GOSPODARKA I SPOŁECZEŃSTWO
W EUROPEJSKIEJ PERSPEKTYWIE

GOSPODARKA I SPOŁECZEŃSTWO W EUROPEJSKIEJ PERSPEKTYWIE

KOMPETENCJE JUTRA CZYLI CZEGO PRZYSZŁOŚĆ BĘDZIE WYMAGAŁA OD NAS I NASZYCH DZIECI

Redakcja
Elżbieta Majchrzak-Kłokocka

ELBLĄSKA UCZELNIA
HUMANISTYCZNO-EKONOMICZNA

Elbląg 2021

Recenzenci

Prof. dr hab. Przemysław Dąbrowski, Katedra Administracji i Socjologii
Akademii Pomorskiej w Słupsku

Dr Paweł Galiński, Wydział Zarządzania Uniwersytetu Gdańskiego
Adiunkt Elbląskiej Uczelni Humanistyczno-Ekonomicznej

Skład i łamanie

Oficyna Wydawnicza Edytor.org
Lidia Ciecierska

Korekta

Zofia Ciecierska

ISBN xxxxxxxxxxxxxxxxxxx

Wydawca

Elbląska Uczelnia Humanistyczno-Ekonomiczna
ul. Lotnicza 2, 82-300 Elbląg
tel. 55 239 38 02, fax 55 239 38 01
www.euh-e.edu.pl

Druk i oprawa

TOTEM.COM.PLSp. z o.o.

SPIS TREŚCI

DWUDZIESTOLECIE ELBLĄSKIEJ UCZELNI HUMANISTYCZNO-EKONOMICZNEJ (2001–2021)

CZĘŚĆ I. GOSPODARKA PRZYSZŁOŚCI

CZĘŚĆ II. RYNEK PRACY, GOSPODARKI I EDUKACJI

CZĘŚĆ III. JAKIE KOMPETENCJE ZAGWARANTUJĄ WEJŚCIE I UTRZYMANIE SIĘ NA RYNKU PRACY?

DWUDZIESTOLECIE
ELBLĄSKIEJ UCZELNI HUMANISTYCZNO-EKONOMICZNEJ

2001-2021

Słowa kluczowe: zarządzanie zasobami ludzkimi, wynagrodzenie, satysfakcja z pracy, motywacja.

ABSTRACT

Remuneration for work and determinants of job satisfaction

This article presents the issue of the job satisfaction and discussed in detail the factors determining the feeling of job satisfaction. The assessment of the workplace significantly determines the degree of involvement in the performance of assigned tasks and the level of motivation. The article reviews the literature and presents the results of own research.

Keywords: human resources management, remuneration, job satisfaction, motivation.

NATALIIA MARYNENKO[01], IRYNA KRAMAR[02], NATALIA HARMATIY[03], ECATERINA DANIELA ZECA[04], HALYNA TSIKH[05], SERHII HARMATII[06]

MODELING OF BANKING STRUCTURES' FINANCIAL STABILITY IMPROVEMENT

In modern times companies', including banking structures, successful business activities require a research of unforeseen factors (changes of political situation in the country, fluctuations in currency exchange rates, coronavirus etc.) impact and further possible challenges that cannot be predicted. Preparation to future crises is one of the five areas which the United Nations Development Program in

01 D.Sc. (Econ.), Professor, Department of Economics and Finance, Ternopil Ivan Puluj National Technical University, Ternopil, Ukraine.
02 D.Sc. (Econ.), Associate Professor, Department of Economics and Finance, Ternopil Ivan Puluj National Technical University, Ternopil, Ukraine.
03 Ph.D. (Econ.), Associate Professor, Department of Economic Cybernetics, Ternopil Ivan Puluj National Technical University, Ternopil, Ukraine.
04 PhD, CEO of CDEAMIA, University Dunarea de Jos of Galati, Galati, Romania.
05 Ph.D. (Econ.), Associate Professor, Dean of the Faculty of Economics and Management, Ternopil Ivan Puluj National Technical University, Ternopil, Ukraine.
06 Post-graduate student,Department of Economics and Finance, Ternopil Ivan Puluj National Technical University, Ternopil, Ukraine.

