0890%	-0.0648	-0.0631	0.2531
2018	Consultation	-0.0122%	-0.0082	-0.0080	0.5763
	Scenario	1.5644%	1.0504	1.0206	1.1932
	Launch & technical specifications	-1.9662%	-1.3859	-1.3458	-1.3064
	Results	2.5935%	1.7018*	1.6549*	1.6761*
	Recommendation	-0.4427%	-0.2674	-0.2601	0.0079

*Note: *p<0.1; **p<0.05; ***p<0.01; market model parameters within an event study framework are obtained with daily logarithmic returns of insurance stock prices over a year period (255 working days) preceding 10 days before the announcement date.*

Finally, we investigate whether the conducted stress tests based on insurance groups contributed to a decrease in systemic risk (2014 and 2018, Table 3 and 4) using a panel regression with fixed effects. To this end, we estimate equation (1) with insurers' returns (column – "Normal"), standardised returns (column – "Standardised") and returns with adjusted beta (column – "Beta-adjusted") according to equation (3). Moreover, we estimate equation 4 (column – "Beta-adjusted with controls") to (i) include German 10-year government bond as a control variable and (ii) reflect that the specific information might be known to the market in advance of particular announcements. Given that both 2014 and 2018 were group exercises, we cannot further investigate whether there are some differences in terms of stress tests' impact on systemic risks for different countries as both exercises were conducted for large insurance groups in Europe with businesses spread across several countries. Similarly, as we cover only large insurance groups in the sample, further split according to the size of insurance companies is not much relevant.

The obtained results for insurers' groups suggest that some elements of the exercise could decrease systemic risk, particularly the consultation with stakeholders. However, this conclusion cannot be made when looking at the insurance stress test 2014 only. Despite the first three results suggest that the publication of final version of technical specifications for the Insurance Stress Test 2014 reduced systemic risk in the insurance equity market, this outcome is not robust when controlling for other factors represented by German government bond yields and modified dummy variables. Similarly, the launch of Insurance Stress Test 2014 seems to

reduce systemic risk when using standardised insurers' returns, but this reduction appears to be insignificant for insurers' returns and returns with adjusted beta even when considering controls.

Table 3. Systemic risk results for groups, EIOPA Stress Test 2014

2014	Normal	Standardized	Beta-adjusted	Beta-adjusted with controls
Stoxx	0.8913***	0.5783***	1.0211***	1.0012***
	(0.0206)	(0.0129)	(0.0225)	(0.0244)
Yield				0.0017***
				(0.0005)
Consultation	0.1876	0.1175	0.1907	0.1158
	(0.1453)	(0.0913)	(0.1585)	(0.0754)
Scenario	0.0764	0.0616	0.0724	0.0925
	(0.0844)	(0.053)	(0.0921)	(0.1193)
Launch	-0.2606	-0.2200**	-0.1301	0.0540
	(0.1699)	(0.1068)	(0.1853)	(0.1353)
Technical	-0.0818**	-0.0562**	-0.0843**	(0.0393)
specifications	(0.0352)	(0.0221)	(0.0384)	(0.0512)
Results and	0.0141	0.0136	-0.0061	0.0012
Recommendations	(0.0486)	(0.0306)	(0.0531)	(0.0512)
Observations	7434	7434	7434	7434
R^2	0.2942	0.3074	0.3150	0.3326
Adjusted R^2	0.2932	0.3065	0.3140	0.3300

*Note: *p<0.1; **p<0.05; ***p<0.01*

In contrast, our results for 2018 stress test reveal a positive effect for the initiation of consultation with stakeholders. This is robust to all considered specifications. Although, our empirical analysis suggests that the results for the stress test scenario announcement and the publication of technical specification might reduce systemic risk as well, it is not robust when controlling for other factors (Table 4, the fourth column).

On the contrary, the publication of the recommendations in 2018 seems to increase systemic risk. However, it might represent a market reaction to the follow-up supervisory actions at the national level rather than to the EU-wide stress test itself, as a recommendation is a legal tool of the EIOPA Regulation. It therefore might be the choice of tool driving the obtained results. It could also be related to the fact that apart from four insurers, the others did not grant their consent on publication of their individual results that might be expected by the market.[7] Unlike the EU banking stress tests, the European body does not have the legal power to enforce the disclosure of individual results.

[7] The consent was provided by Vienna Insurance Group, PFA Pension, Forsikringsselskabet Danica Skadeforsikringsab and MAPFRE S.A. However, only MAPFRE S.A. is part of the employed data sample in this study.

Table 4. Systemic risk results for groups, EIOPA Stress Test 2018

2018	Normal	Standardized	Beta-adjusted	Beta-adjusted with controls
Stoxx	0.9377***	0.5816***	0.9828***	0.9861***
	(0.0192)	(0.0116)	(0.0195)	(0.0224)
Yield				0.0001***
				(0.0003)
Consultation	-0.3298**	-0.2029**	-0.3551**	-0.2800***
	(0.1616)	(0.0976)	(0.1635)	(0.0969)
Scenario	-0.3935***	-0.2479***	-0.4146***	-0.0538
	(0.0932)	(0.0563)	(0.0944)	(0.0865)
Launch & technical specifications	0.0772**	0.0496**	0.0669*	0.0464
	(0.0337)	(0.0204)	(0.0342)	(0.0361)
Results	0.0064	0.0026	0.0112	0.0135
	(0.0387)	(0.0234)	(0.0393)	(0.0364)
Recommendations	0.1124**	0.0686**	0.1241**	0.1443***
	(0.0519)	(0.0313)	(0.0526)	(0.0541)
Observations	9500	9500	9500	9500
R^2	0.3372	0.3447	0.3465	0.3540
Adjusted R^2	0.3353	0.344	0.3458	0.3520

*Note: *p<0.1; **p<0.05; ***p<0.01*

Our results show that the consultation have impact on equity prices during the stress test in 2018. This suggests that investors found this event particularly informative and perhaps given certain parameters adjust their behaviour, which is traceable in the changes of equity prices. This could be the reason why the consequent announcements including the final results are not significant in the 2018 exercise, as it might be already incorporated in the prices according to investors' expectations. In this context, our findings are in line with Ahnert et al. (2018), who examined US banks suggesting that the results of stress tests are to a high degree predictable. In contrast, the recommendations in 2018 were conducted as a separate exercise with a different event day.

Furthermore, according to the results for the 2014 exercise, all the announcements investigated had no significant and robust impact on the equity prices. This might suggest that the stress test was less informative given the lack of experience with such an exercise for both EIOPA and market participants. It is also in line with the overall impression when reading the stress test report that is very lengthy, with long complicated sentences and unclear and not streamlined messages with the results provided in a very high level of aggregation. Overall, it is very difficult to make a clear conclusion that would provide valuable additional information to market participants. Hence, not surprisingly, this exercise had no significant impact on systemic risk.

However, the overall analysis on systemic risk suggests that EIOPA stress test are informative, as European regulator inform financial markets on potential vulnerabilities of insurance companies via the events in particular consultations, disclosure of technical specifications, and recommendations. At the same time the systemic risk assessment showed us that investors in the insurance markets are relatively quickly adjusting their behaviour once new information is received. Hence, we see the impact on equity prices rather at the beginning of stress test exercises in line with Ahnert et al. (2018). In this context, we can argue that EU-wide stress test provides information to markets, as it provides indications to the investors on

future vulnerabilities of the insurance companies. Our results are different for the similar methodology applied to the European banking sector (Sahin et al., 2020), where they found that the publication of the stress test results affect and decreased systemic risk in 2009, 2012, and 2015. This difference might be driven by differences in business models of insurance and banking sector characterised by insurers' long-term liabilities, therefore more significant impact of the key parameters set up in the beginning of the exercises. To better understand market reaction to stress test events within the insurance sector, we assume that investors are informed about regulators' expectations prior the event date. For this purpose, we set up 10 days prior to the even date. We find that the investors are already adjusting their behaviour during the period of consultation. At the same time is worth mention that the public consultation and technical specifications are relatively close to each other. In this context it can be rightful to assume that markets adjusting their behaviour already in the beginning of stress test exercise.

The same analysis was also performed for solo insurers for both the 2014 and 2016 stress test. Due to the small number of listed companies participating in the exercise, however, we cannot draw a clear conclusion.

5. CONCLUSION

EU-wide insurance stress tests have become a standard part of the supervisory risk assessment toolkit to identify key risks and vulnerabilities to follow up. This study contributes to the existing literature by investigating market reactions to the conducted EU-wide stress tests as well as the impact of exercises on systemic risk. To our best knowledge, this is the first paper dealing with this topic for the insurance sector.

Our empirical results suggest that the EU-wide insurance stress tests conducted, especially in earlier years, particularly in 2014 had no significant impact on the market. The market responses to the 2018 stress test were generally stronger than to this conducted in 2014. If we compare our results with similar studies on banking sectors (Fernandez et al., 2017; Sahin et al., 2020), we observe lighter reactions of the market on the disclosure of stress test information. According to the banking literature, the market reaction is especially sensitive to stress test disclosures during time of financial distress. However, all investigated insurance stress tests were conducted rather in non-stress periods. Moreover, the weaker market reaction to the insurance stress tests might be also attributed to the overall lower maturity and shorter history of insurance stress testing in comparison to banking exercises, in terms of all aspects as stress testing framework, governance, organisational structures, data, methodologies and models (Candelon et al., 2015). Furthermore, while, the first fully-fledged EU-wide insurance stress test exercise using the Solvency II framework was conducted in 2014, the Solvency II directive itself has been in place only since 2016. This could imply that the market participants including analysts and investors could gain experience from the new regulatory framework and understand better the implication of stress test results in 2018. Another possible explanation for the differences in market responds to stress test information disclosure in comparison to the banks could be following. European insurance regulator does not publish individual results, and in general insurance companies are better capitalized than banks. Although our results support the idea that the information value provided by stress tests depends on financial environment and circumstances at the time, we argue that it also depends to certain degree on a maturity of governance of insurance stress test. This includes institutional framework, scope of entities covered by the test, methodology and calculation of stress test results, the degree of granularity of the published results, follow-up actions by the relevant authorities, and the communication of all aspects of the stress test (Candelon et al., 2015). This is justifiable, as the insurance sector has received an increasing importance much later than the banking sector. Furthermore, the

insurance sector between 2014 and 2018 was well capitalised and therefore the potential negative effect of the tested scenarios seems to be limited only to a few companies as suggested by our results at company level and are statistically not very strong for the whole sector.

Our analysis also reveals that EU-wide insurance stress tests have the potential to reduce systemic risk. In particular, the public consultation for the 2018 insurance stress test helped reduce systemic risk. Compared to the earlier exercises, the 2018 stress test governance included closer interaction with stakeholders ensuring better feedback being reflected in the design of the exercise. Our results suggest that this practice should be kept as a standard part of the exercise. This aspect was also reflected when EIOPA conducted insurance-wide stress test in 2021. The results suggesting a possible reduction of systemic risk show the important role of communication as for example extensive public consultation could positively affect the sector. Overall, our findings suggest that stress tests could be a useful tool in mitigating systemic risk. EIOPA stress tests therefore could have produce valuable information for market participants and can play a role in mitigating insurance companies' opacity.

Our findings are also relevant for discussions about the future design of insurance stress tests. Further research would be needed to better understand the impact of the recommendations in the 2018 insurance stress test. On the other hand, the impact of recommendations is linked to the follow-up actions as a response to the identified vulnerabilities at the national level rather than the reaction to the stress tests themselves. One explanation of the market reaction to the recommendation related to the 2018 stress test could stem from the negative response of participating insurance companies to the EIOPA request to provide consent on the publication of individual results. Unlike the banking stress tests conducted at the EU level, EIOPA does not have the legal power to do so without such consent.

Several aspects of stress tests require further evolution. While some of those elements might improve the efficiency of stress tests, others are aimed at increasing transparency that may improve credibility of the exercises. However, an important argument against full transparency of all stress test elements is the risk that insurance companies will question the assessment (Bernanke, 2013). As most existing studies in this stream of research, the first part of our empirical analysis is based on an event study framework. While the second part is based on the regression analysis, it still employs market data to assess the impact of stress tests. Our study therefore suffers from the disadvantages of those approaches. Most importantly, only unexpected effects will lead to a change in market prices. Thus, the fact that we often do not find significant market reactions to the disclosure of stress test related information does not mean that these exercises are not useful (Kohn & Liang, 2019). Although event studies can only find out effects in the short-term, the regression analysis employed to investigate systemic risk could explore more long-term effects. However, considering the limited history of EU-wide stress testing for insurance sector, further follow up research is needed to explore robustness of our findings over time. It might be interesting to investigate the long-term effects of stress testing related to risk taking behaviour of insurance companies or the impact of stress tests on systemic risk, employing the latest indicators available in the literature. Moreover, with more EU-wide insurance stress tests conducted with different parameters in the future, it might be possible to further extend our research by splitting the insurance companies according to different characteristics. It would also allow to make more robust conclusions on market sensitivity towards EU-wide stress tests as well as an assessment of the long-term impact of stress tests.

BIBLIOGRAPHY

Acharya, V., & Steffen, S. (2014). Falling short of expectations? Stress-testing the European banking system. *CEPS Policy Brief*, 315, 1–25. Available at SSRN: https://ssrn.com/abstract=2381911

Ahnert, L., Vogt, P., Vonhoff, V., & Weigert, F. (2018). *The impact of regulatory stress testing on bank's equity and CDS performance.* University of St. Gallen, Swiss Institute of Banking and Finance. https://ux-tauri.unisg.ch/RePEc/usg/sfwpfi/WPF-1814.pdf

Akerlof, G. A. (1970). The market for "lemons": quality uncertainty and the market mechanism. *The Quarterly Journal of Economics*, *84*(3), 488-500. https://doi.org/10.2307/1879431

Arrow, K. J. (1963). Uncertainty and the Welfare Economics of Medical Care. *The American Economic Review*, 53(5), 941-973.

Bernanke, B. (2013). *Remarks at "Maintaining Financial Stability: Holding a Tiger by the Tail*. Federal Reserve Bank of Atlanta Stone Mountain, Georgia.

Bierth, C., Irresberger, F., & Weiß, G. N. F. (2015). Systemic risk of insurers around the globe. *Journal of Banking & Finance, 55*, 232-245.

Candelon, B., & Sy, A.N. R. (2015). How did markets react to stress tests? *IMF Working Papers* 15/75. International Monetary Fund.

Carboni, M., Fiordelisi, F., Ricci, O., Lopes, F., & Saverio, S. (2017). Surprised or not surprised? The investors' reaction to the comprehensive assessment preceding the launch of the banking union. *Journal of Banking & Finance, 74*(C), 122-132.

Chotibhak, J., Ellul, A., Kartasheva, A., Lundblad, Ch., & Wagner, W. (2018). Insurers as asset managers and systemic risk. *CEPR Discussion Papers 12849*.

Cohen, A. (2005). Asymmetric information and learning: Evidence from the automobile insurance market. *The Review of Economics and Statistics, 87*(2), 197-207.

Cornett, M. M., Minnick, K., Schorno, P. J., & Tehranian, H. (2020). An examination of bank behavior around Federal Reserve stress tests. *Journal of Financial Intermediation*, *41*, 100789. https://doi.org/10.1016/j.jfi.2018.05.001

Corrado, Ch. J. (1989). A nonparametric test for abnormal security-price performance in event studies. *Journal of Financial Economics, 23*(2), 385-395.

DeLong, G., & DeYoung, R. (2007). Learning by observing: Information spillovers in the execution and valuation of Commercial Bank M&As. *Journal of Finance*, 62(1), 181-216. https://doi.org/10.1111/j.1540-6261.2007.01205.x

Einav, L., Finkelstein, A., & Levin, J. (2010). Beyond testing: Empirical models of insurance markets. *The Annual Review of Economics*, 2, 311–336.

EIOPA. (2014a). *EIOPA Insurance Stress Test 2014*. European Insurance and Occupational Pensions Authority, December.

EIOPA. (2014b). *Low interest rate environment stock taking exercise 2014*. European Insurance and Occupational Pensions Authority, November.

EIOPA. (2016). *2016 EIOPA Insurance Stress Test Report*. European Insurance and Occupational Pensions Authority, December.

EIOPA. (2018). *2018 EIOPA Insurance Stress Test Report*. European Insurance and Occupational Pensions Authority, December.

EIOPA. (2019). *Methodological Principles of Insurance Stress Testing*. European Insurance and Occupational Pensions Authority, December.

EIOPA. (2020). *Second Discussion Paper on Methodological Principles of Insurance Stress Testing*. European Insurance and Occupational Pensions Authority, June.

Ellahie, A. (2012). *Capital market consequences of EU bank stress tests*. London Business School Working Paper. Available at SSRN: https://ssrn.com/abstract=2157715

Finkelstein, A., & Poterba, J. (2004). Adverse selection in insurance markets: Policyholder

evidence from the U.K. annuity market. *Journal of Political Economy, 112*(1), 183-208. http://doi.org/10.1086/379936

Finkelstein, A., & McGarry, K. (2006). Multiple dimensions of private information: Evidence from the long-term care insurance market. *American Economic Review, 96*(4), 938-958.

Flannery, M., Hirtle, B., & Kovner, A. (2017). Evaluating the information in the Federal Reserve stress tests. *Journal of Financial Intermediation,* 29, 1-18.

Garcia, D., & Tsur, M. (2021). Information design in competitive insurance markets. *Journal of Economic Theory*, 191(C). https://10.1016/j.jet.2020.105160

Georgescu, O.-M., Gross, M., Kapp, D., & Kok, C. (2017). Do stress tests matter? Evidence from the 2014 and 2016 stress tests. *ECB Working Paper*, 2054.

Georgoutsos, D., & Moratis, G. (2020). *On the informative value of the EU-wide stress tests and the determinants of banks' stock return reactions*. Empirica.

Gick, W., & Pausch, T. (2012). Persuasion by stress testing: Optimal disclosure of supervisory information in the banking sector. *Bundesbank Discussion Paper*, No. 32/2012.

Goldstein, I., & Leitner, Y. (2018). Stress tests and information disclosure. *Journal of Economic Theory*, 177, 34-69.

Goldstein, I., & Sapra, H. (2014). Should banks stress rest results be disclosed? An analysis of the costs and benefits. *Foundations and Trends® in Finance*, 8(1), 1-54. http://dx.doi.org/10.1561/0500000038

Jakubik, P., & Uguz, S. (2021). Impact of green bond policies on insurers: Evidence from the European equity market. *Journal of Economics and Finance, 45*(2), 381-393.

Lazzari, V., Vena, L., & Venegoni, A. (2017). Stress tests and asset quality reviews of banks: A policy announcement tool. *Journal of Financial Stability, 32*(C), 86-98.

MacKinlay, A. C. (1997). Event studies in Economics and Finance. *Journal of Economic Literature,* 35 (1), 13-39.

Morgan, D. P., Peristiani, S., & Savino, V. (2014). The information value of the stress test and bank opacity. *Journal of Money, Credit and Banking, 46*(7), 1479-1500.

Morris, S., & Shin, H. (2002). Social value of public information. *The American Economic Review, 92*(5), 1521-1534.

Nijskens, R., & Wagner, W. (2011). Credit risk transfer activities and systemic risk: How banks became less risky individually but posed greater risks to the financial system at the same time. *Journal of Banking and Finance, 35*(6), 1391-1398.

Petrella, G., & Resti, A. (2013). Supervisors as information producers: Do stress tests reduce bank opaqueness? *Journal of Banking and Finance, 37*(12), 5406-5420.

Rothschild, M., & Stiglitz, J. (1976). Equilibrium in competitive insurance markets: An essay on the economics of imperfect information. *Quarterly J of Economics, 90*(4), 629-649.

Sahin, C., de Haan, J., & Neretina, E. (2020). Banking stress test effects on returns and risks. *Journal of Banking & Finance*, 117, 105843.

Schuermann, T. (2014). Stress testing banks. *International Journal of Forecasting, 30*(3), 717-728.

Spargoli, F. (2012). *Bank recapitalization and the information value of a stress test in a crisis.* Universitat Pompeu Fabra Working Paper.

Annex

Table 5. Insurers participated in the 2014 and/or 2016 and/or 2018 stress tests included in the sample

Group level	2014	2018
Insurance group 1	X	X
Insurance group 2		X
Insurance group 3	X	X
Insurance group 4	X	X
Insurance group 5	X	X
Insurance group 6	X	X
Insurance group 7	X	X
Insurance group 8	X	X
Insurance group 9	X	X
Insurance group 10	X	X
Insurance group 11		X
Insurance group 12		X
Insurance group 13	X	X
Insurance group 14	X	X
Insurance group 15		X
Insurance group 16	X	X
Insurance group 17	X	X
Insurance group 18		X
Insurance group 19	X	
Insurance group 20		X
Insurance group 21	X	
Insurance group 22	X	X
Insurance group 23	X	
Insurance group 24	X	
Insurance group 25	X	

Solo level	2014	2016
Insurance solo 1	X	
Insurance solo 2	X	X
Insurance solo 3	X	
Insurance solo 4	X	
Insurance solo 5	X	
Insurance solo 6	X	X
Insurance solo 7	X	X
Insurance solo 8	X	
Insurance solo 9	X	
Insurance solo 10	X	X
Insurance solo 11	X	
Insurance solo 12	X	
Insurance solo 13	X	X
Insurance solo 14	X	
Insurance solo 15	X	
Insurance solo 16	X	
Insurance solo 17	X	
Insurance solo 18	X	
Insurance solo 19	X	
Insurance solo 20	X	
Insurance solo 21	X	X
Insurance solo 22	X	
Insurance solo 23	X	
Insurance solo 24	X	

Table 6. EIOPA press releases related to the EIOPA EU-wide stress tests

2014 Insurance Stress Test	
March 13th, 2014	EIOPA invited insurance and actuarial associations (Insurance Europe, CRO Forum, AMICE, Actuarial Association of Europe, CFO Forum) for the consultation to provide comments on stress test reporting templates
April 8th, 2014	Letter from the ESRB Chair to the Chair of EIOPA on the two scenarios and the qualitative questionnaire - scenario announcement
April 30th, 2014	List of technical details in the calculations carried out for EIOPA Stress Test 2014 regarding the Volatility Adjustment, launch of the EU wide stress test
May 28th, 2014	The announcement of Stress Test 2014 specifications
December 1st, 2014	Press Conference on EIOPA Stress Test's Results
2016 Insurance Stress Test	
March 14th, 2016	Invitation to the consultation /workshop
March 17, 2016	Scenario for the European Insurance and Occupational Pensions Authority's EU-wide insurance stress test in 2016
April 13th, 2016	Consultation
May 24th, 2016	Launch of the EU-wide insurance stress test 2016
June 1st, 2016	Insurance Stress Test 2016 technical specifications
December 15th, 2016	Publication of the results for the Insurance Stress Test 2016 for solos
2018 Insurance Stress Test	
April 9th, 2018	Adverse scenario for the European Insurance and Occupational Pensions Authority's EU-wide insurance stress test in 2018
April 16th, 2018	EIOPA workshop with industry
May 14th, 2018	Insurance Stress Test 2018 technical specifications
December 14th, 2018	Publication of the insurance stress test results of 2018 for the European insurance sector, including individual results
April 26th, 2019	EIOPA's Insurance Stress Test 2018 recommendations

Table 7. Individual Results – Cumulative abnormal market returns (CAR) and their statistical significance (t-test)

Insurance Stress Test 2018, event window (-1,2)	Consultation	Scenario	Launch & technical specifications	Results	Recommend.
	CAR				
Insurance group 1	1.556%	-1.695%	0.204%	3.045%*	0.597%
Insurance group 2	0.752%	2.411%	-2.357%	0.678%	1.389%
Insurance group 3	-1.904%	1.282%	-0.355%	-0.021%	-0.291%
Insurance group 22	0.235%	2.083%	-2.355%	-0.546%	-0.014%
Insurance group 4	0.219%	3.369%	0.992%	-2.835%	1.620%
Insurance group 5	-0.658%	0.292%	-1.257%	0.439%	0.781%
Insurance group 6	0.816%	-0.679%	-1.712%	2.378%*	1.057%
Insurance group 7	1.591%	2.881%*	0.099%	0.089%	1.770%
Insurance group 8	2.841%	1.648%	1.032%	0.363%	0.292%
Insurance group 9	-0.216%	0.389%	-1.298%	0.952%	-2.684%
Insurance group 10	0.298%	0.875%	-1.814%	2.020%	1.453%
Insurance group 11	-0.238%	-1.722%	-2.162%	-1.698%	1.872%
Insurance group 12	0.255%	-0.004%	-0.815%	1.667%	-0.066%
Insurance group 13	1.002%	1.753%	0.175%	0.707%	-4.177%**
Insurance group 14[#]	0.391%	-0.490%	-0.652%	0.115%	2.308%
Insurance group 15	-0.139%	0.226%	-2.058%	-1.229%	1.717%
Insurance group 16	1.096%	0.945%	-1.214%	0.388%	-1.656%
Insurance group 17	-1.904%	1.282%	-0.355%	-0.021%	-0.291%
Insurance group 18	0.136%	0.399%	-0.078%		0.557%
Insurance group 20	-0.432%	-3.640%*	-0.513%	1.065%	-0.297%

Note: *p<0.1; **p<0.05; ***p<0.01

[#] Insurance groups that provided consent on publication of its individual results.

Insurance Stress Test 2014, event window (-1,2)	Consultation	Scenario	Launch	Technical specifications	Results and Recommend.
	CAR				
Insurance group 1	-0.467%	1.861%	-6.719%***	-0.467%	0.060%
Insurance group 3	3.255%	2.247%	1.578%	3.255%	-3.005%
Insurance group 4	1.616%	-1.769%	0.794%	1.616%	-2.003%
Insurance group 5	-0.789%	-1.264%	-5.255%***	-0.789%	0.166%
Insurance group 6	2.482%	-0.363%	0.807%	2.482%	-0.352%
Insurance group 7	0.334%	2.278%	1.348%	0.334%	-1.372%
Insurance group 8	0.427%	-3.344%*	-5.486%**	0.427%	-0.893%
Insurance group 9	-2.673%	-0.473%	2.062%	-2.673%	-0.206%
Insurance group 10	1.825%	-2.936%	-1.194%	1.825%	0.169%
Insurance group 13	-0.479%	-1.140%	3.026%	-0.479%	-0.218%
Insurance group 14	1.522%	-1.338%	-1.649%	1.522%	1.785%
Insurance group 16	2.116%	0.258%	0.823%	2.116%	-0.880%
Insurance group 17	3.255%	2.247%	1.578%	3.255%	-3.005%
Insurance group 19	1.017%	-0.540%	-0.989%	1.017%	0.062%
Insurance group 21	0.223%	2.729%	0.442%	0.223%	1.404%
Insurance group 22	0.042%	-6.440%	-4.164%	0.042%	-0.958%
Insurance group 23	0.929%	0.663%	-2.441%	0.929%	-3.712%
Insurance group 24	0.041%	-1.522%	1.638%	0.041%	-1.770%
Insurance group 25	-0.656%	-0.108%	-0.533%	-0.656%	0.464%

Note: *p<0.1; **p<0.05; ***p<0.01

Table 8. Cumulative abnormal market returns (CAR) and their statistical significance for the Insurance Stress Tests 2014 and 2018

Stress Test	Events	CAR	t-test st.	Adjusted t-test st.	Rank test st.
Event window		(-2,2)			
	Consultation	0.6679%	0.6056	0.5913	0.1328
	Scenario	-0.4156%	-0.3974	-0.3879	-0.0581
2014	Launch	-0.5484%	-0.5395	-0.5264	-0.0236
	Technical Specifications	1.3164%	1.4561	1.4207	1.5417
	Results and recommendations	-0.4087%	-0.4414	-0.4299	0.2144
	Consultation	0.9986%	0.9518	0.9247	0.9344
	Scenario	-0.1101%	-0.1045	-0.1016	0.0167
2018	Launch & technical specifications	-0.8248%	-0.8720	-0.8468	-0.9965
	Results	0.8004%	0.7047	0.6852	0.3593
	Recommendation	-0.2874%	-0.2455	-0.2388	0.0461
Event window		(-2,5)			
	Consultation	-0.8730%	-0.5899	-0.5760	-0.8773
	Scenario	-1.2239%	-0.9253	-0.9031	-0.4540
2014	Launch	-0.8109%	-0.6307	-0.6155	-0.0880
	Technical Specifications	1.1125%	0.9302	0.9076	0.6755
	Results and recommendations	0.1563%	0.1258	0.1226	0.5716
	Consultation	1.6841%	1.2691	1.2330	1.6493*
	Scenario	0.6387%	0.4794	0.4658	0.5376
2018	Launch & technical specifications	-0.6836%	-0.5902	-0.5731	-0.5166
	Results	1.2430%	0.8651	0.8413	0.6758
	Recommendation	-0.6355%	-0.4292	-0.4175	-0.0554
Event window		(-2,8)			
	Consultation	0.8741%	0.5596	0.5464	0.1917
	Scenario	-1.0271%	-0.5916	-0.5774	-0.3596
2014	Launch	2.5560%	1.5912	1.5526	-0.7765
	Technical Specifications	-1.9662%	-1.3859	-1.3522	0.8448
	Results and recommendations	0.7016%	0.4509	0.4392	0.6926
	Consultation	0.7016%	0.4509	0.4380	0.9679
	Scenario	0.8741%	0.5596	0.5437	0.7395
2018	Launch & technical specifications	-1.9662%	-1.3859	-1.3458	-1.3064
	Results	2.5560%	1.5912	1.5473	1.4144
	Recommendation	-1.0271%	-0.5916	-0.5754	-0.3627

Note: *p<0.1; **p<0.05; ***p<0.01

Stress Test	Events	CAR	t-test st.	Adjusted t-test st.	Rank test st.
Event window		(-1,1)			
2014	Consultation	0.2366%	0.2769	0.2704	0.1114
	Scenario	-0.4008%	-0.4948	-0.4830	-0.5173
	Launch	-0.3902%	-0.4956	-0.4836	-0.1706
	Technical Specifications	1.0547%	1.6497*	1.6097	2.0895**
	Results and recommendations	-0.4745%	-0.8102	-0.7892	-0.0727
2018	Consultation	-0.1347%	-0.1658	-0.1611	-0.2170
	Scenario	0.5369%	0.6581	0.6395	0.6873
	Launch & technical specifications	0.1677%	0.2047	0.1988	0.0252
	Results	0.0095%	0.0108	0.0105	-0.0769
	Recommendation	0.2259%	0.2492	0.2424	0.6621
Event window		(-1,5)			
2014	Consultation	-0.8030%	-0.5756	-0.5620	-0.7742
	Scenario	-1.2797%	-1.0343	-1.0096	-0.6187
	Launch	-1.0169%	-0.8456	-0.8251	-0.3362
	Technical Specifications	1.0192%	0.9205	0.8981	0.7565
	Results and recommendations	-0.1855%	-0.1584	-0.1543	0.0480
2018	Consultation	0.9703%	0.7817	0.7595	1.2359
	Scenario	1.3290%	1.0665	1.0363	1.0767
	Launch & technical specifications	-0.6836%	-0.5902	-0.5731	-0.5166
	Results	1.2805%	0.9527	0.9265	0.9329
	Recommendation	-0.0511%	-0.0369	-0.0359	0.4102

Note: *p<0.1; **p<0.05; ***p<0.01

CRUCIAL PROBLEM OF MACROECONOMIC NUMBERS: INTERDEPENDENCE OF INDICATORS IN THE SHORT-RUN AND THE LONG-RUN

Helena FIALOVÁ, Alžběta ZÍKOVÁ
Metropolitan University Prague, Czech Republic
helena.fialova@mup.cz

Abstract: *The assessment of the performance and forecasting of the future development of countries and markets for goods and services includes the analysis of both, the long-run economic growth and the short-run business cycle fluctuations. Both develop to a high degree independently. The coherence of the trend and business cycle becomes crucial in forecasting the economic growth of a country based on the extrapolation of the trend. The article pays attention to the impact of the Great Recession in 2007–2008 on the economic performance (measured by the growth of GDP in constant prices) of several countries with regard to long-run economic growth.*

Keywords: *business cycle, economic growth, recession, trend*

1. INTRODUCTION

In standard economic analyses, economic growth is presented as the percentage change (y/y, q/q, exceptionally also m/m) of the real Gross Domestic Product of a country (region or the whole world economy). The analysis is provided in the long-run horizon. It usually aims at the forecast of the future development of the country. Nevertheless, recessionary, and expansionary gaps show the deviation of the actual indicators from the potential product of the country or region under analysis (Frank & Bernanke, 2004). To close these gaps, different tools of the government fiscal and monetary policy are applied.

The analysis of the economic growth of a country usually covers several decades. There is no doubt that the inherent phenomenon of the development of any market economy in the short run is the business cycle. Business cycles have been discussed for centuries, but the concept has been largely abandoned in recent decades (Samuelson,1998).

Business cycles consist of expansions and recessions in the development of countries and markets for goods and services. Internal and external factors influence the length and volatility of individual cyclical fluctuations (Zarnowitz, 1991). Cyclical development is typical for all economic indicators in macroeconomy analysis and hence in the microeconomics sphere, too. Cyclical changes are not only deviations from long-run growth but may fundamentally influence or change the rate of growth of any economy. Economic cycles are measured by different indicators, but the most important is GDP (Isaic et al., 2019).

Forecasts and assessments of the economic growth of countries could be influenced by cyclical deviations and the whole trend may be not only interrupted but fundamentally changed. Forecasting the state of the business cycle is an important issue, as is the identification of past cyclical turning points (Weale, 2002).

Some factors influence all countries and markets generally (population growth, environmental changes, climate changes, integration of countries in larger entities, pacts) and some factors may be found in different periods and regions.

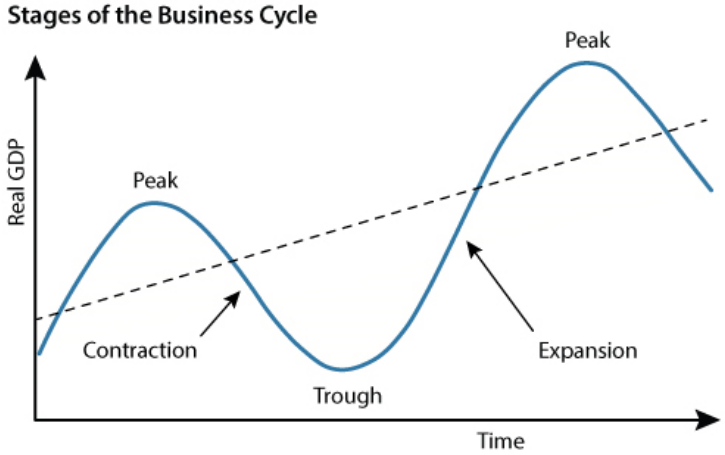
This article pays attention to and provides an analysis of the impact of the Great Recession in 2007–2008 on the economic performance (measured by the growth of GDP in constant prices) of several countries in the long run economic growth.

2. LONG RUN TREND AND THE BUSINESS CYCLE

2.1 Concept of Business Cycles

Business cycles consist of expansions and recessions or regular changes of ups and downs in the development of countries or markets for goods and services. Figure 1 shows the model of four stages (peak, contraction, trough, and expansion).

Figure 1. Stages of the Business Cycle



Source: Wolla, S. A. (2023)

2.2 The Coherence of Trend and Business Cycle

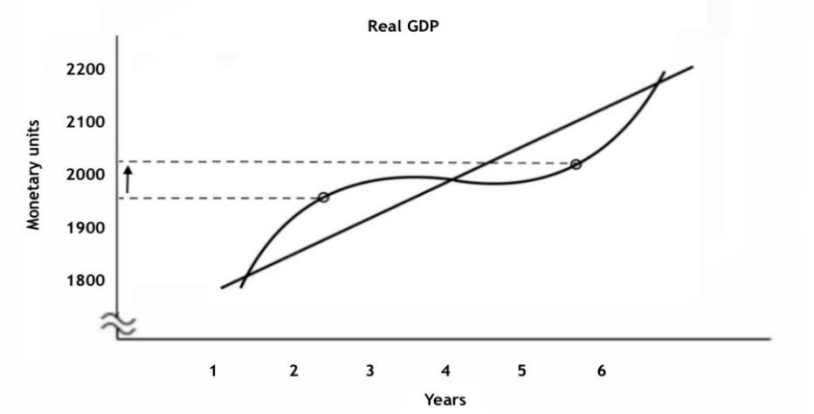
In the long run economic growth is the dominant factor in the development of a country or group of countries. Nevertheless, business cycles as inherent phenomena in the situation in world markets for goods and services influence the respective markets, economies of countries, and the global economy, as well.

The coherence of trend and business cycle is crucial for the assessment of the economic situation of the respective country and especially for the forecast of future development in both, the short run about the business cycle phase, and the long run about economic growth.

The long-run economic growth and the business cycle fluctuations develop to a high degree independently. Nevertheless, the contemporary economic situation of the country and firms is influenced by their mutual coherence and may influence the long-run economic growth, as well.

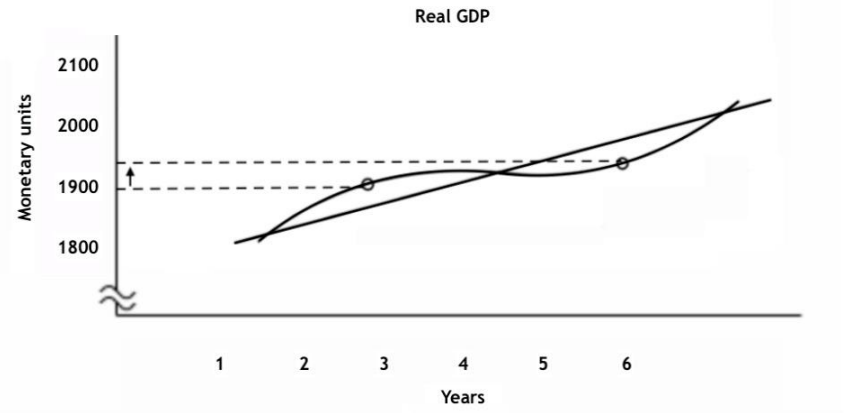
Following graphs show four situations that combine rapid and slow economic growth with a high and low amplitude of cyclical fluctuations. We follow the impact of a recession as the slowdown of economic growth (measured by the rate of growth of the volume of GDP) or the absolute decrease of the indicator. Rapid economic growth with either a high or low amplitude of cyclical fluctuations keeps GDP growing (Figure 2). Slow economic growth with a low amplitude of cyclical fluctuations may have this positive result (Figure 3), too. The negative impact on economic growth results from slow economic growth combined with a high amplitude of cyclical fluctuations (Figure 4).

Figure 2. A model of recession in a country with rapid economic growth



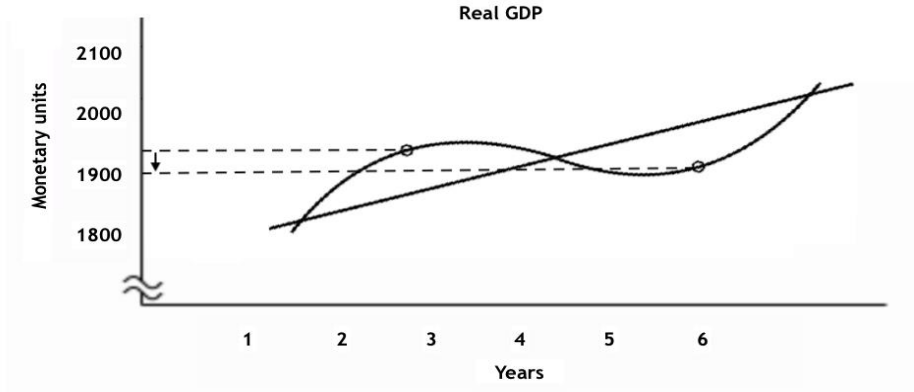
Source: authors' work

Figure 3. A model of recession in a country with small amplitude of fluctuations of the business cycle



Source: authors' work

Figure 4. A model of recession resulting in an absolute decrease in the volume of Gross Domestic Product



Source: authors' work

3. CYCLICAL DEVELOPMENT OF COUNTRIES

3.1 General notes

The global business cycle should characterize or describe the situation in most countries of the world (at major global centers). Several remarkable historical events affected negatively the

entire global economy: The Great Depression (1929–1933), the oil crisis in 1970′, the Great Recession 2007–2009, and COVID-19 pandemic in the latest years. (There were also favorable periods as the "golden" 60′ in the 20. century.[1])

Business cycles within certain regions or in certain countries do not always correspond to the global business cycle. The recession or boom might be shifted in time, it might be milder or stronger according to the industrial structure of GDP or the commodity or the territorial structure of the external trade of the respective country. There might be a global recession (2007–2009) or a recession in some regions or some countries (Canada and Finland 1990–1998). Nevertheless, the impact of the global business cycle on the economies of individual countries matters and deserves attention.

