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Information Systems in Fiscal Administration and Modeling of Excise Tax

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Abstract

The purpose of the article is to substantiate the fiscal role of the excise tax by studying its information and functional potential and to model the dynamics of its payment by the brewing industry. Excise tax occupies a special place in a tax system of each state because, in addition to significant fiscal importance, it has a considerable regulatory impact on the production and consumption of certain categories of goods. Based on information systems in the article

analyses and monitors the indicators of the excise tax payments on goods produced in Ukraine on the example of a particular enterprise in the brewing industry. By means of the initial data analysis of autocorrelation functions of volumes' indicators of the accrued excise taxes on beer the expediency of modelling realization of such indicator dynamics on the basis of ARIMA model is proved. The analytical and statistical approaches to the formation of models for the implementation of forecast for the calculation of excise tax on beer of brewing industry enterprises are improved. The proposed approach is based on the values of autocorrelation of balances and partial autocorrelation, as well as methods of analysis of time series with gaps, which allows to use it in the economic activity of enterprises to make forecasts for the calculation and payment of the excise tax. This will produce financial effects for the brewing industry in terms of cost optimization and minimization of the excise tax risks.

Keywords: Information Systems, Fiscal Efficiency, Tax Administration, Excise Tax, Functions of the Excise Tax, Modeling Methods, Brewing Industry.

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Introduction

Today, excise taxation is an effective tool for implementation of the strategic objectives of tax policy in the interests of society for the sustainable and long-term development of civilization. The excise tax in the tax system is revealed as a promising fiscal instrument that can be transformed into a significant resource of filling the revenue part of the country's budget. It is characterized by uniformity of revenues and rapid mobilization to the state treasury, in addition, it is easily implemented, managed and controlled. Strengthening the functional role of the excise tax in the regulation of social and economic processes leads to the necessity to reinterpret and clarify its essential content and functions. The problem of the excise tax is limited to addressing the issues of compliance of its economic content with the social purpose, as well as identifying its special fiscal role in the tax system.

Tax policy in the field of excise taxation in Ukraine in the direction of strengthening its fiscal role is in line with European trends. Due to the excise tax, the state provides more than 10% of budget revenues. Improving the fiscal efficiency of excise taxation is possible by improving its administration procedures: simplification of tax procedures for taxpayers, the establishment of economically justified tax benefits, escalation control over their intended

use, and the introduction of electronic document management in the process of excise tax administration.

In modern world practice, in particular among some countries of the European Union, the non-fiscal (social) function of collecting the excise duties dominates over the fiscal one, as the tax is characterised by selectivity and taxation of certain goods only. Due to its pricing nature, the excise duty is a harmonized tax on the territory of the European Union. The harmonization of the excise duty in some EU member states aims to ensure constant competition between business entities, as well as to ensure the free circulation of the excise goods on the EU market (Sygut, 2018).

The main priority of the excise taxation today is an increasing reduction of harmful products consumption by population, stimulation to use alternative energy sources, transition to energy-saving technologies and so on. At the same time, in EU countries there is an incentive to consume low-alcohol beverages. Relatively low excise rates on natural wines and beer make these alcoholic beverages more attractive to buyers compared to strong alcoholic beverages, which have quite high excise rates. This directly affects the structure of alcohol consumption in EU countries, where the share of spirits in the overall structure of alcohol consumption is much lower than the share of wine and beer. In Ukraine, the situation is the opposite.

The beer industry occupies a significant niche in the processing industry of the world and Ukraine. It is profitable not only for investors and direct producers, but also for the state. It is important to emphasize that breweries are mostly large taxpayers, in addition, the specificity of the product currently determines the payment of taxes to the local budgets. The brewing industry is quite profitable and popular, so investing in beer production provides a very favourable financial prospects. According to the Internet portal “Business of Ukraine”, currently in beer production in Ukraine are engaged almost 200 businesses. The volume of their production allowed our country to take the fifth place in Europe in brewing (Vyhivska, 2015).

Along with the excise tax, malt beer enterprises in Ukraine pay other tax payments, which is characterized by the strengthening of the fiscal effect for the state. However, in the course of their activities, the brewing industry enterprises encounter a number of tax fluctuations. In this context, an important role is played by the indicators modelling of the excise tax charging by business entities in the brewing industry, which in the final procedural chain has an impact on the enterprise and on the fiscal component of budgetary resources.

Literature Review

A number of scientific researches by foreign and domestic scientists and specialists are devoted to the problems of theory and practice of using information systems in fiscal administration and modeling the excise tax including enterprises of the brewing industry.

The fiscal efficiency of the excise tax is to maximize revenues and minimize the cost of their obtaining. Recently, two main aspects of the analysis of fiscal efficiency of the excise tax have been popularized: in terms of the impact of tax policy instruments on the activity of economic system entities (producers and sellers of excisable products) (Neyapti et al., 2014; Semenchenko et. al., 2020; Gontareva et. al., 2020; Salman et. al., 2022) and filling the revenue part of the state (local) budget (Chiu et. al., 2021).

However, often the results of these assessments come into a conflict, when there is a high fiscal efficiency of the first criterion the diametrically different values of the offered indicator for the second criterion can be obtained. This complicates the process of forming a general conclusion of assessing the effectiveness of the excise tax administration.

W. Petty paid special attention to excises in his scientific works. This, in his study "Treatise of Taxes & Contributions" a separate section was devoted to excises, in which he noted the fairness of the application of this type of taxation. He also pointed to the possibility of using excise duty in regulation of both production and consumption of certain types of goods (Petty, 1662). A. Pigou in his work "The Economics of Welfare" justified the expediency of progressive income taxation and the application of universal excise duty (Pigou, 1920).