Ukraine[1] considers as an important and crucial one for the country in order to become stronger and more resilient after the coronavirus crisis. The government needs to focus on strengthening the resilience of its institutions and infrastructure to shocks.

Aim of the adopted State Economic Stimulus Program[2] to overcome the negative effects caused by the restrictive measures to prevent the occurrence and spread of acute respiratory disease COVID-19 caused by coronavirus SARS-CoV-2020 for 2020–2022 is to implement a comprehensive system and sustainable development of Ukraine's economy and increase employment level by maintaining its existing level and stimulating creation of new jobs. One of the initiatives within the Program are activities aimed at improving access to finance.

Therefore, the development of modern models of companies development, banking structures in particular, aimed at improvement of the enterprises' financial stability in order to survive during the crisis of both national and world economies is an urgent task.

Aim of the research is to improve banks investment, economic and financial stability by using a modern model based on economic and mathematical modeling, which harmonizes the issues of taking into account the profitability of banking institution, as well as all possible risks which might impact bank's activities.

1 Gercheva Dafina. Five pillars for building forward better after COVID-19, 2020; https://www.ua.undp.org/content/ukraine/en/home/blog/2020/five-pillars-for-building-forward-better-after-COVID-19.html [accessed: 10.02.2021].

2 State Economic Stimulus Program to overcome the negative effects caused by the restrictive measures to prevent the occurrence and spread of acute respiratory disease COVID-19 caused by coronavirus SARS-CoV-2020 for 2020–2022; https://www.kmu.gov.ua/npas/pro-zatverdzhennya-derzhavnoyi-programi-stimulyuvannya-ekonomiki-534–270520 [accessed: 20.02.2021] (in Ukrainian).

ANALYSIS OF RECENT RESEARCHES AND PUBLICATIONS

Stochastic processes that occur in the world economy are taking place in the activities of banking structures, so the problem of their financial stability assessment is in focus of scientific research for a significant number of domestic and foreign scientists, in particular, L. Barton, D. Diamond, P. Diebwig, E. Carletti, S. Claessens, A. Fatás, X. Vives[3], B. Gadanecz, K. Jayaram[4], M. Shahchera, N. Jouzdani[5], A. Tanda[6], O. Didenko, S. Dordevic[7] etc. In addition, a significant contribution to the study of theoretical and methodological approaches to diagnosing banks and the banking system financial stability has been made by Ukrainian scientists V. Kovalenko, Yu. Garkusha[8], O. Dzyibliuk, R. Mykhailiuk, Zh. Dovhan, M. Zvieriakov, O. Serhieieva and others.

3 Carletti E., Claessens S., Fatás A. and Vives X. The bank business model in the post-Covid-19 world, 2020; https://voxeu.org/article/bank-business-model-post-covid-19-world [accessed: 25.02.2021].

4 Gadanecz B., Jayaram K. Measures of financial stability – a review, *IFC Bulletin*, 2008, No. 31, pp. 365–80.

5 Shahchera M., Jouzdani N. The impact of regulation on soundness banking, *International Conference of Business and Economics Research* (*Kuala Lumpur, Malaysia),* 2011, *V*ol. 1 (IACSIT Press), pp 152–56.

6 Tanda A. The effects of bank regulation on the relationship between capital and risk, *Comparative Economic Studies*, 2015, No. 57 (1), pp. 31–54.

7 Didenko O., Dordevic S. The optimization of banking regulation intensity from the perspective of financial stability in banking sector: an empirical analysis, *Financial Markets, Institutions and Risk,* 2017, Volume 1, Issue 1, pp. 43–53.

8 Kovalenko V., Garkusha Yu. Theoretical and methodological approaches to the assessment of the banking system financial stability, *Bulletin of the National Bank of Ukraine,* 2013, No. 9, pp. 35–40 (in Ukrainian).

RESEARCH RESULTS

Weakness of the sustainable and secure development system, lack of effective methods to protect financial activities from external and internal threats all determine the instability and insecurity of the financial system[9]. Such instability is a threat not only for the economies of those countries where it is observed, but also to the world economy. This fact makes it necessary to ensure financial stability.