3.2 Impact of Recessions on the Economic Growth of Countries

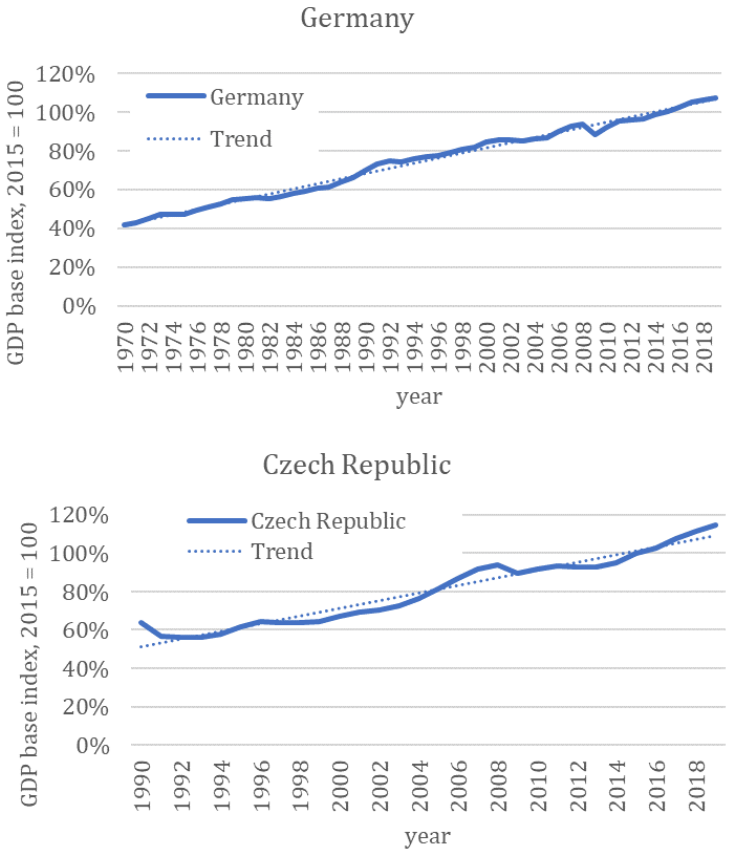
In this article, we pay attention to the impact of the Great Recession in 2007–2008 on the economic performance (measured by the growth of GDP in constant prices) of numerous countries in the long run economic growth. Attention is directed to two points:

- Deviation from the long-term economic growth of the country caused by the Great Recession
- The length of the period (number of years) necessary for the country to return to the long-run growth rate.

Countries are grouped concerning these indicators.

Group 1: mild decrease in the GDP growth and fast return to the long-run growth

Figure 5. GDP base index of Germany and the Czech Republic[2]



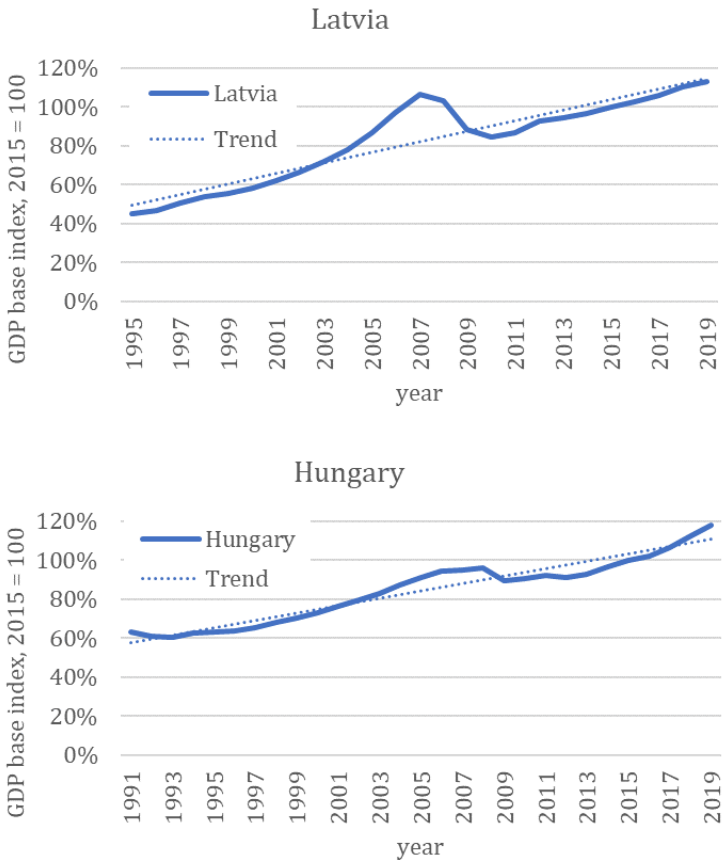
Source: authors' calculations, data from (OECD, 2023)

[1] Attention of economists is usually turned to negative numbers than positive ones.
[2] The data are taken from the OECD database, which offers different lengths of time period for each country.

A similar graph might be presented for Denmark or France.

Group 2: a sharp decrease in the GDP growth (or GDP total) and return to the long-run growth rate after many years

Figure 6. GDP base index of Latvia and Hungary



Source: authors' calculations, data from (OECD, 2023)

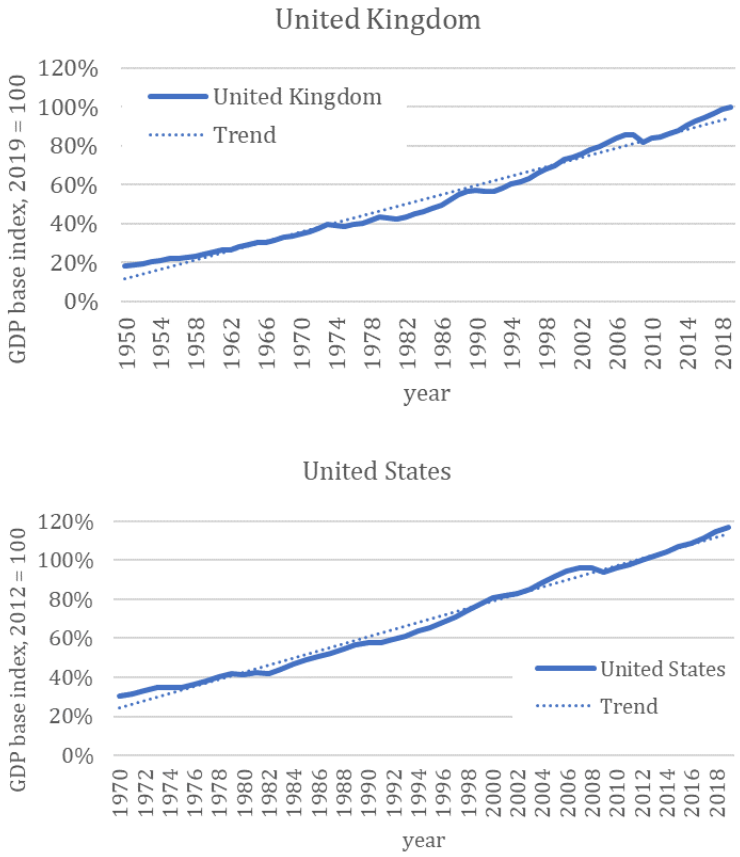
A similar graph might be presented for Lithuania, Sweden, and Spain.

Regarding the graphical presentation of the impact of the Great Recession in 2007–2008 on the economic performance of countries, we may find countries where the negative impact is overlapped by positive numbers of the "pre-recessional" years in the long run curve.[3]

Group 3: actual values of GDP in years before the Great Recession are located above the trend line and in the crucial year 2009 regardless of the decrease of the GDP they remain on the trend line, which may be seen as a positive situation. The impact of the Great Recession is statistically "undervalued".

[3] There are many statistical „tricks", that curve the reality. The choice of the base for a relative number is one of them.

Figure 7. GDP base index of the United Kingdom and the United States



Source: authors' calculations, data from (OECD, 2023)

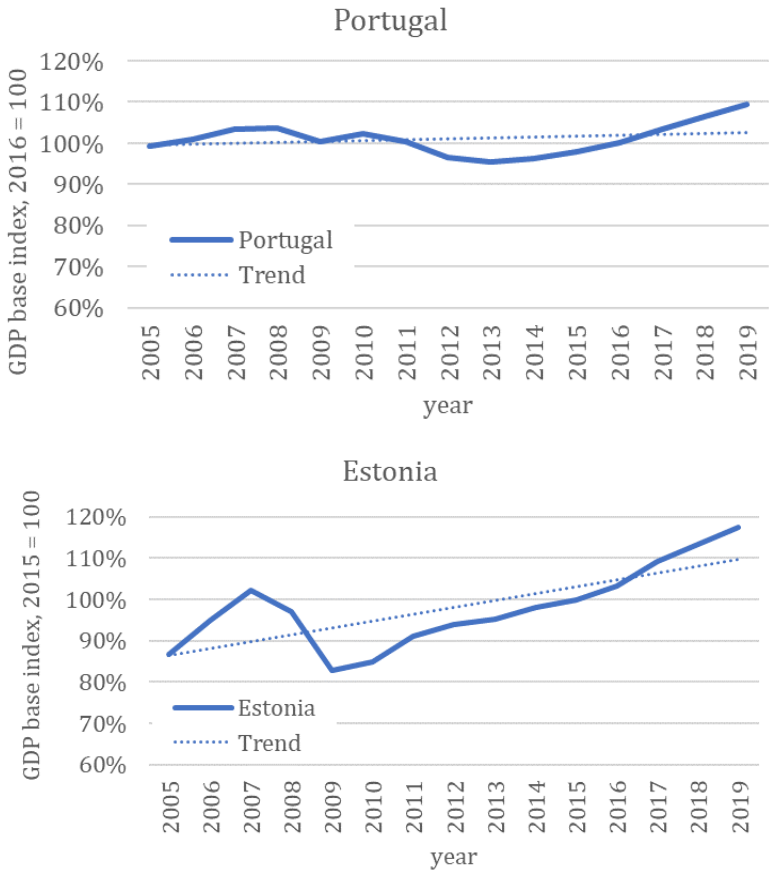
3.3 May a sharp recession decrease the long-run rate of the growth of a country? Or may the strong boom increase the long-run rate of the growth of a country?

The reality of the growth of the gross domestic product of countries, in the long run, shows a variety of cases. We tried to find some "model" situations or typical combinations that might be used for the assessment of the real situation and forecasting of possible scenarios.

In this paragraph, we bring extraordinary cases which are not model situations but should serve as guidelines for policymakers to try to hinder the economy from shocks or unpredictable disasters.

Figure 8 shows two countries with a sharp decrease in GDP growth. Both of them returned to the long-run growth in several years. It might have been a positive impact of the right (or appropriate) government fiscal policy steps.

Figure 8. GDP base index of Portugal and Estonia[4]

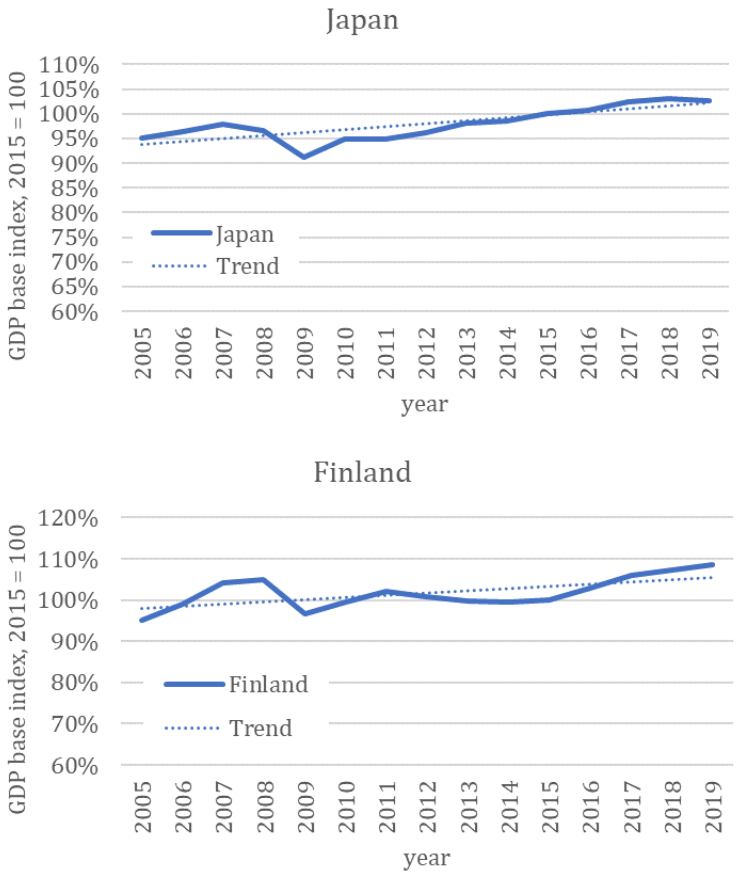


Source: authors' calculations, data from (OECD, 2023)

Figure 9 brings a gloomy situation. The negative impact of the sharp decrease in GDP was not overcome and we assess the situation as the change or slowing down the long-run economic growth. This conclusion is very dangerous, we should admit it but only the development in future years will allow us to confirm it.

[4] Value axis does not start at 0%.

Figure 9. GDP base index of Japan and Finland[5]



Source: authors' calculations, data from (OECD, 2023)

4. CONCLUSION

Economic growth is the dominant factor in the development of a country or group of countries in the long run. In the short run, world markets for goods and services and the global economy are influenced by business cycles. The long-run economic growth and the business cycle fluctuations develop to a high degree independently. Nevertheless, the contemporary economic situation of the country and firms is influenced by their mutual coherence and may influence the long-run economic growth, as well.

The article pays attention to the impact of the Great Recession in 2007–2008 on the economic performance (measured by the growth of GDP in constant prices) of several countries concerning long-run economic growth. Attention is directed to deviation from the long-term economic growth of the country caused by the Great Recession and the length of the period necessary for the country to return to the long-run growth rate.

In some countries, the negative impact of the sharp decrease in GDP is not overcome and the situation leads to the slowing down of the long-run economic growth. Business cycle fluctuations may influence long-run economic growth. The analysis might serve as a guideline for government fiscal policymakers when protecting the economy from shocks or unpredictable disasters.

[5] Value axis does not start at 0%.

BIBLIOGRAPHY

Frank, R. H. & Bernanke, B. S. (2004). *Principles of Economics*, 2nd ed. McGraw-Hill.

Isaic, R., Smirna, T.G., & Păun, C.V. (2019). A critical view on the mainstream theory of economic cycles. *Management & Marketing. Challenges for the Knowledge Society*, 14, 48-58.

OECD. (2023). *Economic outlook no 113 – June 2023. – OECD statistics*. Economic Outlook No 113 – June 2023. https://stats.oecd.org/Index.aspx?DataSetCode=EO

Samuelson, P. A. (1998). *Summing up on business cycles: opening address.* Conference Series; [Proceedings], Federal Reserve Bank of Boston, 42, 33–36. https://ideas.repec.org/a/fip/fedbcp/y1998ijunp33-36n42.html

Weale, M. (2002). Business Cycle Analysis. *National Institute Economic Review*, 182, 57–57. https://doi.org/10.1177/002795010218200106

Wolla, S. A. (2023). All About the Business Cycle: Where Do Recessions Come From? *Page One Economics®.* https://research.stlouisfed.org/publications/page1-econ/2023/03/01/all-about-the-business-cycle-where-do-recessions-come-from

Zarnowitz, V. (1991). What is a Business Cycle? *NBER Working Paper Series*.

BNPL – THE PAYMENT METHOD OF THE FUTURE?

Jaroslav HALÍK
Metropolitan University Prague, Czech Republic
jaroslav.halik@mup.cz

Abstract: *More and more consumers are using deferred payments when shopping in e-shops. The paper presents conclusions of the research aimed at answering the questions: What are the principles and procedures of BNPL shopping? How does the BNPL method develop in the world? What are the advantages and disadvantages for consumers on one side, and for traders on the other side? The presented findings result from data gathered through numerous interviews, domestic and foreign publications, databases, and company websites, and from the long-term pedagogical and research experience of the author.*

Keywords: *BNPL, payment, e-shop*

1. INTRODUCTION

The abbreviation BNPL means "Buy Now, Pay Later", and refers to deferred payments when purchasing in e-shops. The customer first obtains the goods and after some time pays for it. According to the world-respected financial technology company FIS™ (NYSE:FIS), which published a comprehensive analysis and forecast of consumer payment trends in 40 countries around the world in 2023 (FIS, 2023), digital wallets will be 2024 to account for more than 50 per cent of global e-commerce sales, credit card payments will lose ground, and "Buy now, pay later" deferred payments will emerge as the fastest growing online payment preference in the next five years. The global eCommerce market is expected to reach a total value of over 6 trillion USD at this time, BNPL will cover more than 4 per cent. In this article, we will show the current trends in electronic payment, introduce you to the offers of entities providing deferred payments, and summarize the advantages and disadvantages that both consumers and e-shop operators may encounter.

2. LITERATURE REVIEW

As deferred payments became more and more popular worldwide, a lot of publishing appeared around this topic. BNPL has found itself in the crosshairs of many think tanks in the world, financial international organizations, commercial entities providing monetary and accounting services, traders of all kinds, economics and business schools and universities, as well as the mass media, for whom this topic is a welcome platform to develop public discussions held on various platforms and in various formats. For example, an American independent nonprofit organization Consumer Reports (CR, 2023) publishes a special yearly report evaluating the development of BNPL. It contains many useful views on different aspects of deferred payments, such as consumer protection, level of interest rates, technology of payment, government regulation, etc. Many different authors use the Consumer Report's outcomes for their further investigations. According to Fitzgerald (2023), buy now/pay later loans boomed during the pandemic by enabling shoppers to stretch their budgets through simple advances repaid in four instalments with no interest. Referring to the latest Consumer Reports issue, Chien (2023) states that BNPL loans recently have moved into the far riskier territory of longer-term, higher-interest

loans balancing on the edge of a legal grey area. The study of Schomburgk and Hoffmann (2023) finds empirical evidence for the ability of mindfulness to reduce BNPL usage by increasing consumers' financial self-control and decreasing their impulse buying tendencies. Patch (2022) turns attention to the original driver of BNPL and shows that propelled by inflation and the pandemic-driven convenience of online shopping, buy now, pay later services have become as commonplace as a hand sanitiser in a shop entryway. The question of what sense the BNPL has for banks is analysed interestingly by Anil Goyal (2023). British Journal Money Week turns attention to practical applications of BNPL (Goncalves, 2023). It brings an example of launching a buy now, pay later service in retail chains like John Lewis which offers an interest-free credit for purchases over £500 on big-ticket buys, allowing customers to spread the cost over 12 months, interest-free. Hapser Data Services FRPT – M&A Snapshot, which provides a quick overview of all the deals and forecasts that are happening in the Indian as well as global market, announced that BNPL firm Uni Cards buys P2P NBFC for approx. ₹3–4 crore (FRPT, 2023). Global Banking News announced that the Qatar Central Bank is to soon offer licenses for new BNPL service providers. The apex bank has called on companies offering BNPL services to submit applications for licenses. It said that it would receive applications in this regard from September (GBN, 2023). Johnson, Rodwell and Hendry (2021) argue that fee based BNPL in Australia is mostly characterized by the occurrence of destructive and toxic regulatory capture, along with the detrimental impacts of BNPL and indebtedness on consumers suggesting that the Australian regulations do not even make the minimum threshold of not having substantial market failures evident. The ongoing reluctance to incorporate social utility into regulatory consideration is striking given the growth of these alternative forms of finance known as fintech.

3. METHODOLOGY

The article is written in the form of analytical expertise, and conclusions have been formulated in a way that might be directly usable in business practice. The text uses various scientific methods. A deduction discovers relationships between different forms of payment and a special deferred form – buy now pay later. Induction helps to apply theoretical frames to practical examples of the development of BNPL in the world and also from the point of view of generations millennials and X-generation. A comparative approach serves to compare the advantages and disadvantages of deferred payment for consumers on one side and for traders on the other side. The analytical procedures helped to assess risks associated with this form of payment, namely in the area of legislation. The method of synthesis allowed the presentation of the main findings and conclusions. The paper took advantage of numerous domestic and foreign publications, such as professional books, scientific articles, conference proceedings, databases, and websites of companies, institutions, and international organizations. The important source of knowledge was also interviews with colleagues from academia and representatives of companies and institutions.

4. RESULTS AND DISCUSSION

The Principles of Deferred Payments

Deferred payments allow shoppers to purchase goods online and pay for them later, either in full or in instalments, without having to pay the interest that would otherwise be incurred with short-term financing. The advantage is that you can view or try the delivered goods and only then pay for them. The trader is paid for the goods by the service provider, who then receives

payment from the customer. The full amount is paid – minus the fee charged by the BNPL service provider. It usually ranges between 2–8 per cent depending on the quality of BNPL's service, the contractual relationship between the trader and the provider, and the type of goods and their price. After paying the deferred payment to the trader, the buyer receives a notification from his bank that the goods have been paid and is asked to pay the amount owed to the bank. This transaction is free of charge, you only pay for the goods that have been purchased.

Development of BNPL in the World

While digital wallets have become the preferred choice for online shopping and retail purchases, BNPL's deferred payments are rapidly expanding as an alternative to quick loans, replacing card overdrafts or short-term loans with financial institutions. According to the FIS report, globally, BNPL's deferred payments are significantly outperforming traditional bank transfers or digital wallets such as Apple Pay, Google Pay and Samsung Pay in terms of growth rate.

In Europe, the Middle East and Africa, BNPL payments will account for nine per cent of eCommerce spending over the next three years, triple the volume of 2018. Debit cards will continue to be the most used payment method in retail stores in the region, while the use of cash will decline rapidly throughout the region. Within Europe, deferred payments are most developed in Sweden, where one in four online purchases is paid through BNPL. Klarna, the most valuable European fintech, operates here and is considered the pioneer of BNPL payments. A high share of BNPL payments is also in Germany, where deferred payments are used by 18 per cent of online customers, in Norway it is 13 per cent of all eCommerce payments. In the Czech Republic, deferred payments so far amount to one per cent, however, the current increase, due to the COVID-19 pandemic, among other things, corresponds to the world average.

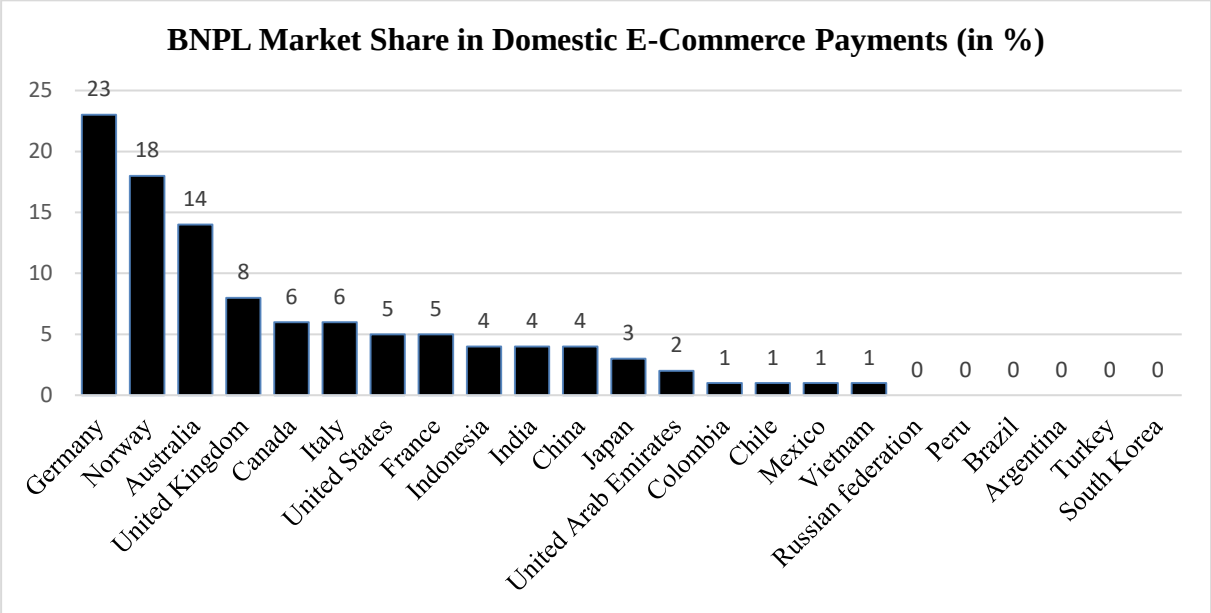
In Asia Pacific, digital wallets account for 58 per cent of regional e-commerce purchases and are expected to reach nearly 80 per cent by 2024. An important role is played by China, which is the leading power in digital payment methods. Led by Alipay and WeChat Pay, digital wallets account for 71 per cent of e-commerce sales and 48 per cent of retail sales. In contrast, in Indonesia and Thailand, bank transfers are the main preferred payment method for e-shop purchases, in Hong Kong and South Korea, credit cards still maintain their strength and conventional credit remains the main payment method both online and in brick-and-mortar stores.

In Latin America, cash continues to dominate at the point of sale. It still accounts for 60 per cent of in-store spending, compared to 15 per cent in North America and 30 per cent globally. The main reasons for the predominance of cash payments are the low rate of opening bank accounts for a large part of the population, relatively high bank fees and persistent concerns about fraud. Nevertheless, it can be expected that mobile purchases will make up more than half of all eCommerce purchases in the next five years, especially thanks to the penetration of mobile phones among the youth.

Paradoxically, the smallest relative increases in the use of electronic wallets and deferred payments are recorded in North America. In the US, consumers continue to prefer credit cards when shopping online, digital, and mobile wallets are on the rise and could reach 40 per cent of eCommerce payments within three years. Specific developments are expected in Canada, where credit cards remain the overwhelmingly predominant form of payment transactions and account for 51 per cent of sales in brick-and-mortar stores and 60 per cent of spending on purchases in e-shops. Canadians are also increasingly relying on wire transfers, which are estimated to become the second most popular form of online payment by 2024.

The following figure shows the market share of BNPL in domestic e-commerce payments registered in 2022 for selected countries around the world, where the share was the highest (de Best, 2023). It is visible that in Europe and Asia, the BNPL method is highly

developed and reflects a rapid growth of e-commerce in these countries. On the other hand, some countries have registered no or very low increases in terms of market share of deferred payments, such as Colombia, Chile, Mexico, Vietnam, Russia, Peru, Brazil, Argentina, Turkey, and South Korea.



From the point of view of generations, the so-called millennials, or people born between 1981 and 1996, who were the first to grow up in the world of the emerging Internet, use BNPL the most. Right behind them are members of the so-called "X" generation, which are their parents, born between 1965 and 1980, who experienced the end of the Cold War, the fall of the Berlin Wall, life under socialism and the 1990s full of wild economic transformations. In Bohemia, the name "Husákovy děti" was adopted for them.

Advantages and Disadvantages of BNPL for Consumers

The first clear advantage for consumers is the possibility of a free trial of goods and not paying interest for deferred payment. BNPL can be used to spread the cost of various goods from the most basic needs to more expensive and valuable products. BNPL can also help them in financially uncertain times, such as during a pandemic or an energy or mortgage crisis. Statistics show that BNPL's total usage has quadrupled in 2020 (de Best, 2023).

The second advantage is generally considered to be transparency and predictability. Customers are moving away from payment cards due to complex terminology, restrictive terms and high fees and prefer BNPL where they feel better control over their spending with no hidden fees, easier repayment methods and a better overview of all their purchases. Many of them are used for monthly subscriptions for various services. Staggering payments allow them to better cover their options, weather sudden market swings and manage unpredictable expenses.

The third most frequently mentioned advantage is the fact that BNPL payment is easy and convenient. No lengthy and unpleasant credit score checks are necessary, the payment method is naturally integrated into the purchasing intentions of the customer, who does not have to worry about finding additional sources of financing.

However, the use of deferred payments also contains some dangers. The most important thing is imprudence in going into debt, when the consumer quickly and easily buys goods, often even ones he does not need at all, and underestimates his future income, from which the debts must be paid. The fact that BNPL payments are not provided for payment in the form of interest

and are therefore exempt from the Consumer Credit Act means that the trader does not need to check the customer's creditworthiness when providing the service. However, in the event of non-payment, he may resort to significantly more "brutal" methods of debt collection, such as reporting to the police due to the commission of a crime by a person for whom the trader does not have sufficient personal data to file a lawsuit, or direct debt collection through judicial execution. Compared to ordinary consumer loans at the bank, the trader does not have to use standard mechanisms such as reminders, out-of-court settlements, repayment schedules, etc. There is also damage to the customer's reputation and the possible destruction of his credibility at his place of residence or work.

Advantages and Disadvantages of BNPL for Traders

Traders use BNPL to increase their revenue for goods sold. They try to "extract" as much money as possible from shoppers. Therefore, they try to increase the Average Order Value (AOV), or the average value of each order in their e-shop. AOV is calculated as the sum of revenue generated on your site/number of orders placed. It is the average value of the amount customers spend for each transaction. According to this indicator, traders include their offers in the product portfolio in the electronic catalogue. If the volume of purchases from the website remains constant and the "basket value" does not increase, it is necessary to resort to so-called sales promotion tools. Among the most popular are providing free shipping to customers who exceed the sum of the average order value or direct discounts for customers based on the value of the products in the cart. So-called up-selling is popular, i.e. offering a product like the one the customer wants, improved, but at a higher price. The so-called cross-selling works in a similar way, in which the customer is offered another free product, the removal of which is a condition for the completion of the order already in progress. Traders use so-called packages, which are packages of various types of goods, provided with a discount that the customer would not receive if he were to buy the products individually. The package can also be supplemented with special packaging, e.g. gift packaging or packaging to increase the protection of the goods against damage. A popular trick of marketers is to set a time limit during which the customer can take advantage of the discount on the desired product. This promotional technique is referred to as "FOMO – Fear of Missing Out" and causes customers to make decisions faster. Finally, traders offer so-called loyalty programs to regular customers. They have the form of a discount for the fact that our loyal customer acquires new customers for our e-shop. For example, it is possible to offer loyalty points for the first three newly obtained orders, which will turn into a discount coupon for the next order.

If we were to look at the disadvantages of BNPL for traders, we would put too long payment periods for higher volume orders in the first place. It is necessary to optimize the ratio between the probability of payment and the volume of goods sold. In other words, every trader should keep an eye on how much the potential losses from unpaid receivables are covered by the profit margin he will get from the increased sales volume. It is not recommended to rely on the already mentioned "brutal" debt collection methods. It is better to prevent the risk of non-payment by optimizing the product portfolio and carefully segmenting customers. For reasons of non-discrimination, it is advisable to reflect this optimization in the principles of the General Terms and Conditions of Sale.

Entities Providing Deferred Payments on the Czech Market

On the Czech market, deferred payments are offered through the fintech services Twisto Pay from Twisto Payments a.s. (founded in 2013, supported by ING Bank Group, UNIQA insurance company and ENERN, Velocity Capital, Finch Capital, Elevator Ventures and ZIP funds), Mall Pay from MallPay s.r.o. (founded in 2018, backed by Mall Group and ČSOB), PlatímPak, originally from Equa Bank a.s., from 1/1/2022 after acquisition in the hands of Raiffeisenbank

a.s. (originally established in 1993) and Třetinka from the company Alza a.s. (launched on the market in 2017). Currently, around ten thousand e-shops on the Czech market use BNPL services.

5. CONCLUSION

The paper raised three basic questions about the rise of a deferred payment method spreading around the world – Buy Now, Pay Later (BNPL). The research that preceded the article and the conclusions presented in the text provide the following answers. 1) What are the principles and procedures of BNPL shopping? The customers purchase goods online and pay for them after delivery, either in full price or in partial instalments. They do not pay the interest that would otherwise be charged if short-term financing was used. However, the BNPL fee must be paid. 2) How does the BNPL method develop in the world? Undoubtedly, BNPL is very rapidly developing in line with e-shopping penetration. This differs from country to country. This form of payment ambitionly attacking short-time loans, card overdrafts and digital wallets. BNPL is mostly used by millennials and X-generation. 3) What are the advantages and disadvantages for consumers on one side, and for traders on the other side? Consumers have the possibility of a free trial of goods and not paying interest, deferred payment is easy and convenient. However, they might they can fall into a debt trap and lose their property in foreclosure. Traders can use BNPL to increase their revenue, but they might incur losses from unpaid receivables. Generally, the deferred payment method BNPL has won its place in the financial world and gradually penetrates all areas of economic and social life.

BIBLIOGRAPHY

CR. (2023). *Consumer Reports*. Retriev. May 30, 2023, from https://www.consumerreports.org

Chien, J. (2023). *Buy Now, Pay Later – Policy measures to mitigate consumer risks from evolving business practices*. Retrieved July 7, 2023 from https://advocacy.consumerreports.org/wp-content/uploads/2023/07/BNPL-Policy-White-Paper.pdf

de Best, R. (2023, Dec 11). Buy Now, Pay Later (BNPL) – Statistics & Facts. *Statista*. https://www.statista.com/topics/8107/buy-nowpay-later-bnpl/#topicOverview.

FIS. (2023*). Global Payments Report by Worldpay from FIS C*. Retrieved Juni 19, 2023 from https://go.worldpay.com/2023GPR

FRPT. (2023). *BNPL firm Uni Cards buys P2P NBFC*. FRPT- M. 2023, 2-2. Retrieved July 14, 2023.

Fitzgerald, K. (2023). Buy now/pay later loans are becoming riskier: Consumer Reports. *American Banker*. Retrieved July 22, 2023 from https://www.americanbanker.com/payments/news/buy-now-pay-later-loans-are-becoming-riskier-consumer-reports

GBN. (2023, August 7). Qatar Central Bank to grant license for new BNPL services. *Global Banking News*. Retrieved August 20, 2023 from https://link.gale.com/apps/doc/A759900736/AONE?u=anon~d70e7945&sid=sitemap&xid=589e1c4b

Goncalves, P. (2023). John Lewis mulls buy now, pay later scheme. *MoneyWeek*. Retrieved August 20, 2023 from https://moneyweek.com/personal-finance/john-lewis-mulls-buy-now-pay-later-scheme

Goyal, A. (2023). Does BNPL make sense for banks? *BAI: Banking Strategies Daily*. Retrieved July 16, 2023 from https://www.bai.org/banking-strategies/does-bnpl-make-sense-for-banks/

Johnson, D., Rodwell, J., & Hendry, T. (2021). Analyzing the Impacts of Financial Services Regulation to Make the Case That Buy-Now-Pay-Later Regulation Is Failing. *Sustainability, 13*(2). https://doi.org/10.3390/su13041992

Patch, E. (2022). Good Reasons to Resist BNPL. *Kiplinger's Personal Finance, 76*(11), 63-63.

Schomburgk, L., & Hoffmann, A. (2023). How mindfulness reduces BNPL usage and how that relates to overall well-being. *European Journal of Marketing, 57*(2), 325–359. https://do.org/10.1108/EJM-11-2021-0923

BELT AND ROAD – 10 YEARS AFTER

Eva JANČÍKOVÁ
Metropolitan University Prague, Czech Republic
eva.jancikova@mup.cz

Abstract: *The belt and road initiative is an economic project of the global economy in 21st century and should not just be about huge investments in transport infrastructure, land and sea, but also about the importance of industrial, energy and agricultural projects, new scientific knowledge, information technology, building joint ventures and significant strengthening of electronic data transmission. The aim of this paper is to discuss the challenges of bri after 10 years. We will analyse the current status of the project and future plans. We also describe the main changes in financial system of china connected with the financing of this large investment, how it can be financed through combination of international and domestic, public and private sources, tailored to the specific projects and countries, backed up by implementation of new forms of international financial cooperation with countries along the belt and road and international financial institutions and set up international platforms to meet the financial services needs of participating countries. We analyse the role of development financial institutons: multilateral development financial institutions, chinese policy banks and special investment funds; the investment opportunities across asset classes and sectors and the potential impact for RMB internationalisation. In order to meet this goal, we used qualitative methods of scientific cooperation, such as analysis, synthesis, induction, deduction and comparison methods.*

Keywords: *Belt and Road Initiative, commercial banks, development financial institutions, RMB internationalization*

1. INTRODUCTION

The trade roads of major civilizations of Europe, Asia and Africa helped in past to facilitate the exchange of goods, knowledge and ideas, and then promoted economic, cultural and social progress in different countries. This historical experience is reflected in Belt and Road Initiative (BRI) considered an economic project of the 21st century in land and maritime transport infrastructure with strong influence on industries, energy and agriculture. Geographical priority of the project is Central Asia, Russia, South Asia and Southeast Asia, the Middle East and East Africa. In the long term the project count on the incorporation of European countries.

Financing plays the crucial role in BRI and requires the China`s cooperation with all participating countries and introduces an opportunity to innovate an international model of financing and to create a multi-tiered financial platform. BRI needs to have a financial security system that is long term oriented, stable and sustainable with manageable risks. Developing countries involved in BRI are plagued by lack of construction capability and funding and they need mid- and long-term financing. It is necessary to build an investment and financing system that is market-oriented, sustainable and mutually beneficial. China will have a more critical and active role to play in cultivating the BRI investment and financing system and driving global cooperation for the financing and capital support for the BRI (Sun & Madera, 2018).

China is the second largest economy in the world, the largest exporter and the second largest importer. The International Monetary Fund (IMF) has upgraded its GDP growth forecasts for China in 2023 and 2024. It now expects China's economy to grow by 5.4% in 2023, up from its previous forecast of 5%. However, the IMF also warns of slower growth next year, projecting that China's GDP will expand by 4.6% in 2024 – up from a 4.2% forecast in October – due to weakness in the property sector and subdued export demand (Whiting, 2023).

The aim of this paper is to discuss the challenges of BRI after 10 years. We will analyse the current status of the project and future plans. We also describe the main changes in financial system of China connected with the financing of this large investment, how it can be financed through combination of international and domestic, public and private sources, tailored to the specific projects and countries, backed up by implementation of new forms of international financial cooperation with countries along the Belt and Road and international financial institutions and set up international platforms to meet the financial services needs of participating countries. We analyse the role of development financial institutons: multilateral development financial institutions, Chinese policy banks and special investment funds; the investment opportunities across asset classes and sectors and the potential impact for RMB internationalisation. In order to meet this goal, we used qualitative methods of scientific cooperation, such as analysis, synthesis, induction, deduction and comparison methods.

2. THE POSITION OF EUROPEAN UNION ON BELT AND ROAD INITIATIVE

The European Union (EU) position on BRI is developing, or better to say, changing. For the first period starting by 2013 the EU approach was so called "wait-and-see". The European institutions focused on study the objectives and goals of the Belt and Road Initiative and its compliance with EU regulations and standards. An important issue was also if it is possible to achieve effective synergy with priorities of the Trans-European Transport Networks (TEN-T), the European Commission policy directed towards the implementation and development of a Europe-wide network of roads, railway lines, inland waterways, maritime shipping routes, ports, airports and rail-road terminals (European Commission, n.d.). In September 2015, the European Commission and the Chinese government signed a Memorandum of Understanding on the EU-China Connectivity Platform to enhance synergies between China's "One Belt One Road" initiative and the EU's connectivity initiatives in the framework of the TEN-T. The Platform had to promote cooperation in areas such as infrastructure, equipment, technologies and standards to create multiple business opportunities and promote employment, growth and development for both sides. They also agreed to set up a joint working group of experts from China´s Silk Road Fund, the Commission and the European investment Bank (EIB) to increase cooperation between the EU and China on all aspects of investment. The EU encouraged deepened collaboration between China and the European Bank for Reconstruction and Development (EBRD), including the examination of a possible membership in the EBRD in line with its rules (European Commission, 2015).

In 2015 the Asian Infrastructure Investment Bank (AIIB) was established and Austria, Germany, Luxembourg, Netherland, Norway and United Kingdom were founding members of the bank. AIIB began operations in 2016 with 57 founding Members (37 regional and 20 nonregional). By the end of 2020, we had 103 approved Members representing approximately 79 percent of the global population and 65 percent of global GDP. Most of European countries are members. In 2018, AIIB was granted Permanent Observer status in the deliberations of both the United Nations General Assembly and the Economic and Social Council, the two development-focused principal organs of the global body (AIIB, 2023).

Chinese investment in Europe increased from about 2 billion euros in 2009 to roughly 20 billion in 2015, and reached 35 billion euros in 2016 (Zuokui, 2018). This huge growth was a result of crises in eurozone. Some of core EU countries started to realize that Chinese investments are not under control and especially Germany worried about the loss of critical technologies by acquisition of state-owned Chinese companies. German Government amended the Foreign investment regulation to control mergers and acquisition by non-EU countries. Similar changes were realized by other EU countries. These countries also pushed the EU

institutions to prepare a uniform regulation for all EU members (Jančíková, 2020). In September 2017, in his annual State of the Union address, President of European Commission Jean-Claude Juncker stated: "Europe must always defend its strategic interests. This is why today we are proposing a new EU framework for investment screening. If a foreign, state-owned, company wants to purchase a European harbour, part of our energy infrastructure or a defence technology firm, this should only happen in transparency, with scrutiny and debate". (European Commission, 2017).

The proposed new legal framework includes:

- A European framework for screening of foreign direct investments (FDI) including transparency obligations;
- A cooperation mechanism between member states and EC and
- EC screening FDI which may affect project or programmes of EU interest (in research Horizon 2020, space – Galileo, transport – Trans-European Network for Transport.

On the end of 2017 EC released a Commission Staff Working Document on Significant Distortions in the Economy of the People´s Republic of China for the Purposes of Trade Defence Investigations. This report examines the core features that give the Chinese economy its current shape and structure, like the concept of "socialist market economy", the role of the Chinese Communist Party (CCP) in the economy, the extensive system of plans, state-owned sector, the financial market, the procurement market and the system of investment screening; the various factors of production, provision of land, energy, capital, material inputs and labour in China and the examination of number of sectors – steel, aluminium, chemical and ceramics (TRADE.EC., 2017). Based on this report EU didn´t grant to China the full market economy status. EU intended to introduce stricter standards for screening of foreign direct investments and EU also planned to raise new trade barriers and to continue in anti-dumping investigations against Chinese products. Liu Zuokui from Chinese Academy of Science in his research paper "Europe´s Protectionist Position on the Belt and Road Initiative and Its Influence", states that protectionism has become an important background for the EU´s denial of China´s market economy status (Zuokui, 2018).

The report of European Think-tank Network on China worked out in December 2017 shows that Chinese investors in Europe are looking for technology, to include established high-tech assets, emerging technologies and know how; access to the European market, for Chinese goods and services; access to third markets via European corporate networks; brand names to improve the marketability of Chinese products worldwide; integrated regional and global value chains in production, knowledge and transport; a stable legal, regulatory and political environments and political/diplomatic influence in the region (Seaman, 2017).