Among the relevant concepts of the excise taxation call attention the following:

- in the world practice, excise taxes are used to increase budget revenues, as well as a fee for the usage (Boesen, 2021; Levell et al., 2016);
- the architectonics of the excise tax is largely unified in all member states of the European Union, which leads to uninterrupted competition between business entities, including brewing industry (Sygut, 2018; Cnossen, 2005; Slavinskaite et al., 2022);
- the excise tax rates for groups of excisable goods (both domestic and foreign) should be higher than for groups of ordinary products (Svetalekth, 2018; Tegetaeva, 2012);
- the excise tax is transformed as a narrow object tax on consumption, which is charged on certain goods, services or activities (Rosenberg, 2015; Hines, 2007);
- for tax purposes the presence of the shadow sector remains an extremely acute social and economic problem in the production and circulation of alcoholic beverages (Krysovatyi et al.; Sainskyi, 2016);

- exemption from the excise duty is usually possible in two forms: in the traditional form (that is the tax is not payable) or in the form of reimbursement of the already paid tax (Lasiński-Sulecki, 2017).

It should be noted that the excise tax as a source of formation of the revenue part of the budgets in Ukraine can be considered quite risky. This is primarily due to the specifics of the excisable goods, vector changes in legislation, high rates on the most popular excisable goods, as well as the relatively low level of accounting of taxpayers and objects of taxation, which is a consequence of ineffective state control over excisable goods (Turianskyi, 2014).

In addition to the fiscal function, the excise tax performs a regulatory function, which is to influence various aspects of the activities of taxpayers and consumers of the excisable products (Kaganovska et al., 2022). The regulatory function of the excise tax is manifested in three main directions:

1) Restriction of the production and consumption of the excisable products;

2) Improvements in the cost structure of the production in the context of stimulating the growth of its efficiency, improvement of the quality of manufactured excisable goods and their consumer characteristics;

3) Profitability regulation of the excisable goods production. The impact of the excise duty on the profitability of certain goods production makes it possible to reduce the desire of producers to enter certain industries, including the production of spirits, alcohol, tobacco, mineral mining and so on (Voloshchuk, 2020).

Some scholars and experts in their researches focus on the advantages and disadvantages of the excise tax (Mankiw et. al., 2009; Mavlutova et. al., 2021; Piketty et. al., 2014; Babenko et. al., 2019; Blahun et. al., 2020). The advantages include the following:

- high speed of budget revenues;
- high fiscal efficiency;
- regular and fast budget receipts;
- no risk of non-payment in case of unprofitable production;
- Relative facility of administration and other.
- Among the disadvantages of the excise tax it should be focused on the following:
- reduction of income amount that could be used for savings;
- inclusion of VAT into the tax base, which increases the price of goods and can lead to double taxation;

- regular constant changes in tax legislation related to tax rates;
- Restriction of consumption, which in the long view may lead to production reduction etc.

In order to make a forecast of the effects or risks of the fiscal administration of the excise tax, some scientists emphasize the use of information systems and technologies in this direction (Hollander, 2009; Matveychuk, 2016; Zayats, 2009). This approach is often based on mathematical methods, statistical data and automated information systems.

Therefore, it can be considered objective to say that excises always had a large share in the total tax revenues of the state during the entire period of existence. In addition, in the vast majority of active use as a source of tax revenues and a means of state regulation of the economy, the excise tax had an exceptional fiscal value. The popularization of the social function of the excise tax has begun recently. At the same time, the formation of the optimal system of excise taxation is impossible without paying attention to its other stages, in particular, it concerns issues related to assessing the results of excise policy, as well as making appropriate adjustments at the macro level and implementing optimization measures based on micro level forecasting models.

Methodology

The effectiveness and efficiency of the hop growing industry and the complementarity of relations with the brewing industry as the main consumer of hop final products depend on the implementation of the state policy of Ukraine and legislative changes aimed, in particular, to simplify economic activity, increase employment and social protection of workers of this segment of the national economy.

The profitability of breweries largely depends on a combination of many factors: raw materials base, sales channels, taxation peculiarities, paying capacity of the population. Therefore, if companies have direct access to raw materials and markets in most cases it is a significant competitive advantage. However, tax instruments, in particular the excise taxation, are an important factor in regulating the brewing industry in the international and Ukrainian arenas. The issue of the excise taxation of brewing enterprises is relevant and opportune and requires consideration of the interests of the society, the state and the industry entities (Kostiana, 2013).

Methodological analysis of data on the calculation of the excise tax on beer can be carried out according to the statistics data without additional information and without taking into account the influence of external factors. In this case, it is advisable to include an array of their data into time series. The main task of statistical analysis of the time series is to build a mathematical model with the help of which the behaviour of the series for future periods can be explained and predicted. Since we need to forecast the excise tax for the future, we will use

the properties of the time series. In order for the time series to be properly formed, one of the important conditions must be observed – the comparability of its levels. Thus, the levels of the series should reflect the essence and purpose of the studied process and be homogeneous in economic content. The purpose of applied statistical analysis of the time series is to build a model of the series, which can be used to explain its behaviour and make a forecast for future periods (Luchko, 2020).

For the practical implementation of such an analysis it is important to consider the structure of the series and its probabilistic characteristics. After making a data curve and performing a preliminary analysis in the time series, the determined components are distinguished and withdrawn. Then, the study of the random component is carried out by constructing an analytical function that characterizes the dependence of the series levels on time. Such method of modelling the tendency of the time series is the most common and is called "analytical alignment of the time series". When the construction of the general model of the series is performed, its adequacy is checked, after which the future behaviour of the series is predicted.

To build models for forecasting the revenues of the excise tax on beer from enterprises in the brewing industry, it is advisable to use the methods of regression and moving average. In essence, the regression method is based on the construction of a line that "on average" deviates the least from the array of values that determines the behaviour of the baseline.

Mathematically, this is described by the equation (Ivashchuk et al., 2017):

$$y_t = \varphi_1 y_{t-1} + \varphi_2 y_{t-2} + \cdots + \varphi_p y_p + \varepsilon_t \,, \quad (1)$$

Where: y_t – the value of y in the moment of time t;

φ_i – coefficients of the equation $(i = 1,2, \dots p)$;

p – Autoregression order

ε_t – random variable.

At the same time, the moving average method is that each element of the series is disposed to the joint actions of the previous errors ε_i:

$$y_t = \omega_1 \varepsilon_{t-1} + \omega_2 \varepsilon_{t-2} + \cdots + \omega_q \varepsilon_{t-q} + \varepsilon_t \,, \quad (2)$$

Where: y_t – the value of y in the moment of time t;

ω_i – coefficients of the equation $(j = 1,2, \dots q)$;

q – The arrangement of the moving average;

ε_t – random variable.