The world economic scientific community is working on the issue of crisis caused by the pandemic of COVID-19, as the crisis has affected all economies' strategic sectors. Ways to overcome the economic crisis and strengthen financial stability for real sectors of the economy and banking system in particular are suggested in[10]: «…continued uncertainty about the scale and duration of the economic impact of the pandemic continues to pose strains on the financial system. Internationally coordinated action to support a well-functioning, resilient financial system and well-functioning and open markets remains a priority».

The issue of changing new forms of technology in the activities of financial structures and banking systems are researched in the articles of leading European scholars[3]. Application of new payment forms leads the activities of financial structures to a new level of development and at the same time they require new methods of financial stability assessment.

That is, the digitalization of the entire financial system and increase of virtual money in the circulation requires regulators to use new approaches of assessment of financial institutions activities as well as banking system, in particular.

9 Vysotska I. Problems of Ukraine's financial system stability assurance, *Scientific bulletin of Lviv State University of Internal Affairs Economics,* 2012, No. 2, pp. 30–38 (in Ukrainian).

10 FSB Report COVID-19 pandemic: Financial stability implications and policy measures taken; https://www.fsb.org/wp-content/uploads/P150420.pdf [accessed: 10.03.2021]

Regulatory approaches to the financial performance of banking structures assessment are no longer quite effective; future is where modern valuation models operating online are implied, and without elements of modeling and application of modern information technology it will be increasingly difficult to conduct.

Modern methods of economic and mathematical modeling, which will make it possible to investigate the optimal assets structure in the portfolio of a commercial or public bank, are suggested to be used in the paper. Such methods include the model of risk and profitability assessment by H. Markowitz. This model allows to study the maximum profitability of bank's securities or assets portfolio simultaneously with the calculation of risk for such activities, which will significantly increase bank's financial stability. It is a classical method of investment portfolio (IP) optimization and accepts the standard deviation of the profitability value as a risk. The greater the value of this indicator, the more risky the portfolio will be.

In his research, H. Markowitz considered the fact that the value of the return on investment securities are random variables, distributed according to the normal (Gaussian) law. The scientist believed that when forming his/her portfolio, the investor evaluates only two indicators: the expected return E (r) and the standard deviation (they are the only ones to determine the probability density of random numbers under normal distribution). The investor must assess the profitability and standard deviation of each portfolio and select the one that ensures maximum profitability at an acceptable level of risk or minimum risk at a given level of expected profitability.

The problem of the corresponding portfolio structure optimization by achieving a given profitability with minimal risk is called the Markowitz problem (the mathematical formalization was suggested by J. Tobin)[11].

11 Rogatynskyi R., Garmatiy N. *Handbook on Mathematical Methods of Free Market Economy for Specialists-Cybernetics*, Ternopil: JSC Publishing House Aston, 2015, 200 p. (in Ukrainian).

If securities profitability values of previous periods are analyzed, the covariance is calculated as:

$$\delta_{i.j} = \sum_{i=1}^{N} \left| r_{i.j} - E(r_i) \right| x \left| r_{j.i} - E(r_j) \backslash (N-1) \right| \quad (1)$$

where $\delta_{i,j}$ – covariance between securities profitability values.

$$R_{i.j} = \sum_{n=1}^{n} r_{i.j} w_{i.j} \rightarrow max \quad (2)$$

where r_i – return of the i-th security or investment for a certain period;

$w_{i,j}$ – share of the total security or investment in the total portfolio.

$$\delta_n^2 = \sum_{i=1}^{n} w_i^2 \delta_i^2 + \sum_i^n \sum_j^n w_i r_j P_{i.j} \delta_i \delta_j \rightarrow min \quad (3)$$

$$\sum_{i=0}^{n} w_i = 1,$$

The analytically mentioned problem of continuous function with two constraints minimization is solved by the method of Lagrange undetermined multipliers[11].