The main role of Central and Eastern European Countries (CEECs) in the BRI is a macroregional contribution from the specific part of Europe which experienced both the socialist and capitalist regimes. The ex-socialist countries had a practical contact with the reality of the Soviet Block for around 40 years, and now they learned their lesson from the contact with the European Union and its allies (while the most of them are EU members, the other ones are closely connected to the EU). It gives the macro-region of CEECs the specific identity which makes possible to understand both sides, i.e. advantages and weaknesses of both the arrangements. The CEECs have the experience with market incentives and central planning, and also with private and public kinds of ownership. China is one of the most important trading partners for Central and Eastern Europe. There are many factors that can affect the future volume and value of trade: the world economy, the domestic economy and domestic politics. This is evidenced by the cooperation on the project of BRI in the form of cooperation between China and the 16 Central and Eastern European countries. These 16 countries include the 11 EU Member States (Bulgaria, the Czech Republic, Estonia, Croatia, Lithuania, Latvia, Hungary,

Poland, Romania, Slovakia, Slovenia) and 5 non-EU countries (Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, Serbia) (Jančíková, 2020).

16+1 relates well to the remaining three priority areas defined by BRI. Improving infrastructure connectivity and policy coordination is expected to result in growth in trade, deeper financial cooperation (if not integration) and growing people-to-people exchange (both officially-sponsored and unofficial, such as those expected to be brought about by increasing trade links or tourism between China and CEE). Furthermore, various measures, initiatives and priority areas defined through the workings of 16+1 also directly respond to the priorities defined under BRI (Pavlićević, 2018).

In August 2018 Greece signed on as a member of the BRI and should become a member of CEE countries grouped in 16+1 renamed as 17+1. In January 2019 Portugal signed on as a member of Belt and Road Project and then in April Italy as one of the core EU countries.

The EU does not speak "with one voice" and the positive rhetoric and some proactive measures by some stakeholders, as described above, are balanced by the non-cooperative and occasionally hostile responses to 17+1 and BRI, as these are more widely perceived to threaten some of the EU's core political and economic interest. Concerns about economic and geopolitical ramifications of 17+1 and BRI have been increasingly coming to the fore in the recent months in the EU, and resulted in a series of policies and measures that aim to ensure these interests are protected (Pavlićević, 2018).

The Cooperation in the frame of 17+1 is criticized by European Union (EU) and in past three years, EU officials have lambasted China for allegedly undermining the European integration process by turning the CEE countries into "Trojan horses" and sowing division in the continent. Some of them demanded that China adopt a "One Europe" policy (Kavalski, 2019). EU politician worry that with China´s increased economic involvement in the region, its political clout grow to an extent that it would be able to "divide and rule" Europe by undermining EU solidarity on multiple key issues such as transparency norms and human rights (Matura, 2019).

On the other side the eleven member states of the 17+1 realized a limited number of projects only. The main reason is that they can use for their infrastructure development more attractive EU funds. One of the exceptions is the development of Belgrade-Budapest railway line with possible connection to the Port of Piraeus in Greece. We can also mention the establishment of a direct connection between the city of Chengdu and Lodz that was realized before the announcement of the BRI. These railway lines are the most successful BRI related cooperation in the region.

Despite the various technical issues, the real challenge of the "17+1 Cooperation" is the sceptical attitude of the EU leadership toward the mechanism. In recent years several efforts have been made by the participating countries to change this view; however, the real breakthrough has not been achieved yet. The BRI provides new opportunities for Europe in the more and more multipolar international order. The new mechanism such as the "17+1 Cooperation" will play a more significant role as a tool to help the increased participation of Europe in the world affairs (Eszterhai, 2018).

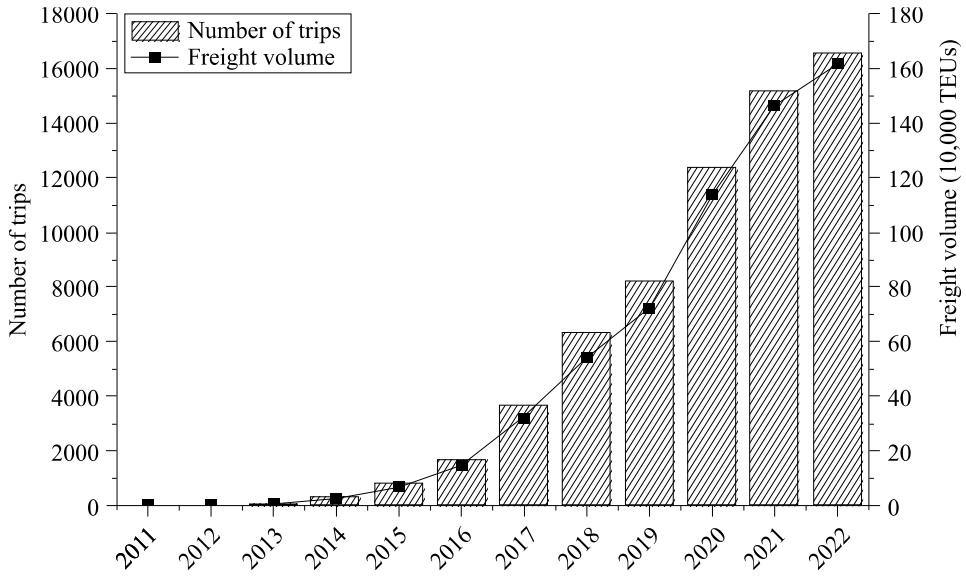
During the first decade China invested tens of billions of dollars in Europe under BRI and the funds helped with the construction of new roads, railways and port facilities, but in some European countries there is concern about debt payments. As an example, we can mention the Greek port of Piraeus which is China's biggest acquisitions in Europe under the BRI. The Chinese state-owned shipping firm COSCO now owns a 67% share in the facility. Supporters say Beijing's money has transformed the port, with container volumes increasing five-fold since 2009. However, critics say China has failed to meet its contractual obligation to invest $300 million in port facilities, which included expanding cruise ship facilities, new passenger terminals, hotels, warehouses, and upgrading the vehicle import terminal. According to Chinese

state media China funded numerous projects in the Eastern Europe and Western Balkans with aim to connect China with the EU and at present more than 1.000 freight trains runs between China and Europe every month. One of the largest recipients of BRI investments in 2022 was Hungary with the project of high-speed rail link between Budapest and Belgrade in 2025. They also plan to connect the rail link with Pireus port.

The China-Europe Railway Express has now reached more than 200 cities in 25 European countries, comprising 86 routes passing through the main regions of the Eurasian hinterland at a speed of 120 km per hour. Its logistics distribution network covers the entire Eurasian continent. By the end of June 2023, the cumulative volume of the China-Europe Railway Express had exceeded 74,000 trips, transporting nearly 7 million TEUs and over 50,000 types of goods in 53 categories such as automobiles, mechanical equipment, and electronic products, to a total value of more than US$300 billion.

The China-Europe Land-Sea Express Line has emerged from scratch to become the third trade channel between China and Europe, after traditional sea routes and the China-Europe Railway Express. In 2022, more than 180,000 TEUs were transported through this line, with rail trips exceeding 2,600. The routes of rail-sea freight trains of the New International Land-sea Trade Corridor cover 18 provinces and equivalent administrative units, in central and western China, transporting goods to 300-plus ports in more than 100 countries (The State Council Information Office of the People's Republic of China, 2023).

Figure 1. Number of trips and freight volume of China-Europe freight trains (2011–2022)



Source: The State Council Information Office of the People's Republic of China, 2023

Among unsuccessful project we can mention the Montenegro´s $1 billion loan from China to build a new highway, which remains unfinished with the debt higher than a third of Montenegro's annual budget. This threatened to bankrupt the country, until a group of American and European banks stepped in to help restructure the financing (Ridgwell, 2023).

In 2019, Italy became the only member of the G7 group to join the BRI. But the government says the purported benefits have failed to materialize, and Rome looks set to pull out of the initiative later this year and they has blocked the sale to Chinese firms of some of its biggest companies, such as the tire maker Pirelli, under its so-called golden power rules. Other European states, including Germany, have sought to limit Chinese acquisitions. Earlier this year, Germany blocked the Chinese state-owned firm COSCO from buying a controlling share

in the port of Hamburg. At present we can see a growing trend of blocking Beijing's acquisition of key strategic assets amid a Western push to reduce dependence on China (Ridgwell, 2023).

3. BRI AND FINANCIAL REFORMS AND INTERNATIONALIZION OF RENMINBI

After the global crisis, the importance of a well-functioning banking system for economic growth has been well appreciated by governments in developing and transitional economies and the reform of the banking system has become a high priority on the policy agenda. China`s market-oriented banking reform improved the domestic banks' performance, enhance competitiveness and strengthen risk management to meet the financial targets of BRI. Very important part of BRI is the encouragement of financial innovation with the goal to raise private capital for BRI projects and to ensure that domestic economy is properly served through inclusive finance. The financial liberalization can be considered as a positive development only, if risks are properly controlled for. Safeguards must be put in place to reduce capital flight where necessary (Jiang & Yao, 2017).

They were aware that to prevent fraud and excessive risk a better financial regulations and enforcement must be implemented. The problem was that Chinese accounting and auditing systems for firms are not developed to be able to guard against fraud and that can cause big problems to many Chinese firms. Lack of underlying institutions presents a barrier to both financial reform and to realizing the financial goals of BRI; further, lack of enforced property and legal rights may undermine the reform process, since it reduces ability to reinforce collateralized loans and debt contracts in general.

The use of the Chinese currency Renminbi for many years lagged behind China's economic development. It was caused by the restrictions applied in China. The situation began to change fundamentally after China's accession to the WTO. China was committed to the gradual release of such restrictions. Renminbi is the official name of the Chinese currency, which means "people´s currency" and Juan is a unit of currency. Renminbi was established in 1949 and for several decades was bound to USD exchange rate of approximately two Yuan per US Dollar (USD). Currently, the USD is about 7 Yuän, and this rate is subject to criticism, especially from the U.S., which along with other developed countries exert some pressure on China to make this course real. In addition to scientists and experts, it is often discussed by politicians (Jančíková & Pásztorová).

SWIFT (Society for Worldwide Interbank Financial Communication) follows the development of the transactions in RMB for several years and works with global banks on the analysis concerning the use of RMB in trade finance, international payments or financial markets. More and more financial institutions have on the agenda the question of the impact of the RMB internationalization in their business. Option "RMBfication" has become a part of the strategy of most global banks (SWIFT, 2018).

The internationalization of RMB is one of the most significant financial events of this decade. It offers enormous opportunities for companies active in China to improve risk management and the efficiency of their treasury operations. However, as an evolving situation – and one driven by government rather than market forces – it is essential for corporate treasurers to keep a close eye on the latest developments, and to choose partners that combine local knowledge with global capabilities (Liao, 2013).

By leading the cross-border Belt and Road infrastructure initiative, China will expand the use of the RMB in connected countries, thanks to improved international payment and settlement facilities (SWIFT, 2018).

For financial markets, the BRI is likely to play crucial role in three particular areas:

[1] It will promote RMB settlement through the current account. One of the initiative's aims is to facilitate bilateral trade between China and countries along Belt and Road routes. The projects are likely to boost exports of Chinese goods and services to Belt and Road countries, thereby increasing demand for RMB trade settlement and promoting currency mobility through the current account.

[2] The Belt and Road initiative promises to boost RMB outflows through the capital account. In recent years, Chinese enterprises have increased investment in Belt and Road regions. Significant part of China's ODI is currently denominated in RMB. As the Belt and Road initiative scales up and more infrastructure projects are undertaken, China's ODI in the relevant countries will increase, and RMB outflows on the capital account will rise accordingly. Moreover, as mentioned, the initiative actively promotes RMB trade settlement. So, the countries in question are likely to be more open to using RMB in order to avoid exchange rate risk and reduce transaction costs.

[3] The Belt and Road initiative is encouraging the international spread of the RMB as storing of value – key feature of any global currency. Demand for investment denominated in RMB is increasing in Belt and Road countries, which have also become more open to using the currency as a reserve asset. This provides an opportunity to increase the diversity and scale of RMB-denominated products in offshore markets. Demand for new RMB-denominated financial products such as local government bonds and asset backed securities is likely to increase. Involvement in Belt and Road projects will also encourage countries to incorporate RMB in their foreign exchange reserves. Several Asian countries – including South Korea, Malaysia and Cambodia – have made the RMB one of their reserve currencies. More countries are expected to follow this trend (Xinhua, 2016).

This rapid development affects all regions of the world. We expect that in the coming years, the Chinese economy will become the strongest economy in the world and it will correspond to the position of its currency. RMB internationalization is on the one hand the result of the reform process in China, but at the same time we can also say that the RMB internationalization greatly helps this process.

China is the first emerging-market currency to be included in the SDR basket. This action promotes the credibility of RMB and thus makes it more likely to be utilised by "Belt and Road' countries" (Lehmanbrown, 2019).

4. BRI AND THE INTERNATIONAL AND CHINESE FINANCIAL INSTITUTIONS

The BRI construction is a long run, complex global ambition that requires comprehensive global cooperation at a deep level. The countries along the BRI are mostly developing countries. Despite their strong desire to promote socioeconomic development they continually encounter issues such as the lack of construction capability and access to funds when implementing key projects, including infrastructure projects. There is a high demand form these countries for financing and a great need for support from the international community (Sun & Madera, 2018).

Along with the expansion of its presence in development aid/finance, China has made effort to enhance its transparency and accountability by announcing the "White Paper" on China´s foreign aid (Oashi, 2018). Among potentional risks we can define 3 main groups of risk: political, security and economic risks. Political situation in countries on the Belt and Road is complicated. We can mention for example Myanmar where Chinese investments fell from 407 mil. USD in 2012 to just 46 mil. USD in 2013 what represents almost 90 percent. This plunged was caused by rising anti-Chinese sentiment and opposition to key projects in

Myanmar, notable the USD 3,6bn Myitsone dam in the northern part of the country. China and Japan are competing to raise their influence in South Asian countries. Japan secured Dhaka´s approval to begin building a 60-foot-deep port in Matarbari, on the southeast coast of Bangladesh. At the same time China and Bangladesh were negotiating on approval for the Sonadi deep water port about 15 miles from Matarbari. The situation is not better in Middle Asia where Tajikistan and Uzbekistan have conflicts about China´s hydropower project on the Amu Darya River what could affect the access of Uzbekistan to water. Chinese investment in countries along Belt and Road may be exposed to turmoil and conflicts, terrorism and religious conflicts. One of the major economic risks is the potential of these countries defaulting on foreign lending and investment projects. Many of countries in this region are among the poorest economies in the world and have problems with corruption (Lu, 2017).

Chinese enterprises try to get the best foreign risk analysis firms to avoid the possible risks. They also try to cooperate with Chinese think tanks doing risk analysis, such as the Chinese Academy of Social Sciences. Think tanks are in better position to evaluate development risk (Lu, 2017).

China´s economy has slowed down and banks´ balance sheets are saddled with doubtful loans, which continue to be refinanced and do not leave much room for massive lending needed to finance BRI. China has also lost nearly USD 1tn. in foreign reserves due to massive capital outflows. This reduces the leeway for Belt and Road projects to be financed by China (Garcia-Herrero, 2017).

China´s state-owned policy banks and state-owned commercial banks are the major sources of BRI financing. They provide 81% of total BRI funding and capital funding for the Chinese government-sponsored bilateral funds and they are the major issuers of the BRI bonds. The Chinese banking system has become a multi-layered system with more than 4000 banking institutions providing a full range of banking products and services to serve the economy. It also plays an increasingly important role in the world financial arena – it is home to the four largest banks in the world in terms of market capitalization (Jiang, 2017).

Chinese policy banks mainly refer to China Development Bank (CDB) and the Export-Import Bank of China (China Eximbank). They take part in the BRI mainly through providing financing and financial consulting services along with low-cost financing support for Chinese and foreign companies and large-scale projects (Jančíková, 2020).

In November 2017 China Development Bank successfully issued the first quasi-sovereign international green bond including USD 500 mil. bonds and EUR 1bn bonds. This bond was executed strictly in compliance with the Bond Principles (GBP) and awarded Climate Bond Certification by Climate Bonds Initiative (CBI). It was listed on the Hong Kong Stock Exchange and the China Europe International Exchange and the funds were used to support green industrial projects along the BRI including the three major green areas of clean transportation, renewable energy and water resources protection. The funds provided strong financing support for the implementation of sustainable development and greening the Silk Road. We can appreciate the positive development of China's development financing institutions to implement and take the lead in responding to the BRI and continue to 19 promote the interconnection of domestic and overseas markets. By integrating the concept of green finance into BRI construction, using various financial instruments including green bonds to guide resources, the funds support BRI cooperation and sustainable development. The ecological environment along the road can be improved while promoting economic development to support sustainable development and win-win results (Sun & Madera, 2018).
Export-Import Bank of China (Eximbank) specialises in implementing Chinese state policy in the industry, foreign trade, diplomacy, investment economic cooperation. Given its important role, the Exim Bank of China is a major player in financing the BRI. For big state-owned

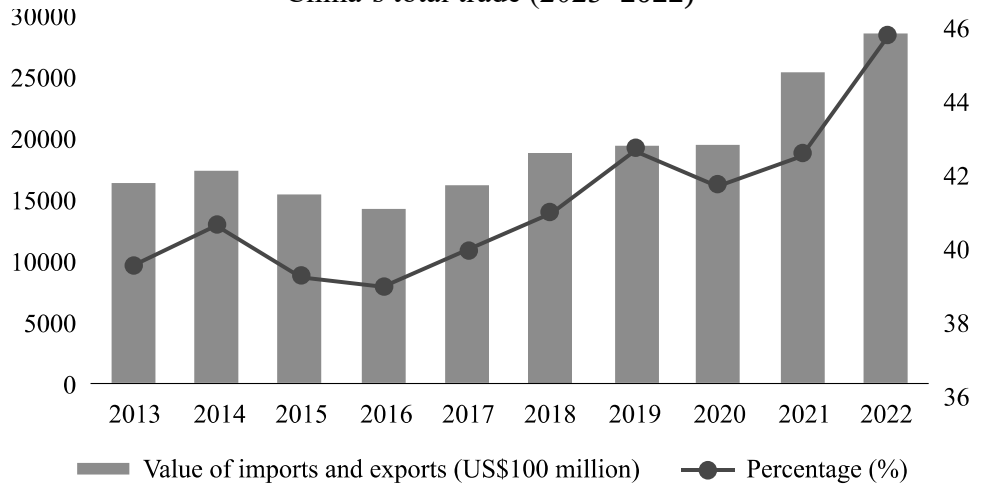
commercial banks, the ICBC, Bank of China, the China Construction Bank (CCB) and the Agricultural Bank of China constitute another significant source for BRI financing.

In December 2017, the Export-Import Bank of China with the assistance of Bank of China, issued the first phase of "bond connect" green bond of 2017, with an amount of RMB 2bn and a maturity of three years. The raised fund aims to invest in key green BRI projects through the specific capital arrangement and qualified credit project reserves of the Export-Import Bank of China. It offers foreign investors direct access to invest in greening the BRI (Che, 2019).

Western banks according to their executives are leaving the big state-sponsored infrastructure projects to local banks and development finance institutions. Instead they are focused on picking up ancillary business, such as providing foreign exchange, trade finance, interest rate swaps, or cash management to the multinational companies that work on project. Citigroup has led large bond issues for Bank of China and Beijing Gas to finance their BRI plans. It has also won cash management and foreign exchange hedging contracts for several Fortune 500 companies operating on BRI projects. Standard Chartered Bank lists 20 financing deals it has won in the past four yours that are linked to BRI. These included a USD 515 mil. project financing for a power plant in Zambia that was guaranteed by China; a USD 200 mil. loan for a Bangladesh electricity plant being built by a Chinese consortium; and USD 42 mil. export credit facility for a Sri Lanka gas terminal that was guaranteed by China (Arnold, 2018). Emerging multilateral development financial institutions such as the Asian Infrastructure Investment Bank (AIIB), New Development Bank (NDB), formerly known as the BRICS Development Bank and Silk Road Fund stand out with their focus on the BRI. These institutions offer diverse and innovative lending models based on international standards and are offered in the following forms: credit, bonds, equity investment and insurance. Joint investment and financing between these institutions and policy-based and commercial banks in China and Silk Road Fund are also possible. Investment by the Asian Infrastructure Investment AIIB, Silk Road Fund and domestic policy banks into the BRI regions is largely done in collaboration with World Bank (Jančíková, 2020).

Trade and investment are expanding steadily. From 2013 to 2022, the cumulative value of imports and exports between China and BRI partner countries reached US$19.1 trillion, with an average annual growth rate of 6.4 percent. The cumulative two-way investment between China and partner countries reached US$380 billion, including US$240 billion from China. The value of newly signed construction contracts with partner countries reached US$2 trillion, and the actual turnover of Chinese contractors reached US$1.3 trillion. In 2022, the value of imports and exports between China and partner countries reached nearly US$2.9 trillion, accounting for 45.4 percent of China's total foreign trade over the same period, representing an increase of 6.2 percentage points compared with 2013; the total value of imports and exports of Chinese private enterprises to partner countries exceeded US$1.5 trillion, accounting for 53.7 percent of the trade between China and these countries over the same period (The State Council Information Office of the People's Republic of China, 2023).

Figure 2. Value of China's imports and exports with BRI partner countries and its share in China's total trade (2023–2022)



Source: The State Council Information Office of the People's Republic of China, 2023

Trade and investment liberalization and facilitation is improving. BRI participating countries continue to uphold multilateralism and free trade, working hard to create a sound institutional environment for closer economic and trade relations. Positive progress has been made in the alignment of working systems, coordination of technical standards, mutual recognition of inspection results, and online verification of electronic certificates (The State Council Information Office of the People's Republic of China, 2023).

5. CONCLUSION

The EU does not speak "with one voice" and the positive rhetoric and some proactive measures by some stakeholders are balanced by the non-cooperative and occasionally hostile responses to 17+1 and BRI, as these are more widely perceived to threaten some of the EU's core political and economic interest. Concerns about economic and geopolitical ramifications of these countries in connection with BRI have been increasingly coming to the fore in the recent months in the EU, and resulted in a series of policies and measures that aim to ensure these interests are protected. The proposed new legal framework includes a European framework for screening FDI together with transparency obligations.

Financial system plays an important role in realising of the Belt and Road Initiative, from building and maintaining effective infrastructures and processes to support capital flows; to working towards common standards and mitigating risks. In China its transformation was one of the most crucial tasks before accession of WTO and it is still going on. They must implement new regulation to prevent fraud and excessive risk and to develop reliable accounting and auditing systems for firms. BRI will complement financial liberalization in China but safeguards must be put in place to control a multitude of risks, including credit, currency, interest rate, liquidity, and solvency risks. This is dependent on proper pricing of risk and reward through loans, equity, or bond financing. Financial investment is expected to increase along the BRI financial expertise and proper financial controls are essential. Policy should emphasize that the rapid development of risk-control and stability mechanisms is essential both for financial reform and for the financing of BRI projects. Building legal mechanisms, information transparency and property rights are also the important precursors for any financial reform. The more that China's own equity, bonds and direct financial markets are

built up, the better it can use these means to serve BRI: where necessary, domestic needs should be prioritized over BRI needs. Without a strong domestic financial and real economy, BRI projects will lack its stable foundation. In summary, BRI is an ambitious undertaking that will require broad financial mobilization. Some of the financial reforms will be sufficient, but additional financial infrastructure is necessary. Continued and gradual approach to reform and investment in BRI is necessary to ensure its stability.

Chinese investment in countries along Belt and Road may be exposed to turmoil and conflicts, terrorism and religious conflicts. Many of countries in this region are among the poorest economies in the world and have problems with corruption. One of the major economic risks is the potential of these countries defaulting on foreign lending and investment projects. Therefore, it is important to assess the risks correctly and carefully not only on the creditor side but also in the debtor country.

BIBLIOGRAPHY

Asian Infrastructure Investment Bank. (2023). *Members and Prospective Members of the Bank*. https://www.aiib.org/en/about-aiib/governance/members-of-bank/

Arnold, M. (2018, February 26). Western banks race to win China´s Belt and Road Initiative deals. *The Financial Times*. https://www.ft.com/content/d9fbf8a6-197d-11e8-aaca-4574d7dabfb6

Eszterhai, V. (2018). "16+1 Cooperation" Promoting Belt and Road Initiative: Better after the Belt and Road Forum for International Cooperation. In H. Ping, & L. Zuokui (Eds.), *How the 16+1 Cooperation promotes the Belt and Road Initiative.* 89-101. China-CEEC Think Tank Book Series. Path International. China Social Sciences Press. https://sha.static.vipsite.cn/media/thinktank/attachments/0127811c10d2e4b9c9090b6240f73362.pdf

European Commission. (2015, September, 28). *Investment Plan for Europe goes global: China announces its contribution to #investEU*. European Commission. https://ec.europa.eu/commission/presscorner/detail/en/IP_15_5723

European Commission. (2017, September 14). *State of the Union 2017 - Trade Package: European Commission proposes framework for screening of foreign direct investments*. European Commission. https://ec.europa.eu/commission/presscorner/detail/en/IP_17_3183

European Commission. (n.d.). *Trans-European Transport Network (TEN-T).* European Commission. https://transport.ec.europa.eu/transport-themes/infrastructure-and-investment/trans-european-transport-network-ten-t_en

EBRD. (2019). *Belt and Road Initiative*. European Bank for Reconstruction and Development. https://www.ebrd.com/what-we-do/belt-and-road/overview.html

Garcia-Herrero, A. (2017, May 12). China can´t finance "Belt and Road" alone. *Bruegel's Weekly Newsletter.* https://www.bruegel.org/blog-post/china-cannot-finance-belt-and-road-alone

Chinadaily. (2018, June 5). China owns Top 10 largest banks in the world. *Chinadaily.* http://www.chinadaily.com.cn/a/201806/05/WS5b15c045a31001b82571e1b2.html.

China Economic Information Service. (2018). Development Finance Institutions Jointly support the Belt and Road Initiative. *Silk Road News*.

Chu, J., & Muneeza, A. (2019). Belt and Road Initiative and Islamic Financing: The Case in Public Private Partnership Infrastructure Financing. *International Journal of Management and Applied Research,* 6(1). 24-40. https://doi.org/10.18646/2056.61.19-002

Hsu, S. (2015). One Belt One Road and the Roadmap to Financial Reform. *Policy Note No. 107*, 8. The Global Institute for Sustainable Prosperity. https://www.global-isp.org/wp-content/uploads/PN-107.pdf

Jančíková, E. (2020). Belt and Road Initiative - New Challenges in Project Financing. *Almanach: aktuálne otázky svetovej ekonomiky a politiky*, *15*(1), 13-35.

Jančíková, E., & Pásztorová, J. (2015). Internationalization of Renminbi. *Actual Problems of Economics*, 7(169), 377-387.

Jiang, C., & Yao, S. (2017). *Chinese Banking Reform*. The Nottingham China Policy Institute Series. Palgrave Macmillan Cham.

Lehmanbrown. (2019). *Belt and Road Initiative*. https://www.lehmanbrown.com/wp-content/uploads/2017/08/The-Belt-and-Road-Initiative.pdf

Liao, C. (2013). *Making the Most of Renminbi Internationalisation*. https://www.theglobaltreasurer.com/2013/04/05/making-the-most-of-renminbi-internationalisation/

Lu, M. (2017). One Belt, One Road: Risks and Countermeasures for Chinese Companies. In *Navigating the New Silk Road. Expert Perspectives on China´s Belt and Road Initiative*.7-9. Oliver Wyman. https://www.oliverwyman.com/content/dam/oliver-wyman/v2/publications/2017/aug/Navigating_The_New_Silk_Road.pdf

Matura, T. (2019). The myth of the Belt and Road in Central and Eastern Europe. *Panda Paw Dragon Claw*. https://pandapawdragonclaw.blog/2019/05/05/the-myth-of-the-belt-and-road-in-central-and-eastern-europe/

Oashi, H. (2018). The Belt and Road Initiative (BRI) in the context of China´s opening-up policy. *Journal of Contemporary East Asia Studies,*7(2), 85-103. https://doi.org/10.1080/24761028.2018.1564615

Pavlićević, D. (2018). 16+1 Promoting Belt and Road Initiative: Challenges and Royal Initiative. In H. Ping, & L. Zuokui (Eds.), *How the 16+1 Cooperation promotes the Belt and Road Initiative*. *China-CEEC Think Tank Book Series.* 54-70. https://sha.static.vipsite.cn/media/thinktank/attachments/0127811c10d2e4b9c9090b6240f73362.pdf

Ridgwell, H. (2023, October 11). Ten Years Old, China's 'Belt and Road' Is Losing Allure in Europe. [online]. *VOA News*. https://www.voanews.com/a/ten-years-old-china-s-belt-and-road-is-losing-allure-in-europe-/7306378.html

Seaman, J., Huotari, M., & Otero-Inglesias, M. (Eds). (2017). Introduction: Sizing Up Chinese Investments in Europe. In *Chinese Investment in Europe: A Country-Level Approach. ETNC Report, December 2017*. 9-18. https://www.ifri.org/sites/default/files/atoms/files/etnc_reports_2017_final_20dec2017.pdf

Sun, G., & Madera, S. (2018). *Building an Investment and Financing System for the Belt and Road Initiative: How London and other global financial centres can support*. City of London Corporation.

SWIFT. (2018). Monthly reporting and statistics on renminbi (RMB) progress towards becoming an international currency. *SWIFT July 2018 RMB Tracker*. [Cited 10.7.2019]. https://www.swift.com/our-solutions/compliance-and-shared-services/business-intelligence/renminbi/rmb-tracker/document-centre.

SWIFT. (2019). An inside look into London's quest for the renminbi. FX and payments in the midst of uncertainties. *RMB Tracker, Special Edition September 2019*. https://medium.com/planetswift/an-inside-look-into-londons-quest-for-the-renminbi-2989216951f1

TRADE.EC. (2017, December 12). Trade - European Commission. *European Commission Staff Working Document: On Significant Distortions in the Economy ot the Peoples´s Republic of China for the Purposes of Trade Defence Investigations.* [Cited 10.7.2019].

https://trade.ec.europa.eu/doclib/docs/2017/december/tradoc_156474.pdf

The State Council Information Office of the People's Republic of China. (2023, October 10). *The Belt and Road Initiative: A Key Pillar of the Global Community of Shared Future*. http://www.scio.gov.cn/zfbps/zfbps_2279/202310/t20231010_773734.html

Whiting, K. (2023, Nov 10). China's growth forecasts upgraded, Eurozone recession fears and other economy news to read this week. *World Economic Forum*. https://www.weforum.org/agenda/2023/11/china-growth-forecast-economy-news/

Xinhua. (2016, May 5). West China Seeks Fortune on Modern Silk Road. *Xinhua Insight.* Retrieved 10. 7. 2019 from http://news.xinhuanet.com/english/2016-05/15/c_135360904.htm

Xinhua. (2016, Sept 23). News Analysis: China's yuan heads for global currency status. *Xinhua*. http://news.xinhuanet.com/english/2016-09/23/c_135708854.htm

Zhang, M. (2016). Why Has RMB Internationalization Stagnated? http://wallstreetcn.com/node/265411.

Zuokui, L. (2018, September/October). Europe´s Protectionist Position on the Belt and Road Initiative and Its Influence. *72 China Int'l Stud.* 145, 145-165.

Financial Management

COOPERATIVE HOUSING AS A FUTURE TREND IN THE CONSTRUCTION OF HOUSING NEEDS

Jan MALÍŘ
Brno University of Technology, Czech Republic
jan.malir@vutbr.cz

Jiří OULEHLA
Brno University of Technology, Czech Republic
jiri.oulehla@vut.cz

Abstract: *This article focuses on the problem of lack of housing in the Czech Republic and its inaccessibility. The lack of housing units is influenced by the current trend in the real estate market, where people are moving from the countryside to larger cities. Inaccessibility is caused by several factors, especially high interest rates for both business loans and housing loans, high prices of building materials and works, average wages of residents, and many others. The real estate market should satisfy the demand for housing, but this has not been the case in recent years, mainly due to the significant increase in real estate prices. High real estate prices in combination with some of the already mentioned factories make it impossible for many people to buy their own real estate. The article mentions three options for living, namely living on one's own property, living in a rental or in the form of cooperative housing, which somewhat combines the two previous options. In our opinion, cooperative housing is a way to make housing more accessible, mainly because of the lower financial burden for the end customer, as the initial investment is lower by several tens of percent. Cooperative housing has several advantages and disadvantages, which are detailed and analyzed in the article. Due to the situation on the market, the topic of cooperative housing is also urgent for developers, who are presented with an alternative way to sell real estate.*

Keywords: *cooperative housing, Czech Republic, housing needs, real estate, real estate market*

1. INTRODUCTION

As for the real estate market, it is a very sensitive sector influenced by the development of individual factors. Companies operating in this market must prevent possible losses, respond in time and well to given changes, maintain their competitiveness and have a properly set planning system. The real estate market is very complex, which means that many factors influence its development. These factors can include, for example, employment, energy prices, legislation, mortgage interest rates, average wages of the population, prices of building materials and many others. In addition to these generally known factors, other factors can be mentioned that affect different groups of customers differently. Based on a comprehensive knowledge of market conditions, the company's strategy can be adjusted, as this knowledge will allow better and more accurate prediction of possible changes in the economy and the real estate market itself.

The real estate market can be divided into two basic segments. The market with new buildings (the market with newly built family and apartment buildings) and the market with existing real estate (the market with existing houses and apartments). It is certainly necessary to mention that the real estate market is currently undergoing major changes compared to, for example, the time before the global COVID-19 pandemic. The real estate environment is characterized by erratic changes (e.g. significant increases in real estate prices) to which businesses must constantly and quickly adapt, just as they must adapt to an ever-accelerating economy. As a result, this influences the very availability of real estate for end customers, who

then must choose between options other than buying real estate, namely between renting or cooperative housing, to which this article is closely devoted.

2. REAL ESTATE MARKET

Participants in the real estate market are households, companies, and the state. The meaning of the word market may differ for individual subjects of the economy. Economists define the market in terms of both sellers and buyers. They describe markets in terms of supply and demand, while marketers refer to buyers as customers and sellers as a market. Businesses usually use the word market to refer to various ways of segmenting customers, including geographic location, product types, and differentiation. In the field of real estate, the definition of the product refers to the typification of apartment buildings, warehouses, offices, it also deals with dimensions or layout, quality, interior design elements, amenities, services included in the price and those that are optional, and, of course, it also deals with the rent or the price itself.

3. QUANTITATIVE INDICATORS OF THE REAL ESTATE MARKET

The real estate market is influenced by many factors, as already mentioned in the text above. Many economic theories in the past years have already accurately described certain factors and thus bring a set of procedures, which indicators should not be neglected when defining market conditions. Quantitative factors determining market development can generally be divided into three basic areas – microeconomic, macroeconomic, and social. Random (fictitious) variables are located at the intersection of these three mentioned areas.

Statistics and econometrics, especially regression analysis, often use the concept of a dummy variable. It is a quantity taking on values of 0 or 1 to indicate the absence or presence of some categorical effect influencing the outcome. Random variables are used as a tool for sorting data into mutually exclusive categories. Econometric analysis of time series refers to occurrences of crises, namely economic, large strikes or political wars, as random variables. Changes in legislation with differences in the restrictions of the "old" and "new" building code are random variables for the real estate market. Random variables are numerical descriptors or "Proxy" variables for qualitative facts in a regression model. In regression analysis, dependent variables can be influenced by quantitative as well as qualitative variables. Random variables are often used in the analysis of time series with lag, seasonality, or the application of qualitative data (Seddighi, 2011).

Even from the point of view of the Czech Republic, the issue of balance or imbalance is being addressed. The view of Hlaváček and Komárek (2010) in a comprehensive study from 2010 differs slightly from the focus of the article. The aim of their research was to reveal the imbalance in the market from the point of view of the classic microeconomic model of the balance of the demand and supply side. The fundamental factors of market development can be identified from the article despite this difference. The entire Czech Republic shows slightly different values than the capital Prague. The price of the land is not a significant variable, instead the average monthly salary and mortgage interest appear to be more significant factors. For the capital city of Prague, the price of land, the demographic development from the point of view of the increase in the number of inhabitants and, last but not least, the increasing share of foreign investments are crucial.

4. LEGISLATIVE DEMARCATION

Legislation in the Czech Republic does not provide a precise definition of the real estate market or entities operating there, but it precisely defines the concept of a building permit, as well as the concept of real estate.

The Act on Territorial Planning and Building Regulations No. 183/2006 Coll., defines a building permit as follows: "A building permit is a document that a builder needs to build a house or make major modifications. The rules and conditions of the building permit are determined by Act No. 183/2006 Coll. on spatial planning and building permits". An exact list of the individual steps in an exhaustive manner is not necessary for the purposes of the dissertation. In the following text, we will work only with the term Building permit, and it is clear that if the building permit is mentioned in the statistical data, it meets the condition of legality.

The new Civil Code 89/2012 Coll., according to § 498, defines immovable property as follows: "Immovable property is land and underground structures with a separate purpose, as well as real rights to them, and rights that the law declares as immovable property. If the law stipulates that a certain thing is not part of the land, and if such a thing cannot be transferred from place to place without violating its essence, this thing is also immovable." The original Civil Code No. 40/1964 Coll., according to § 119 defines the concept of real estate as follows: "Real estate is a kind of thing. According to the traditional definition, it was a plot of land or a building connected to the ground by a solid foundation". According to the new Civil Code, land includes space below and above the surface, structures erected on the plot and other facilities, except for temporary structures, including what is embedded in the plot or fixed in the walls.

The term developers refer to specialized entities that deal with business operations on the real estate market. A more precise definition can be, for example, from Achour (2005): "The developer is an investor in the project, but not the final investor or user. The final user is interested in owning the resulting project or using it in the form of a lease, because he does not want to take the risk of construction." (Achour, 2005). Zeman and Meluzín (2009) uses a similar definition: "The developer is the main organizer of the construction, he owns the given building, prepares, organizes and manages its sale or lease. He does not use the building himself and usually does not even finance it." (Zeman & Meluzín, 2009).

Based on the previous definitions, a business entity that deals with the implementation of business and production processes on the real estate market can be defined as a Development Company. A more precise definition is provided by the Czech National Bank: "Companies, or projects whose goal is the complex construction of residential and commercial real estate. The activities of development companies mainly include selecting a suitable area, ensuring the creation of a project, obtaining all necessary permits, creating utility networks, own construction and sale of real estate. Development companies often also provide clients with financing for the purchase of real estate and are often involved in renting or managing the real estate after construction is complete (mainly for commercial real estate). Due to the combination of construction activity and speculative purchases of real estate, the results of development companies are strongly dependent on the development of real estate prices." (Česká národní banka, 2021).

The development project and its specifics are evaluated by Achour and Dančišin (2006). A specific feature is the relatively high costs at the beginning of the project implementation, such as reconstruction, construction, or purchase of real estate. These costs are returned to the entrepreneur in the form of rent when he rents the property, but also in the form of the purchase price when he sells the completed property. The developer usually does not finance the high initial costs of the initial phase of the development project from his own resources, therefore he decides how the financing of the development project will take place.

5. REAL ESTATE MARKET TRENDS

It is assumed that the general trends that are now appearing in the real estate market, especially in developed European countries, will also occur in the Czech Republic in the future. One of the biggest trends is the gradual increase in the number of inhabitants in the cities at the expense of the depopulation of the countryside. However, several countries, including the Czech Republic, are not ready for this trend, as there is not a sufficient number of properties in the cities to satisfy housing needs.

Urban expansion is influenced by the country's institutional set-up, the country's economic status and demographic development. A sample of 31 countries was used in the study by Ehrlich et al. (2018), but not all data are available in all countries. In general, for the Balkan countries, the unit of decentralization is not specified, and the exact numbers of towns and villages are not defined. The results present the following three dependencies:

- An important factor across regions is the variability of the degree of interregional economic competition. This is mainly the effect of the number of municipalities that are able to potentially compete for new residents. The absolute number of municipalities strongly depends on the size of the country. In smaller countries, urban population growth is faster than in larger countries.
- Eastern and Central Europe shows a higher rate of urban growth, which may become less pronounced because of urbanization, and therefore the influence of policy decisions to support rural areas will weaken. The factor in the model present in four of the five specifications that affects the growth of the urban population is GDP.
- Urban sprawl is significantly positively correlated with the degree of decentralization. Legislators with "certain autonomy" or residual powers in states in the sub-national sphere have an expansion level of 25% to 30% units higher. Countries classified as non-federal show a level of urban sprawl 7% lower than federalized countries (Ehrlich et al., 2018).

6. COOPERATIVE HOUSING

Due to the current economic situation, there is an increasing question mark over affordable housing. According to the Ministry of Regional Development (Ministerstvo pro místní rozvoj ČR, 2021), real estate prices have been constantly increasing since 2010, while their availability is due to the new regulations of the Czech National Bank, which apply from April 1, 2022, and record high interest rates for mortgage loans, which currently range from above 6% (ČNB, 2021). A practically identical situation also prevails in neighboring Poland, where there has been a significant problem with the availability of own housing, especially for young people, since 2016, when real estate prices began to rise and people began to prefer renting or cooperative housing to buying real estate (Lis et al., 2023).

Development companies, which normally decide when selling a property whether to sell the property immediately or to keep it for rent, now must find an answer to the question of how to sell the property immediately, when property prices are high and the availability of mortgage loans, for example, has significantly worsened compared to the previous two years. The answer to this question could be cooperative housing, which has rather declined in the Czech Republic since 1991. According to the Czech Statistical Office, the number of cooperative apartments has decreased by almost 60% over the past 30 years (ČSÚ, in ČT24, 2022). The result of the research by Slavata (2017), who in his work dealt with the division of the real estate market between 2015–2017, has practically the same telling value, because while in 2015 cooperative housing had almost a 15% share of the market, two years later it was only less than 10% and thus decreased by a third.

