DETERMINATION OF THE PROBABILITY OF FAVORABLE TRENDS IN THE EXPORT-IMPORT OF TOURIST SERVICES OF UKRAINE WITH EU COUNTRIES: FINANCIAL BACKGROUND

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Abstract

The purpose of this article is to analyze the dynamics of financial indicators of export-import of travel-related services between Ukraine and the EU, to identify their favorable trends in the short term. Data from the State Statistics Service of Ukraine for 2014–2021 on the annual volumes of foreign trade in services of Ukraine with the countries of the world, dynamics of foreign trade in services by types were used for the analysis. To identify favorable trends in indicators, a probabilistic forecasting method is used, the basis of which is the use of the Poisson distribution law. The obtained results indicate that the largest recipients of Ukrainian tourist services in the analyzed period were the following EU countries: Cyprus, France, Germany, Italy, Poland (more than 1 million US dollars annually). At the same time, tourism services worth more than 10 million US dollars were imported to Ukraine annually from Cyprus, Germany, Greece, Malta (except for the indicator from Greece for 2020). Bulgaria, Cyprus and Finland have the highest probability of a favorable trend (>0.65) for 1 year for the financial indicators of the export of tourist services from Ukraine; Lithuania, Portugal, and Romania – for indicators of import of tourist services to Ukraine. It will be possible to compare the obtained results with the actual data in May-June 2023, when the State Statistics Service of Ukraine will publish statistical information for 2022. However, a war on the territory of Ukraine may prevent the predictions from coming true.

Key words: export, import, tourist services, Ukraine, EU countries

INTRODUCTION

The EU is one of Ukraine's important trading partners, particularly in the field of tourism services. According to the data of the State Statistics Service of Ukraine (2023a, 2023b), the share of travel-related services exported from Ukraine to EU countries in the total export of tourist services of Ukraine in 2014–2021 annually exceeded 11% and was 14.28% on average. At the same time, the share of travel-related services imported from the EU to Ukraine in the total amount of tourism services imported to Ukraine annually exceeded 32% and averaged 39.94% [9; 10]. Considering the significant potential of cooperation between Ukraine and the EU in the field of tourism, it is expedient to predict its favorable trends in the future.

Analysis and forecasting of tourism indicators in the EU countries was carried out by a number of scientists: Grigoras M. A. *et al.* (2018) – the indicators of tourism in the Brasov County (Romania) were analyzed from the point of view of tourist inflow and accommodation in the period 2007–2016, and a forecast was made for 2017–2021 [1];

Gunter U. (2018) – predicted future trajectories of real tourism exports and relative prices for tourism exports in the EU-15 were analyzed [2];

Gunter U. *et al.* (2022) – demand forecasting was carried out in selected EU countries in terms of total outbound travel expenses (import of tourist goods) [3];

Ivanovic Z. *et al.* (2018) – applied the financial portfolio theory to tourism demand in Croatia and constructed the optimal mix of foreign inbound tourists [4];

Mavrommati A. *et al.* (2021) – the determinants of tourism demand were investigated for a statistically significant sample of eleven European countries for 1996–2015 [5];

Popescu A. (2016) – analyzed the relationship between tourist accommodation opportunities

in terms of the number of units and the number of tourist flows in terms of arrivals to Romania and its 8 micro-regions in the period 2007–2015 [6]; Popescu A. (2021) – analyzed to what extent the Covid-19 pandemic affected tourist flows in Romanian tourism in 2020 compared to 2019 and the forecast for 2020 [7]; Popescu A. and Plesoianu D. (2017) – trends in tourism in Maramures county (Romania) were analyzed, a forecast of the number of tourist arrivals and overnight stays for the period 2017–2021 was made [8]; Tindeche C. *et al.* (2018) – monitoring of EU tourism policy, EU regional policy and sustainable development policy was carried out [11]. In addition, we note publications on the analysis and forecasting of Ukraine's foreign economic activity: Totska O. (2022c, 2022d, 2022a, 2022b) – financial aspects of trade in agricultural products between Ukraine and Romania [14]; Ukrainian export of grain crops, fats and oil to European Union countries [15]; predictive modeling of foreign trade between Ukraine and Romania by separate groups of goods of the agro-industrial complex [12]; forecasting the export value of agricultural products of Ukraine based on fuzzy sets [13]. The purpose of this article is to analyze the dynamics of financial indicators of export-import of travel-related services between Ukraine and the EU, to identify their favorable trends in the short term (since there is a war in the country, which increased the risks for foreign tourists, and also affected number and well-being of Ukrainians).