Main disadvantages of the classical approach are as following: the requirement for a normal distribution of profitability values, the ability to consider only specific profitability values and the necessity to establish the probability of their obtaining. Risk is considered as each deviation from the planned indicators, both to a lesser or greater extent. To add and improve the Markowitz model it is also possible to use the model of optimization of banking institution securities or assets portfolio called the Sharp model. Modeling of the improvement of banking institutions financial stability through the use of the Markowitz model makes it possible to establish the maximum allowable profitability yield of banking institutions at correlation with the magnitude of risk when a particular package of banking institution securities is used.

Input data for the modeling of banking institution's financial stability is carried out on the example of OTP Bank indicators (table 1).

Table 1. Input data for modeling – financial indicators of OTP Bank [thous. UAH]

Bank assets	As of 31.12.2020	Share, %
Cash and accounts at the National Bank of Ukraine	3,510,420	6.02
Money in banks	13,628,078	23.36
Loans to customers	27,638,193	47.38
Investments measured at fair value through other comprehensive income	6,602,257	11.32
Investments measured at amortized cost	5,901,418	10.12
Fixed and intangible assets	734,358	1.26
Current income tax assets	90	0.0002
Deferred income tax assets	76,544	0.13
Investment real estate	27,857	0.05
Other assets	219,864	0.38
Portfolio, total	58,339,079	100%

Source: Official website of OTP Bank; https://www.otpbank.com.ua [accessed: 26.04.2021]

According to the mathematical representation of the Markowitz model and using the Mathcad software, banking institution's profitability is calculated in order to assess its stability.

D:=(3510420;13628078;27638193;6602257;5901418;734358;90;76544;27857;219864)

$$Ds := \begin{pmatrix} 2.32 & 2.18 & 1.94 & 1.01 & 1.56 \\ 2.51 & 3.71 & 2.12 & 2.08 & 1.81 \\ 27.76 & 21.09 & 18.20 & 17.33 & 18.17 \\ 1.11 & 0.69 & 1.40 & 0.25 & 0.09 \\ 3.68 & 4.46 & 2.61 & 3.01 & 0.65 \\ 0.51 & 0.42 & 0.35 & 0.41 & 0.37 \\ 0.13 & 0.19 & 0.19 & 0.01 & 0.01 \\ 0.18 & 0.47 & 0.72 & 0.64 & 0.50 \\ 0.04 & 0.04 & 0.18 & 0.22 & 0.20 \\ 0.45 & 0.38 & 0.36 & 0.60 & 0.29 \end{pmatrix}$$

>> Ch: = (6.02; 23.36; 47,38; 11,32; 10,12; 1.26; 0,0002; 0,13; 0,05; 0,38),

where D – value of assets during the previous year;
Ds – value of assets during all studied years;
Ch – assets share in IP.

In order to calculate the IP profitability, it is necessary to multiply the corresponding elements of the matrix, not the whole matrix, so the function $\overrightarrow{f(M)}$ is used. To calculate the profitability, the sum of two matrices elements product is found by using the function Σv.

$$Rp := \left(\overrightarrow{D \cdot \frac{Ch}{100}}\right) =$$

	0
0	0.137
1	0.163
2	19.943
3	0.032
4	0.349
5	$6.579 \cdot 10^{-3}$
6	$3.891 \cdot 10^{-4}$
7	$8.869 \cdot 10^{-4}$
8	$3.938 \cdot 10^{-5}$
9	$5.415 \cdot 10^{-3}$

$$R := \sum Rp = 20.638$$

Thus, IP profitability is UAH 20,638 thousand.

The next step is to calculate the portfolio risk. In the Mathcad, it is possible to select only columns from the matrix as individual matrix vectors. Therefore, matrix Ds is transposed by using the function M^T.

$A := Ds^T =$

	0	1	2	3	4	5	6	7	8	
0	2.32	2.51	27.76	1.11	3.68	0.51	0.13	0.18	0.04	
1	2.18	3.71	21.09	0.69	4.46	0.42	0.19	0.47	0.04	
2	1.94	2.12	18.2	1.4	2.61	0.35	0.19	0.72	0.18	
3	1.01	2.08	17.33	0.25	3.01	0.41	0.01	0.64	0.22	
4	1.56	1.81	18.17	0.09	0.65	0.37	0.01	0.5		...