In a way, cooperative housing is not only a rescue solution for development companies and cities, but also for the residents of the locality in which the cooperative apartments are built. In the current situation, the reason is simple and that is the availability of more or less own housing. As already mentioned above, currently interest rates for mortgage loans are at a record high, and in combination with new restrictive regulations from the CNB and the astronomical prices of new buildings and real estate in general, availability is very poor, and most people cannot afford their own housing. The solution can be precisely cooperative housing, which removes some of these obstacles, for example in the form of the inaccessibility of a mortgage loan, and this burden is taken over by the creator of housing, which can be a city, region or perhaps a development company, in such a way that the loan is not taken by the end customer, but by the cooperative. By paying the membership deposit, the end customer becomes a member of the cooperative, and in the form of a lease, the end customer repays the loan or part of it. Of course, this form has its advantages but also pitfalls, which we will focus on in chapter: Advantages and disadvantages of cooperative housing (Stavbař, n.d.).

7. MOTIVATION AND CONSTRUCTION OF COOPERATIVE HOUSING

There are several reasons for choosing the construction of cooperative apartments and it mainly depends on the entity that started the construction. There is a long-term shortage of apartments, and when apartments are available, they are at a price that few can afford these days. People turn to the municipality or region with requests for municipal apartments, but there are not enough of them, and therefore municipalities and regions resort to the construction of cooperative apartments. There are several motivating factors here. Satisfying the housing needs, there is no need for maintenance from the municipality or the region, because the maintenance is taken care of by the cooperative and it is only a short-term intervention in the budget. A pleasant benefit for residents is the easier availability of "own" housing. The word own is in quotation marks on purpose, since cooperative housing is, let's say, a kind of hybrid between apartment ownership and rental housing. From the research conducted by Balmer and Gerber (2018) in five large Swiss cities, it follows that cooperative housing is a support mechanism in housing security that is needed and to which the entire political spectrum in this country has a positive attitude. The fact that housing cooperatives are overwhelmingly conceived as non-profit adds to their popularity.

Development companies can also take a friendly step towards residents in the form of making their own housing available, but it is usually a rescue solution. Why? It is simple. During construction, the developer has two options on how to deal with the built property. Either he keeps it and rents it out or, which happens in most cases, the property is sold to end clients. If the developer chooses the option where the property is sold to end customers and there is a situation where people cannot afford to buy their own housing, a problem arises for the developer, either in the form of a loan that has to be repaid or in the form of a major impact on cash flow and the company budget itself. Cooperative housing is such an effective solution to get out of this situation. As already mentioned, the cooperative takes out a loan to pay the developer, which solves the developer's problem. The cooperative loan is then repaid by the cooperative members, in the form of rent. The construction itself is practically no different from other projects, except for one exception, which is the administrative part, which is significantly more demanding in cooperative housing than in a classic apartment building (Bydlení na doporučení, 2022).

8. ADVANTAGES AND DISADVANTAGES OF COOPERATIVE HOUSING

Just like rental housing or real estate ownership itself, cooperative housing has its advantages and disadvantages. Undoubtedly, the biggest advantage for people who desire their own housing, which, as has already been mentioned several times, is currently very difficult to access. The advantage lies in the fact that those people who cannot obtain a mortgage loan in such an amount that they can buy their own apartment do not go to the bank to apply. And it doesn't matter for what reason they don't qualify for such a loan, whether it's because they don't have a high enough income, or they have enough income, but they can't prove it, or it's unacceptable. The cooperative applies to the bank for a loan. In practice, this means that the municipality or developer sets up a cooperative in which they are themselves from the beginning, arranges a loan from the bank, which also has better terms than a standard mortgage, given the size of the loan. Also, the entry price is significantly lower than the purchase itself, as it accounts for approximately 20-30% of the total price of the apartment, and for financing such an amount, financial products are more available than a mortgage loan (Stavbař, n.d.). If the initial membership fee is paid from own resources, the cooperative member is not bound by any debt for the entire time. For the developer or the municipality, the already mentioned lower demand on the budget is an immense advantage, i.e. it is only a short-term intervention in the budget and zero maintenance costs, because the cooperative takes care of these activities (Sillmen, 2014).

On the other hand, however, cooperative housing has a lot of disadvantages that mainly affect end customers. As already mentioned in the paragraph above, the cooperative member is not burdened with debt all the time, because this burden is borne by the cooperative. But this also means that the cooperative member is not actually the owner of the apartment for which he pays rent to the cooperative every month, and he does not have to become one even after fully repaying his part of the cooperative loan. Everything follows from the statutes according to which the cooperative is governed. These statutes are usually difficult to change, as 100% approval is required to approve the change. The statutes also determine what cooperative members can and cannot do. Other pitfalls can arise in case of possible reconstruction of the apartment, for which the consent of the cooperative is needed, but the cooperative member may not always get it. Other activities for which the consent of the cooperative is required are, for example, subletting, building modifications, glazing of the balcony or the actual transfer to personal ownership. Financing the initial investment in the form of joining a cooperative can be a disadvantage, due to the impossibility of financing with a mortgage loan, and if the end customer does not have enough of his own resources, he must resort to a housing loan, which as a rule has worse conditions than a mortgage, or even to consumer credit, where the interest can easily be tripled (Slavata, 2017). The disadvantages also include the fact that in case of violation of the articles of association, a member of the cooperative may be expelled from the cooperative and thus lose the apartment, or the right to lease it and the cooperative share. Historically, it also happened that the cooperative was tunnelled and was destined for liquidation, during which the cooperative shares naturally disappeared, which resulted in the loss of any rights associated with the given housing units. From the point of view of the municipality or the developer, the clear disadvantage is more complicated administration, compared to rental housing or classic sales to end customers, and of course potentially lower interest, because despite the fact that cooperative ownership is quite common abroad, in our country this concept is perceived as a survival of socialism and many people have reservations and resistance to it (Šimek, 2019).

9. CONCLUSION

As already mentioned in the introduction, the real estate market is a very sensitive sector that is influenced by many factors such as employment, legislation, average wages of the population, prices of construction works and materials, and in the Czech Republic in recent years, mainly loan interest rates, which greatly complicate life for both developers and end customers.

The current trend in housing, when people are moving from the countryside to the cities, is drastically increasing the demand for housing in the cities, and the Czech Republic is currently unable to satisfy the demand. The lack of places to live has its share in this, as well as the high interest rates on housing loans, which many people cannot afford at all or not in such an amount that they can purchase real estate. However, this trend is encouraging developers, opening up the possibility for them to build in-demand apartments or family houses. Cooperative housing can be used to overcome the already mentioned complication in the form of high initial investments of end customers and to provide quick financial satisfaction to the developer, which reduces the initial investment of end customers by several tens of percent and makes it easier for the developer to sell built properties and return on investment.

BIBLIOGRAPHY

Achour, G. (2005, April 27). *Developerské projekty – 1. část*. http://www.epravo.cz/top/clanky/developerske-projekty-1cast-32869.html

Achour, G., & Dančišin, M. (2006). Úvěrové financování developerských projektů. *Realit, 7*.

Balmer, I. & Gerber, J. D. (2018). Why are housing cooperatives successful? Insights from Swiss affordable housing policy. *Housing Studies, 33*(3), 361-385. https://doi.org/10.1080/02673037.2017.1344958

Bydlení na doporučení. (2022, April 1). *Družstevní byt (družstevní vlastnictví) – výhody a nevýhody.* https://bydleninadoporuceni.cz/druzstevni-byt-druzstevni-vlastnictvi-vyhody-nevyhody/

Česká národní banka (2021, June 15). Slovníček pojmů. In *Zpráva o finanční stabilitě 2020/2021*. 105-108. https://www.cnb.cz/cs/financni-stabilita/publikace-o-financni-stabilite/Zprava-o-financni-stabilite-2020-2021-00002/

ČNB. (2021, Nov 25). *ČNB nově nastaví limity ukazatelů LTV, DTI a DSTI u hypotečních úvěrů, zvýší i proticyklickou kapitálovou rezervu na 2%.* https://www.cnb.cz/cs/cnb-news/tiskove-zpravy/CNB-nove-nastavi-limity-ukazatelu-LTV-DTI-a-DSTI-u-hypotecnich-uveru-zvysi-i-proticyklickou-kapitalovou-rezervu-na-2-/

ČT24. (2022, June 12). *Roste zájem o bytová družstva. Oproti vlastnímu bydlení mají řadu výhod.* https://ct24.ceskatelevize.cz/domaci/3503853-roste-zajem-o-bytova-druzstva-oproti-vlastnimu-bydleni-maji-radu-vyhod

Ehrlich, M. V., Hilber, C., L., & Schöni, O. (2018). Institutional settings and urban sprawl: Evidence from Europe. *Journal of Housing Economics, 42*, 4-18. https://doi.org/10.1016/j.jhe.2017.12.002

Hlaváček, M., & Komárek, L. (2010). Rovnovážnost cen nemovitostí v České republice. *Politická ekonomie, 58*(3), 326-342. https://doi.org/10.18267/j.polek.733

Lis, P., Rataj, Z. & Suszyńska, K. (2023). Limitations in the diffusion of collaborative housing in Poland: Expectations and beliefs of young generation as potential users. *Journal of Urban Affairs*. https://doi.org/10.1080/07352166.2023.2206034

Ministerstvo pro místní rozvoj ČR. (2021). *Koncepce bydlení České republiky 2021+*. https://www.mmr.cz/getmedia/30528174-7e61-421e-a058-5f39aa4f09c9/KB-2021-_komplet-web(C)_max.pdf.aspx?ext=.pdf

Seddighi, H. (2011). *Introductory econometrics: A practical approach*. Routledge.

Sillmen, D. (2014). *Družstevní byty se vrací. Jaké mají výhody a nevýhody?* https://www.mesec.cz/clanky/druzstevni-byty-se-vraci-jake-maji-vyhody-a-nevyhody/

Slavata, D. (2017). Unemployment and regional structure of housing market. In V. Klímová, & V. Žítek (eds.), *20th International Colloquium on Regional Sciences: Conference Proceedings*. 320-326. Masaryk University.

Stavbař (n.d.). *Výhody při koupi a prodeji družstevního bydlení.* Retrieved 16.08.2022 from https://druzstevnivystavba.cz/co-to-je/

Šimek, T. (2019, Sep 3). *Nevýhody družstevního bytu.* https://www.remaxdelux.cz/nevyhody-druzstevniho-bytu?fbclid=IwAR35WQq7B1G6sIWiNEuEDfKdrt5Hat5GaBvCQwlHXZQa_HGwwQodFm29zxg

Zákon č. 183/2006 Sb., o územním plánování a stavebním řádu.

Zákon č. 40/1964 Sb., občanský zákoník.

Zákon č. 89/2012 Sb., občanský zákoník.

Zeman, V., & Meluzín, T. (2009). *Bankovnictví: pro studijní obor realitní inženýrství*. Akademické nakladatelství CERM.

EFECTIVE WORK WITH STOCK INFORMATION

Josef KOŠŤÁLEK, Pavla KOŤÁTKOVÁ STRÁNSKÁ, Petra KRÁLOVÁ
University of Chemistry and Technology Prague, Czech Republic
School of Business, Prague, Czech Republic
josef.kostalek@vscht.cz, pavla.kotatkova.stranska@vscht.cz , petra.kralova@vscht.cz

Abstract: *Accounting systems are linked to inventory records, where various sophisticated software tools are used today. Thanks to information technology today, the transfer of information is fast and easy. Modern inventory software makes a large amount of information available to managers in real time. An important factor is the ability to process this information correctly and use it to create analyses for managerial decisions that will benefit the development of the company. This paper describes a specific situation in an industrial factory where inventory data was exported from an information system. This data was analysed, and specific proposals and recommendations were created, many of which were actually implemented by the company's management. The whole paper is actually a search for an answer to a research question: How specifically can effective processing of information about stored stocks bring about cost savings?*

Keywords: *data, inventory, storage, analysis*

1. INTRODUCTION

Material flows in logistics relate to information flows, where, for example, inventory records are linked to a number of documents that are important for accounting, e.g. delivery notes, invoices, storage cards, record sheets, data from stock inventories (Macík, 1995, pp. 50–51). Today's information technology enables the recording of this information in electronic form and mutual connection between individual parts of the company (accounting, storage, production management, purchasing). The condition is a well-functioning information system where the individual subsystems are interconnected and there is no duplicate data entry. Another important element is the correct setting of internal control mechanisms (Dvořáček, 2005, pp. 116–117).

Inventory management is an important area in financial management because capital is tied up in inventory. That is why there is an effort to ensure that the inventory level in the warehouse is not unnecessarily high. Reducing the inventory level will increase the company's cash flow, which is very important for the functioning of any company (Slavík, 2013, p. 33). On the other hand, stocks ensure smooth production (Švecová, 2021, p. 61), and a low level of stocks can cause an industrial company to lack them and stop production. We live in an age where suppliers and subcontractors are decentralized around the world. Industrial enterprises in Europe often use components imported from Asia for their production. The drive to minimize inventory combined with long shipping routes has left supply chains vulnerable. This was reflected in the lack of raw materials and components during the COVID-19 pandemic. Today, half of the world's trade takes place over a distance of more than 3000 km, 43.5 million 20-foot sea containers pass through the port of Shanghai annually, on the sea route from Shanghai via Suez Canal to Europe, it carries out 26% of world trade, and when the cargo ship Ever Given blocked the Suez Canal in March 2021, it caused panic in the financial markets and supply shortages (Romancov, 2022, pp. 209–214).

Inventory management is not a simple matter. This paper describes the methods and the real application of inventory analysis that could partially help with this issue. Therefore, this

paper seeks an answer to the research question: How can efficient processing of information about stored stocks bring about cost savings?

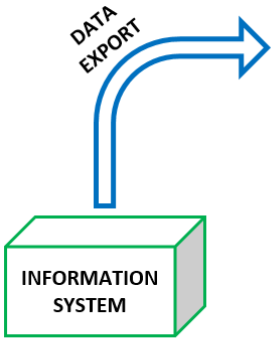
2. THE STOCK ANALYSIS

Inventory analysis provides information about the items that are located in the warehouse. This information is very important. We find out, for example, how much of which item we consume (ABC analysis), how often we need this item (XYZ analysis), how long is the average delivery time of the item, etc. We can choose any criteria that make sense for our analysis, different authors give different criteria, but the general principle is to divide inventory items into categories (Pernica, 1998, p. 219). What is the main goal of this analysis? If, for example, we find out that we need an item that we keep in stock only once a year and we only need, for example, two pieces and at the same time the average delivery time is three days, then we do not store such an item. And once a year there is a wait for stock, but only three days. And the benefit is the creation of space in the warehouse and the rationalization of the storage process. On the contrary, if we find out that we need an item very often and the amount of consumption of this item is high, then we have clear information to place it in an easily accessible place in the warehouse, because we will take it often and in large quantities. Stock analysis in the warehouse was described in general, its goal and main principle were described. Specifically, this analysis will be described on a real situation. Information technologies, which have experienced rapid development in recent decades, allow us to record, store, record and sort a large amount of data of all kinds, and the key issue is the ability to process this data into concrete documents used for quick and correct decision-making (Smith, 2017, pp. 78–79).

3. THE REAL SITUATION

We performed this analysis in a specific warehouse in an industrial plant where 294 different items of inventory are stored. We obtained the input data from the information system, which exported this data to MS Excel, where it is easy to work with. We determined the values of the specified criteria for all inventory items. We have chosen as important criteria: the amount of consumption (how much we use in three months), the frequency of consumption (how often we need the supply in three months), the average delivery time (how long it takes for the supplier to deliver it to us). The time interval for the analysis was three months.

Figure 1. Input data – partial view of the table



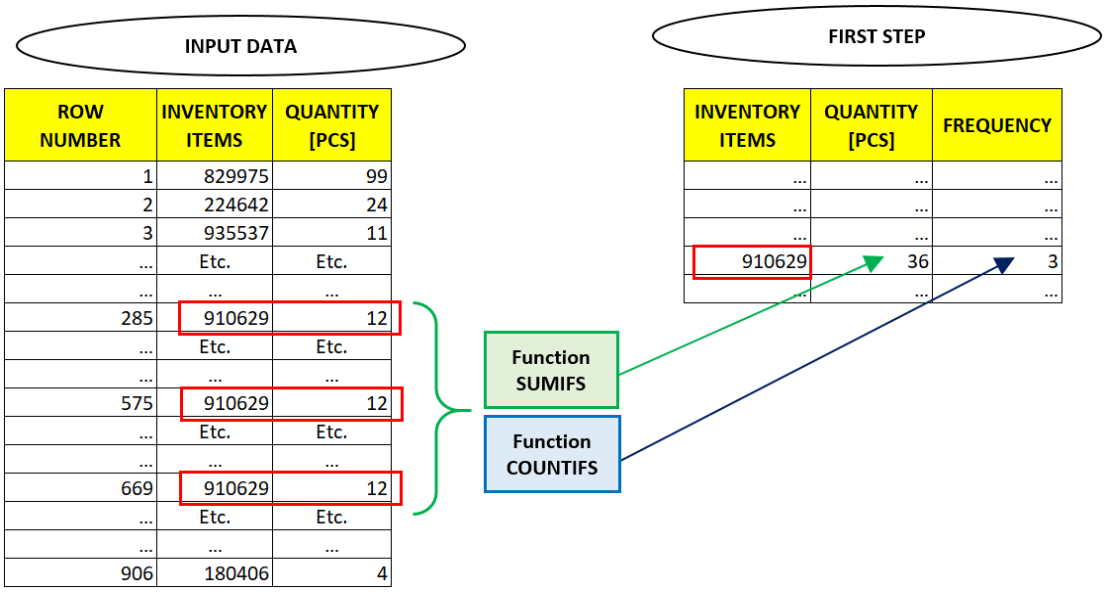
ROW NUMBER	INVENTORY ITEMS	QUANTITY [PCS]
1	829975	99
2	224642	24
3	935537	11
4	117484	70
5	437669	27
6	453137	61
7	516210	29
8	407803	48
9	833879	10
10	124470	17
11	841429	64

Source: Own

Each inventory item is identified by a numeric code that contains six digits. Figure 1 describes the input values that were exported to MS Excel from the information system. Figure 1 is a view of a portion of a large table that continues and has 906 rows. This table records which inventory items have been consumed and how many of these inventory items have been consumed over a three-month time interval. The table shown in Figure 1 describes the material flows of the components out of the warehouse.

From this input information, we determined how much was consumed in total for the inventory item, e.g. 910629, and how often this item was needed (how many times it is included in the entire table, where part of the table is illustrated in Figure 1). In MS Excel, we made this work with the data very easy, because we determined how many pieces were consumed using the "SUMIFS" function, and the frequency of consumption (how many times the item was needed) was determined using the "COUNTIFS" function.

Figure 2. The first step of analysis – processing of input data



Source: Own

The principle of this data processing is described in Figure 2. There are 294 inventory items and we determined how much was consumed and how often each item was used. It can be seen that the amount consumed, and the frequency of use is very uneven. Our goal will be to divide all inventory items into categories A, B, C and X, Y, Z. Where category "A" is those inventory items that have been consumed in high quantities. Category "B" are those items that have been consumed in smaller quantities and category "C" are those items that have been consumed in the least amount. And the same principle applies for the frequency criterion, where the "X" categories are those inventory items that have the highest frequency, etc.

3.1 ABC analysis

In this phase, we will deal with the division of stocks into categories A, B, C according to the quantity criterion (ABC analysis). The items were sorted from the largest quantity to the smallest, see Graph 1.

Graph 1. Amount of each item consumed

Source: Own

Again, this operation can be done very easily in MS Excel using the data sorting tool. From the graph 1 it is easy to see how the distribution of values is uneven. There are a total of 294 inventory items, but more than 300 units have been used for only nineteen items. This is an empirical regularity used in several technical and economic sectors, which is based on the well-known Pareto rule.

Percentage shares were calculated from the amount of stock consumed, and cumulative values are calculated from these values. The total amount of all consumed items together is 37,733 pcs and, for example, item number 798034 consumed 920 pcs, which corresponds to a share of 2.44%, see Figure 3.

Figure 3. Calculation of shares and cumulative values for ABC analysis – part of the table

	37 733	← Total sum of the quantities	
INVENTORY ITEMS	**QUANTITY [PCS]**	**QUANTITY SHARE [%]**	**CUMULATIVE VALUE [%]**
798034	920	2.44	2.44
423012	870	2.31	4.74
574243	824	2.18	6.93
690671	790	2.09	9.02
780944	770	2.04	11.06
285607	690	1.83	12.89
585724	683	1.81	14.70
260876	673	1.78	16.48
530076	673	1.78	18.27
623994	661	1.75	20.02
Etc.	Etc.	Etc.	Etc.
...	...	...	...

Source: Own

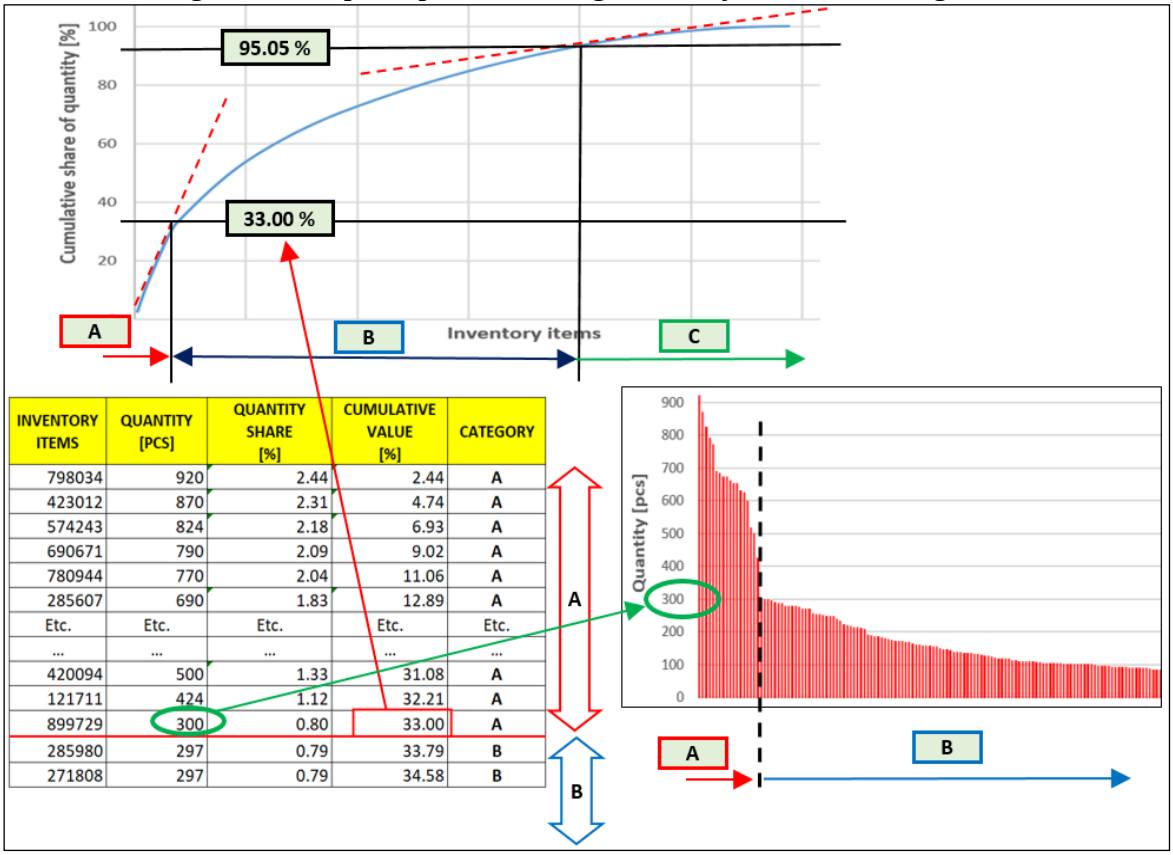
Cumulative values were plotted graphically, even if they are discontinuous values, interpolation using a continuous curve is used, see Graph 2. And we get a characteristic curve that can be divided into three areas: In the first area, the values rise quickly, in the second, they rise more slowly, and in the third, the values they hardly increase anymore. And it is these three areas that make up the three categories A, B, C, into which we classify inventory items (Jemelka et al., 2017; Starbek et al., 2000).

Graph 2. Curve for ABC analysis

Source: Own

Now we have all the data ready, and we will divide the inventory items into categories A, B, C, see Figure 4. From Figure 4, but also from Graph 1 and Graph 2, important information can be clearly seen. The boundary between category "A" and category "B" can be well identified. But the line between category B and category C is not very clear and identifiable. The real situation differs from the general theory. This is probably because the production in this factory is specific. A large number of types of products are produced here, and this implies a large number of different types of stocks, where the consumption of these stocks is slow. For this reason, the theory (curves in Graphs 2 and 4) was supplemented with logical reasoning so that the boundaries for the categories made sense. E.g. in the ABC analysis, it is logical that the boundary of category "A" ends where the quantity is 300 pcs.

Figure 4. The principle of dividing inventory items into categories



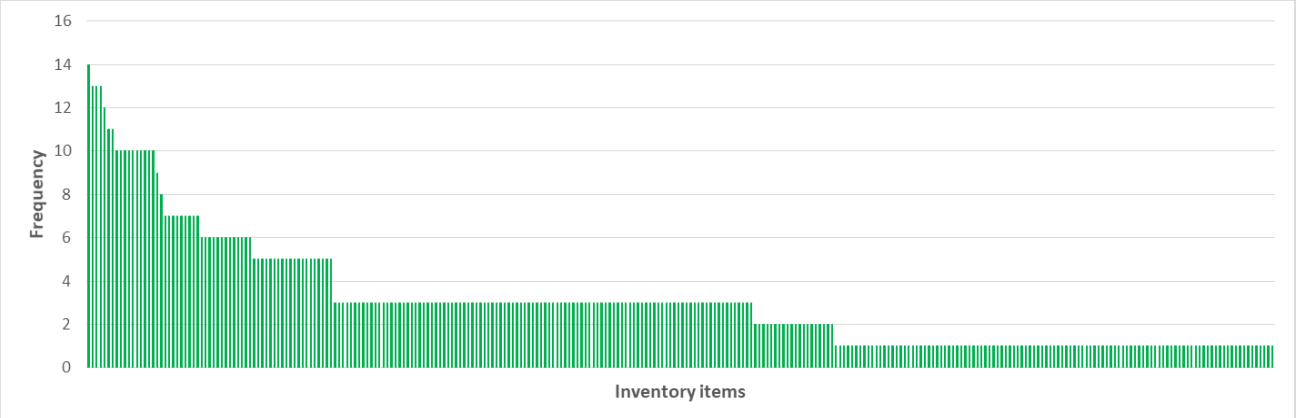
Source: Own

This means that they are those items of stock of which an average of at least 10 pcs are consumed in one day. And the border of category "B" ends where the quantity is 47 pcs (average consumption of 1 pc in two days). As will be seen later, a very similar situation occurs in the XYZ analysis, where the inventory will be sorted into categories according to the frequency of use.

3.2 XYZ analysis

The principle described above is applied here to frequency values. The goal is to divide all inventory items into three categories X, Y, Z (XYZ analysis).

Graph 3. Frequency of use of items



Source: Own

The most frequently used inventory item was used 14 times, the least used only twice, see Graph 3. Again, it is clear here that only a few inventory items have a high frequency of use, and a large number of inventory items have a low frequency. This is a consequence of the phenomenon described above when it comes to stocks of components for non-mass production. And at the same time, the production is flexible and can produce a large number of different types of products according to the customer's wishes. This implies many different types of stock. After recalculation into shares (percentages) and calculation of cumulative values, a table was created, where part of the table is in Figure 5.

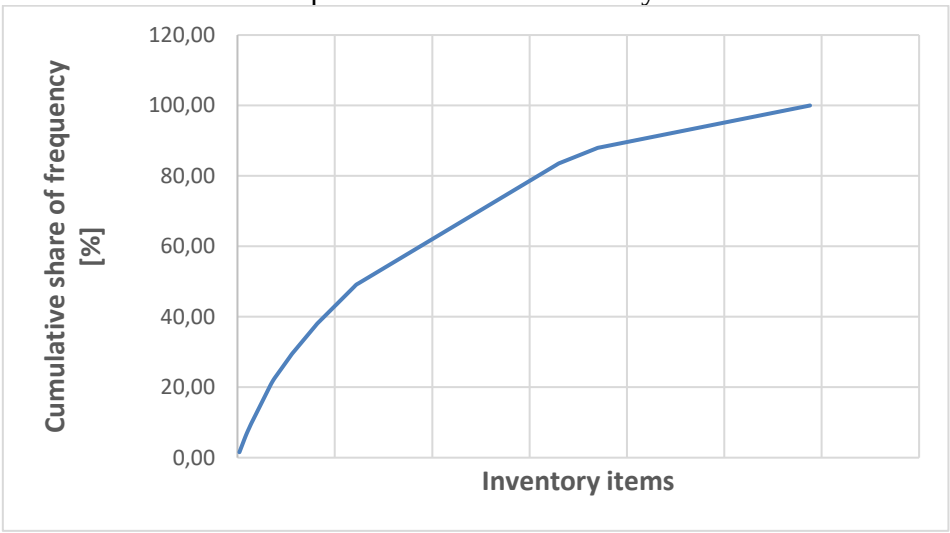
Figure 5. Calculation of shares and cumulative values for XYZ analysis – part of the table

	906 ← Total number of uses		
INVENTORY ITEMS	**FREQUENCY (Number of uses)**	**FREQUENCY SHARE [%]**	**CUMULATIVE VALUE [%]**
703947	14	1.55	1.55
121711	13	1.43	2.98
775579	13	1.43	4.42
180406	13	1.43	5.85
841429	12	1.32	7.17
574243	11	1.21	8.39
178421	11	1.21	9.60
Etc.	Etc.	Etc.	Etc.
...	...	...	...

Source: Own

A graph was created from these values and a curve was created, see Graph 4.

Graph 4. Curve for XYZ analysis



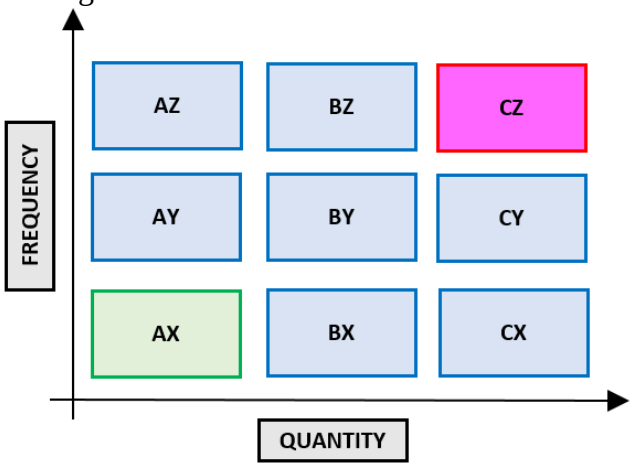
Source: Own

Category "X" (most frequently used supplies) includes all items of supplies that have been used at least ten times (in three months). All inventory items that have been used at least three times belong to the "Y" category and all other inventory items belong to the "Z" category.

3.3 Complementing the analysis with another criterion

Now we have all inventory items divided according to the criterion of consumed quantity into categories: A, B, C. And at the same time, we have all items divided according to the criterion of their frequency of use into categories: X, Y, Z. By combining these two criteria, a total of 9 groups will be created, see Figure 6, where each group has its own specifics in the inventory management (Zenkova et al., 2020).

Figure 6. The combination of two criteria



Source: Own

Figure 7 is a view of the results obtained where the inventory item numbers and categories assigned using the search functions. At this moment, we have more detailed information about each inventory item and we know which group from Figure 6 it belongs to. We also know how many inventory items are in a given group.

Figure 7. The Combination of two criteria

INVENTORY ITEMS	CATEGORY ABC	CATEGORY XYZ
798034	A	X
423012	A	X
574243	A	X
690671	A	X
780944	A	X
285607	A	X
585724	A	Z
260876	A	Z
...	...	...
486896	B	Z
933201	B	Y
518060	B	Y
408466	B	Z
...	...	...
833879	C	Z
261614	C	X
927413	C	Z
...	...	...

Source: Own

We will supplement the results obtained in this way with additional information, namely the average delivery time. We choose suitable criteria as needed. Several methods have been developed to perform multi-criteria ABC analysis (Ravinder et al., 2014, p. 257). Different delivery times from the past are recorded in the information system. We exported this information again to MS Excel and determined the average delivery times. The inventory items were then analysed in the same way as described above, but the criterion for division into the categories "α", "β" and "γ" was the lead time (time from order to delivery). Again, the shares in percentages were calculated and from them the cumulative values and their graphical interpretation. From this analysis, it emerged that the category "α" consists of stocks with a delivery time of less than three days, the category "β" consists of stocks with a delivery time of three to ten days, and the category "γ" consists of stocks with a delivery time of more than 10 days.

The final result is an analysis that divides all inventory items into groups of 27. And the division is made using three criteria: quantity consumed, frequency, delivery time. The above Figure 6 will be supplemented by a third dimension. Figure 8 describes the view of the resulting table in MS Excel.

Figure 8. The combination of three criteria

INVENTORY ITEMS	CATEGORY ABC	CATEGORY XYZ	CATEGORY α β γ
798034	A	X	β
423012	A	X	γ
574243	A	X	γ
690671	A	X	α
780944	A	X	γ
285607	A	X	α
585724	A	Z	β
260876	A	Z	β
...	...	...	...
486896	B	Z	γ
933201	B	Y	γ
518060	B	Y	β
408466	B	Z	γ
...	...	...	...
833879	C	Z	γ
261614	C	X	β
927413	C	Z	γ
...	...	...	...
138070	C	Z	α
935537	C	Z	α
...	...	...	...

Source: Own

4. THE EVALUATION OF ANALYSIS RESULTS

At this stage, we have a comprehensive analysis of the stock in the warehouse and management decisions can be made:

The analysis showed that there are nine inventory items from the CZα group (low consumption, low frequency, and an average delivery time of three days) in the warehouse. It is possible not to store these items, because they are hardly needed, and in case they are needed, they are delivered quickly. Furthermore, it is possible not to stock inventory items from the CZβ group, where the average delivery time is within ten days. There are 23 of these inventory items in the warehouse. It is possible to perform further analysis and find out what the dimensions of these inventory are (how much space they take up in the warehouse) and what is their value (how much capital is tied up in them). And of these inventory items, don't store those that take up a lot of space or tie up a lot of capital. This frees up warehouse capacity and reduces the amount of funds tied up in stocks, on the other hand, it can disrupt the flow of production. Their shortage can be eliminated by purchasing them operationally at the moment when production will need them, and this can be identified from the production plan. So there is an opportunity to reduce inventory by a total of 32 items. Especially in a situation where the company has problems with insufficient storage capacity, an analysis of this type should be carried out. Because it is possible to obtain storage capacity only by discarding some inventory items and there is no need to invest in the construction of a new warehouse (Švecová, 2021, p. 174).

For the inventory items from the groups: CYα, CYβ, BZα and BZβ, the same consideration can be made and there has been a large reduction in inventory because it is a large number of inventory items, see tables 1, 2, 3. There is another solution that is also suitable for

other groups of inventory items, and that is to use the services of external logistics companies and use consignment storage.

Table 1. Numbers of inventory items in category α

	α			
	X	Y	Z	**Sum**
A	2	0	3	**5**
B	3	11	36	**50**
C	0	0	9	**9**
Sum	**5**	**11**	**48**	**64**

Source: Own

Table 2. Numbers of inventory items in category β

	β			
	X	Y	Z	**Sum**
A	1	0	2	**3**
B	1	7	29	**37**
C	1	0	22	**23**
Sum	**3**	**7**	**53**	**63**

Source: Own

Table 3. Numbers of inventory items in category γ

	γ			
	X	Y	Z	**Sum**
A	5	0	6	**11**
B	4	26	76	**106**
C	0	0	50	**50**
Sum	**9**	**26**	**132**	**167**

Source: Own

Other suggestions and recommendations relate to the distribution of individual items of stock in the warehouse. Because the warehouse is equipped with racks and there are four or five floors in each rack. And the shelves are arranged in several rows. It is advisable to use the information from the ABC and XYZ analyses to check whether the storage locations are distributed in a way that corresponds to the amount and frequency of use of the stock. It is advisable to place inventory items from categories A and X on the shelves that are closer to production and on the lower levels of the shelves. This will reduce the labour involved in storing and removing supplies. On the contrary, items from categories C and Z should be placed on further shelves and on upper floors.

A special case is inventory items from group AX. A large amount of these is consumed and at the same time they are needed often. Here, it is advisable to create special storage places for them and in the part of the warehouse that is closest to production. And in the case that there are queues when storekeepers handle material, then it is advisable to create two storage locations for one item of stock.

5. CONCLUSION

The article describes a methodology that is able to divide inventory items into different categories according to predetermined criteria. By combining these criteria, groups of stocks

with similar characteristics will be created. Thanks to this analysis, it was possible to identify which inventory items are unnecessary to store. These are stocks that are used with a low frequency, their consumption is small, and they can be quickly supplied when needed. Furthermore, groups of stocks were identified, which the company's management could eventually remove from the warehouse if necessary to increase storage capacities and reduce the amount of money tied up in stocks. This analysis showed that it would be appropriate to relocate some inventory items in the warehouse. Based on the ABC analysis, which examined how much stock is used, in combination with the results of the XYZ analysis, which examined how often the stock is needed, nine changes to the storage locations in the shelves were made. These changes should bring to the company a reduction in labour in the work of storekeepers, since it is a matter of placing frequently used and high consumption stocks in locations on the shelves with better accessibility (closer shelves and lower floors).

The same methodology for sorting, processing, and evaluating data can be used by other businesses and thereby reveal the potential for rationalizing their storage processes and capital tied up in inventories. So that supplies for production are not threatened. The costs of performing this analysis and potential changes are relatively low and are not associated with demanding changes or expensive investments. All the mentioned benefits imply cost savings. Therefore, we can state that we managed to answer the question posed in the introduction and describe how to concretely transform the effective processing of information related to stocks into cost savings.

It should be added that the situation in the production company is constantly changing, as products are being innovated. Other components are then used and often from other suppliers. Logically, the consumed quantity and frequency of individual inventory items will change. Therefore, it is advisable to repeat this analysis and thereby react to the changed situation.

BIBLIOGRAPHY

Dvořáček, J., & Kafka, T. (2005). *Interní audit v praxi*. Computer Press Brno.

Jemelka, M., Chramcova, B., & Kriz, P. (2017). ABC analyses with recursive method for warehouse. *4th International Conference on Control, Decision and Information Technologies (CoDIT)*, 960-963. IEEE.

Macík, K. (1995). *Účetnictví pro manažery*. Grada Publishing.

Pernica, P. (1998). *Logistický management. Teorie a podniková praxe*. Radix.

Ravinder, H., & Misra, M. B. (2014). ABC analysis for inventory management: Bridging the gap between research and classroom. *American Journal of Business Education*, 7 (3), 257 – 264. https://doi.org/10.19030/ajbe.v9i1.9578

Romancov, M. (2022). *Námořní slepota.* N Média.

Slavík, J. (2013). *Finanční průvodce nefinančního manažera. Jak se rychle zorientovat v podnikových a projektových financích*. Grada Publishing.

Smith, M. (2017). *Research methods in accounting*. (4th ed.). SAGE.

Starbek, M., Petrisic, J., & Kusar, J. (2000). Extended ABC analysis. *Journal Strojarstvo*, 42(3-4), 103-108.

Švecová, L., & Veber, J. (2021). *Produkční a provozní management*. Grada Publishing.

Zenkova, Z., Musoni, W., & Tarima, S. (2020). Accounting for deficit in ABC-XYZ analysis. *5th International Conference on Logistics Operations Management*, 79-84. IEEE.

IMPACT OF LEVERAGE ON FIRMS' PERFORMANCE IN NIGERIA: EVIDENCE FROM THE MANUFACTURING SECTOR

Babajide Francis FADAKA
Federal University Oye Ekiti, Nigeria
jide.fadaka@fuoye.edu.ng

Abstract: *This study examined leverage and financial performance of quoted manufacturing firms in Nigeria. The study employed panel regression analysis. Data for the study were obtained from financial reports of the selected companies from 2006 to 2021. Two models were considered to represent performance measurements. The models are return on asset and return on equity while leverage variables such as debt ratio and debt to equity were employed. Firm size, asset quality and sales growth were also added as the control variables in the models. Specifically, the models were investigated under the fixed and random effects. Hausman test was performed on the two models and the outcome showed that the random effect result produced a more reliable outcome. From the result of the test in both models (return on asset and return on equity), the study indicated that the two models provided a conflicting outcome as leverage variables influence return on asset and return on equity differently. With this, it justified the inefficiency of financial management in employing debt and therefore suggested improvement in the use of financial and accounting information if the consistent outcomes will be guaranteed. The study further suggested that firms that desire to increase their capital structure and raise funds for expansion and operation could source financing from debt either through the capital market or other financial agencies saddled with such responsibility and this should be employed judiciously.*

Keywords: *debt ratio, debt equity ratio, firms' performance, panel analysis*

1. INTRODUCTION

Availability of funds is the nerve of all firms needed for their continued production as well as the offsetting of expenses for the acquisition of assets necessary to cater for the day-to-day operations. In a bid to make this possible, funds are generated through various means, this can be through the capital provided by the owners of the firm (equity) or part of the revenue accruing to the firm from previous years (retained earnings). However, in cases where firm projects or activities cannot be catered for by such options, the firm usually resorts to borrowing, that is, debt as a source of funding which then forms the kernel of the concept of leverage (Abubakar & Garba, 2019). Meanwhile, leverage is still not considered a perfect escape route for firms in the literature despite its numerous advantages due to its substantial disadvantages which cannot be waived. Nonetheless, firms prefer leverage as far as the firm is not levered enough to be bankrupt because this option assists the firm to protect the ownership structure from dilution and is also beneficial because the interest paid on debt is not taxable.