For further research we use ARIMA model that combines these two methods and has the form:

$$y_t = \sum_{i=1}^{p} \varphi_i y_{t-1} + \sum_{j=0}^{q} \omega_j \varepsilon_{t-1} + const. \quad (3)$$

Results

Today, the main driver of the global beer market supply is Belgium, in particular AB InBev. Its share was 29.3% of the world beer production in 2018. In addition, the leading positions are occupied by companies from China (13.2%) and the Netherlands (13.0%). The Ukrainian company "Obolon" ranked 36th position in the world rankings.

When conducting a regional analysis, it is worth clarifying that in Ternopil region among beer producers the biggest amount of tax payments for the period from 2018 to 2020 was paid by LLC "Brewery "Opillia" – 186.7 million UAH to the Consolidated Budget of Ukraine, in particular, the growth rate in 2020 was 3.3%, which is 6.5% more than in the previous reporting period (see Fig. 1) (Tkachyk et al., 2018).

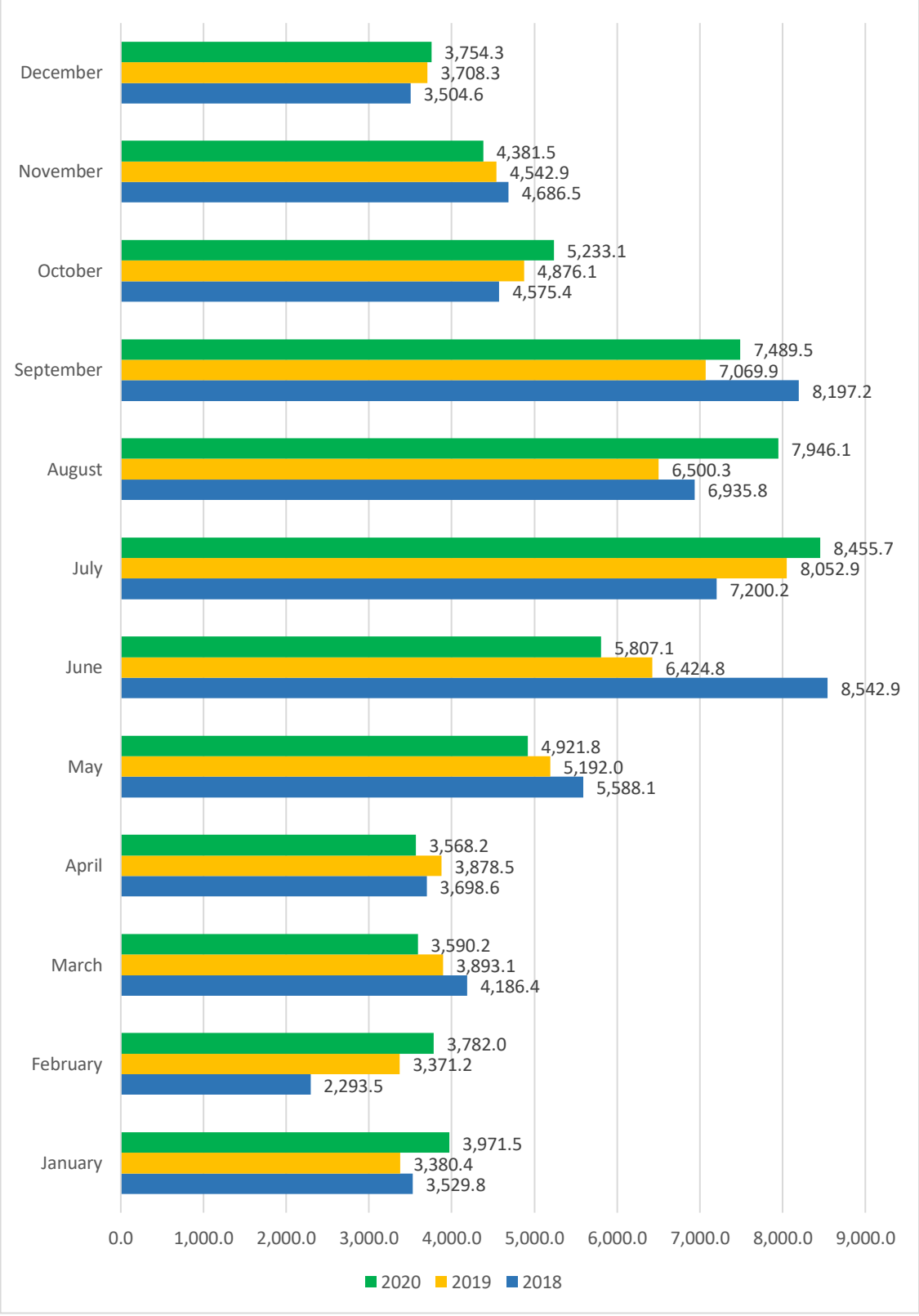

Figure 1. Dynamics of the excise tax payment on goods produced in Ukraine by LLC “Brewery “Opillia”, thousand UAH.

In order to better visualize and test the models for forecasting the excise tax revenues of enterprises in the brewing industry, we will conduct a graph (Fig. 1) and a histogram of the series (Fig. 3).