Each of the columns standard deviation is found. Based on the obtained results a vector is formed. In the Mathcad, the first column of the matrix has the ordinal number 0, the second – 1, and so on. Using the function Stdev () the standard deviation of each column of the transposed matrix A (i.e., the matrix D term, which means the profitability of each security) is calculated.

$$S1 := Stdev\left(A^{\langle 0 \rangle}\right) = 0.528$$

$$S2 := Stdev\left(A^{\langle 1 \rangle}\right) = 0.749$$

$$S3 := Stdev\left(A^{\langle 2 \rangle}\right) = 4.296$$

$$S4 := Stdev\left(A^{\langle 3 \rangle}\right) = 0.555$$

$$S5 := Stdev\left(A^{\langle 4 \rangle}\right) = 1.432$$

$$S6 := Stdev\left(A^{\langle 5 \rangle}\right) = 0.062$$

$$S7 := Stdev\left(A^{\langle 6 \rangle}\right) = 0.091$$

$$S8 := Stdev\left(A^{\langle 7 \rangle}\right) = 0.207$$

$$S9 := Stdev\left(A^{\langle 8 \rangle}\right) = 0.089$$

$$S10 := Stdev\left(A^{\langle 9 \rangle}\right) = 0.118$$

Matrix of the standard deviation of banking institution securities profitability is calculated.

$$S := \begin{pmatrix} S1 \\ S2 \\ S3 \\ S4 \\ S5 \\ S6 \\ S7 \\ S8 \\ S9 \\ S10 \end{pmatrix}$$

S =

	0
0	0.528
1	0.749
2	4.296
3	0.555
4	1.432
5	0.062
6	0.091
7	0.207
8	0.089
9	0.118

Correlation coefficients between investment assets are calculated in the Mathcad software.

$A1 := A^{\langle 0 \rangle}$ $A2 := A^{\langle 1 \rangle}$ $A3 := A^{\langle 2 \rangle}$ $A4 := A^{\langle 3 \rangle}$ $A5 := A^{\langle 4 \rangle}$ $A6 := A^{\langle 5 \rangle}$

$$A1 = \begin{pmatrix} 2.32 \\ 2.18 \\ 1.94 \\ 1.01 \\ 1.56 \end{pmatrix} \quad A2 = \begin{pmatrix} 2.51 \\ 3.71 \\ 2.12 \\ 2.08 \\ 1.81 \end{pmatrix} \quad A3 = \begin{pmatrix} 27.76 \\ 21.09 \\ 18.2 \\ 17.33 \\ 18.17 \end{pmatrix} \quad A4 = \begin{pmatrix} 1.11 \\ 0.69 \\ 1.4 \\ 0.25 \\ 0.09 \end{pmatrix} \quad A5 = \begin{pmatrix} 3.68 \\ 4.46 \\ 2.61 \\ 3.01 \\ 0.65 \end{pmatrix} \quad A6 = \begin{pmatrix} 0.51 \\ 0.42 \\ 0.35 \\ 0.41 \\ 0.37 \end{pmatrix}$$

$A7 := A^{\langle 6 \rangle}$ $A8 := A^{\langle 7 \rangle}$ $A9 := A^{\langle 8 \rangle}$ $A10 := A^{\langle 9 \rangle}$

$$A7 = \begin{pmatrix} 0.13 \\ 0.19 \\ 0.19 \\ 0.01 \\ 0.01 \end{pmatrix} \quad A8 = \begin{pmatrix} 0.18 \\ 0.47 \\ 0.72 \\ 0.64 \\ 0.5 \end{pmatrix} \quad A9 = \begin{pmatrix} 0.04 \\ 0.04 \\ 0.18 \\ 0.22 \\ 0.2 \end{pmatrix} \quad A10 = \begin{pmatrix} 0.45 \\ 0.38 \\ 0.36 \\ 0.6 \\ 0.29 \end{pmatrix}$$

The correlation coefficients between the two vectors are calculated by using the function corr (x1,x2).