Globally, firms seek to obtain the best financial structure that can transform their financial position by ensuring an optimum combination of debt and equity in their capital structure. In Nigeria, the situation is not different as firms also borrow to finance their activities. This is more pronounced among the manufacturing firms than other firms in the country because they provide services and sell products on wholesale and retail as these firms have to acquire and maintain heavy-duty machines for production and other overheads cost, supplying industries with the needed raw materials and payment of salaries and wages of their workers (Cheng & Tzeng, 2011). To access this fund is more worrisome as financial institutions prefer lending to sectors like mining and quarrying, oil and gas against the priority sector like

manufacturing. This sector (manufacturing firms) is therefore affected to obtain the needed financial support to meet their short and long-term obligations to ensure optimum financial structure capable of minimizing the cost of debt and boosting their financial performance.

However, determining the optimum capital structure that can positively influence manufacturing sector performance in Nigeria remained a matter of contention in literature. This contention in literature has given rise to different theories in literature such as the pecking order theory, agency theory and many more and also strengthened by the lack of consensus to justify the validity of results obtained from the empirical literature (De Jong et al., 2011). Instances of such divergence is the results obtained from the work of Mahmood, Han, Ali, Mubeen and Shahzad (2019) and Yinusa, Adelopo, Rodionova and Samuel (2019) who discovered negative and positive effects of leverage respectively as well as the irrelevance perspective that leverage does not affect the firm value as advanced by Modigliani and Miller (1958).

In addition, despite the existence of a preponderance of literature on the subject matter, there exists a paucity of contributions that pooled companies together in a panel between leverage and firm performance as most studies were limited in their estimation techniques using Ordinary Least Square (Garba et al., 2019; Gathara et al., 2019; Abeywardhana, 2015). Therefore, this study considered panel regression analysis with the use of pooled least square, fixed effect and random effect estimation techniques.

Contributors in Nigeria have focused on other sectors such as the financial and service sectors (Yinusa et al., 2019; Ndubuisi & Onyema, 2019; Abubakar & Garba, 2019). Hence, the need to consider the manufacturing sector as the sector contributes significantly to boosting employment, sources of raw materials for other industries and above all improves the growth and development of the country. It is in the light of these, that the study examined the impact of leverage on firm performance in Nigeria with a special inclination to the manufacturing sector.

2. LITERATURE REVIEW

Leverage and its Implications

Leverage which can also be referred to as debt is the borrowing made from external sources with the obligation to pay back with interest at a specified time (Pandey, 2009). It becomes corporate leverage when a firm through borrowing raises funds from an external source to finance its operations. Meanwhile, such creditors are paid first upon the realization of profit by the firm before the owners. Rauh and Sufi (2010) averred that a firm will rather borrow from external sources either for long or short-term purposes than raising funds through equity capital as such may dilute the ownership structure of the firm.

Furthermore, firms will rather go for leverage as it allows the firm the opportunity to maintain the ownership structure and avoid unnecessary influence on decisions (Fama & French, 2002). Also, repayments on debt though obligatory are not tax-deductible. This reduces the taxable income of the firm (Nyamita et al., 2014). In addition, Miller (1977) conjectured that the leverage option is a major strategy for mopping up excess idle cash flow in a firm, that is, the rate of free cash flow is effectively reduced when leverage is considered, and therefore, the managers are monitored at less cost as they will not have enough funds for self-aggrandizing purposes.

However, in divergence with the views above, Mohamed (2013) maintained that an excessive level of leverage may disrupt firm activities due to the possibility of incurring bankruptcy costs associated with leverage as creditors must be paid even if losses are made. Also, as good as leverage may sound to be, assessing it under favourable conditions is very difficult as it is influenced by other factors such as macroeconomic conditions, the credit rating

of the firm as well as the age of the firm. In other words, new firms may not have good chances to access leverage because the return on their projects which may also be new and strange in the market is not guaranteed (Titman & Wessels, 1988).

In theory, the M & M irrelevance theory as propounded by Modigliani and Miller (1958) has its crux centered on the fact that the value of a firm is not in any way dependent on its capital structure is one of the significant theories in the sphere of capital structure. That is, the capital base of a firm as constituted by debt and equity does not affect the value of a firm. Hence, the theory assumes that leverage has no significant influence on the market value of the firm. However, the proposition is hinged on several assumptions that there are no corporate income taxes, no bankruptcy costs, no growth and more specifically that the firm exists in a perfect market. Meanwhile, criticisms rose sharply against the theory as scholars in literature (Myers, 2001; Baxter, 1967) averred that the conditions and assumptions underlining the MM theory are not feasible in real life.

Also, the agency theory was postulated by Jensen and Meckling (1976) with the core tenet of the theory built on the relationship between the managers of the firm who is the agent and the owners of the firm often referred to as the principal. The theory assumes that both the managers and the owners have divergent views about the profit maximization and funding of the firm. They assumed that managers tend to make use of the firm resources for their interests which are already at loggerheads with the owners' goal of wealth maximization (Muchai, 2016). This is exemplified by an investment of firm resources in projects that will yield higher remuneration and increased flight and travel expenses which will reduce the wealth maximization of the owners (Abor, 2008). As a result, Jensen (1986) averred that owners tend to ensure that the firm takes on debt financing as the source of financing to the end that the rate of idle cashflow available for such self-centered managerial activities is reduced due to debt repayment obligations.

Furthermore, the pecking order theory was postulated by Donaldson (1961) and later advanced by Myers and Majluf (1984). The kernel of the theory is the assumption that information asymmetry spurs the firm's cost of financing. The two elements of the capital structure –equity and debt project different information to entities within the market (De Matos, 2001). The theory assumes that a firm is financed principally by internally generated funds, debt and equity and the firms go for these sources of financing in order of priority to the end that the firm prefers internal funding first possibly retained earnings and when it exhausts that, it moves to debt financing next before considering new equity which is always the last report as an option (Myers & Majluf, 1984). Hence, any time the firm is open to an external source of financing, debt is preferred to equity. This is because considering equity as an option may alter the ownership structure of the firm. Also, the theory assumes that debt financing is negatively related to profit maximization in that more profitable firms have a pool of retained earnings to draw from while less profitable firms must resort to debt financing, to the end that with a sufficient level of profit, a firm will not have to borrow (Myers & Majluf, 1984).

Empirical Literature

Also, taking into cognizance empirical findings as regards the subject matter in literature, Asen, Nwude, Idamoyibo, Ufodiama and Udo (2021) studied the connection between financial structure and manufacturing company's performance in Nigeria from 1999 to 2018 using Panel Least Squares estimation techniques. The empirical findings indicated a negative relationship between the dependent variables and other independent variables under study.

The empirical work of Ajayi and Obisesan (2020) assessed the relationship between financial structure and performance of manufacturing companies in Nigeria from 2013 to 2017 using a static panel technique. Following the fixed effect estimated result, a significant negative relationship was found between financial leverage and ROE. This result strongly justified the

traditional assertions that the capital structure of firms significantly influences the profitability of firms.

Abubakar and Garba (2019) scrutinized the effect of financial leverage on the financial performance of seven services firms in Nigeria between 2005 and 2016. The study used return on equity as the explained variable and also short-term debt ratio, long term debt ratio, total debt ratio, total debt to equity ratio as explanatory variables coupled with the use of descriptive statistics, correlation analysis and regression analysis, it was revealed that leverage has a negative effect on firm performance.

Abeywardhana (2015) examined the relationship between capital structure and profitability of non-financial small and medium scale enterprises in the United Kingdom between 1998 and 2008. The study adopted return on assets and return on capital employed as dependent variables while liquidity ratio, size, gearing ratio, short-term debt ratio and sales growth were used as the independent variables. The study further used panel data regression technique and revealed that leverage has a negative relationship with profitability.

Garba, Abubakar and Sulaiman (2019) examined the impact of financial leverage on the financial performance of three listed agricultural firms in Nigeria between 2005 and 2017. The study which adopted descriptive statistics and pooled regression techniques also made use of return on equity as the endogenous variables and short term debt ratio as well as long term debt ratio as exogenous variables. The study revealed that short and long-term leverage has a negative and positive effect on firm performance respectively.

In Kenya, Gathara, Kilika and Maingi (2019) investigated the effect of leverage on the financial performance of 30 quoted firms between 2007 and 2015. The study which used descriptive statistics and regression techniques coupled with the use of return on assets, return on equity and return on sales as the dependent variables while debt ratio was used as the independent variable, it was revealed that leverage has a positive effect on firm performance.

Mahmood, Han, Ali, Mubeen and Shahzad (2019) studied the effects of firm size and leverage on the working capital finance-profitability relationship of firms in China between 2000 and 2017. The study made use of return on equity as the dependent variable while working capital finance, size, growth and leverage were used as independent variables. The study employed descriptive statistics and regression analysis; it was revealed that leverage has a negative effect on firm performance.

Ndubuisi and Onyema (2019) explored the effect of financial leverage on the profit growth of 80 non-financial firms in Nigeria between 2000 and 2015. The study made use of total asset growth ratio as the explored variable and also used financial leverage proxied by long term debt to capital ratio, total debt to capital ratio, debt to equity ratio, cost of debt, total debt to total asset, inflation rate, interest rate and exchange rate as exploring variables coupled with the use of the panel regression technique, it was revealed that leverage indices exerted a mixed effect on economic growth.

Yinusa, Adelopo, Rodionova and Samuel (2019) examined the impact of capital structure on firm performance in Nigeria between 1998 and 2015 taking into cognizance 115 firms. The study used return on equity as the dependent variable and also leverage, firm size, age, ownership, growth opportunity and asset tangibility as independent variables coupled with the use of descriptive statistics and the Genralized Method of Moments, it was revealed that leverage has a positive relationship with firm performance.

Umar (2016) studied the relationship between profits, firm size, growth opportunities and capital structure of firms in the UAE between 1990 and 2012. The study used leverage as the dependent variable while profitability, tangibility, sales, cash flow volume and abnormal returns were employed as independent variables. The result from the regression analysis revealed that there exists a negative relationship between leverage and profits.

In Nigeria, Abubakar (2015) examined the relationship between financial leverage and the performance of 11 banks between 2005 and 2013. The study used return on equity as the dependent variable and also debt to equity ratio as well as debt ratio as the independent variables coupled with the use of descriptive statistics and correlation analysis, it was revealed that debt ratio has no significant effect on a firm performance.

3. MATERIALS AND METHODS

The impact of leverage on firm performance taking into cognizance selected manufacturing firms in Nigeria was investigated with the use of panel regression analysis. Data for the study covered the period 2006–2021 culled from the annual financial reports of the firms. Ten manufacturing firms were selected, and they are Dangote Flour Plc., Unilever Plc., Berger Paints Plc., Dangote Cement Plc., Lafarge Cement Plc., Nigerian Breweries Plc., PZ Cussons., Nestle Nigeria Plc., May and Baker Plc. and Presco Plc. The firms were selected as they were found to be the market leaders in the manufacturing sector, highly tangible and solvent. An econometric approach of Panel data which takes into consideration the pooled least square, fixed and random effects model to determine the effect of leverage on the performance of manufacturing companies was employed.

Model Specification

In a bid to examine the impact of leverage on manufacturing sector performance in Nigeria the study adapted the model used by Ahmadu and Abdulkarim (2019). In line with their model, the study stated its model as:

$ROA = f(DR, DER, SIZE, ASQ, SAGR) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots Model\ 1$

$ROE = f(DR, DER, SIZE, ASQ, SAGR) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots Model\ 2$

This can be restated economically as:

$$ROA_{it} = f\ (\beta_0 + \beta_1 DE_{it} + \beta_2 DER_{it} + \beta_3 SIZE_{it} + \beta_4 ASQ_{it} + \beta_5 SAGR_{it} + \mu_{it}) \dots\dots Model\ 1$$

$$ROE_{it} = f\ (\beta_0 + \beta_1 DE_{it} + \beta_2 DER_{it} + \beta_3 SIZE_{it} + \beta_4 ASQ_{it} + \beta_5 SAGR_{it} + \mu_{it}) \dots\dots Model\ 2$$

Where:

ROA = Return on Asset
ROE = Return on Equity
DR = Debt Ratio
DER = Debt Equity Ratio
SIZE = Firms Size
ASQ = Asset Quality Ratio
SAGR = Sales Growth
f = Functional Notation
β_o = Constant parameter
$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$, = Co-efficient of associated variables.

Estimation Techniques

Panel estimation technique was considered suitable as it allowed cross-sectional observation over periods of time. The technique is more beneficial than other methods as it has the capacity to control heterogeneity for individual observation, it gives a more suitable and realistic information on the data, variables produce less collinearity, suitable for study situated on dynamic adjustment among several benefits (Baltagi, 2005). The model structures under panel are pooled least square model which can be formulated as:

$$Y_{it} = \alpha + X'_{it}\beta + \mu_{it} \quad i = 1, \ldots, N, \quad t = 1, \ldots, T \ldots\ldots (1)$$

i denotes the selected manufacturing company; t represents the time-series dimension; $i\,subcript$ indicates the cross-sectional dimension; α is a scalar; β is $K\ X\ 1$ and X_{it} is the itth observation on all the explanatory variables.

$$\mu_{it} = \mu_i + v_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

μ_i indicates time invariant and the unobserved individual specific effect not included in the regression. However, when the assumptions of the classical model such as: zero conditional mean of μ_{it}, independence across observations, homoscedasticity, among others are met, pooled regression techniques would be considered suitable. When these assumptions are violated, the fixed effect model is therefore obvious. FE eliminates time-invariant characteristics effect which made it possible to examine the net effect of the predictors on the outcome variable. With this, the estimated coefficients cannot be biased. The fixed-effects models are more appropriate when the causes of changes among the variables are estimated.

The fixed effect model takes this form:

$$Y_{it} = \alpha + u_i + X'_{it}\beta + \mu_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

It should be noted that the occurrence of time-invarient variables (TIVs) in the pooled regression result hindered fixed effect model.
The estimated fixed effect model permits the correlation of unobserved individual effects with the included variable. In this case, the model applies only to the cross-sectional units in the study but not the unobserved sample. In a situation where the regressors of individual effects are mainly uncorrelated, modeling the individual specific constant terms as randomly distributed across cross-sectional units might be appropriate. The random effect model denoted as:
$Var(\mu_{it}) = \sigma_\mu^2 + \sigma_v^2$

4. RESULTS AND DISCUSSION OF FINDINGS

Data Analysis, Interpretation
Panel Regression Result for ROA (Model 1)

Table 1 is the estimated result for the Pooled Least Square (POLS), Fixed Effect (FE) and the Random Effect (RE) of return on asset model for the selected manufacturing companies in Nigeria. Table 2 showed the Hausman test conducted to determine which of the models is more appropriate between fixed and random results. However, the outcome of the test (Hausman) indicated that the random effect model produced a more reliable test and therefore used for prediction and decision making. This is because the probability value of the Chi-square statistics exceeded 5% (0.8060) hence; the interpretation of the return on asset model was based on the random effect model.

Table 1. Data Analysis on Panel Regression Result for ROA (Model 1)

	Dependent Variable ROA (Model 1)		
Independent	**Pooled OLS**	**Fixed Effects**	**Random Effects**
Constant	-75204617*** (13062481)	-1.04E+08*** (14864658)	-99361381*** (14714463)
DR	-17147.31 (1408516.)	2267313.* (1362210)	2009812 (1342749)
DER	460770.6 (1244292.)	-933467.2*** (1115911)	793230.5 (1108475)
SIZE	4985310. *** (767931.9)	6653654.*** (875988.2)	6413058*** (843186.3)
AST	111453.3*** (39052.28)	147300.9*** (36320.99)	142909.7*** (35891.03)
SAGR	10872.58 (9153.767)	10350.24 (7940.097)	10298.58 (7910.211)
No.	140	140	140
R-squared	0.278973	0.531499	0.313776
Adjusted R^2	0.252069	0.479027	0.288170
F-statistics	10.36920	10.12918	12.25429
Prob.	0.000000	0.000000	0.000000

Note: *, **, *** show the significance levels at 10%, 5% and 1% respectively while the parentheses are reported in standard errors.

Source: Authors' Computation with E-views, Version 9 (2022)

Table 2. Extract from the Hausman Test Result Model 1

Test Summary	**Chi-square statistic**	**Chi-square d.f.**	**Prob.**
Cross-section random	2.301931	5	0.8060

Source: Authors' Computation with E-views, Version 9 (2022)

The coefficient of the constant parameter for the ROA model for RE is -99361381 units. The result showed that if all other variables are held constant, manufacturing sector performance will decrease by 99361381 units. In the same vein, debt ratio and sales growth for the Random Effect (RE) recorded an insignificant value of 2009812 and 10298.58 units respectively. The result implied that a unit increase in debt ratio and sales growth of the manufacturing company will increase return on asset by 2009812 and 10298.58 units respectively.

The debt equity ratio also indicated an insignificant positive relationship of 793230.5 units. The result depicted that a unit increase in the debt-equity ratio will increase return on asset by 793230.5 units. However, the size of the firm and asset quality recorded a significant positive relationship of 6413058 and 142909.7 units respectively. The result showed that a unit increase in firm size and asset quality of the manufacturing companies in Nigeria will increase return on asset by 6413058 and 142909.7 units respectively.

The F statistics which denote the overall significance of the model under the random effect model stood at 12.25429 with a probability value of 0.000000. This indicated that the ROA model is of good fit because of its significant level.

Panel Regression Result for ROE (Model 2)

Table 3. Data Analysis on Panel Regression Result for ROE (Model 2)

	Dependent Variable ROE (Model 2)		
Independent	**Pooled OLS**	**Fixed Effects**	**Random Effects**
Constant	0.141861 (0.270848)	0.507568* (0.301584)	0.216883 (0.274086)
DR	0.333393*** (0.060019)	0.283196*** (10.068211)	0.322852*** (0.060611)
DER	0.189859*** (0.054775)	0.134599** (0.057490)	0.177604*** (0.054276)
SIZE	0.010920 (0.016438)	-0.010791 (0.018302)	0.006540 (0.016503)
AST	0.000969 (0.001520)	0.001072 (0.001590)	0.000982 (0.001506)
SAGR	0.000242 (0.000413)	0.000258 (0.000416)	0.000248 (0.000405)
No.	140	140	140
R-squared	0.198841	0.290103	0.177190
Adjusted R^2	0.170228	0.214236	0.147804
F-statistics	6.949363	3.823837	6.029711
Prob.	0.000008	0.000020	0.000044

Note: *, **, *** show the significance levels at 10%, 5% and 1% respectively while the parentheses are reported in standard errors.

Source: Authors' Computation with E-views, Version 9 (2022)

Table 4. Extract from the Hausman Test Result Model 2

Test Summary	**Chi-square statistic**	**Chi-square d.f.**	**Prob.**
Cross-section random	8.977526	5	0.1100

Source: Authors' Computation with E-views, Version 9 (2022)

In the same vein, Table 3 reported the Pooled Least Square (POLS), Fixed Effect (FE) and the Random Effect (RE) conducted on the return on equity model for the selected manufacturing companies in Nigeria while Table 4 depicted its Hausman test conducted in the assessment of the preferred model between fixed and random results. The outcome of the Hausman test indicated that the random effect model is more reliable test and therefore used for the interpretation of return on equity model because the statistics for Chi-square probability exceeded 5% (0.1100).

The coefficient of the constant parameter for the ROA is positive but insignificant with a value of 0.216883 units. The result implied that if all other variables are fixed at zero, the return on equity will increase by 0.216883 units. The debt ratio and debt to equity ratio have a positive and significant coefficient value of 0.322852 units and 0.177604 units respectively. The result implied that a unit increase in both debt ratio and debt to equity ratio will increase return on equity by 0.322852 units and 0.177604 units respectively. Conversely, sizes of the

firm, asset quality and sales growth have insignificant positive relationship values of 0.006540, 0.000982 and 0.000248 units respectively. The result implied that a unit increase in sizes of the firm, asset quality and sales growth will increase return on equity by 0.006540, 0.000982 and 0.000248 units respectively. To determine the fitness of the model, the value of the F statistics under the random effect model was used for this purpose. It indicated 6.029711 with a probability value of 0.000044. This showed that the return on equity is of good fit.

Discussion and Implication of Findings

From model one; leverage (debt ratio and debt equity-ratio) depicted an insignificant positive relationship with the performance of manufacturing firms in Nigeria. The result implied that the use of debt has no significant effect on firm performance using return on asset. This implied that an increase in leverage does not affect the performance of manufacturing firms. This is exactly an authentication of the M & M irrelevant Hypothesis by Modigliani and Miller (1958) and the findings of Abubakar (2015) and antithetical to the discoveries of Umar (2016) and Yinusa, Adelopo, Rodionova and Samuel (2019). The insignificant effect is possible as debt and equity are considered perfect substitutes to the end that what debt can do in a firm, equity can also do. Hence, performance is determined by other factors aside from debt using return on asset as a performance indicator. This is also in agreement with the standpoint of Gwatidzo (2007). In model two which used return on equity as a performance indicator for the selected manufacturing firms, the result deviated from what was obtained under return on asset model as leverage ratio subrogated by debt ratio and debt-equity ratio depicted a significant positive relationship with the performance of manufacturing firms in Nigeria. This result supports the theoretical proposition of Static trade-off and is well fitted with the agency cost theory that assumed that increase in leverage lower agency costs and increases the value of a firm as it enhances managers in acting responsibly in the interest of the shareholders. The empirical works of Yinusa, Adelopo, Rodionova and Samuel (2019), Gathara, Kilika and Maingi (2019) also support the findings. It negates the pecking order and the market timing theory that believed in the significant negative relationship between leverage and financial performance and also contradicts the empirical findings of Asen, Nwude, Idamoyibo, Ufodiama and Udo (2021), Ajayi and Obisesan (2020), Abubakar and Garba (2019), Mahmood, Han, Ali, Mubeen and Shahzad (2019), Umar (2016) and Abeywardhana (2015) among others. The control variables employed such as size of the firm and asset quality came out to be positive and significant in model one but insignificant in model two while sales growth exhibited an insignificant positive relationship in the two models. The joint significance of the two models which was revealed by the F-statistics values indicated that both the return on asset and return on equity model are statistically significant as their values are less than 5%.

5. CONCLUSION AND RECOMMENDATIONS

In a bit to examine leverage and financial performance of quoted manufacturing firms in Nigeria, the study employed panel regression analysis. Data for the study were obtained from financial reports of the selected companies from 2006 to 2021. Two models were considered to represent performance measurements. The models are return on asset and return on equity while leverage variables such as debt ratio and debt to equity were employed. Firm size, asset quality and sales growth were also added as the control variables in the models. Specifically, the models were investigated under the fixed and random effects. Hausman test was performed on the two models and the outcome showed that the random effect result produced a more reliable outcome which was therefore used for interpretation and prediction. From the outcome of the test in both models (return on asset and return on equity), the study indicated that the two models provided

a conflicting outcome as leverage variables influence return on asset and return on equity differently even though they were calculated with the same accounting information in their numerators. With this, it justified the inefficiency of financial management in employing debt and therefore suggested improvement in the use of financial and accounting information if consistent outcomes will be guaranteed. The study further suggested that firms that desire to increase their capital structure and raise funds for expansion and operation could source financing from debt either through the capital market or other financial agencies saddled with such responsibility.

BIBLIOGRAPHY

Abeywardhana, D. K. Y. (2015). Capital structure and profitability: An empirical analysis of SMEs in the UK. *Journal of Emerging Issues in Economics, Finance and Banking, 4*(2), 1661-1675.

Abor, J. (2008). Agency theoretic determinants of debt levels: Evidence from Ghana. *Review of Accounting and Finance, 7*(2), 183-192.

Abubakar, A. (2015). Relationship between financial leverage and financial performance of deposit money banks in Nigeria. *International Journal of Economics, Commerce and Management, 3*(10), 759-778.

Abubakar, A., & Garba, A. (2019). Financial leverage and financial performance of quoted services firms in Nigeria. *Nigerian Journal of Management Technology and Development, 8*(2), 273-282.

Ajayi, L. B., & Obisesan, O. G. (2020). Impact of capital structure on firm performance in Nigeria. *International Journal of Economics, Commerce and Management, 8*(3), 415-428.

Asen, A., Nwude, C. E., Idamoyibo, H. R., Ufodiama, C. N., & Udo, E. S. (2021). Effect of capital structure on firms performance in Nigeria. *Universal Journal of Accounting and Finance, 9*(1), 15-23.

Baxter, N. D. (1967). Leverage, risk of return and the cost of capital. *The Journal of Finance, 22*(3), 395-403.

Cheng, M. C., & Tzeng, Z. C. (2011). The effect of leverage on firm value and how the firm financial quality influence on this effect. *World Journal of Management, 3*(1), 30-53.

De Jong, A., Verbeek, M., & Verwijmeren, P. (2011). Firms' debt-equity decisions when the static tradeoff theory and the pecking order theory disagree. *Journal of Banking and Finance, 35*(5), 1303-1314.

De Matos, J. A. (2001). *Theoretical foundations of corporate finance.* New Jersey: Princeton University Press.

Donaldson, G. (1961). *Corporate debt capacity: a study of corporate debt policy and the determination of corporate debt capacity.* Boston: Harvard University, Graduate School of Business Administration, Division of Research.

Fama, E. F., & French, K. R. (2002). Testing trade-off and pecking order predictions about dividends and debt. *Review of Financial Studies, 15*(1), 1-33.

Garba, A., Abubakar, A., & Sulaiman, S. A. (2019). Impact of financial leverage on the financial performance of quoted agriculture firms in Nigeria. *Retrieved from https://www.researchgate.net/publication/330505813*.

Gathara, Z. M., Kilika, J. M., & Maingi, J. N. (2019). Effect of leverage on financial performance of selected companies listed in the Nairobi Securities Exchange, Kenya. *International Journal of Innovative Finance and Economics Research, 7*(1), 10-33.

Gwatidzo, T. (2007). *The determinants of capital structure among selected Sub-Saharan African Countries.* (Ph.D. Thesis). University of Witwatersrand.

Jensen, M. C. (1986). Agency cost of free cash flow, corporate finance, and takeovers. *American Economic Review, 76*(2), 323-329.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: managerial behaviour, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305-360.

Mahmood, F., Han, D., Nazakat, A., Mubeen, R., & Shahzad, U. (2019). Moderating effects of firm size and leverage on the working capital finance-profitability relationship: Evidence from China. *Sustainability, 11*(1), 1-14. https://doi.org/10.3390/su11072029

Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. *American Economic Review, 48*(3), 261-297.

Mohamed, S. (2013). *Bankruptcy prediction of firms listed at the Nairobi Securities Exchange.* University of Nairobi.

Muchai, J. K. (2016). *Evaluating the effect of corporate leverage on profitability of Nairobi Securities Exchange Listed Manufacturing and Allied Companies.* (M.Sc. Thesis). Kisii University, Kenya.

Myers, S. C. (2001). Capital structure. *Journal of Economic Perspectives, 15*(1), 81-102.

Myers, S. C., & Majluf, N. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics, 13*(2), 187-221.

Ndubuisi, K., & Onyema, J. I. (2019). Effect of financial leverage on profit growth of quoted non-financial firms in Nigeria. *Journal of Financial Marketing, 3*(1), 9-14.

Nyamita, M. O., Garbharran, H. L., & Dorasamy, N. (2014). Factors influencing debt financing decisions of corporations- theoretical and empirical literature review. *Problems and Perspectives in Management, 12*(4), 189-202.

Pandey, I. M. (2009). *Financial management.* New Delhi: Vikas Publishing House Pvt Limited.

Rauh, J. D., & Sufi, A. (2010). Capital structure and debt structure. *Review of Financial Studies, 23*(12), 4242-4280.

Titman, S., & Wessels, R. (1988). The determinants of capital structure choice. *The Journal of Finance, 43*(1), 1-19.

Umar, B. (2016). Profits, firm size, growth opportunities and capital structure: An empirical test. *Journal of Finance and Economics, 4*(1), 58-69.

Yinusa, O. G., Adelopo, I., Rodionova, Y., & Samuel, O. L. (2019). Capital structure and firm performance in Nigeria. *African Journal of Economic Review, 7*(1), 31-56.

Non-financial Reporting and Literacy

FROM NUMBERS TO NARRATIVES: UNRAVELING THE PATH TO STANDARDIZED NON-FINANCIAL REPORTING IN EUROPE

Ladislava KNIHOVÁ, KRISTINA LENKOVÁ
The University of Finance and Administration in Prague, Czech Republic
ladislava.knihova@mail.vsfs.cz

Abstract: *In the rapidly evolving European business reporting, a paradigm shift from traditional financial metrics to comprehensive non-financial reporting is underway. This study aims to assess the readiness of financial institutions in the Czech Republic to implement the Corporate Sustainability Reporting Directive (CSRD) and European Sustainability Reporting Standards (ESRS). Going beyond mere numerical data, the contemporary focus is on ESG (Environmental, Social, and Governance) narratives rooted in real-world contexts. Utilizing a mixed-method approach, including desktop research and expert interviews with selected financial institutions, we investigate how these organizations are navigating the complexities of ESG reporting implementation. Our analysis highlights both Moneta Money Bank (MMB) and BNP Paribas Cardif as noteworthy cases in the evolving landscape of ESG reporting within the financial services sector. By closely examining the ESG approaches employed by these financial institutions, the paper reveals how aligning regulatory compliance with proactive ESG reporting can enhance transparency and bolster investor appeal. The paper offers insights into implementation timelines, investor considerations, and the potential transformative impact of standardized non-financial reporting on sustainable entrepreneurship across Europe.*

Keywords: *non-financial reporting, ESG, European sustainability reporting standards, investors, sustainability reports, Moneta Money Bank*

1. INTRODUCTION

The European Union's recent Corporate Sustainability Reporting Directive (later on referred to as CSRD) (Directive (EU) 2023/2464), effective since January 5, 2023, mandates rigorous environmental, social, and governance (ESG) public disclosure obligations for large companies, listed SMEs, and parent companies of large groups operating in EU Member States. This study aims to assess the readiness of financial institutions operating in the Czech Republic for implementing CSRD and ESRS.

The previous regulatory framework for sustainability reporting was the Non-Financial Reporting Directive (NFRD) (Directive 2014/95/EU), which was more limited in scope and applied to large "public interest" companies with more than 500 employees.

To objectively understand the rationale behind the CSRD, it is essential to recognize that the directive evolved from a comprehensive review of the NFRD with the ambitious aim of elevating sustainability reporting to a standard as robust and reliable as traditional financial reporting. Beyond standardization, the new directive significantly expands the scope of companies required to comply and introduces stringent standards, along with penalties for non-compliance.

Considering these evolving directives, the paper seeks to address a crucial research question:

"How well-prepared are financial institutions in the Czech Republic for the implementation of CSRD and ESRS?"

By investigating this question, we aim to assess the operational readiness of these institutions to comply with the new sustainability reporting standards, which are, at the moment of writing this paper, undergoing the evaluation of public consultation's results. To be more precise, the draft standards were published on 9th June 2023, for feedback until 7th July 2023 (Sellar et al., 2023). The responsible EU representatives expect that these standards will be finalized, adopted, and published by the end of 2023. In pursuing this research, it is also our sincere endeavor to gain insights into the challenges and opportunities that these financial institutions may encounter during the early stages of the implementation process.

The question of how well financial institutions are prepared for the implementation of the new EU directives holds particular significance. The readiness of financial institutions to adopt new EU directives is not only crucial in the context of European financial integration and governance but also has the potential to significantly influence the economy in the broader context.

In order to fully appreciate the transformative impact of the Corporate Sustainability Reporting Directive (CSRD) on European business reporting, it is essential to understand the rationale behind this landmark legislation. The European Commissioner highlighted the importance of the CSRD during a plenary debate at the European Parliament held on November 9, 2022. He underscored that the CSRD's role is a crucial legislative tool to steer companies towards more sustainable business models and enhance the transparency and reliability of sustainability information. The debate focused on the urgency of addressing climate change and biodiversity loss. The CSRD aims to strengthen rules surrounding environmental and social information that companies are required to report. For the first time, the Directive seeks to put sustainability reporting on par with financial reporting. Simultaneously, the Commissioner emphasized the necessity for accurate and reliable information to guide investments toward a sustainable future and to combat greenwashing. The Directive includes provisions ensuring that small and medium-sized enterprises (SMEs) are not unduly burdened. This consideration is particularly important for SMEs involved in supply chains. It aligns well with another proposed Directive on Corporate Sustainability Due Diligence and aims to harmonize European standards with global standards being developed by the International Sustainability Standards Board (ISSB) (European Commission, 2022).

In the ever-evolving landscape of ESG and sustainability reporting, the importance of goal setting and measurement cannot be overstated. Drawing from Deloitte's 2017 report, 'non-financial and integrated reporting: Real value, real cost, real profit,' the notion that *'If you do not have goals and you do not measure their implementation, you cannot manage them'* serves as a cornerstone principle (Deloitte, 2017). By establishing concrete sustainability objectives and employing rigorous metrics to gauge progress, organizations gain a comprehensive view of their ESG performance. This analytical approach not only enhances the quality and reliability of ESG reports but also informs and refines managerial decisions. Thus, a more responsible and transparent alignment with stakeholder interests and broader sustainability goals is ensured.

Both in the academic and business communities, the importance and relevance of non-financial reporting resonate strongly since it aligns with the evolving priorities of the modern business landscape. This acknowledgment, however, brings forth its own set of challenges. The implementation of high-standard sustainability reports represents several challenges. Among the most pressing are the complexity of adhering to evolving regulatory guidelines, the resource-intensive nature of data collection and analysis, and the need for skilled personnel to interpret and communicate the nuances of environmental, social, and governance (ESG) metrics. Additionally, organizations often face difficulties in integrating these sustainability metrics with traditional financial reporting systems. Especially small and medium-sized enterprises may not have the necessary expertise and resources. It is becoming obvious that

overcoming these challenges is critical for ensuring that sustainability reports not only comply with regulations but also serve as reliable tools for decision-making among stakeholders.

2. THE NON-FINANCIAL REPORTING LANDSCAPE – THEORETICAL BACKGROUND

In order to understand the complexities and evolving trends in the European business landscape, one must delve into the multifaceted world of non-financial reporting—a domain increasingly recognized for its critical role in shaping a corporation's public image, ethical standing, and long-term sustainability.

As articulated by Stolowy and Paugam, there is a heterogeneity in definitions of what non-financial reporting entails (Stolowy & Paugam, 2018). Previous EU Directives like the NFRD (Directive 2014/95/EU) sought to clarify what corporations should disclose, focusing primarily on increasing transparency regarding the social and environmental impacts of businesses. Building on the notion of transparency, it is imperative to acknowledge that transparency and accountability in reporting serve a dual purpose: they not only uphold ethical standards but also furnish stakeholders with a more nuanced understanding of a company's operations and values.

Transparency and accountability in reporting are vital because they not only uphold ethical standards but also provide stakeholders with a clearer understanding of a company's operations and values. This includes a company's environmental, social, and governance (ESG) performance such as sustainability initiatives, employee relations, and community development efforts.

The "double materiality" perspective, as amended by the CSRD, requires companies to report both on their impacts on people and the environment, and how social and environmental issues create financial risks and opportunities for the company. This approach diverges from traditional financial materiality, which focuses only on the financial consequences for the company and its stakeholders. Double materiality not only examines financial repercussions but also considers the social and environmental impacts on society at large.

The concept of double materiality has gained critical importance in the evolving landscape of non-financial reporting. By establishing a symbiotic link between a company's financial performance and its broader societal and environmental impacts, double materiality offers a multi-faceted lens through which organizations can assess their standing. This perspective aligns closely with the notion presented by Delgado-Ceballos et al. (2023), who argue that double materiality helps companies navigate complex sustainability challenges and connect their corporate actions to broader Sustainable Development Goals (SDGs). It enables companies to identify both immediate and latent risks and opportunities across different dimensions, offering a more comprehensive understanding of their operational context.

By effectively integrating sustainability considerations into strategic decision-making processes, companies are better positioned to build resilience against emerging sustainability-related risks and adapt to regulatory changes. Moreover, the principle of double materiality helps greater transparency, enhancing stakeholder trust and enabling more informed decision-making. It serves as an indispensable tool for companies striving to create long-term value for their stakeholders, while also navigating the complexities of modern sustainability challenges.

The notion of double materiality is essential as it establishes a two-way relationship between a company's financial performance and its societal and environmental impacts. This broader view allows companies to identify both risks and opportunities, better integrate sustainability considerations into strategic decision-making, and thus create long-term value for their stakeholders. The implementation of high-standard sustainability reports represents

several challenges. Among the most pressing is the complexity of adhering to evolving regulatory guidelines, the resource-intensive nature of data collection and analysis, and the need for skilled personnel to interpret and communicate the nuances of environmental, social, and governance (ESG) metrics (Carbon, 2023). Additionally, organizations often face difficulties in integrating these sustainability metrics with traditional financial reporting systems.

In a significant move to enhance corporate transparency and accountability, on July 31, 2023 the European Commission released its first delegated act that supplements the Accounting Directive as amended by the Corporate Sustainability Reporting Directive (European Commission, 2023). The act focuses on providing comprehensive standards for the disclosure of environmental, social, and governance information, particularly aimed at large and listed companies in the banking and financial services sector. The changes focus on ensuring "Materiality" assessments are rigorous and transparent while providing "Phasing-in certain requirements" to ease compliance, particularly for smaller companies. Some datapoints have been moved from mandatory to "Making certain disclosures voluntary" to offer more operational flexibility. Additional "Further flexibilities in certain disclosures" have been made to the mandatory datapoints to ease compliance burdens without sacrificing transparency. To ensure a seamless regulatory environment, changes have been made for "Coherence with EU legal framework". Furthermore, efforts for "Interoperability with global standard-setting initiatives" have been continued to ease the reporting process for multinational corporations. Lastly, "Editorial and presentational modifications" have been carried out to enhance clarity, coherence, and ease of use of the standards (European Commission, 2023).

As we are awaiting the final reading of the European sustainability reporting standards, we are currently entering an era where integrated reporting—encompassing both financial and sustainability disclosures—will be mandatory. In view of all the changes under preparation, integrated reporting aiming to merge financial and non-financial elements offers a more holistic perspective of the company's strategy, governance, performance, and outlook.

Dealing with the complexities and nuances of non-financial reporting, especially in the era of evolving regulatory frameworks and stakeholder demands, we are also gradually moving towards an era of obligatory integrated reporting. This emerging paradigm is not just another model of incorporating non-financial metrics with traditional financial reporting; it represents a transformative shift in how businesses are expected to report and, by extension, operate. In view of all the changes under preparation, integrated reporting seeks to offer a more holistic perspective that encompasses the company's strategy, governance, performance, and outlook. By merging financial and non-financial elements, integrated reporting enables companies to provide a more comprehensive account of their value-creation process, thereby assisting stakeholders in making more informed decisions. It represents the future of corporate reporting – the future where financial viability is intertwined with social responsibility and environmental stewardship.

3. BRIDGING THE GAP: ESG REPORTING EXPECTATIONS VS. REALITY IN 2023

Whether one is a proponent or critic of ESG initiatives, having reliable data is crucial for making informed decisions and assessments. Therefore, regardless of one's stance on ESG reporting, objective data from surveys by reputable research institutions can offer critical insights that are beneficial for all stakeholders involved. According to results from a recent McKinsey survey of chief investment officers, investors believe in the importance of ESG but need more clarity about the ESG value proposition (Gelb et al., 2023). The survey is a valuable addition to the ongoing discourse around ESG reporting. It provides detailed insights into how

investors view Environmental, Social, and Governance (ESG) initiatives from within companies. The most significant results include:

Investor Perspective on ESG

- More than 95% of S&P 500 companies issue sustainability reports, but few integrate ESG into their equity stories, creating a gap in understanding how ESG initiatives translate to financial performance.

Survey Insights

- 85% of surveyed Chief Investment Officers (CIOs) consider ESG important in investment decisions.
- Most investors are willing to pay a premium for companies that clearly link their ESG efforts to financial performance.
- Current ESG communications from companies fall short of investor expectations in significant ways, including a lack of clarity and certainty about long-term value and regulations.

Importance of Industry-Specific ESG Focus

- ESG priorities vary by industry. For instance, environmental initiatives are most important for the energy and industrial sectors, social initiatives are vital in tech and pharma, and governance is a priority in finance and insurance.
- A lack of a clear ESG strategy can lead investors to consider decreasing exposure to specific industries.

Crafting the ESG Story

- Companies should offer a clear narrative linking ESG efforts to long-term financial gains and competitive advantages.
- ESG reporting should be more than just a checklist; it should provide a granular explanation

Communication Strategy

- The ESG story should clearly explain the company's strategy and how it creates value, provide evidence that the strategy works, and outline the risks and opportunities (Gelb et al., 2023).

In summary, investors want more than just data; they want an integrated, coherent story ("equity story") that links ESG initiatives to long-term financial performance and value creation. This offers a compelling opportunity for companies to differentiate themselves in the eyes of long-term investors.

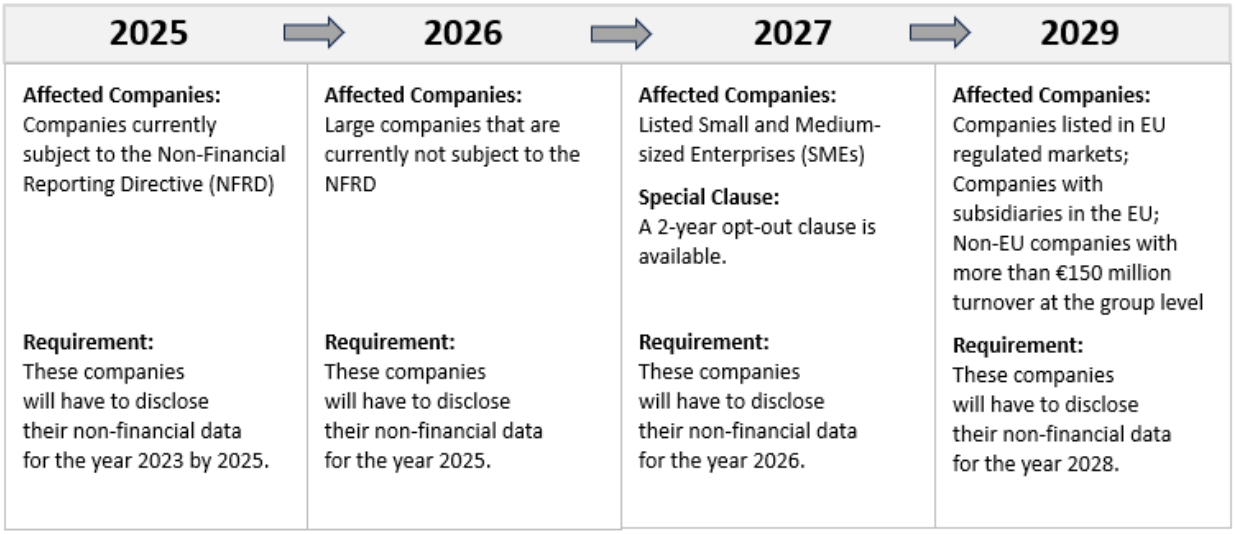
As the 2023 McKinsey survey illuminates, the modern investor is neither disinterested nor naive about the role of ESG in business today. Instead, they are calling for a higher level of clarity, specificity, and coherence in ESG reporting. The data suggests an urgency for companies not just to "do good", but to demonstrate how "doing good" aligns with "doing well" financially.