MATERIALS AND METHODS

Data from the State Statistics Service of Ukraine for 2014–2021 on the annual volumes of foreign trade in services of Ukraine with the countries of the world, dynamics of foreign trade in services by types were used for the analysis [9; 10].
To identify favorable trends in indicators, a probabilistic forecasting method is used, the basis of which is the use of the Poisson distribution law. The essence of this method is that first in the studied time series, the fluctuations of the series are marked with

pluses and minuses: a "+" sign is written if the next level is greater than the previous one; and "–" if vice versa. At the same time, the initial observation is also assigned a "–" sign. Then build a table of favorable trends (Table 1) and calculate their average length according to the formula:

$$\bar{\tau} = \frac{\sum \tau_i f_i}{\sum f_i},\qquad(1)$$

where:
τ_i – the value of the i-th favorable trend, years;
f_i – frequency of its repetition.

Table 1. Favorable trends

Type of trend	The magnitude of the favorable trend, years, τ_i	Frequency of repetitions, f_i
– –	0	
–+–	1	
–++–	2	
–+++–	3	
–++++–	4	
–+++++–	5	
–++++++–	6	
–+++++++–	7	
–++++++++–	8	

Source: Yeleiko V. I. (1988) [16].

The intensity of interruption of favorable trends is calculated using the obtained average value according to the formula:

$$\lambda = \frac{1}{\bar{\tau}}.\qquad(2)$$

The probability of a favorable trend is determined based on the Poisson distribution law according to the formula:

$$P = e^{-\lambda t} = \left(e^{-1}\right)^{\lambda t},\qquad(3)$$

where:
$e^{-1} = 0{,}3679$,
t – number of periods.
All formulas are taken from [16].

RESULTS AND DISCUSSIONS

Analysis and determination of favorable trends in the export of travel-related services from Ukraine to EU countries

To analyze the dynamics of financial indicators of the export of tourist services from Ukraine to EU countries, Table 2 was created.

Table 2. Export of travel-related services from Ukraine to EU countries, thsd. USD

Country	2014	2015	2016	2017	2018	2019	2020	2021
Austria	798.9	931.1	597.4	903.6	908.5	1,757.9	214.2	474.7
Belgium	970.8	1,082.7	1,240.9	1,482.5	1,370.5	1,184.8	254.9	412.3
Bulgaria	1,100.4	1,046.7	705.4	1,098.7	1,302.5	1,469.6	1,536.3	2,336.1
Croatia	140.1	267.6	205.1	282.2	107.6	200.0	75.2	108.4
Cyprus	4,785.0	1,764.2	1,498.6	2,819.2	5,234.0	5,763.8	6,602.5	6,743.2
Czechia	1,434.2	1,197.2	595.5	447.6	671.9	801.1	318.0	5,945.7
Denmark	627.1	322.5	449.1	506.3	759.9	660.9	168.2	410.9
Estonia	1,417.2	1,031.2	351.5	752.5	703.2	664.5	205.7	766.7
Finland	492.7	505.8	581.2	634.5	657.7	678.1	287.1	383.5
France	2,209.4	1,875.4	1,828.4	2,216.8	3,742.0	4,549.2	2,048.9	2,904.8
Germany	3,900.0	2,756.3	3,392.3	4,429.7	6,445.7	6,147.3	3,655.5	5,716.7
Greece	1,234.6	2,033.6	2,360.7	2,735.5	2,368.0	1,659.8	482.1	799.6
Hungary	555.4	729.7	622.3	449.7	804.3	805.9	359.1	655.5
Ireland	728.5	455.7	367.6	374.8	345.3	436.0	562.6	1,166.3
Italy	1,087.7	1,044.7	1,177.8	1,538.8	1,912.8	5,515.4	3,604.9	4,502.3
Latvia	1,064.6	819.9	3,877.9	1,305.4	1,069.9	1,122.3	592.5	618.7
Lithuania	264.0	234.8	402.3	1,301.8	1,124.9	1,737.8	529.7	863.4
Luxembourg	44.4	56.9	38.0	113.9	217.9	174.0	35.1	168.7
Malta	116.2	46.9	58.1	145.5	229.1	402.0	116.7	1,349.8
Netherlands	1,028.7	866.9	763.2	1,077.3	1,704.4	1,941.0	947.7	1,825.2
Poland	7,073.6	7,676.8	5,615.2	6,775.9	8,768.4	10,295.6	3,473.3	4,390.1
Portugal	167.4	69.9	134.3	168.6	344.0	287.4	144.3	256.9
Romania	341.2	436.0	449.4	800.8	630.8	990.1	718.9	1,645.0
Slovakia	195.9	267.2	275.1	324.8	306.8	474.4	234.9	499.2
Slovenia	234.0	128.4	78.3	162.7	180.5	208.7	175.0	239.5
Spain	836.5	822.6	1,087.0	1,900.7	2,116.7	1,525.7	1,747.8	2,265.6
Sweden	719.0	456.3	602.4	1,012.6	1,152.4	1,157.9	529.8	820.4
EU 27	33,567.4	28,926.9	29,355.0	35,762.4	45,179.6	52,611.1	29,620.6	48,269.0
World	228,049.1	200,937.0	205,236.3	242,748.2	298,855.4	334,952.5	263,445.8	343,482.8
Share of EU 27	14.72	14.40	14.30	14.73	15.12	15.71	11.24	14.05