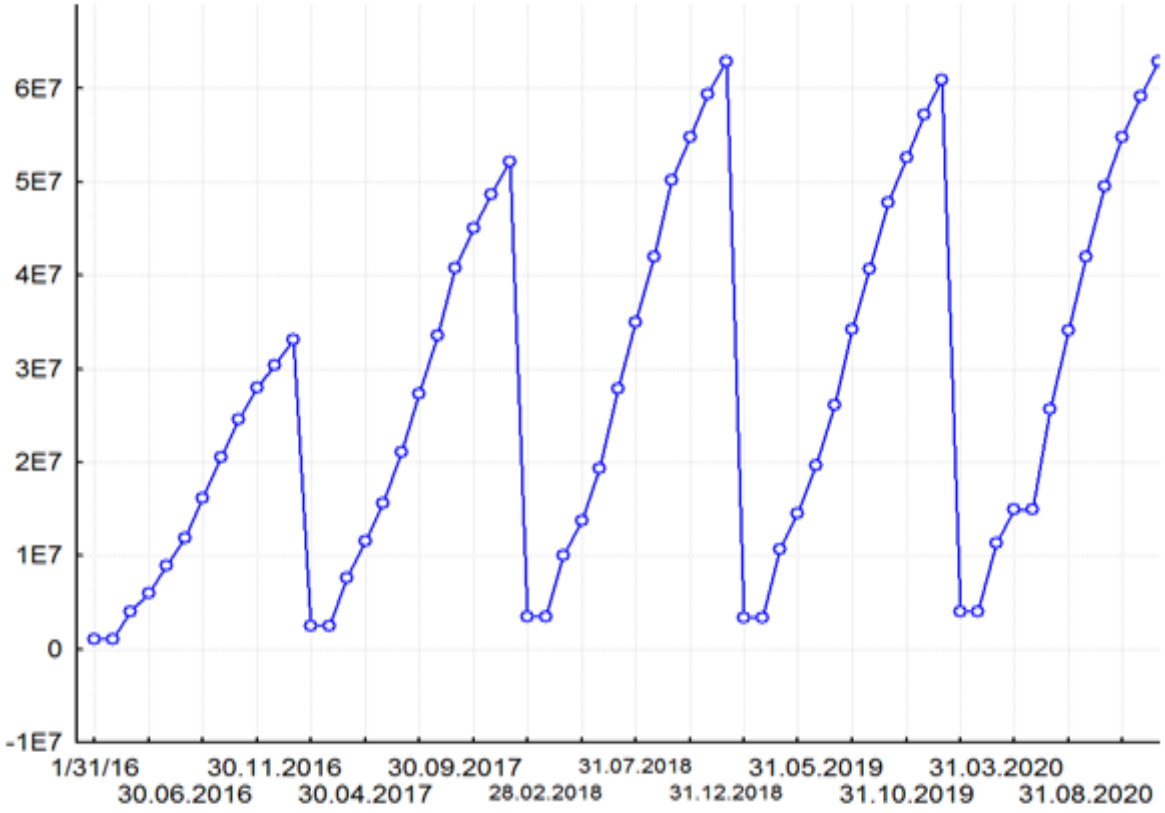

Figure 2. Line graph of the accrued excise taxes on beer of LLC "Brewery "Opillia" for the period from January 2016 to December 2020

Let us consider the time series on the excise tax on beer of the brewing industry. Based on the data for each month from January 2016 to December 2020 and the module "Time series analysis / Forecasting" of the package "Statistika", we obtained a graph of the series (Matveychuk, 2016). This series consists of 60 observational data and is characterized by seasonal periodicity. As the matter of fact, there is a reason to believe that it is a fluctuation around a certain level. We assume that the series cannot be defined as stationery, so we will transform the time series for further study.

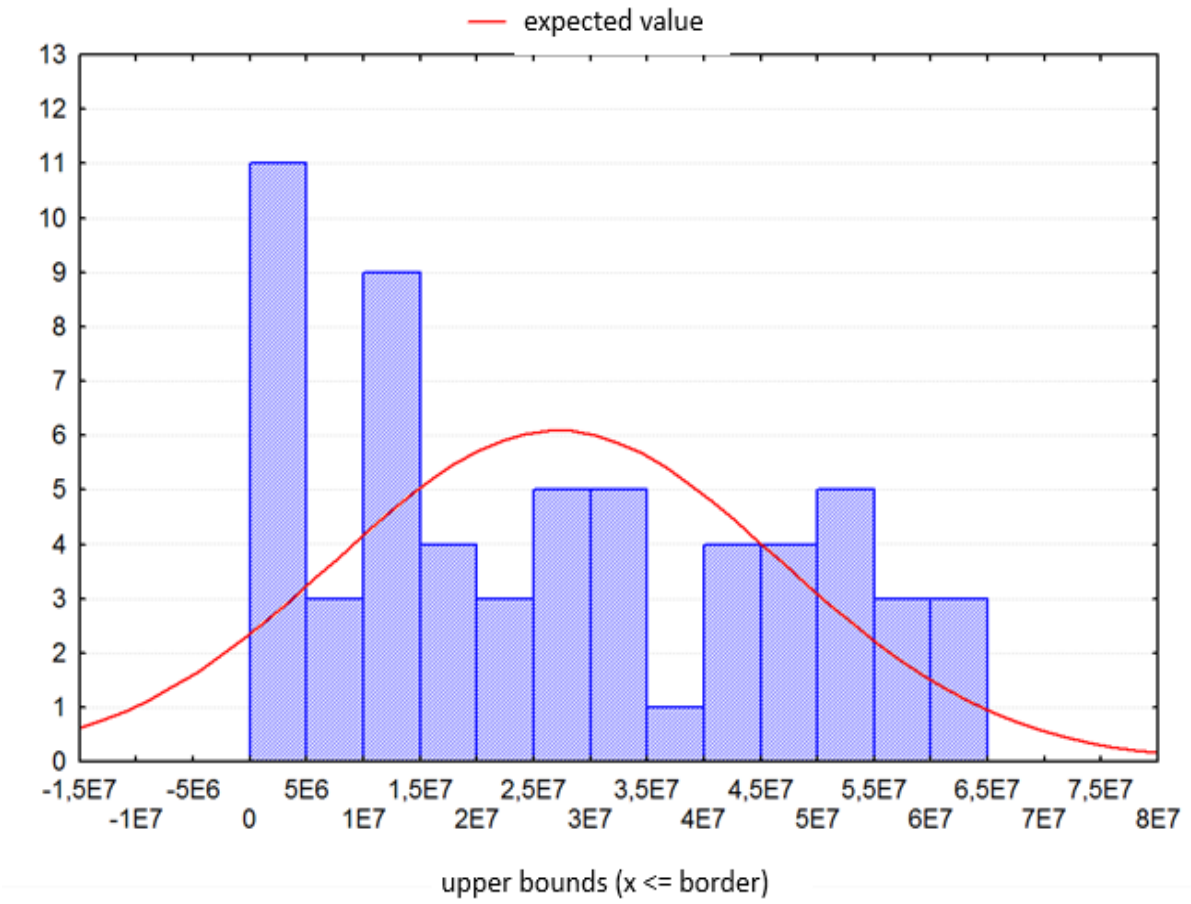

Figure 3. Histogram of the accrued excise taxes on beer of LLC "Brewery "Opillia" for the period from January 2016 to December 2020