4. THE PROCESS OF IMPLEMENTING ESG REPORTING

As part of the European Union's commitment to sustainability and corporate transparency, the Corporate Sustainability Reporting Directive (CSRD) 2022/2464 was enacted to lay the foundation for more robust Environmental, Social, and Governance (ESG) reporting. Outlined in Appendix D of the CSRD, the structure of non-financial reports has been meticulously designed to encompass essential areas. Specifically, companies are mandated to disclose comprehensive information covering environmental, social, and governance aspects. The

phased timeline for implementing these reporting requirements reflects the EU's deliberate approach to making ESG reporting a legal obligation for various types of companies. The following timeline (Figure 1) provides a well-arranged outline delineating the critical milestones for mandatory ESG reporting applicable to large companies, SMEs, and companies headquartered outside the EU.

Figure 1. Timeline for Mandatory ESG Reporting in the EU



Source: own elaboration based on (European Commission, 2022)

By understanding these key deadlines and requirements, companies can better navigate their responsibilities under the currently valid EU regulatory framework for sustainability reporting.

5. METHODOLOGY

Employing a qualitative analysis approach, which is inherently inductive and moves from specific observations to broader theories or explanations – often described as a "bottom-up" method (Suter, 2012) – the authors have made this the cornerstone of their research.

Research type: desktop research and primary qualitative research.

Research objectives: The research objectives of this study are multifold.

- To conduct an in-depth analysis of the newly enacted EU directives pertaining to ESG (Environmental, Social, and Governance) non-financial reporting, specifically the Corporate Sustainability Reporting Directive (CSRD) and European Sustainability Reporting Standards (ESRS).
- To evaluate the readiness of financial institutions in the Czech Republic for implementing these new EU directives.
- To employ a mixed-method approach involving desktop research and expert interviews to understand how selected financial institutions manage the complexities associated with implementing the new ESG reporting standards.
- To move beyond quantitative metrics and delve into the narratives surrounding ESG efforts, thereby offering insights rooted in real-world contexts.
- To identify challenges and opportunities that financial institutions may encounter during the implementation process and thus to contribute to the ongoing discourse on the

alignment of corporate sustainability reporting with broader societal and environmental objectives.

Research methods: document analysis, expert interviews, comparative analysis, case study While designing this research, the authors opted for a holistic approach. Each research method "adds to the whole" and collectively provides a comprehensive, multi-layered understanding of the complexities involved in non-financial reporting.

Table 1. Research methods' description and justification

Method	Description	Justification
Document analysis	Document analysis allows for the examination of pre-existing records, reports, and materials. In the context of non-financial reporting, this could include sustainability reports, corporate disclosures, and policy documents.	This method provides a historical context and captures the evolution of non-financial reporting frameworks, practices, and regulations. It is particularly useful when investigating the changes over time or benchmarking against specific standards like EU directives.
Case study	Case studies provide a focused, detailed investigation of a single entity or a small number of entities.	Case studies offer in-depth analysis of real-world non-financial reporting, highlighting context, effectiveness, and regulatory impact. They can also demonstrate the practical implications of regulations and provide tangible examples of best practices.
Expert interview	Expert interviews provide in-depth qualitative data that is highly specialized.	Expert opinions can offer nuanced insights that are not readily apparent in written documents. These interviews can clarify why specific policies were adopted, the challenges in implementation, and the future trajectory of non-financial reporting.
Comparative analysis	Comparative analysis helps to contextualize the research subject by analyzing it in relation to other similar or contrasting cases.	Comparative analysis is valuable for identifying best practices, areas of improvement, and emerging trends.

*Source: author*s' *own elaboration*

With the use of the above-mentioned research methods, the research is designed to provide a comprehensive view of the subject matter.

Research period: 1st April – 31st August 2023

Having established the research framework and methods, we now turn our attention to Moneta Money Bank as a case study to exemplify excellence in ESG reporting.

5.1 Assessing the readiness of key financial institutions for esg reporting

In anticipation of new regulations and standards, it's crucial to gauge how prepared key players in the financial sector operating in the Czech Republic (partly Slovakia) are in adopting ESG reporting. The table below offers a comparative snapshot of the preparedness of significant financial institutions in the Czech Republic and Slovakia. Each bank's current engagement with ESG reporting is evaluated based on several criteria, including the availability of a dedicated website of microsite on ESG, the issuance of dedicated ESG reports for 2021 and 2022, and inclusion of ESG topics in their Annual and Group ESG reports. Despite all being in various stages of preparation, this table highlights the differing levels of readiness among these key institutions. This snapshot enables us to assess the current state of ESG reporting in the financial sector in the Czech Republic, serving as a context in which Moneta Money Bank's ESG practices can be evaluated.

As the EU's new ESG reporting guidelines come into force, it is imperative to assess how financial institutions in the Czech Republic are adapting to these changes. Table 2 presents an overview of the readiness level for ESG reporting among key players in the sector, comprising both banks and insurance companies. Each institution's current engagement with ESG reporting is evaluated based on several criteria, including the availability of a dedicated website or microsite on ESG, the issuance of dedicated ESG reports for 2021 and 2022, and/or the inclusion of ESG topics in their Annual and Group ESG reports. Thus, this assessment evaluates their dedicated efforts toward ESG reporting through various means, including dedicated websites, reports, and group-specific initiatives.

Table 2. Readiness of Key Financial Services Sector Institutions in the CR for ESG Reporting

Name of Institution	**Dedicated website/ microsite on ESG reporting**	**Dedicated ESG Report 2021**	**Dedicated ESG Report 2022**	**ESG reporting as part of the '21 & '22 Annual reports**	**ESG reporting as part of the '21 & '22 Group ESG reports**	**Notes**
Banks						
ČS	Yes	Yes	Yes	N/A	N/A	
ČSOB	Yes	Yes	Yes	N/A	N/A	
Komerční banka	Yes	Yes	Yes	N/A	N/A	
Moneta Money Bank	Yes	Yes	Yes	N/A	N/A	
Raiffeisen bank	No	No	No	Yes	N/A	Published information in accordance with EU Taxonomy regulations
Fio Bank	No	No	No	No	N/A	
Airbank	No	No	No	Yes	N/A	
Unicredit Czech Republic and Slovakia	Yes	No	No	Yes	Yes	Published info in accordance with SFDR regulations
mBank	Yes	No	No	No	No	
Banka Creditas	Yes	No	No	No	No	

Insurance Companies						
Allianz pojišťovna, a.s.	Yes	No	No	Yes	Yes	Published documents in accordance with SFDR requirements
BNP Paribas Cardif, a.s.	As part of CSR Website	No	No	2021 No 2022 Yes	Yes	Published documents in accordance with SFDR requirements by the HQ
Uniqa pojišťovna	No	No	No	No	N/A	
Generali pojišťovna a.s.	Website on CSR and Sustainable Financing	No	No	No	N/A	Published documents in accordance with SFDR requirements
ČSOB pojišťovna, a.s.	No	No	No	N/A Annual reports not found	Yes	
Komerční pojišťovna, a.s.	No	No	No	N/A Annual reports not found	Yes	
Allianz pojišťovna, a.s.	Yes	No	No	Yes	Yes	Published documents in accordance with SFDR requirements
BNP Paribas Cardif, a.s.	As part of CSR Website	No	No	No	Yes	Published documents in accordance with SFDR requirements by the HQ (one paragraph)
Uniqa pojišťovna	No	No	No	No	Not found	
Generali pojišťovna a.s.	Web sections on CSR and Sustainable Financing	No	No	No	N/A	Published documents in accordance with SFDR requirements
ČSOB pojišťovna, a.s.	No	No	No	N/A Annual reports not found	Yes	

Komerční pojišťovna, a.s.	No	No	No	N/A Annual reports not found	Yes	
Allianz pojišťovna, a.s.	Yes	No	No	Yes	Yes	Published documents in accordance with SFDR requirements

Source: authors' own elaboration based on publicly available data

Notes:
1. The order of banks in Table 2 follows their ranking in terms of the number of clients – from the highest to the lowest
2. mBank has the status of a foreign branch of mBank Poland, a member of Commerzbank
3. For companies that have released a dedicated ESG report, we did not include this in the sections "ESG reporting as part of the '21 & '22 Annual reports" and "ESG reporting as part of the '21 & '22 Group ESG reports". Instead, we marked these sections as N/A.

The information in Table 2 provides a nuanced understanding of the disparate levels of preparedness among financial services institutions in the Czech Republic. While some entities, notably Moneta Money Bank and Komerční banka, are at the forefront of ESG reporting, others are in various stages of alignment with new and existing standards. It is evident that ESG reporting is becoming a priority, albeit at varying speeds, for institutions in this sector. As we proceed to delve into the case study of Moneta Money Bank, these comparative insights will offer a broader contextual understanding of excellence in ESG reporting.

5.2 Moneta Money Bank – a case study of excellence in ESG reporting

To identify a financial institution exemplifying best practices in non-financial reporting, the authors reviewed publicly available documents – such as annual reports, CSR reports, and sustainability reports – from more than twenty different organizations. Among these, Moneta Money Bank stood out as a paragon of excellence.

Moneta Money Bank stands out in the Czech financial landscape as a beacon of independent ESG reporting, unhindered by affiliations to international financial groups. Notably, its commitment to ESG principles was paved even before they became regulatory mandates, with active engagement since its 2016 debut on the Stock Exchange. Proudly serving 1.5 million clients, approximately 14.5% of the population of the Czech Republic, it ranks as the fourth-largest bank in terms of clientele and the sixth in managed assets. While its expansive reach spans over 22,000 shareholders across 40 countries, Moneta Money Bank retains its Czech roots, epitomized by its prestigious position on the Prague Stock Exchange's Prime Market. This study selects Moneta Money Bank's 2022 ESG non-financial reporting as a best practice benchmark, illustrating its remarkable equilibrium between short-term KPIs and long-term ESG ambitions.

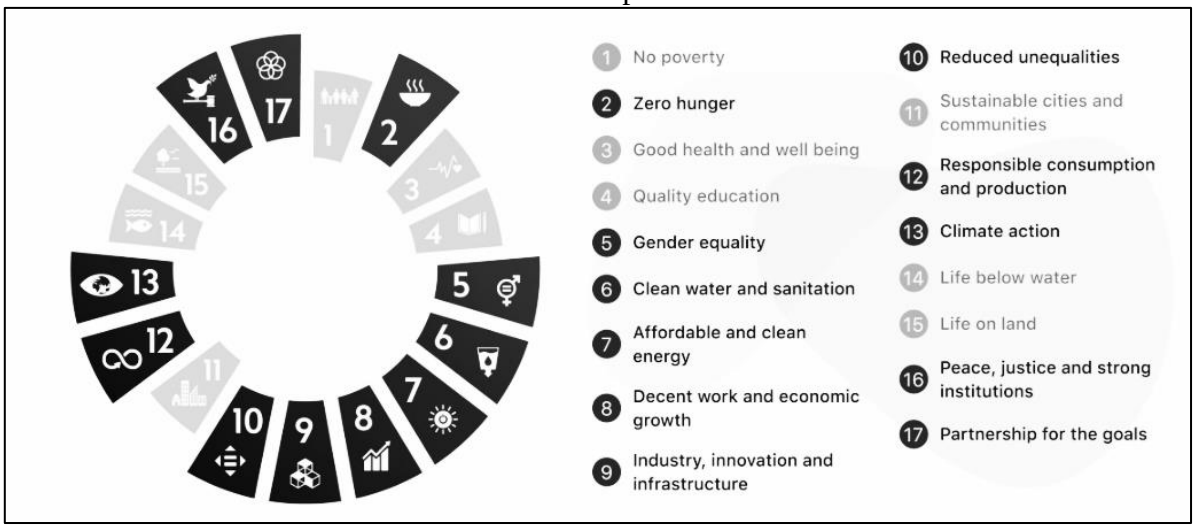
The selection of Moneta Money Bank (MMB) for this case study is underpinned by the bank's unmatched dedication to comprehensive Environmental, Social, and Governance (ESG) reporting within the Czech Republic's banking industry. According to their 2022 sustainability report, Moneta Money Bank not only complies with European regulations but also voluntarily embraces international standards and initiatives, such as TCFD recommendations, Principles for Responsible Banking, Women Empowerment Principles, and the Global Reporting Initiative (GRI).

Moneta Money Bank serves as an exemplary figure in the proactive management and reporting of sustainability efforts. Their outstanding approach has earned them high accolades in various sustainability indices, including MSCI, CDP, ISS, and FTSE4Good. Furthermore, their strategic focus on sustainability for the years 2021-2026 distinguishes them as a forward-thinking institution. Given these qualifications, a comprehensive case study on Moneta Money Bank could provide valuable insights and serve as an inspiration for other banks aiming to advance their sustainability initiatives.

5.2.1 Moneta Money Bank's ESG reporting – An in-depth analysis

Since 2016, MONETA Money Bank (MMB) has been diligently shaping its approach to ESG (Environmental, Social, and Governance) sustainability reporting. The bank took a significant step forward in 2021 by publishing its strategic document, the ESG Strategy of MONETA Group (Moneta Money Bank, 2021). Available to the public on a dedicated website, this comprehensive guide details 11 Sustainable Development Goals, showcasing MONETA Money Bank's strong commitment to ESG initiatives.

Figure 2. Eleven Sustainable Development Goals (SDGs) Most Relevant to the MONETA Group



Source: (Moneta Money Bank, 2021)

The document is not only specific but also articulately crafted, binding the institution to well-defined goals in the realm of ESG sustainability. Furthermore, its 2022 ESG reporting already incorporates the three new requirements introduced in the CSRD amendment compared to the current NFRD: information about the company's future objectives, a clear definition of its sustainability risk, and the acknowledgment of double materiality in sustainability reporting.

It is evident that MONETA Money Bank is making a concerted effort to align its key performance indicators (KPIs) with the broader ESG (Environmental, Social, Governance) areas, further mapping them to the Sustainable Development Goals (SDGs). This integrated approach signifies a strategic effort to not just 'check the box' on sustainability but to embed it deeply into the corporate structure. In this strategic document, we are introduced to the Moneta Money Bank's focal areas of sustainability, which include:

Environment

1. NET Carbon Neutral by 2026
2. Renewable Energy and Electric Car Fleet
3. Reduction of Water and Energy Consumption

Social

1. Women in Management
2. Gender Pay Gap
3. Employee Welfare and Philanthropy

Governance

1. Ethics and Values
2. Sustainability Committee
3. Risk and Lending Policies

After detailing its alignment with Sustainable Development Goals, it's imperative to understand how Moneta Money Bank perceives and integrates ESG risks into its broader strategy.

Moneta Money Bank recognizes **ESG risks** as factors that could adversely impact not only the bank but its counterparties — entities and individuals involved in financial transactions or contracts with the bank — and its assets. This recognition has led to a comprehensive analysis of these risks, which are then integrated into its ESG strategy. The report's ESG Strategy section emphasizes Risk Management Sustainability as a central pillar, together with Digital Capabilities and the Efficient Capital Strategy.

In line with **double materiality**, companies should reflect both on how sustainability influences their business and how their operations affect society and the environment. While the bank aligns its reporting with the Global Reporting Initiative (GRI) principles (showcasing the "outside-out" view), its 2022 Sustainability report also adopts the Sustainable Development Goals (SDGs) and the Task Force on Climate-related Financial Disclosures (TCFD) recommendations, highlighting the "outside-in" perspective.

Selecting goals that resonate with the management's priorities is already half the battle won in achieving sustainable success. When the management is genuinely invested in specific sustainability objectives, it energizes the entire organization and ensures a more focused and effective approach to achieving these goals.

Undoubtedly, MMB's early adoption of a well-defined ESG strategy, including targeted Sustainable Development Goals that align with the company's core values, has given it a notable competitive advantage. This proactive approach has not only enhanced their market position but also helped them earn a reputation as a leader in sustainable entrepreneurship.

However, introducing new reporting standards like the CSRD and ESRS could change the landscape considerably. While these new regulations aim to standardize ESG reporting, making it easier for investors to make comparisons, they also raise an important question: How can a company maintain its unique identity and stand out in an increasingly standardized environment? The ability of MMB to adapt its well-crafted strategies to these new requirements will be the next important milestone in its journey toward sustainable leadership.

The release of MONETA's 2022 Sustainability Report marks a successful first step in adapting to the changing landscape of ESG standards. Far from being a mere compilation of vision and mission statements, the report delves deeply into stakeholder engagement. Identifying a range of key stakeholders—from shareholders and regulators to local communities and the media—MONETA outlines a multi-faceted strategy for dialogue and reporting, thereby ensuring a broad yet focused approach to sustainability.

The report elaborates on the types of dialogues and channels used to interact with different stakeholder groups and the frequency of these interactions. Stakeholder engagement is organized meticulously, conducted through surveys, meetings, and transparent reporting that meets the requirements of the Global Reporting Initiative (GRI). The topics discussed include various areas, including Diversity & Equal Opportunities, Employment, GHG Emissions, and

Cyber Security, among others. Moreover, the report's structure aligns well with GRI guidelines, showing MONETA's commitment to internationally recognized reporting standards.

Additionally, MONETA emphasizes its core values and ethics as foundational elements of its corporate culture. These values are not mere words on paper; they are lived and breathed by every employee, from management to frontline staff. This unified commitment to values like Entrepreneurship, Respect, Cooperation and Engagement, Accountability, Credibility, and Integrity adds a unique depth to MONETA's ESG initiatives, setting a high bar for responsible corporate conduct.

As MONETA moves forward in its sustainability journey, the 2022 report sets a strong precedent for comprehensive, stakeholder focused ESG reporting. It is a blueprint for how the company engages with its stakeholders and the larger community. With this robust approach, MONETA is not only aligned with current standards but is also well-prepared to adapt to future requirements in the fast-evolving world of ESG and sustainability.

The Sustainability Report MONETA GROUP 2022 (Moneta Money Bank, 2022) represents a monumental first step in MONETA's ongoing journey towards sustainability and ESG (Environmental, Social, and Governance) goals. By concentrating on stakeholder engagement, the report provides a holistic picture of the bank's commitment to various interest groups—ranging from employees and clients to shareholders and regulators.

Stakeholder Engagement

A substantial section of the report is dedicated to stakeholder engagement, outlining the different methods of dialogue and channels of communication with each stakeholder group. This year, in line with the Global Reporting Initiative (GRI), the key areas of importance have been categorized into material topics such as Diversity & Equal Opportunities, Employment, GHG Emissions, Supplier Assessment, and more. A range of stakeholders, including employees, management, clients, and shareholders, are involved through various platforms such as surveys, meetings, and regular reports.

MONETA's Values and Ethics

The backbone of MONETA's culture and operations are its core values: Entrepreneurship, Respect, Cooperation and Engagement, Accountability, and Credibility and Integrity. The report emphasizes that these values are not mere words but guiding principles that are brought to life by each employee at MONETA.

Key Activities of 2022

Q1

Inclusion: Introduced read-aloud function in Internet Banka for the visually impaired.
Awards: Bagged four gold medals in the Finparáda 2021 competition.
Diversity: Improved position on the Bloomberg Gender Equality Index.
Philanthropy: Launched a Grant Programme focusing on climate protection and disadvantaged persons.

Q2

Sustainable Business: Initiated a shared ATM project with Komerční banka.
Philanthropy: Waived penalty fees for clients in arrears through the Summer of Grace II initiative.

Q3

Environmental Protection: Achieved a 76.3% reduction in direct CO2 emissions since 2016.

Governance: Became signatories to the UN Global Compact's Women's Empowerment Principles.

Q4
Awards: Ranked as the 6th TOP responsible large company in the Czech Republic.
Sustainable Finance: Introduced a "green loan" product for small entrepreneurs affected by rising energy costs.
By documenting these activities, MONETA is not only showcasing its achievements but also setting a precedent for accountability and future action.

The report serves as a specific and inspiring roadmap for the bank's sustainability vision, successfully integrating global standards like the UN Agenda for Sustainable Development 2030 and the Paris Agreement. With its new website dedicated to sustainability and ESG strategy, MONETA has set the stage for transparent and consistent communication with all stakeholders, reinforcing its commitment to a sustainable future.

5.2.2 Moneta Money Bank's ESG reporting – Implications

The commitment of MONETA Money Bank (MMB) to Environmental, Social, and Governance (ESG) reporting has several far-reaching implications for the institution, its stakeholders, and the industry at large:

Enhanced Transparency – With the implementation of comprehensive ESG reporting, MONETA improves its transparency, which is vital for winning stakeholder trust. This is particularly true for investors who increasingly prioritize ESG factors when making investment decisions.

Improved Stakeholder Relations – Systematic ESG reporting allows for a more structured dialogue with stakeholders. From employees to suppliers and from clients to shareholders, everyone involved gains a clearer understanding of the bank's goals and progress in areas like sustainability and social responsibility.

Regulatory Compliance – By issuing an annual sustainability report as a separate document, MONETA is already adhering to new EU requirements for mandatory ESG reporting. This proactive stance on regulatory compliance positions the bank as an industry leader and mitigates potential future risks associated with new ESG-related regulations.

Benchmarking & Competitive Advantage – High standards in ESG reporting provide benchmarks against which performance can be measured year-on-year, both internally and against industry peers. This is essential for continual improvement and could offer a competitive edge in the marketplace.

Long-term Value Creation – ESG initiatives are not just about "doing good"—they are also about long-term value creation. MONETA's focus on ESG aspects like financial inclusion, diversity, and environmental sustainability speaks to a strategic vision that recognizes the intrinsic link between social/environmental impact and long-term business success.

Employee Morale and Talent Attraction – MONETA's ESG efforts, especially in areas like diversity, inclusion, and philanthropy, can make the company more appealing as an employer, thus attracting high-quality talent and improving employee retention rates.

Risk Management – Identifying, assessing, and reporting on ESG issues can provide a nuanced understanding of the operational and strategic risks and opportunities that MONETA faces. Whether it's adapting to climate change or ensuring the equitable treatment of all employees, understanding these factors can help in formulating a more robust risk management strategy.

Reputational Benefits – Reputation is an invaluable asset in the highly-competitive finance industry, and a strong focus on ESG can significantly bolster MONETA's reputation among customers, partners, and regulators.

Innovation and Adaptability – The focus on sustainability often encourages innovation as companies look for ways to reduce their environmental impact or better serve their communities. For MONETA, this could take the form of new financial products aimed at underserved segments or more efficient, less resource-intensive operational methods.

5.2.3 Moneta Money Bank's ESG reporting – Conclusions

Moneta Money Bank's ESG reporting is more than just a regulatory requirement or a CSR activity; it's a strategic imperative for long-term sustainability and competitiveness. The implications are manifold and intersect various aspects of the business—from risk management and regulatory compliance to stakeholder engagement and brand value.

Through early preparation, well-thought-out strategies, and clear objectives, MMB's comprehensive ESG reporting serves as a springboard for the bank to not only become a leader in the sector but also to set an example for sustainable and responsible business practices for others to follow. In doing so, MONETA Money Bank positions itself as a brand leader that lights the way forward in the financial industry's adoption of ESG principles and practices.

5.3 Introducing BNP paribas cardif: a pillar in the financial services landscape

While Moneta Money Bank's ESG initiatives have been explored in detail in chapter 5.2, it's essential to also shed light on another influential player in the financial domain, BNP Paribas Cardif. This is especially relevant given the forthcoming semi-structured interviews with representatives from both institutions (see Chapter 5.4).

BNP Paribas Cardif, a significant entity in the insurance sector, possesses a rich heritage in the Czech Republic, with its roots dating back to 1996. Unique for its pioneering insurance product focused on the ability to fulfill financial obligations during unforeseen adversities, the company has evolved to offer a spectrum of insurance products, addressing a gamut of risks, from personal asset damages to long-term illnesses. Collaborating extensively with domestic and international financial entities, BNP Paribas Cardif is a testament to innovative insurance products, client-centricity, and strategic partnerships.

Despite lacking dedicated ESG reporting, the international BNP Paribas Group exhibits a well-articulated ESG strategy. With the group's commitment to a positive societal and environmental impact, BNP Paribas Cardif in the Czech Republic is well-positioned to navigate future ESG reporting intricacies, drawing upon its parent group's collective wisdom and resources.

5.4 Insights into ESG reporting: expert interviews with Moneta Money Bank and BNP paribas cardif

As we navigate through a pivotal moment where new standards for ESG reporting are being finalized and enacted, the authors had the unique opportunity to conduct in-depth, semi-structured interviews with representatives from two key financial institutions: Moneta Money Bank (MMB) and BNP Paribas Cardif Pojišťovna, a.s., an insurance company. These interviews aim to provide crucial insights into the existing landscape of ESG sustainability reporting. By incorporating these primary data sources, the study is enriched with first-hand perspectives from organizations that are actively participating in the shaping and compliance of emerging ESG reporting standards.

5.4.1 Expert Interview Design

The interviews were conducted in a semi-structured format, comprising 7 open-ended questions and 5 closed-ended questions. As is typical in such settings, some ad hoc questions naturally arose during the discussions. Due to the sensitive nature of the topics discussed, audio recording was not employed; instead, detailed notes were taken for further analysis and interpretation.

The set of questions covered a variety of topics, ranging from the current state and challenges of preparatory tasks for ESG sustainable reporting to issues of regulatory compliance and stakeholder engagement. In alignment with the semi-structured format, the interviewers aimed to create a comfortable and open atmosphere to encourage candid responses from the interviewees.

Given the limited scope of this article, the authors have chosen to focus on two key questions that best illustrate the current state of ESG preparedness within the interviewed organizations.

5.4.2 Moneta Money Bank – an expert interview details

Date of Expert Interview:	August 9, 2023
Duration of Expert Interview:	120 minutes
Interviewers:	authors of this study
Interviewee:	ESG Product Owner – responsible for ESG area coverage, sustainability reporting included (50% of a full-time position)

Selected questions, answers and commentaries

Q1: Does your company have a special document describing the company's ESG?

Interviewee's Answer

"I can recall the period following the COVID-19 pandemic, as it was when the decision to dive into ESG was made, and I had the incredible opportunity to be a part of it. A lot of developments were already underway at that moment. For instance, we had already begun waste sorting before it was regulated, effectively reducing the total waste output. Similarly, when it comes to water management, we opt for technologies that minimize water usage during our branch renovations. We have also transitioned to a fleet of electric vehicles to further our sustainability efforts."

Authors' Commentary

The company took a forward-thinking approach by addressing issues that were both urgent and aligned with ESG goals, even before these issues were widely recognized as ESG priorities. This proactive stance is exemplified by their early waste management initiatives, water conservation technologies in their branch renovations, and their transition to a fleet of electric vehicles.

Q2: How does the senior management of your company view all these activities, especially considering the fact that they entail costs?

Interviewee's Answer

"For example, our CEO was the one who initiated the transition to electric mobility. Not only is he enthusiastic about EVs, but he sees them as the future. Our top management is quite progressive and meets with investors frequently. Thanks to international examples, it has become clear that investors will be interested too, which adds to our attractiveness as Moneta Money Bank."

Authors' Commentary
The involvement and enthusiasm of senior management for ESG initiatives cannot be overstated. As the interviewee notes, the CEO's personal commitment to electromobility set the tone for the entire organization. This kind of leadership not only facilitates easier implementation of ESG strategies but also enhances the organization's attractiveness to investors. When senior management believes in and is actively involved in ESG initiatives, it significantly streamlines the process and contributes to the company's long-term success.

5.4.3 BNP Paribas Cardif Pojišťovna – an expert interview details

Date of Expert Interview:	August 18, 2023
Duration of Expert Interview:	120 minutes
Interviewers:	authors of this study
Interviewee:	Brand and Communication Manager for CEE & Senior Marketing Expert

Selected questions, answers and commentaries
Q1: Does your company have a special document describing the company's ESG?

Interviewee's Answer
"Yes, our company does have a special section within our Annual Financial Report that thoroughly outlines our approach to Environmental, Social, and Governance (ESG) issues. This section, called 'A Committed Bank: Information Concerning the Economic, Social, Civic and Environmental Responsibility of BNP Paribas,' provides a detailed account of our ESG strategies, commitments, and performance. It covers everything from our economic responsibilities to our commitments to social inclusion, environmental sustainability, and governance. We also have a third-party auditor verify our extra-financial performance statement to ensure transparency and accountability."

Authors' Commentary
While BNP Paribas Cardif currently doesn't issue a separate, detailed report focusing solely on its ESG initiatives, it does adhere to group-wide guidelines and communicates these initiatives through public relations activities and social media channels. This leads us to believe that the company possesses a robust foundation for future reporting in compliance with CSRD requirements. However, meeting these requirements will entail significant efforts in terms of data collection, processing, adjustment, and alignment with both the group's overarching reports and relevant legislative norms. Nevertheless, based on our recent interviews, we are optimistic that substantial support from the group's headquarters—armed with the requisite knowledge, skills, and resources—will facilitate a smooth transition and effective preparation for BNP Paribas Cardif's ESG non-financial reporting.

Q2: Do you have a dedicated position or team specifically focused on addressing ESG issues?

Interviewee's Answer
"No, BNP Paribas Cardif in the Czech Republic does not have a team specifically dedicated to ESG matters. However, our headquarters has taken significant steps in this direction. In February 2022, they established an 'Impact and Innovation' department, which reports directly to a member of the Executive Committee responsible for CSR/ESG initiatives. This department coordinates and defines the company's impact strategy, overseeing all ESG-related projects across different business lines and

countries within the group. Their role is crucial for creating synergies and scaling these initiatives, all while operating under a well-defined governance framework."

Authors' Commentary
While the establishment of the "Impact and Innovation" department is a commendable step, it's worth noting that as ESG reporting becomes increasingly mandated and scrutinized, merely having a specialized department may not be enough. There may be a need to expand these efforts to include dedicated ESG teams across various business lines and geographical locations, particularly in the Czech Republic operations. This is essential for a more granular focus on localized ESG issues and for complying with region-specific regulatory requirements. Doing so would also facilitate the data collection and analysis processes, which are crucial for transparent and effective ESG reporting.

5.4.4 Expert interviews – conclusion

In conclusion, the authors would like to emphasize that the incorporation of selected questions from expert interviews has enriched our study with an authentic perspective. This will significantly contribute to the overall rigor and credibility of our findings. The methodology used provides a nuanced understanding of the current landscape of ESG initiatives and reporting within the financial services sector. These expert interviews offer invaluable, first-hand insights into how companies are orchestrating their internal ESG strategies, and they shed light on both the challenges and opportunities ahead. This unique input adds a new layer of depth to our understanding and fortifies the recommendations and strategies we put forth for enhancing ESG compliance and performance moving forward.

6. DISCUSSION AND FURTHER RESEARCH DIRECTIONS

This chapter delves into an in-depth discussion of our key findings, draws implications from these observations, acknowledges the inherent challenges and limitations of our study, and provides directions for future research. The insights drawn from Moneta Money Bank's ESG practices serve as a foundation for understanding broader implications in a rapidly evolving regulatory landscape.

Our analysis highlights key trends in regulatory evolution, standardization, and practical implementation in the domain of ESG reporting. Moneta Money Bank serves as a progressive example, demonstrating that financial institutions can excel in ESG reporting regardless of the current maturity stage of non-financial disclosure in the industry.

Moneta Bank emerges as a best practice example in ESG reporting, setting a high bar for excellence and transparency. Its well-crafted report together with a dedicated website not only complies with emerging standards but also goes beyond, providing a model that could be adopted across sectors and geographies. The lessons from Moneta Bank demonstrate that strong leadership, a dedicated internal ESG team, and foresight in management can combine to produce exemplary ESG reporting, irrespective of the industry or region.

Regardless of the current state of non-financial reporting, our study underscores the possibility of achieving excellence in this field. Financial institutions, endowed with considerable resources, have the capacity to attract top talent and assemble specialized ESG teams. With forward-thinking management, they can produce exemplary ESG sustainability reports that serve as a benchmark for the industry.

The authors are fully aware of the limitations inherent in this research. First, the subjectivity involved in defining "excellence" in ESG reporting is a challenge that requires further examination by the scientific community. Second, the single-case focus on Moneta

Money Bank narrows the scope of our analysis and may introduce observer bias, potentially skewing data in support of our thesis. This is an area calling for further, financially well-supported research within a broader project. Nonetheless, it is worth having a progressive example. Finally, the intrinsic subjectivity of case study methods may affect the objectivity of our findings, given that different stakeholders might interpret ESG excellence in various ways. Despite these limitations, the study provides valuable insights and serves as a stepping stone for future research in the field of ESG reporting.

While this study serves as an initial step, there are avenues for future research that are calling for further exploration. These could include more comprehensive, financially supported projects that expand the scope beyond a single case study. Additionally, there is a pressing need to make examples of good practice in ESG reporting more accessible and barrier-free. Such transparency not only serves as an educational tool but also acts as a catalyst for the widespread adoption of robust ESG standards. In doing so, it not only influences the immediate financial landscape but also has far-reaching implications for the future of our planet.

While our study focuses on a single-case example with Moneta Money Bank, the lessons are particularly timely and carry broader implications. With the new EU Directive having come into force in January 2023 and the final version of the ESG standards still pending, the financial industry is at a crossroads. Moneta Money Bank serves not merely as an isolated example but as a springboard for how to excel in ESG reporting during these transitional times. Though caution should be exercised in generalizing from a single case, the urgency of the current regulatory landscape demands actionable insights. We believe that Moneta's practices offer such insights and should be considered as a reference point for organizations navigating the early stages of new ESG regulations. We cannot afford to wait; the time for action is now.

7. CONCLUSION

As we stand on the threshold of a new era of non-financial reporting, this study serves as both a cautionary tale and an optimistic roadmap. Our investigation into Moneta Money Bank's ESG reporting practices shows that, even amidst a turbulent regulatory landscape, it's possible to produce exemplary ESG sustainability reports. In contrast, BNP Paribas has begun to take foundational steps in the same direction, even if they have yet to publish a dedicated ESG report.

Specifically, BNP Paribas' establishment of an "Impact and Innovation" department signals a commitment to ESG challenges, setting the stage for future reporting in compliance with new CSRD norms. Their proactive approach serves as an example for other financial institutions that are just beginning their journey toward full ESG disclosure.

The narrative today extends beyond financial metrics to encompass sustainable development and corporate social responsibility. This transition to more holistic reporting is articulated through compelling stories that humanize data. We invite regulatory bodies, academic researchers, and corporate practitioners to participate in this unfolding story—a story that will not only reshape financial markets but also determine the sustainability of our planet for generations to come.

Two additional crucial points emerge from our investigation. Firstly, companies that are already under current EU non-financial reporting regulations, like BNP Paribas Cardif, possess a head start. They have acquired the know-how for collecting the necessary data and preparing reports, offering them a distinct advantage as the new standards under the CSRD norm are introduced. While this advantage is largely speculative at this point, it sets a foundation for future research, particularly as new ESG reports for 2024 and 2025 emerge.

Secondly, both Moneta Money Bank and BNP Paribas have shown that early engagement in ESG reporting helps effectively communicate their goals and actions towards

sustainability to a broader audience, including employees, investors, customers, and other stakeholders. This does more than fulfill a regulatory requirement; it enriches the company's brand, enhances its reputation, and can have a significant impact on its overall performance.

While we acknowledge the limitations inherent in our dual-case study approach, the insights gleaned offer invaluable perspectives that can guide future research and policy formulation. We can't afford to be spectators in this critical journey. We can't wait; we have to act. Examining both Moneta Money Bank, which has already published an exemplary ESG report, and BNP Paribas Cardif, which is in the early stages of building its ESG strategy, provides a comprehensive view of the spectrum of ESG readiness within the financial sector.

Echoing our central theme of transitioning "from numbers to narratives," this study emerges as a pertinent reference as the EU finalizes its newest Directive. We probe the trajectory towards a future where standardized non-financial reporting transcends legal obligations to become a social imperative.

BIBLIOGRAPHY

Carbon, T. I. (2023, April 18). *Double Materiality: What It Is and Why It Matters for Your Business*. IRIS CARBON®. https://iriscarbon.com/double-materiality-what-it-is-and-why-it-matters-for-your-business/

Delgado-Ceballos, J., Ortiz-De-Mandojana, N., Antolín-López, R., & Montiel, I. (2023). Connecting the Sustainable Development Goals to firm-level sustainability and ESG factors: The need for double materiality. *BRQ Business Research Quarterly*, *26*(1), 2–10. https://doi.org/10.1177/23409444221140919

Deloitte. (2017). *Non-financial and integrated reporting Real value, real cost, real profit*. https://www2.deloitte.com/content/dam/Deloitte/cz/Documents/risk/en-non-financial-and-integrated-reporting.pdf

European Commission. (2022). *Corporate Sustainability Reporting Directive* [Text]. European Commission - European Commission. https://ec.europa.eu/commission/presscorner/detail/en/speech_22_6747

European Commission. (2023, July 7). *European Commission—Have your say* [Text]. European Commission – Have Your Say. https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13765-European-sustainability-reporting-standards-first-set_en

Gelb, J., McCarthy, R., Rehm, W., & Voronin, A. (2023, Sep 15). Investors want to hear from companies about the value of sustainability. *McKinsey & Comp.* https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/investors-want-to-hear-from-companies-about-the-value-of-sustainability?cid=other-eml-dre-mip-mck&hlkid=8524260e59d14590b1e0fff20497d1ad&hctky=11311789&hdpid=977ed115-f5e9-4094-b86d-c5a83c746984

Moneta Money Bank. (2021). *We grow sustainably*. Moneta ESG. https://www.moneta.cz/homepage

Moneta Money Bank. (2022). *Moneta ESG | MONETA Money Bank*. Moneta ESG. https://esg.moneta.cz/documents

Sellar, P., McElwee, G., Raedschelders, L., & Vandorpe, W. (2023). *The EU's Corporate Sustainability Reporting Directive (CSRD): What you need to know*. Fieldfisher. https://www.fieldfisher.com/en/locations/belgium/insights/the-eus-corporate-sustainability-reporting-directive-csrd-what-you-need-to-know

Stolowy, H., & Paugam, L. (2018). The expansion of non-financial reporting: An exploratory study. *Accounting and Business Research*, *48*(5), 525–548. https://doi.org/10.1080/00014788.2018.1470141

Suter, W. (2012). *Introduction to Educational Research: A Critical Thinking Approach*. SAGE Publications, Inc. https://doi.org/10.4135/9781483384443

ANALYSING FINANCIAL LITERACY ACROSS DIVERSE SCHOOL LEVELS AND REGIONAL SETTINGS: A QUANTITATIVE STUDY

Irena JINDŘICHOVSKÁ, Dana KUBÍČKOVÁ
Metropolitan University Prague, Czech Republic
irena.jindrichovska@mup.cz, dana.kubickova@mup.cz

Marie FIŠEROVÁ
Prague University of Economics and Business, Czech Republic
fiserova@vse.cz

Abstract:
***Idea**: Financial literacy refers to the knowledge and understanding of various financial concepts that enable individuals to make informed and responsible decisions about their money. It encompasses a wide range of topics, including budgeting, saving, investing, debt management, and more.*
***Data and Tools:** To achieve our research goal, we used a diverse set of data that includes information from different types of schools and in different locations in the Czech Republic. We collected this data by giving a structured questionnaire to a group of people, which helped us learn about their financial knowledge and how they make economic decisions. We are using numbers and statistics to study how financial knowledge relates to the type of school people attend and where they live. This will help us understand how knowing about money affects how people save, invest, and handle debt.*
***What's new:** This research contributes to the existing literature by comprehensively analysing the correlation between financial literacy and economic behaviour in different regions and specifics in the evolution of financial views in the period of primary school to college. Although the previous studies have explored similar themes, this paper advances the understanding by utilizing a large and diverse dataset, employing statistical techniques, and focusing on a broader range of economic habits. Moreover, the study investigates the potential moderating effects of demographic factors, adding depth to the findings.*
***Contribution:** The findings of this study may have significant implications for policymakers, educators, and financial institutions. By highlighting the positive impact of financial literacy on economic decision-making, the research advocates for targeted financial education programs, including online programs targeted to enhance overall financial well-being and reduce economic vulnerabilities. Understanding the factors that influence economic behaviour is crucial for designing effective interventions and promoting a financially savvy society.*
***Limitations:** Despite its contributions, this research is not without limitations. Firstly, the data is based on self-reported financial literacy levels, which may introduce response bias. Additionally, the cross-sectional nature of the data limits the ability to establish causality definitively. Furthermore, while efforts have been made to include diverse demographics, the study's sample may not fully represent all segments of the population. Nonetheless, this research lays a solid foundation for future studies to further explore and address these limitations.*
***Conclusion:** In addition, this research incorporates a questionnaire-based study, gathering insights from a diverse sample of individuals regarding their financial knowledge, attitudes, and behaviours. The questionnaire aims to assess the level of financial literacy among participants and identify potential gaps and areas for improvement. The conclusion of the work is devoted to proposals and recommendations that would support financial literacy in the Czech Republic*

Keywords: *behavioural economics, digital tools, education programs, financial literacy, questionnaire research, responsible financial products, savings culture*

1. INTRODUCTION

Financial literacy is an essential life skill that empowers individuals, especially young people, to navigate the intricacies of personal finance, make informed decisions, and secure their financial futures. In the Czech Republic, a country undergoing rapid economic and technological changes, equipping young citizens with strong financial knowledge and skills is paramount. This conference paper delves into the specific realm of financial literacy among young people in the Czech Republic, examining the current landscape, identifying challenges unique to this demographic, exploring existing strategies for improvement, and proposing innovative avenues for future development.