$c1 := \text{corr}(A1, A2) = 0.575$

$c2 := \text{corr}(A2, A3) = 0.357$

$c3 := \text{corr}(A3, A4) = 0.441$

$c4 := \text{corr}(A4, A5) = 0.448$

$c5 := \text{corr}(A5, A6) = 0.568$

$c6 := \text{corr}(A6, A7) = 0.091$

$c7 := \text{corr}(A7, A8) = -0.069$

$c8 := \text{corr}(A8, A9) = 0.749$

$c9 := \text{corr}(A9, A10) = 0.123$

The IP risk is calculated through the calculation of the product of the assets share vectors and the standard deviation.

$Z := \overrightarrow{(S \cdot Ch)} =$

	0
0	3.117
1	4.871
2	308.454
3	1.61
4	13.601
5	0.08
6	0.027
7	0.103
8	$8.877 \cdot 10^{-3}$
9	0.141

The vector is decomposed into separate numbers.

$Z1 := (Z^T)^{\langle 0 \rangle} = (1.226)$

$Z2 := (Z^T)^{\langle 1 \rangle} = (1.881)$

$Z3 := (Z^T)^{\langle 2 \rangle} = (119.327)$

$Z4 := (Z^T)^{\langle 3 \rangle} = (0.618)$

$Z5 := (Z^T)^{\langle 4 \rangle} = (5.265)$

$Z6 := (Z^T)^{\langle 5 \rangle} = (0.031)$

$Z7 := (Z^T)^{\langle 6 \rangle} = (0.012)$

$Z8 := (Z^T)^{\langle 7 \rangle} = (0.037)$

$Z9 := (Z^T)^{\langle 8 \rangle} = (3.496 \times 10^{-3})$

$Z10 := (Z^T)^{\langle 9 \rangle} = (0.053)$

Bank activity risk is calculated according to the Markowitz model.

$$\xi := Z1 \cdot Z2 \cdot c1 + Z2 \cdot Z3 \cdot c2 + Z3 \cdot Z4 \cdot c3 + Z4 \cdot Z5 \cdot c4 + Z5 \cdot Z6 \cdot c6 + Z6 \cdot Z7 \cdot c7 + Z7 \cdot Z8 \cdot c8 + Z8 \cdot Z9 \cdot c9 = 774.663$$

$$\delta := \sqrt{\xi} = 27.833$$

Therefore, the investment portfolio risk indicator is equal to 27,833.

According to the carried out modeling of the financial stability improvement on the example of OTP Bank, it can be stated that there is a threat to the banking institution, as risk exceeds profitability of bank's assets portfolio because its largest share (47.38%) belongs to the loans to customers. Therefore, this situation is to be adjusted in the structure of the bank's assets as this may result in the bank's illiquidity.

CONCLUSION

The use of modern tools of economic and mathematical modeling in the improvement of banking sector financial stability assessment, i.e. matching the profitability of bank financial activities with the risk level, will make it possible to diagnose the state of financial institutions prior illiquidity and risk of banking sector functioning. This will allow to minimize the crises' negative impact on the domestic economy and to foster its further successful development.

REFERENCES

Gercheva Dafina. Five pillars for building forward better after COVID-19, 2020; https://www.ua.undp.org/content/ukraine/en/home/blog/2020/five-pillars-for-building-forward-better-after-COVID-19.html [accessed: 10.02.2021].

State Economic Stimulus Program to overcome the negative effects caused by the restrictive measures to prevent the occurrence and spread of acute respiratory disease COVID-19 caused by coronavirus SARS-CoV-2020 for 2020–2022; https://www.kmu.gov.ua/npas/pro-zatverdzhennya-derzhavnoyi-programi-stimulyuvannya-ekonomiki-534–270520 [accessed: 20.02.2021] (in Ukrainian).

Carletti E., Claessens S., Fatás A. and Vives X. The bank business model in the post-Covid-19 world, 2020; https://voxeu.org/article/bank-business-model-post-covid-19-world [accessed: 25.02.2021].

Gadanecz B., Jayaram K. Measures of financial stability – a review, *IFC Bulletin*, 2008, No. 31, pp. 365–80.