The histogram of the amounts of accrued excise tax on beer of LLC "Brewery "Opillia" for the period from January 2016 to December 2020 shows that the series which is under the study is not normally distributed. For further research it is necessary to establish the dependence of this series. We divide the initial data into two components: a deterministic function and a random component (Hollander, 2009). The random component should be represented as a Gauss' series with independent increments. In order to determine the nature of the non-random component, we construct an autocorrelation function of the initial data (Fig. 4).

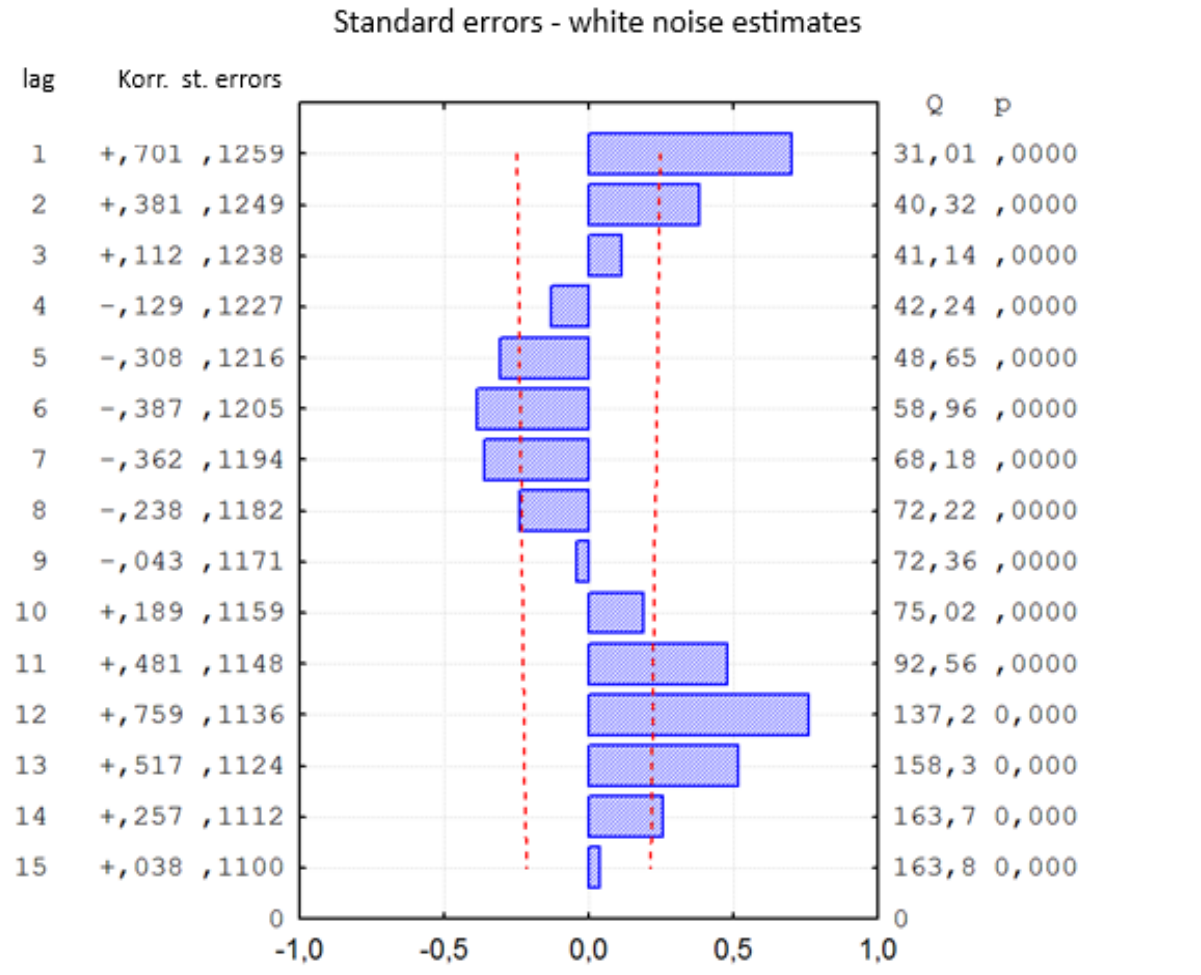

Figure 4. Function of autocorrelation of the amounts of accrued excise taxes on beer of LLC "Brewery "Opillia" for the period from January 2016 to December 2020

Having analysed the characteristics of autocorrelation functions of indicators of accrued excise taxes on beer of LLC "Brewery "Opillia", we can say that to model the dynamics of this indicator it is advisable to use autoregressive models.

Let us convert the original research series into a series of the form:

$$Dx(t) = x(t) - x(t-1)$$

The transformed series is shown on Figure 5.