By analysing existing empirical research, surveys, and data sources, we aim to provide a comprehensive overview of the financial literacy landscape in the Czech Republic. Additionally, we will explore the effectiveness of current financial education initiatives and programs implemented by governmental agencies, educational institutions, and non-profit organizations. This analysis will be instrumental in identifying successful approaches and best practices that can be used to enhance the level of financial literacy levels across the nation.

Government institutions, non-profit organizations as well as financial and other bodies have been paying intensive attention to the financial literacy of the population for several decades. These activities are effective and partially effective. However, the conditions in which people live, young, middle, and older generations, are rapidly changing. Extensive research that was carried out by Czech and international institutions (OECD) twelve or seven years ago speaks of conditions that are already a thing of the past. The number of financial products, their complexity, including the technologies that make these products available to everyone at any time.

Most products can be ordered from anywhere, payment cards are increasingly used exclusively for payment, which can also be stored in a mobile phone, and almost every bank can provide its clients with mobile or internet banking. The age limit for the availability of these tools is decreasing, people always have the state of their finances at hand, but access to additional financial resources (loans).

Although these technologies are very beneficial, they also carry with them – especially for younger users – certain risks: in addition to e.g., loss of personal data, there are pharming, fishing, lack of information, experience, etc. Problems are also encountered by the older generation, who are often unable to control new technologies. On the other hand, these technologies are also a suitable means of financial education.

On the other view, the age limit for the availability of these tools is decreasing, people always have the state of their finances at hand, but access to additional financial resources (loans). Although these technologies are very beneficial, they also carry with them – especially for younger users – certain risks: in addition to e.g., loss of personal data, there are pharming, fishing, lack of information, experience, etc. Problems are also encountered by the older generation, who are often unable to control new technologies. On the other hand, these technologies are also a suitable means of financial education.

This significantly changes the environment in which especially the young generation finds itself and perceives it as an obvious part of everyday life. However, these new parameters do not yet correspond to the knowledge equipment and awareness of their nature and possible risks, or their adequate increase compared to the previously identified – and already relatively low – level of financial literacy. This shift in technologies, or in the availability of increasingly complex products, including extensive marketing support, on the one hand, brings increased demands on financial knowledge (or financial literacy), on the other hand, in the growing risk of incorrect and hasty decisions.

Thus, in this research, we focused on whether and how the level of financial literacy develops in the system of three levels of schools: primary, secondary and universities and colleges, and whether there are differences in the approach to financial decisions between individual regions in the Czech Republic and between individual fields of study. Following on from previous research, we focused on three areas of financial literacy: personal finance, banking services, and investments.

Methodologically, we use a purposive sampling approach in this paper to ensure a diverse representation of young people across different educational levels and socio-economic backgrounds/regions. The survey is administered through online platforms, and educational institutions, to reach a broad spectrum of respondents.

2. PREVIOUS LITERATURE

In recent years, several authors have delved into the field of financial literacy, with a particular focus on its key influences on individuals' financial knowledge and behaviour. For instance, Koskelainen et al. (2023) conducted a study investigating the impact of digitalization on people's financial literacy and financial capabilities. Their research identified three critical intersections between finance and digitalization:

2. *Fintech Evolution:* Over the last few decades, information technology has transformed the financial industry. Notably, IT giants like Amazon, Google, and Apple have ventured into finance, offering innovative financial products and services as integral components of their business strategies.
3. *Digital Environment's Influence on Financial Behaviour:* The digital revolution is reshaping the landscape of financial services. Individuals must acquire new skills and update their financial literacy to effectively manage their finances in this evolving digital environment.
4. *Behavioural Interventions*: In this context, the authors stress the importance of enhancing financial and digital literacy education to help individuals navigate this changing financial world successfully.

Additionally, a significant aspect of the discussion revolves around the measurement of financial literacy itself. Rieger (2020) addresses this concern by evaluating the informativeness of various methods used to measure financial literacy. The author notes that while common methods are generally informative, they may not always be so. Based on the analysis, a combination of two methods emerges as the most effective approach. This entails integrating elements from the two selected measurement approaches that best represent financial literacy. Rieger recommends employing a concise (six-item) and robust scale, which has demonstrated considerable predictive power concerning individuals' actual financial behaviour and attitudes. Other authors (Fong et al., 2021) try to fill the gap in the measurement of financial literacy among older people (in Singapore's Life Panels). They explore the correlation of financial literacy levels with timely repayment of credit card debt, stock market participation, and age-based diversification of investment risk. Most of their older respondents understand interest rates and inflation, but less than half know about risk diversification. Almost all older credit card holders pay off their balances on time, but only 40% hold shares. Less than 18% with assets of $1000+ hold portfolios in line with age-appropriate investment rolling paths. This paper examined the financial behaviour of older people (50–70 years) and examined the role of financial literacy as a predictor of practices generally recommended as protection against financial distress. It found that 92% of older Singapore credit card holders always paid off their credit card balances on time for 24 months, and 42% participated in the stock market.

Many authors emphasize the significant influence that education has on the level of financial literacy. Some mention that, in addition to formal education, non-formal education plays an important role, which can also lead to informal education for individuals, among other things. Xu et al. (2023) published the results of research that tested the impact of financial literacy on poverty reduction in rural households. The main findings of the thesis can be summarized in three points. (1) Financial literacy has current and long-term effects on poverty reduction in rural households. (2) Low levels of education significantly hinder families from achieving poverty reduction. Financial literacy and education have an important complementary effect on reducing poverty in rural households. Indeed, this result indicates the difference between financial literacy and knowledge acquired through education, since financial literacy is a type of expertise that differs from comprehensive knowledge acquired through education. (3) Financial education can significantly improve the financial literacy of households and effectively increase the current, long-term, and dynamic impact on improving the condition of rural households in poverty reduction.

Similarly, Hasan and Hoque (2021) find that financial literacy is one of the main factors influencing the ability to access financial services in rural areas. The authors emphasize that a comprehensive and long-term educational program should be widely provided to the rural population, thereby taking a big step towards reducing poverty and prosperity.

Education therefore has a significant impact on financial literacy. This education is discussed in the article by Králová and Kropáč (2020). Their contribution deals with the teaching of financial literacy to secondary schools. Financial literacy is an important part of economic literacy. The text shows what content of the curriculum in secondary school teaching needs to be paid more attention to and how to process the curriculum best methodically. In addition, the paper deals with whether the teaching of financial literacy corresponds to current world trends and whether it is provided sufficiently. At the end of the paper, the possibilities of solving the mentioned problems are indicated. The article mentions, among other things, the PISA financial literacy survey in 2012, which was conducted in 18 countries. The Czech Republic ranked 6th above the OECD average. However, there was a very significant difference between pupils of multi-year grammar schools on the one hand and pupils of vocational schools on the other. Further investigations are also being carried out by the Czech Banking Association (CBA). In 2019, the financial literacy index was measured, which reached 57% in the Czech Republic, which was 1% more than in 2018. The large difference in knowledge between people is due to different levels of education.

The current press release of the Czech Banking Association (Česká bankovní asociace, 2023) states that the financial literacy index is stable (56 points). However, when compared with the previous data, we see a slight decrease. It is more common to transfer funds to advantageous savings accounts or investments. Education plays a big role in the level of financial literacy. People with primary education often do not know what to do with their finances. Six out of ten Czechs put money aside, 43% save for old age, and the financial reserve would most often last 3 months.

The level of financial literacy of secondary school students in Poland is examined in another study (Swiecka et al., 2020). The study was conducted with a large sample of high school students with an average age of 15–16 years. The results of the research showed a good and partly very good level of financial knowledge of young people in Poland. 45.3% received an average level score and 43.8% achieved a high-level score in financial knowledge. This result shows that they can be rational in their financial decisions. However, although it is understood that gender has an influence on financial behaviour and the use of financial instruments, gender does not make any difference in the level of financial knowledge.

3. METHODOLOGY

The research method is based on a questionnaire survey. This investigation was targeted at the last years of three levels of schools, i.e., primary schools, secondary schools, and universities and colleges, in all territorial regions of the Czech Republic, i.e., in 14 regions. The subject structure of secondary schools and universities was not specifically monitored, data from all regions have a comparable structure. Structure of respondents – see Table 1.

Table 1. Structure of respondents

Region / Type of School	Prague	Central Bohemia	South Bohemia	Region Plzeň	Region Karlovy Vary	Region Ústí nad Labem	Region Liberec	Region Hradec Králove	Region Pardubice	Region Vysočina	Region South Moravia	Region Zlín	Region Olomouc	Region Moravo-Silesia	Total	
															Abs.	*%*
Primary	61	42	24	22	18	36	33	28	31	33	26	32	12	13	*411*	*33%*
Secondary	55	34	17	22	18	23	24	23	21	19	42	21	16	18	*353*	*28%*
Uni/Coll.	88	57	29	37	27	36	33	14	24	17	47	15	24	39	*487*	*39%*
Total	*204*	*133*	*70*	*81*	*63*	*95*	*90*	*65*	*76*	*69*	*115*	*68*	*52*	*70*	*1251*	*100%*

Source: own investigation

The questionnaire was structured for all school levels into three areas: personal finance, banking products and services, and investments. The questions and tasks in individual areas were identical in content for all levels of school, only the formulation was adapted to the level of students. The content and formulation of the questions and tasks were based on the financial literacy research conducted by the Ministry of Finance of the Czech Republic in 2020 [1] and on previous research conducted in the Czech Republic (Kubíčková, Nulíček, 2020; Belás et al., 2016).

In this article, we will present the survey results only on selected questions and tasks. The selection was motivated by the aim of this study.

4. FINDINGS

In the first part of the questionnaire, we investigated the general approach to finance. This area was investigated by three questions in the questionnaire. Here we present the answers to the question that investigated whether students try to save, i.e., the awareness and willingness to postpone current consumption for the future:

1. Are you trying to save?
- *a. Yes, a little*
- *b. I would like to, but I don't have enough funds.*
- *c. I don't save money.*

The results are shown in Table 2.

[1] Results of measurement of financial literacy 2020. Available at: https://financnigramotnost.mfcr.cz/cs/pro-odborniky/mereni-urovne-financni-gramotnosti/2020/vysledky-mereni-financni-gramotnosti-20-3286. Online 21.4.2023

Table 2. Answers to the question 1: breakdown by school level.

	No of respondents	Yes	I would like to, but I don't have enough funds	I do not save
Primary	*411*	25%	29%	46%
Secondary	*353*	27%	41%	32%
Uni/Coll.	*487*	67%	12%	21% (10%)*)

*) *"I can borrow".*

Source: own investigation

The resulting frequencies of answers from the respondents indicate both the rate/relation to savings and the shift about savings depending on age: the tendency to save clearly increases from primary school to secondary school and shows the highest frequency at university. This can be explained, among other things, by the availability of funds that should be saved, however, it can be assumed that even in the last year of elementary school, students usually have some form of pocket money. And they can do with it as they see fit – 25% is kept for future use. This can be considered a relatively low proportion. The share of secondary school students is increasing slightly, however, at the same time there is a significant increase in those who think about saving but do not have the means. However, the effort to save money for future needs is higher in high school. And the highest is at university, where there is a significant decrease in those who want to save, but do not have the means. However, there is still a high proportion of those who do not save here.

In a follow-up part (question), it was ascertained whether students have experience with obtaining funds through a loan and with the position of a borrower. One of the questions was focused on whether they had ever borrowed money and, if so, from whom. We also included this question for primary schools, with the understanding that even children of this age can encounter this solution in the form of loans from their parents or friends:

2. Have you ever borrowed money? a) yes b) no

Our findings are in Table 3.

Table 3. Experience with borrowing money for individual school levels and regions

Region / School	Prague	Central Bohemia	South Bohemia	Region Plzeň	Region Karlovy Vary	Region Ústí nad Labem	Region Liberec	Region Hradec Králové	Region Pardubice	Region Vysočina	Region South Moravia	Region Zlín	Region Olomouc	Region Moravo-Silesia	Total %
Elementary	15%	21%	71%	59%	44%	100%	82%	82%	84%	100%	100%	72%	100%	100%	*65%*
Secondary	68%	76%	76%	78%	72%	73%	75%	75%	62%	65%	76%	67%	75%	78%	*72%*
College	76%	74%	55%	68%	67%	69%	70%	70%	54%	53%	62%	73%	67%	38%	*65%*

Source: own investigation

Although the fact that in some regions every primary school student has experienced borrowing funds may seem strange, it can be explained by the fact that the students do not/cannot have income other than from their parents and that they borrow from them. The family's experience

with loans is also hidden here – and this may also explain the fact that in some regions the experience with loans is high (100%).

In the following part of the questionnaire, we investigated how are students prepared to use financial resources. One of the questions was focused on the perception of the investment process. In the first part, we have asked how they perceive the investments or what they understand by investing. Considering the relative difficulty, the question was included in the questionnaire for secondary schools and universities only. The resulting answers and their frequency according to both levels of schools and according to regions are presented in Table 4.

Table 4. Comparison of answers from secondary schools and universities sorted by region to the question: What does investing mean?

	Secondary school			**University/college**		
	Appreciation of funds	Future revenues /income	Risk/fear of losses	Appreciation of funds	Future revenues /income	Risk/ fear of losses
Prague	16%	60%	24%	43%	22%	35%
Central Bohemia	18%	58%	24%	44%	23%	33%
South Bohemia	24%	58%	18%	38%	31%	31%
Region Plzeň	14%	59%	27%	32%	16%	51%
Region Karlovy Vary	11%	72%	17%	48%	7%	44%
Region Ústí nad Labem	13%	65%	22%	47%	22%	31%
Region Liberec	13%	66%	21%	61%	9%	30%
Region Hradec Králové	17%	61%	22%	50%	14%	36%
Region Pardubice	14%	62%	24%	58%	17%	25%
Region Vysočina	16%	68%	16%	65%	12%	24%
Region South Moravia	14%	67%	19%	32%	23%	45%
Region Zlín	10%	76%	14%	60%	13%	27%
Region Olomouc	19%	56%	25%	54%	29%	17%
Region Moravo-Silesia	11%	72%	17%	13%	10%	77%

Source: own investigation

The results show that the majority of secondary school students understand investment as future income or profit, less so as the appreciation of invested funds. And only a small part of the respondents is aware of the risk associated with the investment. The situation is the same for secondary schools in all regions, there are greater differences between regions in the case of universities. Most understand the investment correctly as an appreciation of funds or future income, however, differences in the perception of risks differ significantly between regions (17% in Olomouc, 77% in the Moravian-Silesian Region).

In the following Tables 5 and 6, the results from secondary schools and universities are organized by field of study.

Table 5. Comparison of secondary school respondents answering the question "What is the meaning of investing?" organized by the field of study

Field of study	*No of respondents*	Appreciation of funds	Future revenues /income	Risky manipulation with finance
Economics and Business	*55*	22%	60%	18%
Business Academy	*48*	19%	64%	17%
Secondary vocational school	*73*	15%	66%	19%
Gymnasium	*124*	17%	64%	19%
Pedagogy	*10*	20%	50%	30%
Hospitality and tourism	*43*	7%	56%	37%

Source: own investigation
Note: the highest values are highlighted in gray

Table 6. Comparison of university respondents answering the question "What is the meaning of investing" organized by the field of study

Field of study	*No of respondents*	Appreciation of funds	Future revenues /income	Risky manipulation with finance
Banking and finance	*47*	40%	17%	43%
Hospitality and tourism	*28*	75%	4%	21%
Economics	*58*	33%	16%	51%
Philosophy	*35*	57%	32%	11%
IT	*44*	32%	27%	41%
Medicine and Pharmacy	*38*	39%	8%	53%
Management	*45*	38%	18%	44%
Marketing	*41*	34%	2%	64%
Business Academy	*32*	41%	19%	40%
Law	*40*	42%	30%	28%
Pedagogy	*37*	41%	40%	19%
Journalism	*42*	62%	14%	24%

Source: own investigation
Note: Note: the highest values are highlighted in gray

The results provide an interesting overview and interdisciplinary comparison (see highlighted values). The largest share of answers in the form of the importance of investments, mainly for the evaluation of resources, appears in the field of Hospitality and Tourism, while as a source of future income, it is evaluated mainly in the field of Pedagogy, Students of Marketing and Medicine and Pharmacy, as well as Economics, perceive the risk associated with investments the most – for these three, this answer is found in more than half of the students.

The questionnaire also contained sub-tasks that required certain knowledge or mathematical knowledge/experience, for which the resulting answers could be scored as correct or incorrect (they had to estimate the average mortgage payment or by what amount of funds the mortgage would be overpaid). The proportion of correct answers according to individual grades of schools is shown in Table 7.

Table 7. Percentage of correct answers to selected questions in the different level of schools

	Primary schools	Secondary schools	University/College
Share of correct answers to selected questions (in %)	44%	42%	45%

Source: own investigation

The responses yielded an interesting finding: the proportion of correct judgments was essentially the same at all school levels, with the difference that the lowest value was reached in secondary school.

Family background has a great influence on the relationships of young people. That is why we included the question "Do you talk about money at home and how to work with money?".

Table 8. Answers to the question:
"Do you talk about money at home and how to work with money?"

	Yes	Yes, we speak about money, but not how to work with it	No
Primary school	8%	45%	47%
Secondary schools	13%	41%	46%
University/College	44%	36%	20%

Source: own investigation

The results are again interesting, especially the share of negative answers. This decreases with the increasing age of students, however, even in the case of university, 20% of negative answers were found.

When analyzing the results, we also focused on the question of whether the results differ in individual fields of study, or in individual regions. To answer the first question, we compared the results of students of two selected fields, namely Grammar school and specialized school on Economics and Business. We assumed that Grammar school students have a higher level of financial literacy compared to Economics and Business majors. The results were compared in the points-rated questions, i.e., in questions 4, 6, 9, 10, 11, 12, 13, and 14.

Table 9. Success rate for Grammar School and Economics and Business Majors

Questions	Grammar school	Economics and Business majors
Question No 4	12%	20%
Question No 6	23%	47%
Question No 9	21%	25%
Question No 10	49%	10%
Question No 11	74%	49%
Question No 12	34%	38%
Question No 13	85%	96%
Question No 14	67%	64%
Average	*46%*	*44%*

Source: own investigation

Paired Two Sample t-test on means was used for comparison. The percentage of success in these questions at the Grammar School and in the study field of Economics and Business is shown in Table No. 9. The level of significance is set at 5%. The critical value was determined

according to the table Critical values for the Wilcoxon test, namely for n 13, where the critical value is set at 17.2.

Table 10 shows the calculation of the t-test. The result shows that the p-value is 0.79, which is higher at the 5% significance level than the t-test value for the appropriate sets. This means that the results in the field of economics and business differ from the results in gymnasiums. Which complements the results in Table 9.

Table 10. t-Test results

Paired Two Sample t-test on means

	Grammar School	**Economics and Business Majors**
Mean	0.45625	0.43625
Variance	0.074398214	0.075226786
Observations	8	8
Pearson Correlation	0.721600753	
df	7	
t Stat	0.277159806	
P(T<=t) one-tail	0.394831827	
t Critical one-tail	1.894578605	
P(T<=t) two-tail	0.789663654	
t Critical two-tail	2364624252	

Source: own investigation

The result shows that the p-value was 0.79, which is higher at the 5% level of significance than the t-test value for identical sets. This means that the results in the fields of Economics and Business are different from the results in Grammar schools.

We also focused on whether the level of financial literacy differs depending on the region. For this purpose, we chose the Prague region, where specific conditions can be assumed, and the South Moravian region. The choice of the second region was completely random, it was not based on any criteria. Results were compared in scored tasks, the same as for conformity assessment in selected fields. The achieved results – shares of correct answers of university students in the two regions are shown in Table 11.

Table 11. Success rate in the Prague region and in the South Moravian region

Question	Prague region	South-Moravian region
Question No 4	64%	45%
Question No 6	68%	74%
Question No 7	75%	43%
Question No 8	18%	6%
Question No 9	48%	23%
Question No 13	69%	55%
Average	*43%*	*31%*

Source: own investigation

Table 12. t-Test results
Paired Two Sample t-test on means

	Variable 1	*Variable 2*
Mean	0.57	0.41
Variance	0.0448	0.05708
Observations	6	6
Pearson Correlation	0.839255867	
Hypothesized Mean Difference	0	
df	5	
t Stat	3.005876597	
P(T<=t) one-tail	0.014948385	
t Critical one-tail	2.015048373	
P(T<=t) two-tail	0.029896771	
t Critical two-tail	2.570581836	

Source: own investigation

The t-test statistic value came out to be 3.0058, which is less than the critical value of 10.7. This confirms that the regions are statistically significantly different from each other. The test results prove that the financial literacy of Prague students is different compared to students from the South Moravian Region. To generalize this conclusion to all regions, however, multiple comparisons for all regions would be necessary. Although the results cannot be generalized to all regions, it is evident from the absolute data that the results are different in individual regions.

5. CONCLUSION, LIMITATION AND RECOMMENDATIONS

Many countries around the world are realizing how important it is for people to understand money matters. That is why they are making sure that financial education is a big part of what students learn in school (OECD, 2020). Researchers are discussing about financial inventions these days. Not only experts are involved in this, but people in general are interested as well (Lusardi & Mitchell, 2014). The reason for this focus on money skills is that many people are facing money problems like debt and losing their homes. Also, a lot of people struggle to understand complicated money issues (Rowe, 2021).

To deal with this, the educational system needs to teach people, especially young students more about money. They are the future, and we want them to make wise money choices (Hastings et al., 2013). When the country does this, it will not just help individuals. It will also make the Czech Republic's economy stronger (World Bank, 2019).

Based on the above-mentioned results of the questionnaire survey, noticeable differences can be observed in the knowledge and behaviour of students at individual school levels. Even if it cannot be clearly determined that this is an increase in financial literacy, an increasing range of knowledge and level of opinions can be observed at higher levels of schooling. However, a slight drop in the level in all analysed areas can be observed in secondary schools and, on the contrary, a more significant increase in universities.

Taking in consideration the assembled data, we can summarize the following conclusions:

Firstly, financial literacy is increasing with the increasing school level, however, the increase in financial insight is not as clear-cut as could be expected.

Secondly, as to the differences in financial literacy between the fields of study in secondary school students, the data implied higher levels of financial literacy at grammar schools compared to economic and business majors. Financial literacy differs according to the study field, but the direct influence of the study field on financial literacy was not confirmed, because a igher level of financial literacy was found in grammar schools compared to economics and business majors.

Thirdly, as to the regional differences in financial literacy, our tests have shown relatively high differences between two selected regions, Prague and South Moravia. Our results illustrate the differences between the two selected regions, but they represent the differences found between all other regions. The selected region Prague is specific because there are many schools and education opportunities, it is the economic centre of the whole country. However, differences in the level of financial literacy were found among the other regions, too.

The major limitations of our study lay in the limited and unbalanced sample – a limited number of respondents representing each region and individual field of study, as well as their structure. Another shortcoming can be attributed to the construction of the questionnaire. Although the questionnaire was based on the OECD research, it had to be accommodated to specific conditions of our target respondent group.

As to our recommendations in general, financial education needs to improve but financial literacy is based on attitude to life, and it cannot be learned from books only. As we have seen in our research using a limited sample (see Table 8 above. Financial literacy is higher in grammar schools that provide general education than in specialized economic and business schools. Education at specialized economic schools does not increase financial literacy above the level of a general education school, or grammar school. Financial literacy is more about general attitude to life see also Guðjónsson, Jonsdottir and Minelgaitė (2023).

BIBLIOGRAPHY

Belás, J., Nguyen, A., Smrčka, L., Kolembus, J., & Cipovová, E. (2016). Financial literacy of secondary school students. Case study from the Czech Republic and Slovakia. *Economics and Sociology*, 4, 191-206. https://doi.org/10.14254/2071-789X.2016/9-4/12

Česká bankovní asociace. (2023). *Finanční gramotnost Čechů.* https://cbaonline.cz/ financni-gramotnost-cechu-2023

Guðjónsson, S., Jonsdottir, S. M., & Minelgaitė, I. (2023). Knowing more than own mother, yet not enough: Secondary school students' experience of financial literacy education. *Pedagogika, 145*(1), 5–21. https://doi.org/10.15823/p.2022.145.1

Fong, J. H., Koh, B. S., Mitchell, O. S., & Rohwedder, S. (2021). Financial literacy and financial decision-making at older ages. *Pacific-Basin Finance Journal, 65*, 101481. https://doi.org/10.1016/j.pacfin.2020.101481

Hasan, M., Le, T. & Hoque, A. (2021). How does financial literacy impact on inclusive finance? *Financial Innovation,* 7(1), 1-23.

Hastings, J. S., Madrian, B. C., & Skimmyhorn, W. L. (2013). Financial literacy, financial education, and economic outcomes. *Annual Review of Economics, 5*(1), 347-373. https://doi.org/10.1146/annurev-economics-082312-125807

Koskelainen, T., Kalmi, P., Scornavacca, E. & Vartiainen, T. (2023). Financial literacy in the digital age—A research agenda. *Journal of Consumer Affairs,* 57(1), 507-528. https://doi.org/10.1111/joca.12510

Králová, A. & Kropáč, D. (2020). How to Prepare Secondary School Teachers for Education of Financial Literacy? In L. Pavera, K. Krpálková Krelová, & J. Novák a kol., *Pohledy na středoškolského učitele odborných předmětů.* 93-101. Extrasystem Praha. http://www.extrasystem.com/9788087570487.pdf

Kubíčková, D., & Nulíček, V. (2020). Does the financial literacy increase during the secondary school study. In P. Jedlička, P. Marešová, K. Firlej, & I. Soukal (Eds), *I. Proceedings of the international conference Hradec Ekonomic Days*. 399-406. University Hradec Králové. https://doi.org/10.36689/uhk/hed/2020-01-046

Lusardi, A., & Mitchell, O. S. (2014). The economic importance of financial literacy: Theory and evidence. *American Economic Journal: Journal of Economic Literature, 52*(1), 5-44. https://doi.org/10.1257/jel.52.1.5

OECD. (2020). *PISA 2018 Results (Volume VII): Financial Literacy*. https://doi.org/10.1787/5b1225f8-en

Rieger, M. O. (2020). How to measure financial literacy? *Journal of Risk and Financial Management*, 13(12), 324. https://doi.org/10.3390/jrfm13120324

Rowe, J. (2021). The Consumer Financial Protection Bureau: A powerful agency with a questionable legal status. *SSRN*, 3833343. http://dx.doi.org/10.2139/ssrn.3833343

Swiecka, B., Yeşildağ, E., Özen, E. & Grima, S. (2020). Financial literacy: The case of Poland. *Sustainability*, 12(2), 700.

Xu, S., Yang, Z., Tong, Z. & Li, Y. (2023). Knowledge changes fate: can financial literacy advance poverty reduction in rural households? *The Singapore Economic Review, 68(04),* 1147-1182.

World Bank. (2019). *Financial Literacy, Financial Inclusion, and Financial Stability: Evidence from International Surveys*. https://openknowledge.worldbank.org/ handle/10986/32553

REVISION OF THE GOVERNMENT'S ESTIMATE OF THE INCREASE IN THE STATE BUDGET ASSOCIATED WITH CHANGES IN THE GAMBLING SECTOR

Jakub ŽOFČÁK
Jan Evangelista Purkyně University in Ústí nad Labem, Czech Republic
Jakub.Zofcak@ujep.cz

Josef ŠÍMA
Metropolitan University Prague, Czech Republic
Jan Evangelista Purkyně University in Ústí nad Labem, Czech Republic
Josef.Sima@mup.cz

Abstract: *The Czech government and the Ministry of Finance of the Czech Republic estimate that the introduction of changes under the public finance consolidation package presented in May 2023 will bring CZK 150.7 billion to the state budget. The package includes measures related to the gambling market (namely tax increases and changes in the way tax revenue is allocated between the state and municipalities), which are expected to bring CZK 4.2 billion to the budget in 2024. The objective of our paper is to evaluate this impact using its own calculation – based on conservative and simplified assumptions (stable growth of the sector, constant ratio of winnings paid out and no supply and demand response), the annual increase to the state budget should amount to CZK 17.8 billion. 89% of this increase is due to the change in the allocation of tax revenue between the municipalities and the State, and not to the increase in taxes (which will bring in only about CZK 2 billion). Thus, the government's estimate seems to operate with unrealistic assumptions and does not include the sector's growth next year. The main weaknesses of our calculation are the lack of inclusion of the market response to these changes and the simplistic estimate of the annual growth of the gambling sector. However, even with an even more conservative assumption about the growth of the sector, our estimate of the growth of the state budget is more than double the official estimate.*

Keywords: *consolidation package, gambling, gambling tax, impact analysis, policy analysis*

1. INTRODUCTION

Due to the necessity to consolidate public finances due to the record debt of the Czech public finances, the government of Prime Minister Petr Fiala came up with a plan for a consolidation package of public finances. The plan contains a total of 58 measures which, according to their creators, are estimated to have a positive impact of CZK 150.7 billion on the state budget balance between 2024 and 2025. The package was presented in May 2023 and, if approved, will enter into effect from the beginning of 2024 (MFČR, 2023a).

One of the sectors targeted by the package is gambling. Along with tobacco and alcohol, gambling falls into the category of "sinful consumption" and governments have an incentive to impose excise duties on these goods and services. On the one hand, the aim is to reduce the consumption of these goods through higher costs (thus removing the externalities associated with their consumption), and on the other hand, to raise money for public budgets, making it easier for governments to justify taxing these goods and services. The two main changes in the consolidation package as far as the gambling sector is concerned will be a change in the tax rates on individual games and a change in the budgetary allocation of tax revenues. The

Ministry of Finance estimates that these changes will add a total of CZK 4.2 billion to the state budget in 2024 alone (MFČR, 2023a).

As neither the government nor the Ministry of Finance has published the methodology for this calculation or the impact analysis, the objective of this paper is to revise the Ministry's estimate and to construct its own estimate of the impact of this measure on the Treasury. First, selected theoretical concepts related to gambling taxation and relevant data will be presented, followed by the assumptions of our calculation of the impact of the tax and budgetary allocation changes and the calculation itself. Finally, we will confront the results with the Ministry of Finance's estimate and discuss the weaknesses of this approach. This paper uses some insights elaborated in more detail in an unpublished study by Hudík et al. (2023).

2. THEORETICAL FRAMEWORK

The tax base for calculating gambling tax is in most countries calculated as the difference between the total deposits received and the winnings paid out – this indicator is called gross gaming revenue (GGR):

$$Tax\ base\ (GGR) = gambling\ deposits\ received - gambling\ winnings = gambling\ bets\ lost$$

From an economic point of view, the very basic concept of the price of gambling is problematic – it is not represented by the amount of the bet itself since the consumer himself chooses it. For example, Eadington (1999) defines the price of gambling as the house advantage, i.e., the statistical edge that the casino or gambling house has over the player. However, the high variability makes this definition difficult to use (see Nichols & Tosun, 2013). While for example this edge is relatively stable in roulette, it varies from machine to machine in technical games and depends on the player's strategy in card games. Therefore, researchers (e.g., Florensa et al., 2022) often define the cost of gambling as the proportion of lost bets (i.e., the GGR defined above) to received bets:

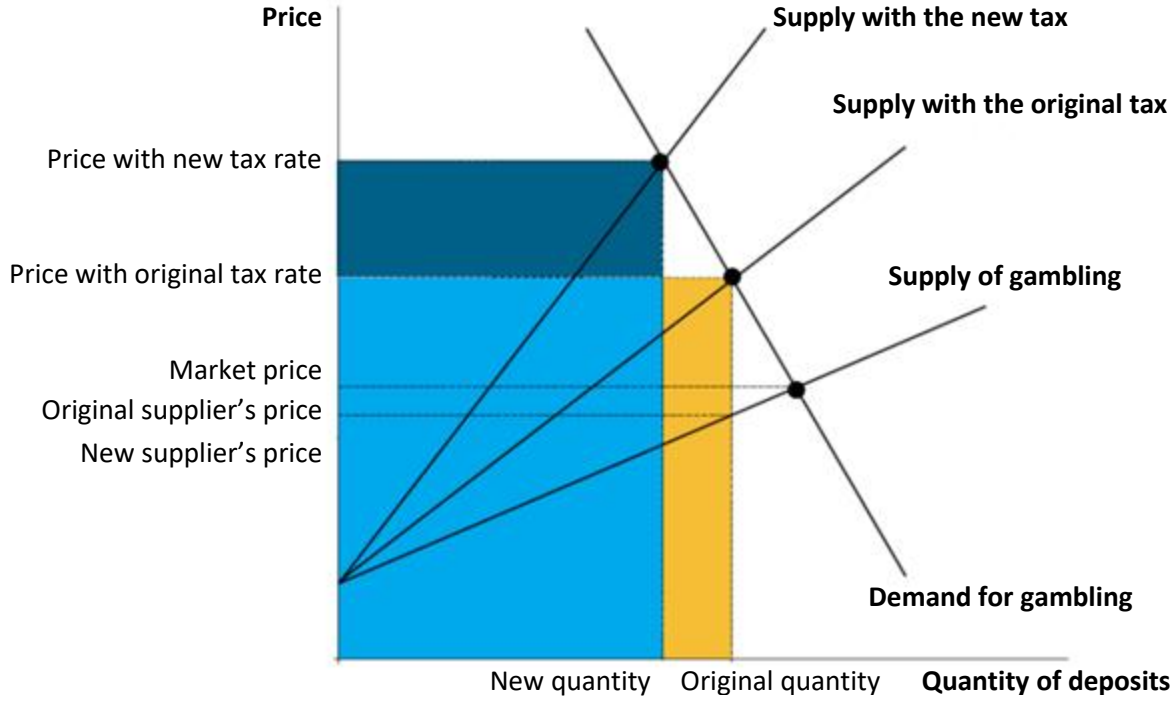
$$price\ of\ gambling = \frac{deposits\ received - winnings}{deposits\ received} = \frac{bets\ lost\ (GGR)}{deposit\ received}$$

The numerator (GGR) therefore grows either because deposits received grow or winnings paid out fall (or both things happen at the same time); if both factors move proportionally, the price of the gambling game remains constant. The resulting tax yield can be calculated subsequently:

$$\begin{aligned} tax\ yield &= tax\ rate \times tax\ base(GGR) = \\ &= tax\ rate \times bets\ lost = \\ &= tax\ rate \times (deposits\ received - winnings) = \\ &= tax\ rate \times price\ of\ gambling \times deposits\ received \end{aligned}$$

As this equation shows, there will only be a change in tax revenue if a change in the tax rate leads to a change in the price of gambling and a change in deposits received. In practice, this is very difficult to predict as it also depends on the response of supply (e.g., changes in marketing costs, player bonuses etc.) and demand. The macroeconomic impact of the gambling tax on the market for gambling is illustrated in Figure 1.

Figure 1. Impact of the gambling tax on the gambling market



Source: Hudík et al. (2023)

The original tax revenue is equal to the sum of the light blue and yellow areas, with higher taxation the price of gambling increases (shown in the figure by the dark blue area) and in turn deposits received decrease (yellow area). However, whether the new tax base is larger or smaller than the original tax base depends on the elasticity of demand, i.e.:

$$price\ elasticity\ of\ demand\ = \frac{\%\ change\ of\ quantity\ demanded}{\%\ price\ change}$$

The more elastic the demand (less than -1), the flatter the demand curve, which increases the yellow area in Figure 1 and decreases the dark blue area – so when the tax increases, the tax base falls. Conversely, for inelastic demand (steeper demand curve), the tax base decreases when the tax increases. The elasticity or inelasticity of demand depends on the responsiveness of consumers to price changes, which is mainly determined by the availability of substitutes for the good or service in question. Easier availability of substitutes for the taxed good or service implies a higher elasticity of demand and vice versa. This implies that the demand for particular types of gambling (i.e., the demand for technical games, sports betting, lotteries, etc.) is more elastic than the demand for gambling in general. Other factors that affect the tax revenue from gambling include substitution between different types of gambling and changes in income.

Estimates of the price elasticities of gambling are (unlike, for example, estimates of the demand elasticities of cigarettes or alcohol) relatively rare. Two meta-studies can be mentioned here, the results of the first one – Nichols and Tosun (2013) meta-study – are summarized in Table 1.

Table 1. Comparison of price elasticities of demand for gambling according to Nichols and Tosun (2013)

Authors	Location	Elasticity estimate(s)
Casino games		
Thalheimer and Ali (2003)	Iowa, Illinois, Missouri (USA)	–1.5 (1991); –0.90 (1998)
Landers (2008)	Iowa, Illinois, Missouri, Indiana (USA)	–0.75 to –0.87
BERL (1997)	New Zealand	–0.87
Swan (1992)	New South Wales (Australia)	–1.9
Lotteries		
Gulley a Scott (1993)	Kentucky, Massachusetts, Ohio (USA)	–1.15; –1.92; –1.20
Farrell et al. (1999)	United Kingdom	–1.05 (short run); –1.55 (long run)
Forrest et al. (2000)	United Kingdom	–1.03
Beenstock and Haitovsky (2001)	Israel	–0.65
Lin and Lai (2006)	Taiwan	–0.142
Yu (2008)	Kanada	–0.672
Horce racing		
Suits (1979)	Nevada (USA)	–1.59
Morgan and Vasche (1982)	California (USA)	–1.30
Thalhiemer and Ali (1995)	Ohio, Kentucky (USA)	–2.85; –3.06; –3.09
Betting shops		
Paton et al. (2004)	United Kingdom	–1.59; –1.62

Source: Nichols and Tosun (2013, p. 42)

The elasticities themselves are quite variable – for casino games (i.e., technical and live games) they range from -1.9 to -0.75, so demand can be both elastic and inelastic. A second systematic literature review is provided by Gallet (2015). Its results are summarized by Table 2.

Table 2. Comparison of price elasticities of demand for gambling according to Gallet (2015)

Predicted price elasticity:			
	(1)	**(2)**	**(3)**
Horce Racing	–1.021	–1.101	–1.188
Casino Gaming	–0.733	–0.760	–0.680
Lottery	–1.105	–1.066	–1.067
Europe	–1.229	–1.208	–1.232
Asia	–1.450	–1.408	–1.217
Other Region	–0.871	–0.833	–0.945

Note: (1), (2), a (3) represent different estimation methods used for meta-analysis
Source: Gallet (2015, s. 20)

Gallet (2015) analyzed a total of 46 studies that quantified the price elasticity of horse racing, casinos and lotteries in different countries. Again, the results show that the resulting elasticity value is dependent on the time and space where it was estimated and again ranges over elastic (Suits, 1979; Farrell & Walker, 1999) and inelastic (Mobilia, 1993; Perez & Forrest, 2011) intervals.

However, the results of both meta-studies suggest that casino games (technical and live games) are on average less elastic than horse racing and lotteries, and that demand for lotteries

and horse racing is on average more elastic and demand for technical games rather inelastic. At the same time, gambling is more elastic in the long run rather than in the short run (since gamblers respond more elastically in the long run, in line with economic theory) and the resulting elasticities published in leading economic journals are significantly higher than the other results. Other more recent articles that deal with the elasticity of gambling include Can and Nichols (2022) and Gandullia and Leporatti (2019).

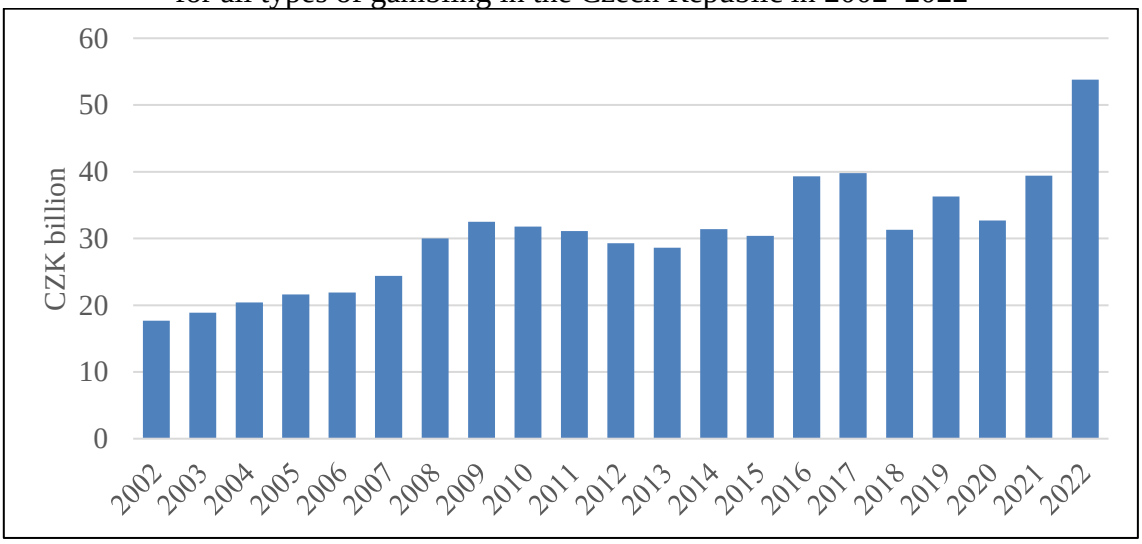
At this point, we should also mention a study conducted by the H2 company, which examined the relationship between tax rate and tax revenue in Denmark (to our knowledge, this is the only study of its kind). Specifically, the authors examined the impact of increasing the tax rate on gambling from 20% to 28%. The authors predict that while tax revenue will increase, it will be at the detriment of consumers as some of them will stop seeking regulated Danish gambling and shift their demand to foreign providers (i.e., the offshore sector) where there will be less consumer protection. The authors estimate that the share of demand in the domestic (onshore) sector will be reduced by a quarter in the first four years after the higher rate is introduced, and that the higher tax will roughly compensate for the lower growth of the sector and the tax revenue will remain the same. The optimal tax rate, according to the authors, is 22%. Thus, the authors were able to estimate the peak of the Danish so-called Laffer curve – a non-linear relationship between tax rate and tax revenue first introduced by Arthur Laffer in the 1970s (H2, 2020).