Shahchera M., Jouzdani N. The impact of regulation on soundness banking, *International Conference of Business and Economics Research* (*Kuala Lumpur, Malaysia),* 2011, Vol. 1 (IACSIT Press), pp. 152–56.

Tanda A. The effects of bank regulation on the relationship between capital and risk, *Comparative Economic Studies*, 2015, No. 57 (1), pp. 31–54.

Didenko O., Dordevic S. The optimization of banking regulation intensity from the perspective of financial stability in banking sector: an empirical analysis, *Financial Markets, Institutions and Risk,* 2017, Volume 1, Issue 1, pp. 43–53.

Kovalenko V., Garkusha Yu. Theoretical and methodological approaches to the assessment of the banking system financial stability, *Bulletin of the National Bank of Ukraine,* 2013, No. 9, pp. 35–40 (in Ukrainian).

Vysotska I. Problems of Ukraine's financial system stability assurance, *Scientific bulletin of Lviv State University of Internal Affairs Economics,* 2012, No. 2, pp. 30–38 (in Ukrainian).

FSB Report COVID-19 pandemic: Financial stability implications and policy measures taken; https://www.fsb.org/wp-content/uploads/P150420.pdf [accessed: 10.03.2021]

Rogatynskyi R., Garmatiy N. *Handbook on Mathematical Methods of Free Market Economy for Specialists-Cybernetics*, Ternopil: JSC Publishing House Aston, 2015,. 200 p. (in Ukrainian).

Official website of OTP Bank; https://www.otpbank.com.ua [accessed: 26.04.2021].

SUMMARY

The analysis of possible ways of banking institutions' financial stability improvement as an element of ensuring sustainable economic development of the country is presented in the article. The Markowitz model, which investigates the issues of taking into account both the profitability of banking institution and all possible risks which might impact its activities, is used in the paper in order to improve investment climate, economic and financial stability of the bank. The modelling of banking institution financial stability is carried out on the example of OTP Bank. According to the carried out modelling of the OTP Bank financial stability improvement, a particular threat to the banking institution was determined as risk exceeds profitability of bank's assets portfolio. It is found that this situation is due to the fact that the largest share of the portfolio (47.38%) belongs to the loans to customers which is recommended to be adjusted in the structure of the bank's assets.

Keywords: banking system, financial stability, Markowitz model

Słowa kluczowe: system bankowy, stabilność finansowa, model Markowitza.

INFORMACJA O WYDAWNICTWIE EUH-E

Uczelnia posiada wydawnictwo umożliwiające rozpowszechnianie publikacji pracowników uczelni zarówno w kraju, jak i zagranicą. Wydawnictwo stwarza pracownikom uczelni warunki do publikowania podręczników akademickich, monografii i artykułów będących rezultatem badań własnych.

Owocem działalności wydawnictwa od 2002 roku jest 100 pozycji z różnych dziedzin nauki. Są to publikacje:

1. Magdalena Dubiella-Polakowska, „Życie społeczne Elbląga w latach 1945–2000 (oświata, kultura, opieka, pomoc, sport i rekreacja)", EUH-E, Elbląg 2002, ss. 580, 24 cm.
2. „Acta Elbingensia. Rocznik Naukowy Elbląskiej Uczelni Humanistyczno-Ekonomicznej", t. 1, EUH-E, Elbląg 2003, ss. 301, 24 cm.
3. „Acta Elbingensia. Rocznik Naukowy Elbląskiej Uczelni Humanistyczno-Ekonomicznej", t. 2, EUH-E, Elbląg 2004, ss. 547, 24 cm.
4. „Acta Elbingensia. Rocznik Naukowy Elbląskiej Uczelni Humanistyczno-Ekonomicznej", t. 3, EUH-E, Elbląg 2005, ss. 477, 24 cm.
5. Jurij Głazunow, „Matematyka Wyższa. Zbiór zadań z analizy funkcji jednej zmiennej", EUH-E, Elbląg 2003, ss. 284, 24 cm.
6. Norbert Michta, Jan Sobczak, „Zapomniany polemista i apostata doktryny Róży Luksemburg. Stanisław Trusiewicz-Zalewski (1871–1918)", EUH-E, Elbląg 2004, ss. 262, 24 cm.