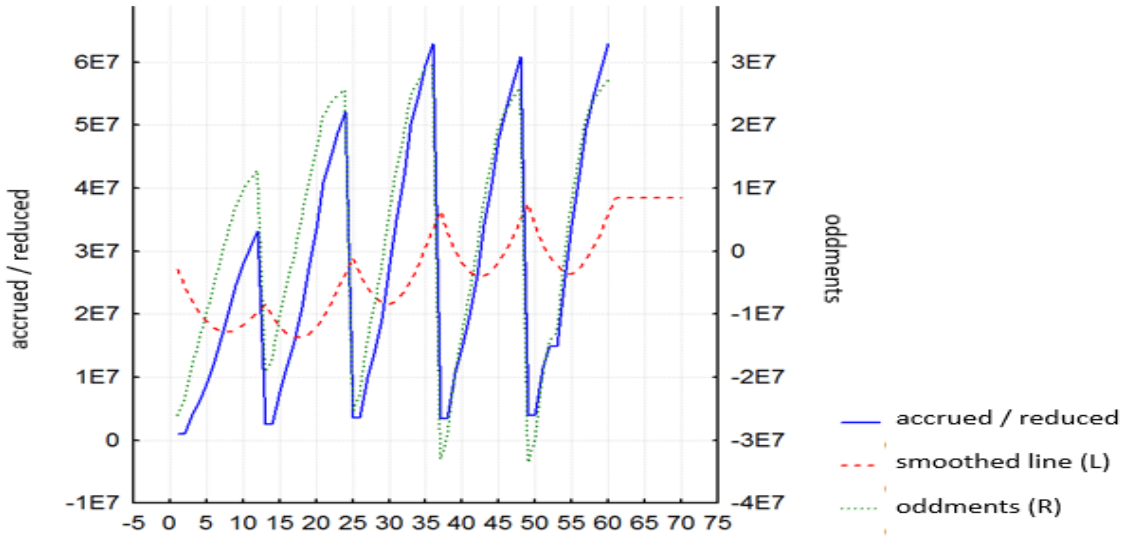

Figure 5. Dynamics of the accrued excise taxes on beer of LLC "Brewery "Opillia" for the period from January 2016 to December 2020 (transformed series)

Having tested the input data of the smoothed time series and the monthly accrued excise tax on beer of LLC "Brewery "Opillia" for the period from January 2016 to December 2020, using ARIMA-model, we conducted a study that resulted in certain models (A, B, C) (Table 1).

Table 1. Grouping of the received ARIMA-models

Parameters	Result:	Increased / Changed (by_month_1)				
	Transformations:	No				
	Model A	(1,0,0) MS Remainder = 193E12				
	Parameter	Asymptotic standard error.	Asymptotic t(59)	p	Lower confidence limit 95%	Higher confidence limit 95%
p(1)	0,938883	0,055941	16,78351	0,000000	0,826945	1,050520
Parameters	Result:	Increased / Changed (by_month_1)				
	Transformations:	No				
	Model B:	(1,0,0)(1,0,0) seasonal lag: 12 MS Remainder = 271E11				
	Parameter	Asymptotic standard error.	Asymptotic t(58)	p	Lower confidence limit 95%	Higher confidence limit 95%
p(1)	0,873348	0,063886	13,67032	0,000000	0,745466	1,001231
Ps(1)	0,999687	0,058220	17,17094	0,000000	0,883147	1,116226
Parameters	Result:	Increased / Changed (by_month_1)				
	Transformations:	No				
	Model C:	(1,0,1)(1,0,1) seasonal lag: 12 MS Remainder = 567E11				
	Parameter	Asymptotic standard error.	Asymptotic t(56)	p	Lower confidence limit 95%	Higher confidence limit 95%
p(1)	0,944830	0,041003	2,304291 E+01	0,000000	0,862691	1,026969
q(1)	0,842359	0,066101	1,274343 E+01	0,000000	0,709942	0,974776
Ps(1)	0,999893	0,000000	9,308036 E+11	0,000000	0,999893	0,999893
Qs(1)	-0,376320	0,100742	-3,735484E+00	0,000441	-0,578130	-0,174510

If we consider the residuals to choose the best model, that is in which model the residuals are the less that model is best, then this is the model (1, 0, 0) (1, 0, 0). As for the other two models, the residuals do not differ significantly there, so let us check the significance parameters of each model according to the Student's t-test.

With this aim, we set up two hypotheses:

1. H_0 – the parameters of the model are zero.
2. H_1 – not all parameters are zero (also an alternative hypothesis).

For each parameter φ_i and ω_j t_{calcul} are defined as a ratio of the modular regression coefficient to its standard error. Let us check the assumptions made above. The calculated value we compare to $t_{criter} = 2{,}006$ with the significance level of α = 0,01 and the numbers of degrees of freedom df = 58. Comparing the values of t_{calcul} and t_{criter} for each of the obtained parameters, we indicate that the hypothesis of the significance of all parameters in four models is confirmed so we accept the alternative hypothesis

Let us consider the last indicator p. The closer its value to zero is, the better is the result, the closer it is to or equals one, the insignificant is the parameter, therefore, all parameters are significant.

For better visualization, residual autocorrelation (ACF) and partial autocorrelation (PACF) were monitored for these models and it was found that all models except the model (1, 0, 0) (1, 0, 0) have one emission. The functions of partial autocorrelation show a decrease in the correlation dependence (Radchenko et al., 2018).

Based on the values of ACF and PACF and using the method of analysis of the time series with gaps (Interrupted Time Series Analysis Arima) we obtained forecast values for the calculation of the excise tax on beer for LCC "Brewery "Opillia" for different models.

To achieve this game, we compare the results of forecasting for these models (Table 2).