Among other relevant authors who have examined the impact of a change in the gambling tax rate on the tax base are Combs et al. (2016), who examined the reaction of casinos to tax changes in the US state of Illinois, and Gu and Tam (2014), who conducted similar research in Macau. Combs et al. (2016) report a tax base elasticity of -1.1, so a one percent change in the tax rate leads to a 1.1 percent reduction in the GGR of casinos in Illinois.

3. DATA

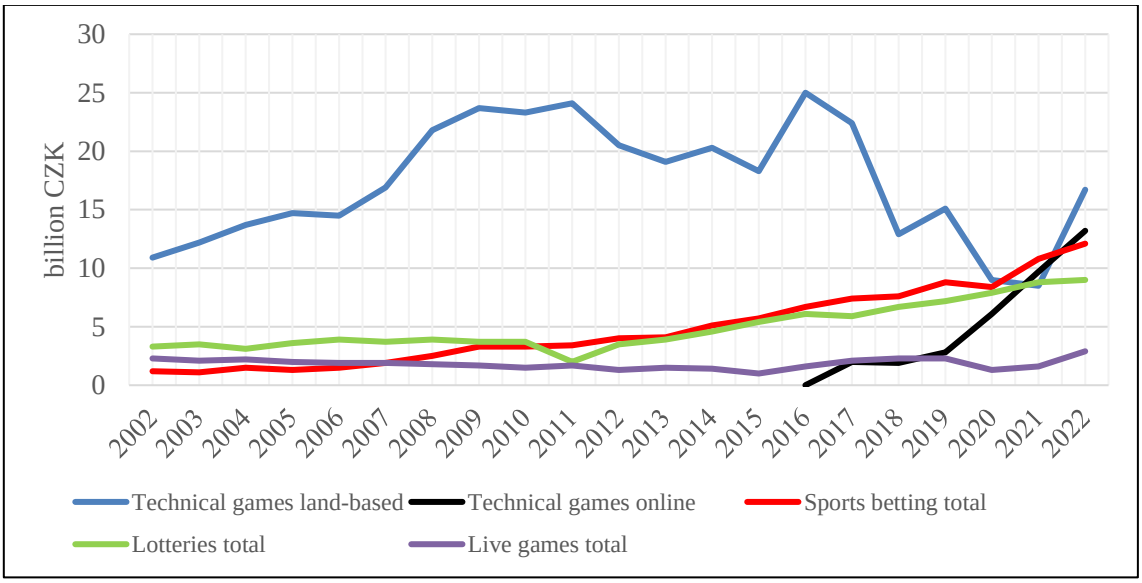
In this section, relevant data related to gambling in the Czech Republic in the context of tax collection will now be presented. Figure 2 illustrates the development of the above described GGR indicator in the Czech Republic in recent years, Figure 3 then breaks it down into individual gambling games:

Figure 2. GGR indicator (difference between deposits received and winnings paid out) for all types of gambling in the Czech Republic in 2002–2022



Source: Mravčík et al. (2021, p. 39), Finanční správa (2023), own processing

Figure 3. Development of GGR for different types of gambling in the Czech Republic in 2002–2022

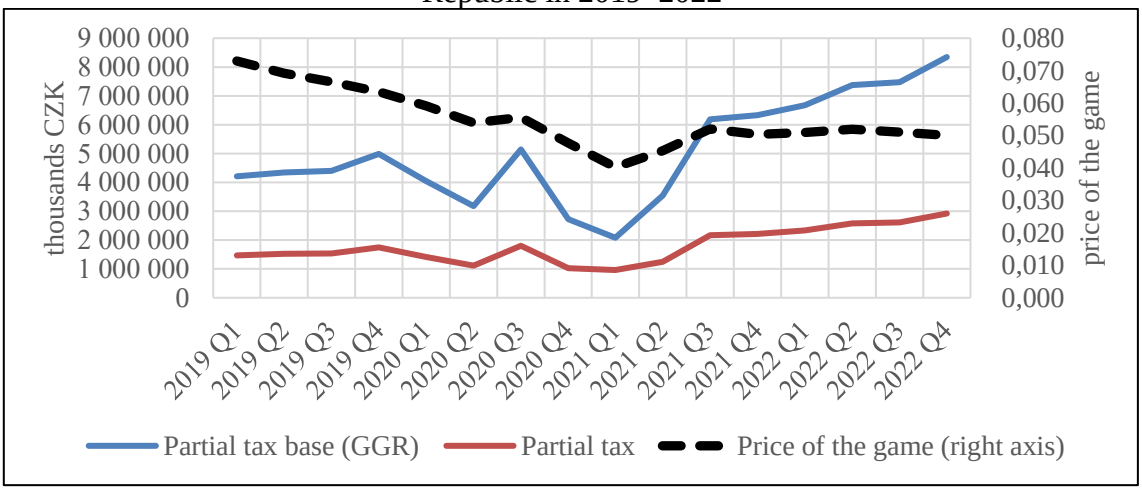


Source: Mravčík et al. (2021, p. 39), Finanční správa (2023), own processing

As can be seen in Figure 2, the industry has been hit hardest in recent years by the Covid-19 pandemic, a period during much of which land-based gaming and casinos had to close completely. Figure 3 illustrates the boom of the on-line sector (especially technical gaming) and the gradual decline of land-based technical gaming, which only a few years ago accounted for the vast majority of gambling in the country.

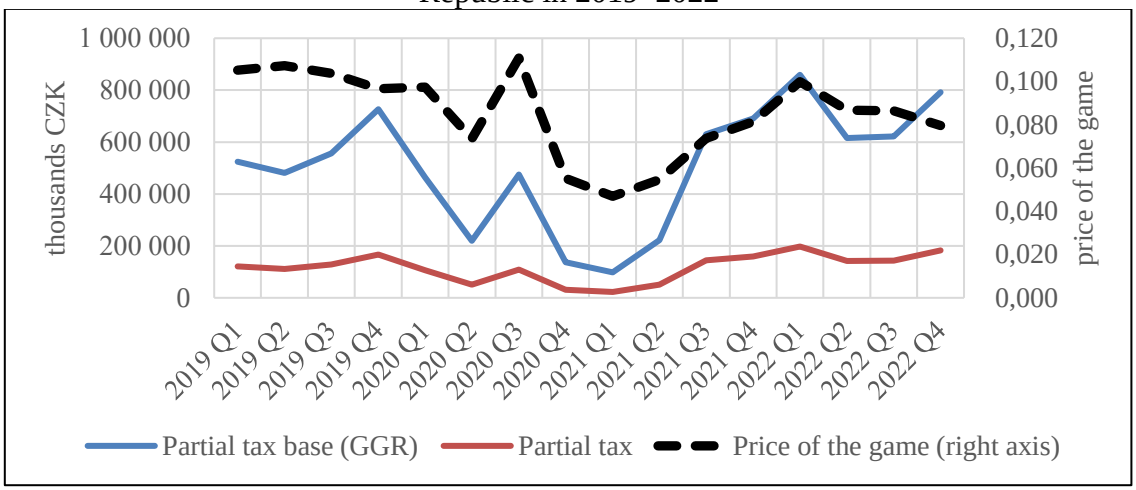
The following charts describe the evolution of the GGR, the sub-taxes levied and the prices of gambling (as defined above) for the most important types of games, i.e., technical games, live games, lotteries and sports betting from 2019 to 2023. These types of games have been selected because they account for over 99% of the gambling volume in the country (Finanční správa, 2023) and the period 2019–2023 has been selected because these are the years in which the data of the Finanční správa (2023) are available on a quarterly basis and not only on an annual basis as in previous years.

Figure 4. Evolution of total deposits and price of the game in technical games in the Czech Republic in 2019–2022



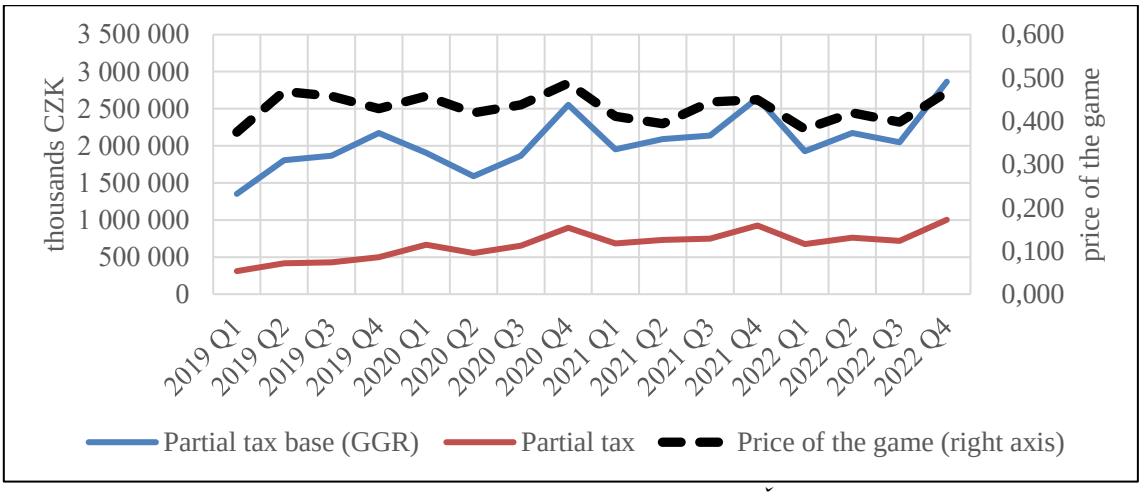
Source: Mravčík et al. (2021), Finanční správa (2023), MFČR (2023a), own processing

Figure 5. Evolution of total deposits and price of the game in live games in the Czech Republic in 2019–2022



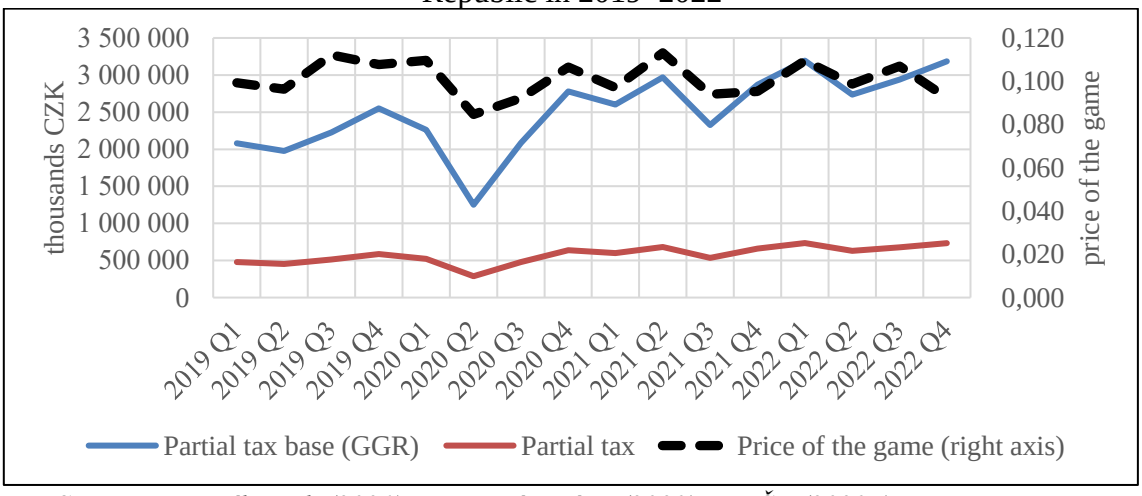
Source: Mravčík et al. (2021), Finanční správa (2023), MFČR (2023a), own processing

Figure 6. Evolution of total deposits and price of the game in lotteries in the Czech Republic in 2019–2022



Source: Mravčík et al. (2021), Finanční správa (2023), MFČR (2023a), own processing

Figure 7. Evolution of total deposits and price of the game in sports betting in the Czech Republic in 2019–2022



Source: Mravčík et al. (2021), Finanční správa (2023), MFČR (2023a), own processing

As can be seen for all the types of games presented, the price of gambling remained fairly constant over the time frame, with the exception of technical and live games, which were hit hardest by the COVID-19 pandemic, when the land-based sector experienced a decline in deposits. However, after the pandemic, the situation returned to its previous levels.

Based on this data, the impact of the changes in the consolidation package will now be estimated and compared with the official estimate of the Ministry of Finance.

4. IMPACT OF THE CONSOLIDATION PACKAGE CHANGES

As mentioned above, the government's consolidation package brings two major changes to gambling regulation – the first is a change in tax rates. Table 3 summarizes the gambling tax rates before and after the introduction of the consolidation package.

Table 3. Changes to gambling tax rates under the consolidation package (status as of 12 May 2023)

	Original tax rate	**Proposed tax rate from 1st January 2024**
Technical games	35%	35%
Lotteries	35%	35%
Sports Betting	23%	**30%**
Live Games	23%	**30%**
Sweepstakes games	23%	**30%**
Bingo	23%	**30%**
Tombola	23%	**30%**
Small Scale Tournament	23%	**30%**

Source: MFČR (2023b), own processing

For the games in bold, an increase in the tax rate is proposed, all by the same seven percentage points, i.e., 30%.

The second main change is the new budgetary allocation of the tax revenue. Currently, a rather complex situation applies, where 30% of the gross national gambling tax revenue goes to the state budget and 70% to the budget of the municipalities, apart from the revenue from technical gambling, where 65% of the tax revenue goes to the municipalities and 35% to the state. Moreover, this revenue is not equally received by all municipalities, but, in a simplified way, the more a municipality contributes to the national gross gambling tax revenue, the more it collects. Municipalities also collect a share of the tax revenue from on-line gambling, but according to Act No. 187/2016 Coll., this share for technical games is conditioned on the municipality having at least one land-based technical game on its territory. Thus, if a given municipality bans all land-based technical games on its territory (which is allowed by the law), it will lose its entitlement to the revenue from the tax on on-line technical games (see Žofčák et al., 2022). This fact may significantly intervene in the decision-making process of given decision-makers regarding the keeping of land-based gambling on the territory of the municipality. This system is changed and simplified by the consolidation package – the tax revenue from all on-line gambling will now go 100% to the state budget under the proposal, while 35% of the revenue from land-based gambling will go to the state and 65% to municipalities.

The Ministry of Finance has estimated that these measures will bring an extra CZK 4.2 billion to the state budget. Since the methodology for this calculation is not available, we can only guess how the analysts arrived at this figure. A roughly similar sum of CZK 3.8 billion (the Ministry's original estimate when presenting the package in May 2023 was CZK 3.9 billion) can be reached by multiplying the last known revenue from 2022 by the proposed

tax rate (see Table 3) and redistributing this revenue in a new manner between municipalities and the state. Table 4 illustrates this calculation.

Table 4. Estimated consideration of the MFCR in assessing the impact of changes in gambling taxation under the consolidation package (in thousands CZK)

	Tax yield 2022	**Revenue to the state budget**	**Increased revenues**	**Revenue to the state budget**	**Difference**
Land-based technical games	5,849,821	2,047,437	5,849,821	2,047,437	**0**
Land-based lotteries	2,390,359	1,673,251	2,390,359	836,626	**-836,626**
Sports betting land-based	232,335	162,635	303,046	106,066	**-56,569**
Live games land-based	574,989	402,492	749,986	262,495	**-139,997**
On-line technical games	4,606,645	1,612,326	4,606,645	4,606,645	**2,994,319**
On-line lotteries	764,382	535,067	764,382	764,382	**229,315**
On-line sports betting	2,539,694	1,777,786	3,312,644	3,312,644	**1,534,859**
Live games on-line	89,461	62,623	116,688	116,688	**54,066**
Total					**3,779,366**

Source: own calculation based on Mravčík et al. (2021), Finanční správa (2023) and MFČR (2023a)

If the Ministry's estimate was obtained by this method, it would be a highly simplified estimate which does not take into account several facts, in particular the growth of the entire gambling sector in the next year and thus the growth of the deposits received which contribute to the GGR (see above). At the same time, the elasticity of demand and supply is not considered – it can be assumed that the supply side (i.e., gambling operators) will react to higher taxation and will try to transfer the costs to the demand side, i.e., to the players and increase the price of gambling as defined above (at least through e.g., bonuses for new players).

Our revision of this calculation will work under several conservative assumptions:

- for all relevant gambling types, the deposits received will grow at the same average rate as in previous years,
- we assume nominal values, so inflation will not be included in the calculation,
- the winnings paid out (also entering the GGR) will grow at a rate such that gambling providers will maintain the same proportion of winnings on deposits – thus the price of gambling as defined above will remain constant,
- for lotteries and technical games, the tax rate will remain the same, so the benefit to the state budget from these games will only lie in a different allocation of tax revenues between municipalities and the state,
- for other games (sweepstakes, bingo, tombola, small scale tournaments) the tax revenue is negligible, its growth will be simply calculated through the average growth in tax revenue over the last four years,
- under a conservative approach, we will neglect the supply and demand side response to these changes, thus not accounting for gambling providers' efforts to transfer costs to players. We are therefore working with the assumption of a perfectly inelastic tax base, which is the ideal conditions for the Treasury. Such a strong assumption is not so unrealistic if the change is quick (the new tax system will be launched next year, so the supply side won't have as much time to adjust), and at the same time the possibilities to pass on costs from gambling operators to players are rather limited (as they can only "save costs" through bonuses, marketing costs, odds, etc.) and demand is rather inelastic, especially for addicted players; and
- for the sake of simplicity, we neglect secondary effects such as the growth of the black market, substitution of gambling by other unregulated (or less regulated) services, etc.

Therefore, the first step is to calculate the growth of the industry (i.e., the deposits received) for each type of gambling. Based on the available annual growth data, we calculated geometric averages, which (again taking a conservative approach) did not include the years affected by the Covid-19 pandemic (2020–2022). Similarly, the proportions of winnings and deposits were averaged for the years 2012–2022, the results are summarized in Table 5.

Table 5. Annual growth of deposits received for different types of gambling in the Czech Republic in 2012–2019 and their average

	Average growth of deposits received	**Average proportion of winnings and deposits**
Land-based sports betting	1.20	0.819
On-line sports betting	1.23	0.898
Land-based live games	1.12	0.864
On-line live games	1.95	0.865
Land-based technical games	1.17	0.884
On-line technical games	2.10	0.954
Land-based lotteries	1.10	0.545
On-line lotteries	1.63	0.584

Source: own calculation based on Mravčík et al. (2021), Finanční správa (2023) and MFČR (2023a)

The expected deposits in 2023 and 2024 are obtained by multiplying the last known values in 2022 by the above coefficients, as well as the paid winnings. Subtracting these values then gives us the GGR, i.e., the tax base. The results are summarized in Table 6.

Table 6. Estimated deposits received, winnings paid and GGR from various types of gambling in the Czech Republic in 2023 and 2024 (in thousands CZK)

		2023 estimate	**2024 estimate**
Land-based sports betting	Deposits received	7,886,063	9,425,324
	Winnings paid out	6,454,748	7,714,633
	GGR	1,431,316	1,710,690
On-line sports betting	Deposits received	138,234,995	170,261,190
	Winnings paid out	124,182,025	152,952,436
	GGR	14,052,971	17,308,754
Land-based live games	Deposits received	23,050,099	25,893,244
	Winnings paid out	19,924,765	22,382,412
	GGR	3,125,334	3,510,833
On-line live games	Deposits received	23,979,371	46,647,839
	Winnings paid out	20,749,028	40,363,750
	GGR	3,230,343	6,284,089
Land-based technical games	Deposits received	295,509,978	344,484,962
	Winnings paid out	261,252,628	304,550,127
	GGR	34,257,350	39,934,834
On-line technical games	Deposits received	696,900,017	1,460,060,193
	Winnings paid out	664,776,201	1,392,758,278
	GGR	32,123,816	67,301,915
Land-based lotteries	Deposits received	17,692,106	19,395,911
	Winnings paid out	9,645,947	10,574,882
	GGR	8,046,159	8,821,030
On-line lotteries	Deposits received	8,745,710	14,211,439
	Winnings paid out	5,104,529	8,294,662
	GGR	3,641,181	5,916,777

Source: own calculation based on Mravčík et al. (2021), Finanční správa (2023) and MFČR (2023a)

The next step is to calculate the total tax revenue from gambling, which will then be redistributed between municipal budgets and the state budget. Table 7 summarizes the tax revenues in 2024 from individual games (including those not subject to the higher tax rate) in the scenario with the original and with the increased tax rate:

Table 7. Total tax revenues and increase in public budget revenues (in thousands CZK) in 2024 if tax rates on certain gambling games are increased from 23% to 30%

	2024 (original tax rate)	**2024 (proposed tax rate)**	**Difference**
Land-based sports betting	393,459	513,207	**119,748**
On-line sports betting	3,981,013	5,192,626	**1,211,613**
Land-based live games	807,492	1,053,250	**245,758**
On-line live games	1,445,341	1,885,227	**439,886**
Other games	786	831	**45**
Land-based lotteries	3,087,360	3,087,360	**0**
On-line lotteries	2,070,872	2,070,872	**0**
Land-based technical games	13,977,192	13,977,192	**0**
On-line technical games	23,555,670	23,555,670	**0**
Total increase in public budgets			**2,017,050**

Source: own calculation based on Mravčík et al. (2021), Finanční správa (2023) and MFČR (2023a)

Finally, the last step is the allocation of the CZK 2 billion tax revenue between the state and municipalities according to the above-mentioned principle. Table 8 again summarizes two situations – the first one when the consolidation package is not introduced (i.e., with the original tax rates and the original conditions for allocation between the state and municipalities) and the second one when the package is introduced (with new rates and conditions):

Table 8. Allocation of tax revenues from various types of gambling between municipalities and the state with and without the consolidation package (in thousands CZK)

	2024 (original tax rate and conditions)		**2024 (proposed tax rate and conditions)**		
	Municipal budgets	**State budget**	**Municipal budgets**	**State budget**	**State budget increase**
Land-based technical games	9,085,175	4,892,017	9,085,175	4,892,017	**0**
Land-based lotteries	926,208	2,161,152	2,006,784	1,080,576	**-1,080,576**
Land-based sports betting	118,038	275,421	333,585	179,622	**-95,799**
Land-based live games	242,247	565,244	684,612	368,637	**-196,607**
On-line technical games	15,311,186	8,244,485	0	23,555,670	**15,311,186**
On-line lotteries	621,262	1,449,610	0	2,070,872	**621,262**
On-line sports betting	1,194,304	2,786,709	0	5,192,626	**2,405,917**
On-line live games	433,602	1,011,738	0	1,885,227	**873,488**
Other games	236	550	540	291	**-260**
Total	27,932,257	21,386,928	12,110,696	39,225,539	**17,838,611**

Source: own calculation based on Mravčík et al. (2021), Finanční správa (2023) and MFČR (2023a)

Under the assumptions mentioned above, that is, under conservative and very favorable conditions for the state budget, the maximum increase in the state budget with higher tax rates on gambling and new conditions of allocation between the state and municipalities amounts to CZK 17.8 billion.

5. DISCUSSION AND CONCLUSION

The resulting amount is therefore more than four times the official estimate of the Ministry of Finance, which was presented by the government together with the consolidation package. However, it must be stressed once again that this amount is not primarily the result of an increase in tax rates – a tax increase would only bring CZK 2 billion into public budgets. 89% of the resulting CZK 17.8 billion is the result of a change in the system of redistribution between state and municipal budgets.

The limitations of our research include the fact that over 85% of the sum of tax revenues is made up of only one item, namely the revenue from on-line technical games (which, if the consolidation package is adopted, will go 100% to the state budget). This growth can be highly variable, as the growth in deposits received from on-line technical games of 2.1 (see Table 5) was calculated based on the geometric mean of only two annual averages (due to the non-inclusion of years subject to the COVID-19 pandemic). This estimate should therefore be taken with some caution. If, instead of the geometric average, we assume the same growth as that between 2021 and 2022, the growth in deposits would be only 38% and the state budget would increase by "only" CZK 9.2 billion. Even in this case, however, it would be more than double the forecast of the Ministry of Finance. Given the trends towards growth in on-line gaming and the shift of technical gaming players to the on-line sector, there is no reason to believe that this sector will not grow at least at the same rate as last year, so this amount represents the lower limit in terms of tax revenue from on-line technical gaming. Even though the geometric mean is the weak point of our model and it makes it somewhat unstable, it nevertheless remains our best option.

Another big limitation is the fact that we did not include analysis of the response of market players (gambling operators and gamblers) to these changes, for example in a form of the Laffer curve. Future researchers could build on e. g. H2 (2020) research and use sensitivity analysis to calculate the response of the supply side (gambling operators) to higher taxation (for example in the form of lower bonuses offered to new players, worse odds offered, reduced marketing etc.). Such a sensitivity analysis should also include the subsequent response of the demand side (ideally by calculating the elasticity of demand). This analysis is so complex and data intensive that it is beyond the format of this paper. Another secondary effect of higher taxation would be the development of a black market, as these responses represent a de facto increase in the price of legal gambling, which is another route that follow-up researchers may take. Last but not least, it should be noted that taxation will reduce economic value added of the gambling industry, see CETA's input-output analysis of the gambling industry in the Czech Republic (CETA, 2022).

Therefore, the calculation presented here is only a simplified review of the impact of government measures and does not aspire to be a comprehensive and exhaustive analysis of the impact of this policy. However, it is at least a basic suggestion of a methodology that regulators could follow in the future when estimating the impact of regulatory changes.

If our estimate is correct (despite the limitations above), this implies several possible implications. First, from the government's point of view, this conclusion is positive, as the measures will bring even more money into the budget than expected. Second, however, it means that the government analysts either did not work with realistic assumptions or did not have the correct data (which is hard to believe). There is also the possibility that the government wanted to keep municipalities unaware of how much money they would lose because of a different way of redistributing tax revenue (but we cannot confirm this theory). The main conclusion remains that the government and the Ministry of Finance did not seem to have made realistic estimation of the impact of the consolidation package. It did consider year-on-year market growth and

almost certainly did not take into account the market's response (especially supply and then demand) to the change in regulatory conditions or secondary effects.

Thus, the main added value of our research is the emphasis on rigorous calculation in estimating the impact of policy measures (not only in the Czech Republic, but anywhere in the world). Although our methodology is relatively simple, we demonstrate establishing basic assumptions, presenting the data, statistically processing the data, drawing conclusions, and discussing the limitations of the research. It is these steps that should have been introduced in the presentation of the consolidation package.

BIBLIOGRAPHY

Act No. 187/2016 Coll. (2016). Zákon o dani z hazardních her. In: *Sbírka zákonů*. 26. 5. 2016.

Beenstock, M., & Haitovsky, Y. (2001). Lottomania and other anomalies in the market for lotto. *Journal of Economic Psychology*, *22*(6), 721-744. https://doi.org/10.1016/S0167-4870(01)00057-5

BERL. (1997). Sensitivity analysis of gross win to price elasticities of demand. In *Gaming: A new direction for New Zealand, and its associated reports*. Wellington: New Zealand Lotteries Commission.

Can, E., & Nichols, M. W. (2022). The Income Elasticity of Gross Sports Betting Revenues in Nevada: Short-Run and Long-Run Estimates. *Journal of Sports Economics*, *23*(2), 175- 199. https://doi.org/10.1177/15270025211036968

CETA. (2022). *Ekonomická analýza přínosu průmyslu hazardních her v České republice*. Praha: Centrum ekonomických a tržních analýz.

Combs, K. L., Kim, J., Landers, J., & Spry, J. A. (2016). The Responsiveness of Casino Revenue to the Casino Tax Rate. *Public Budgeting & Finance*, *36*(3), 22-44. https://doi.org/10.1111/pbaf.12106

Eadington, W. R. (1999). The Economics of Casino Gambling. *Journal of Economic Perspectives*, *13*(3), 173-192. https://doi.org/10.1257/jep.13.3.173

Farrell, L., Morgenroth, E., & Walker, I. (1999). A Time Series Analysis of U.K. Lottery Sales: Long and Short Run Price Elasticities. *Oxford Bulletin of Economics and Statistics*, *61*(4), 513-526. https://doi.org/10.1111/1468-0084.00141

Finanční správa. (2023). Daň z hazardních her. Retrieved May 31, 2023, from https://www.financnisprava.cz/cs/dane/dane/dan-z-hazardnich-her

Florensa, M., Giuliodori, D., & Rodriguez, A. (2022). The price elasticity of casino gambling: a case study in Argentina. *Applied Economics*, *54*(56), 6445-6455. https://doi.org/10.1080/00036846.2022.2066619

Forrest, D., Gulley, O. D., & Simmons, R. (2000). Elasticity of Demand for UK National Lottery Tickets. *National Tax Journal*, *53*(4.1), 853-863. https://doi.org/10.17310/ntj.2000.4.04

Gallet, C. A. (2015). Gambling demand: a meta-analysis of the price elasticity. *The Journal of Gambling Business and Economics*, *9*(1), 13-22. https://doi.org/10.5750/jgbe.v9i1.882

Gandullia, L., & Leporatti, L. (2019). Distributional effects of gambling taxes: Empirical evidence from Italy. *The Journal of Economic Inequality*, *17*(4), 565-590. https://doi.org/10.1007/s10888-019-09423-9

Gu, X., & Tam, P. S. (2014). The impacts of demand and supply elasticities on gambling tax choices. *The Journal of Gambling Business and Economics*, *8*(1), 53-71. https://doi.org/10.5750/jgbe.v8i1.694

Gulley, O. D., & Scott, F. A. (1993). The demand for wagering on state-operated lotto games. *National Tax Journal*, *46*(1), 13-22. https://doi.org/10.1086/NTJ41788992

H2. (2020). *Denmark Online Gambling Market – Impact Analysis*. H2 Gambling Capital. Retrieved from https://www.egba.eu/uploads/2020/06/Tax-analysis-Denmark.pdf

Hudík, M., Žofčák, J., & Dvouletý, O. (2023). *Analýza zdanění hazardu v České republice*. Praha: Fakulta podnikohospodářská Vysoké školy ekonomické v Praze.

Landers, J. (2008). What's the potential impact of casino tax increases on wagering handle: estimates of the price elasticity of demand for casino gaming. *Economics Bulletin*, *8*(6), 1-15.

Lin, C.-T., & Lai, C.-H. (2006). Substitute effects between Lotto and Big Lotto in Taiwan. *Applied Economics Letters*, *13*(10), 655-658. https://doi.org/10.1080/13504850500401858

MFČR. (2023a). *Vláda představila Ozdravný balíček za bezmála 150 miliard*. Retrieved May 31, 2023, from https://www.mfcr.cz/cs/aktualne/tiskove-zpravy/2023/vlada-predstavila-ozdravny-balicek-za-be-51211

MFČR. (2023b). *Příloha tiskové zprávy k Ozdravnému balíčku 2024/2025*. Ministerstvo financí České republiky https://www.mfcr.cz/assets/cs/media/2023-05-11_Priloha-k-TZ-k-Ozdravnemu-balicku_v06.pdf

Mobilia, P. (1993). Gambling as a rational addiction. *Journal of Gambling Studies*, *9*(2), 121-151. https://doi.org/10.1007/BF01014864

Morgan, W. D., & Vasché, J. D. (1982). A note on the elasticity of demand for wagering. *Applied Economics*, *14*(5), 469-474. https://doi.org/10.1080/00036848200000042

Mravčík, V., Rous, Z., Chomynová, P., Grohmannová, K., Janíková, B., Černíková, T., Cibulka, J., & Franková, E. (2021). *Zpráva o hazardním hraní v České republice 2021* (2. upr. vyd.). Národní monitorovací středisko pro drogy a závislosti. https://www.drogyinfo.cz/data/obj_files/33589/1118/VZ%20hazard%202021_web_fin_fin.pdf

Nichols, M. W., & Tosun, M. S. (2013). The Elasticity of Casino Gambling. In L. V. Williams & D. S. Siegel, *The Oxford Handbook of the Economics of Gambling* (37-54 ed., pp. 37-54). Oxford University Press.

Paton, D., Siegel, D. S., & Williams, L. V. (2004). Taxation and the demand for gambling: New evidence from the United Kingdom. *National Tax Journal*, *57*(4), 847-861. https://doi.org/10.17310/ntj.2004.4.04

Perez, L., & Forrest, D. (2011). Own- and cross-price elasticities for games within a state lottery portfolio. *Contemporary Economic Policy*, *29*(4), 536- 549. https://doi.org/10.1111/j.1465-7287.2010.00234.x

Suits, D. B. (1979). The elasticity of demand for gambling. *The Quarterly Journal of Economics*, *93*(1), 155–162. https://doi.org/10.2307/1882605

Swan, P. (1993). *Report on the likely effects of slot machines in a casino on the operations and viability of the registered club and hotel industries*. Sydney: Chief Secretary of New South Wales.

Thalheimer, R., & Ali, M. M. (1995). The demand for parimutuel horse race wagering and attendance. *Management Science*, *41*(1), 129-143. https://doi.org/10.1287/mnsc.41.1.129

Thalheimer, R., & Ali, M. M. (2003). The demand for casino gaming. *Applied Economics*, *35*(8), 907-918. https://doi.org/10.1080/0003684022000018259

Yu, K. (2008). Measuring the output and prices of the lottery sector: An application of implicit expected utility theory. *NBERWorking Paper*, No. 14020. Cambridge, Mass.: National Bureau of Economic Research.

Žofčák, J., Šíma, J., & Rod, A. (2022). Analysis of the impact of the gambling ban in Prague. In *The 10th International Scientific Conference IFRS: Global Rules and Local Use – Beyond the Numbers* (pp. 263-276). Praha: Metropolitan University Prague, Anglo-American University.

SUMMARY AND FINAL COMMENTS

The 11th edition of the International Scientific Conference IFRS: Global Rules & Local Use – Beyond the Numbers was organized as a hybrid event.

The keynote was the opening address of the conference founder, prof David Alexander, who concentrated on currently burning topics encompassing the decrease in biodiversity and criticized the homocentric approach represented by the IIRC effort, the UN Sustainable Development Goals defined by Brundtland's report, and many recent developments such as the Green Deal, for their excessive subservience to humans, rather than to nature to which many organizations claim. The growth of nonfinancial reporting concentrates on social and environmental issues, including sustainable development goals. Prof. Adriana Tiron-Tudor presented the current situation as well as the latest trends in non-financial reporting.

Professor Bialek-Jaworska concentrated on the Polish market and showed that banning IFRS use by domestic firms on the alternative market discourages leading foreign investors, resulting in decreased total FDI, debt-based FDI flows, and earnings reinvestment after 2012. Since the ban, portfolio investments and equity based FDI from countries with more IFRS users have also declined. The following contributions dealt with issues of international trade. Namely, prof Ugurlu analyzed the effect of COVID-19 on trade in the V4 and Germany, and Prof. Jancikova examined the recent development of the Belt and Road Initiative leading to an increase in international trade from previously less developed countries – the so-called BRICS and the extended New BRICS. The professional representative, Petra Smejkalová, introduced the effort to use uniform accounting standards across all industrial segments.

Other individual contributions were devoted to using IFRS in agriculture and the monetary aspects of payment methods, as well as scrutinizing the gambling industry. New speakers also introduced the apparent shift from financial reporting to non-financial reporting or a transition "from numbers to narratives". Researchers explored relevant legal documents as the EU finalizes its newest Directive, envisioning a future where standardized non-financial reporting goes beyond legal obligations to become a social imperative. A study was performed on two case studies from the banking segment.

In the insurance segment, the authors from Charles University explored the stress test, which is traditionally performed in the banking sector. The study utilizes an event study framework and regression analysis and examines the impact of EU-wide insurance stress tests on market reactions and systemic risk. Unlike banking sectors, the insurance stress tests elicited weaker market reactions, possibly due to the industry's lower maturity in stress testing and its better capitalization.

Despite all the interesting topics, the financial challenges in the post-COVID era harmed this conference due to limited funding and the resulting lower number of participants. While those attending enjoyed the on-site proceedings, many traditional participants were absent. Consequently, the decision was made to limit the conference to a single day. Despite the lively discussions and rich future research plans shared during the on-site event, it is apparent that the conference will need to adapt its format.

In summary, the 11th edition of the conference offered insightful perspectives on the current state of accounting and finance topics. Importantly, this collection of conference papers facilitates the broader sharing of ideas, inspiring new research in the areas currently being explored.

Editors

LIST OF REVIEWERS OF ACCEPTED PAPERS

Assoc. Prof.Dr. H. Gülçin Beken, Gümüşhane Üniversitesi, Turkey

Prof. Anna Bialek-Jaworska, University of Warsaw, Poland

Prof. Madalina Dumitru, Bucharest University of Economic Studies, Romania

Prof. Liliana Feleaga, Bucharest University of Economic Studies, Romania

Doc. Helena Fialová, Metropolitan University Prague, Czech Republic

Dr. Marie Fišerová, Ph.D., Prague University of Economics and Business, Czech Republic

Dr. Jaroslav Halík, Ph.D., Metropolitan University Prague, Czech Republic

Dr. habil. Ing. Eva Jančíková, Ph.D., University of Economics in Bratislava, Slovakia

Dr. Petra Jílková, Ph.D., Masaryk Institute of Advanced Studies, Czech Technical University Prague, Czech Republic

Doc. Irena Jindřichovská, Metropolitan University Prague, Czech Republic

Dr. Dana Kubíčková, Ph.D., University of Finance and Administration Prague, Czech Republic

Dr. Enikő Lőrinczová, Ph.D., University of Life Sciences Prague, Czech Republic

JUDr. Radka MacGregor Pelikánová, Ph.D., LL.M, MBA, Metropolitan University Prague, Czech Republic

MSc. David John Muir, MBA, Anglo-American University, Prague, Czech Republic

Doc. Yusuf Muratoğlu, Ph.D., Hitit University, FEAS, Economics, Turkey

Prof. Ing. Josef Šíma, Ph.D., Metropolitan University Prague, Czech Republic

Ing. Saida Teleu, Ph.D., Anglo-American University, Prague, Czech Republic

Prof. Erginbay Ugurlu, Istanbul Aydın University, Turkey

Dr. Alžběta Zíková, Ph.D., Metropolitan University Prague, Czech Republic

LIST OF AUTHORS

Babajide Francis FADAKA
Federal University Oye Ekiti, Nigeria
jide.fadaka@fuoye.edu.ng

Helena FIALOVÁ
Metropolitan University Prague, Czech Republic
helena.fialova@mup.cz

Marie FIŠEROVÁ
Prague University of Economics and Business, Czech Republic
marie.fiserova@vse.cz

Kateřina FOJTŮ
Anglo-American University, Prague, Czech Republic
katerina.fojtu@aauni.edu

Jaroslav HALÍK
Metropolitan University Prague, Czech Republic
jaroslav.halik@mup.cz

Petr JAKUBÍK
Charles University in Prague, Czech Republic
jakubik@fsv.cuni.cz

Eva JANČÍKOVÁ
Metropolitan university Prague, Czech Republic
eva.jancikova@mup.cz

Irena JINDŘICHOVSKÁ
Metropolitan University Prague, Czech Republic
irena.jindrichovska@mup.cz

Ladislava KNIHOVÁ
The University of Finance and Administration in Prague, Czech Republic
ladislava.knihova@mail.vsfs.cz

Dana KUBÍČKOVÁ
Metropolitan University Prague, Czech Republic
dana.kubickova@mup.cz

Josef KOŠŤÁLEK
University of Chemistry and Technology Prague, Czech Republic
josef.kostalek@vscht.cz

Pavla KOŤÁTKOVÁ STRÁNSKÁ
University of Chemistry and Technology Prague, Czech Republic
pavla.kotatkova.stranska@vscht.cz

Petra KRÁLOVÁ
University of Chemistry and Technology Prague, Czech Republic
petra.kralova@vscht.cz

Kristina LENKOVÁ
The University of Finance and Administration in Prague, Czech Republic
lenkovakristina@yahoo.co.uk

Enikő LŐRINCZOVÁ
Czech University of Life Sciences Prague, Czech Republic
lorinczova@pef.czu.cz

Jan MALÍŘ
Brno University of Technology, Czech Republic
jan.malir@vutbr.cz

Jiří OULEHLA
Brno University of Technology, Czech Republic
jiri.oulehla@vut.cz

Josef ŠÍMA
Metropolitan University Prague, Czech Republic
Jan Evangelista Purkyně University in Ústí nad Labem, Czech Republic
josef.sima@mup.cz

Jitka ŠIŠKOVÁ
Czech University of Life Sciences Prague, Czech Republic
siskova@pef.czu.cz

Saida TELEU
Anglo-American University, Prague, Czech Republic
Charles University in Prague, Czech Republic
saida.teleu@fsv.cuni.cz

Alžběta ZÍKOVÁ
Metropolitan University Prague, Czech Republic
alzbeta.zikova@mup.cz

Jakub ŽOFČÁK
Jan Evangelista Purkyně University in Ústí nad Labem, Czech Republic
Jakub.Zofcak@ujep.cz

IFRS:
GLOBAL RULES & LOCAL USE – BEYOND THE NUMBERS

Editors:

doc. Ing. Irena Jindřichovská, CSc., Metropolitan University Prague, Czech Republic
MSc. David John Muir, MBA, Anglo-American University, Prague, Czech Republic

Publisher: Metropolitan University Prague, Anglo-American University, Prague
Place of publication: Prague / Praha
Year of publication: 2023
Number of pages: 162

First edition

ISBN (MUP) 978-80-7638-036-3
ISBN (AAU) 978-80-907602-9-5