Table 2. Results of application of ARIMA-model

Monitoring A	forecast:	Model (1,0,0) seasonal lag: 12 (by_month_1)				
	Result:	Increased / Changed				
	start of initial data	1 End of initial data: 57				
	Forecast	Lower limit 90,0000%	Higher limit 90,0000%	standard error	observ.	remainder
58	46504801	22855342	70154260	14152090	54765133	8260332
59	43662551	11223108	76101995	19412111	59146627	15484076
60	40994013	2433469	79554556	23075043	62900931	21906918
61	38488568	-4755090	81732225	25877469		
62	36136249	-10850083	83122581	28117125		
63	33927698	-16126268	83981663	29952830		
64	31854127	-20755836	84464090	31482367		
65	29907288	-24856949	84671525	32771507		
66	28079434	-28515836	84674704	33867217		
67	26363294	-31798251	84524838	34804492		
Monitoring B	forecast:	Model (1,0,0) (1,0,0) seasonal lag: 12 (by_month_1)				
	Result:	Increased / Changed				
	start of initial data	1 End of initial data: 57				
	Forecast	Lower limit 90,0000%	Higher limit 90,0000%	standard error	observ.	remainder
58	54180756	45246896	63114616	5344647	54765133	584377,0
59	58524939	46663621	70386256	7095987	59146627	621688,2
60	62059781	48380453	75739108	8183605	62900931	841150,4
61	5008029	-9909756	19925813	8924507		
62	4876594	-10920672	20673860	9450654		
63	12131679	-4304795	28568153	9833057		
64	15598485	-1309299	32506270	10115017		
65	15510932	-1747688	32769552	10324903		
66	26160037	8638544	43681530	10482166		
67	34546340	16826964	52266715	10600548		
68	42431602	24562768	60300437	10689961		
69	49867791	31885794	67849788	10757660		
Monitoring C	forecast:	Model (1,0,1) (1,0,1) seasonal lag: 12 (by_month_1)				
	Result:	Нараховано / зменшено				
	start of initial data	1 End of initial data: 57				
	Forecast	Lower limit 90,0000%	Higher limit 90,0000%	standard error	observ.	remainder
58	51051009	38178270	63923749	7696603	54765133	3714124
59	55400792	42460645	68340940	7736906	59146627	3745835
60	59138228	46138201	72138255	7772708	62900931	3762703
61	4448298	-8604952	17501547	7804529		
62	4437427	-8663151	17538006	7832828		
63	11774132	-1368554	24916818	7858003		
64	15152937	1972776	28333099	7880410		
65	13332836	119310	26546362	7900359		
66	26105465	12862225	39348705	7918125		
67	34630614	21360904	47900324	7933951		
68	43207168	29913874	56500463	7948052		
69	51016754	37702441	64331068	7960620		

Accordingly, the actual value for December 2020 is $y_{60} = 62900931$, the forecast value for the ARIMA-model (1, 0, 0) is 40994013, then we get:

$$\theta = \frac{|62900931 - 40994013|}{62900931} = 0{,}35.$$

For ARIMA-model (1, 0, 0) (1, 0, 0) the forecast value is 62059781, then we get:

$$\theta = \frac{|62900931 - 62059781|}{62900931} = 0{,}01.$$

For ARIMA-model (1, 0, 1) (1, 0, 1) the forecast value is 59138228, then we get:

$$\theta = \frac{|62900931 - 59138228|}{62900931} = 0{,}06.$$

Thus, it is obvious that in the first case we make an error of about 4%, in the second – 0.1%, in the third – 0.6%. Since in ARIMA-model (1, 0, 0) (1, 0, 0) there is the smallest standard error the smallest residues and autocorrelation of residues occurs without emissions, we can confidently say about adequacy of this model and its application for forecasting the excise tax charges for beer of LCC "Brewery "Oplillia".

Conclusion

Thus, excise taxation in Ukraine has a significant impact on social and economic processes taking place in the country. Monitoring of the domestic experience of the excise taxation has shown that it is an important tool used to ensure the required amount of budget revenues, which becomes especially relevant in a period when the state economy is in crisis. In recent years, there has been a tendency to strengthen the fiscal role of the excise taxation in the country, there has been a significant increase in the share of excise tax revenues in the revenue part of the budget.

As a result of the study, the analytical, informational, mathematical and statistical approaches to the formation of models for the implementation of forecasts for the calculation of the excise tax on beer of enterprises in the brewing industry were improved. The proposed approach based on the values of autocorrelation of residues and partial autocorrelation, as well as the method of analysis of the time series with gaps can be used in the activities of enterprises to make models and forecasts for the excise taxes. This will produce financial effects in terms of costs optimizing and minimizing the risks of the excise tax on beer, as well as will contribute to effective management decisions in the practice of tax management of the business entity.

Conflict of interest

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely witnessed by the authors.

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References

Babenko, V., Lomovskykh, L., Oriekhova, A., Korchynska, L., Krutko, M., Koniaieva, Y. (2019). Features of methods and models in risk management of IT projects, *Periodicals of Engineering and Natural Sciences*, 7(2), 629–636. http://dx.doi.org/10.21533/pen.v7i2.558

Boesen, U. (2021). Excise Tax Application and Trends. Tax foundation, 753. URL: https://files.taxfoundation.org/20210315131902/Excise-Tax-Application-and-Trends.pdf (Accessed 25.04.2022).

Blahun, I.S., Blahun, I.I., Blahun, S.I. (2020). Assessing the stability of the banking system based on fuzzy logic methods. Banks and Bank Systemsthis, 15(3), 171–183.

Chiu, Y.H., Huang, K.Y., Lin, T.Y., Chang, T.H. (2021). Government debt and fiscal execution efficiency. Managerial And Decision Economics. 5, 17.

Cnossen, S. (2005). Theory and Practice of Excise Taxation. Smoking, Drinking, Gambling, Polluting and Driving. Oxford: Oxford University Press, 255.

Gontareva, I., Babenko, V., Shmatko, N., Litvinov, O., Hanna, O. (2020). The Model of Network Consulting Communication at the Early Stages of Entrepreneurship. *WSEAS Transactions on Environment and Development*, 16, 390-396. https://doi.org/10.37394/232015.2020.16.39

Hines, Jr.J.R. (2007). Excise Taxes. Ann Arbor: University of Michigan and NBER. URL: https://www.bus.umich.edu/otpr/WP2007-2.pdf (Accessed 20.05.2022).

Hollander, A. (2009). Accounting, Information Technology, and Business Solutions. McGrawHill/Irwin, 600.

Ivashchuk, O.T., Dziubanovska, N.V. (2017). Econometrics: Methodical recommendations for solving practical problems of the course “Econometrics” for full-time students, 160.

Ivashchenko, A., Kovalenko, Yu., Hubanov, O., Hubanova, T., Lutsenko, I. & Fialkovska, A. (2021). Digital tools in cross-cultural analysis of sme financial state support in the conditions of pandemic crisis, *Journal of Information Technology Management*, 13, 142–162.

Kaganovska, T., Muzyka, A., Hulyk, A., Tymchenko, H., Javadov, H., Grabovskaya, O. (2022). Introduction of Information Technologies as the Newest Concept of Optimization of Civil Proceedings. *Journal of Information Technology Management*, 14(3), 1–25. DOI: 10.22059/JITM.2022.87260

Kostiana, O.V. (2017). Peculiarities of development of excise taxation in Ukraine. Biznes inform, 3, 259–266.

Kovalenko, Yu. (2013). Standards within the Code of Good Practice for financial activities, *Actual Problems of Economics*, 148 (10), 8–14.

Kovalenko, Yu., Boreiko, N., Skoromtsova, T., Panura, Yu. & Boreiko, O. (2021). Modification of the State Budget and Tax Policy for E-commerce in the Context of the Global Corona Crisis, *Journal of Financial Studies & Research*, URL: https://ibimapublishing.com/articles/JFSR/2021/104815/ (Accessed 25.04.2022).

Krysovatyi, A.I., Valihura, V.A., Hutsul, I.A., Tkachyk, F.P., Dmytriv, V.I. (2020). Fiscal Aspects of the Functioning of the Electronic Declaration System of Citizens' Income and Property in Ukraine. 2020 10th International Conference on Advanced Computer Information Technologies. 16-18, Deggendorf, Germany, 533–536.

Lasiński-Sulecki, K. (2017). Akcyza w prawie Unii Europejskiej 2014. Warszawa: Wolters Kluwer S.A.

Levell, P., O'connell, M., Smith, K. (2016). Excise Taxes. The IFS Green Budget. London: Institute for Fiscal Studies, 201–231.

Luchko, M.R. (2020). Analysis and modelling of value added tax revenues on imports: Some issues of application in Ukraine. *International Journal of Production Management and Engineering*, 9 (1), 37-46.

Mankiw, N., Weinzierl, M., YAGAN, D. (2009). Optimal taxation in theory and practice. *Journal of Economic Perspectives*, 23(4), 147–174.

Matveychuk, L.O. (2016). Information technologies and systems in state tax administration. Public administration and customs administration, 1, 77-84.

Mavlutova, I., Babenko, V., Dykan, V., Prokopenko, N., Kalinichenko, S., Tokmakova, I. (2021). Business Restructuring as a Method of Strengtening Company's Financial Position. *Journal of Optimization in Industrial Engineering*, 14(1), 129-139. http://dx.doi.org/10.22094/JOIE.2020.677839

Neyapti, B., Bulut-Cevik, Z.B. (2014). Fiscal efficiency, redistribution and welfare. *Economic Modelling,* 41, 375–382.

Petty, W.A. (1662). Treatise of Taxes & Contributions. London, for N. Brooke, 221.

Pigou, A.C. (1920).The Economics of Welfare, Macmillan, London, 976.

Piketty, T., SAEZ, E., Stantcheva, S. (2014). Optimal taxation of top labor incomes: A tale of three elasticities. *American economic journal: economic policy*, 6 (1), 230–271.

Radchenko, O.P., Kazak, D.S. (2018) The applying of the correlation-regression analyzes in management system of enterprise foreign-economic activity. Efektyvna ekonomika, 12. URL: http://www.economy.nayka.com.ua/pdf/12_2018/110.pdf (Accessed 24.06.2022).

Roik M.V., Prysiazhniuk, O.I., Denysiuk, V.O. (2017) Review of software for statistical data analysis. *Efektyvna ekonomika*. 7. URL:http://www.economy.nayka.com.ua/?op=1&z=5676 (Accessed 24.06.2022).

Rosenberg, J. (2015) The distributional burden of federal excise taxes. Washington D.C.: Urban Institute Press, 22.

Sainskyi, D.A. (2016) Analysis of the impact of legislative changes on the work of hop and brewing industries. *Visnyk Vinnytskoho politekhnichnoho instytutu*, 5, 32–39.

Salman, R.T., Sanni, P., Olaniyi, T.A., Yahaya, K.A. (2022). Governance Transparency of Tax Revenue Performance in West Africa. *Business Ethics and Leadership, 6*(1), 14-24. https://doi.org/10.21272/bel.6(1).14-24.2022

Semenchenko, N.V., Roshchina, N.V., Bordanova, L.S. (2020). Excise tax: modern trends and problems. *Agrosvit,* 10, 16–23.

Shevchuk, O., Martynenko, V. (2020). An integrated approach to assessing the level of fiscal policy decentralization, *Investment Management and Financial Innovations*, 17 (1), 49–63.

Slavinskaite, N., Lapinskiene, G., Hlawiczka, R., & Vasa, L. (2022). Financial Innovation Management: Impact of Fiscal Decentralization on Economic Growth of the Baltic Countries. *Marketing and Management of Innovations*, 1, 257-271. https://doi.org/10.21272/mmi.2022.1-19

Svetalekth, T.H. (2018). Should excise tax be collected on mobile services? Experience in Thailand. Technology, Innovation and Industrial Management: Mater. of Intern. Conf., Naples, 16–18 May 2018. Naples, 251–258.

Sygut, E. (2018). Tax exemptions in excise duty in the context of fiscal efficiency, e-Finanse: Financial Internet Quarterly. *University of Information Technology and Management*, Rzeszów, 14 (2), 47–57.

Tegetaeva, O.R. (2012). The role of excise tax in the regulation of economic processes. *Terra Economicus*, 10, 2, 60–64.

Tkachyk, F., Hutsul, I., Zinkevych, A. (2018). Features of administration and audit of excise tax on malt beer. Svit finansiv, 3 (56), 69–79.

Turianskyi, Yu.I. (2014). The role of specific excise duties in ensuring the optimal structure of consumption: for example, highly profitable and monopoly goods. Bulletin of I. I. Mechnikov National University of Odesa, 19, 3/4, 107–111.

Voloshchuk, R. (2020). Excise tax: nature and significant characteristics. Infrastruktura rynku, 41, 254–260.

Vyhivska, I.M. (2015). The problem issues of accounting and control of unfinished production of breweries. Problemy teorii ta metodolohii bukhhalterskoho obliku, kontroliu i analizu. Ser.: Bukhhalterskyi oblik, kontrol i analiz, 2, 38–49.

Zayats, V. (2009). Role of information technologies in formation of manager's strategic thinking. *Actual problems of the economy*, 6 (96), 280–288.

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