Source: Created by the author based on data from the State Statistics Service of Ukraine (2023a, 2023b) [9; 10].

According to Table 2, in 2014–2021, most tourist services (more than 1 million US dollars annually) were exported from Ukraine to the following EU countries: Cyprus, France, Germany, Italy, Poland.

The least tourist services (less than 350,000 US dollars annually) were exported to Croatia, Luxembourg, Portugal and Slovenia.

The total export of Ukrainian travel-related services to the EU increased in all years except 2015 (after the beginning of the occupation of the territory of Ukraine in 2014) and 2020 (during the Covid-19 pandemic).

To identify favorable trends in export indicators, Table 3 was constructed. Note that in Table 3, for better visualization of the data, positive fluctuations of the series are highlighted in blue, negative – in yellow. According to Table 3, the longest positive trends in the dynamics of export indicators were observed for such countries as Italy, Malta, Sweden (for 4 years) and Bulgaria, Cyprus, Finland (for 5 years), as well as for the total indicators for the EU and the world (for 4 years).

In the short-term perspective (1 year), the following EU countries have the highest probability of a favorable trend (>0.65) for the indicators of the export of tourist services from Ukraine: Bulgaria, Cyprus, Finland.

Table 3. Fluctuations in export levels of travel-related services from Ukraine to EU countries

Country	2014	2015	2016	2017	2018	2019	2020	2021	The frequency of repetitions of a favorable trend, f_i						$\bar{\tau}$	λ	P
									0 years	1 year	2 years	3 years	4 years	5 years			
Austria	-	+	-	+	+	+	-	+		2		1			1.67	0.60	0.55
Belgium	-	+	+	+	-	-	-	+	1	1		1			1.33	0.75	0.47
Bulgaria	-	-	-	+	+	+	+	+	1					1	2.50	0.40	0.67
Croatia	-	+	-	+	-	+	-	+		4					1.00	1.00	0.37
Cyprus	-	-	-	+	+	+	+	+	1					1	2.50	0.40	0.67
Czechia	-	-	-	-	+	+	-	+	1	1	1				1.00	1.00	0.37
Denmark	-	-	+	+	+	-	-	+	2	1		1			1.00	1.00	0.37
Estonia	-	-	-	+	-	-	-	+	2	2					0.50	2.00	0.14
Finland	-	+	+	+	+	+	-	+		1				1	3.00	0.33	0.72
France	-	-	-	+	+	+	-	+	1	1		1			1.33	0.75	0.47
Germany	-	-	+	+	+	-	-	+	2	1		1			1.00	1.00	0.37
Greece	-	+	+	+	-	-	-	+	1	1		1			1.33	0.75	0.47
Hungary	-	+	-	-	+	+	-	+	1	2	1				1.00	1.00	0.37
Ireland	-	-	-	+	-	+	+	+	1	1		1			1.33	0.75	0.47
Italy	-	-	+	+	+	+	-	+	1	1			1		1.67	0.60	0.55
Latvia	-	-	+	-	-	+	-	+	2	3					0.60	1.67	0.19
Lithuania	-	-	+	+	-	+	-	+	1	2	1				1.00	1.00	0.37
Luxembourg	-	+	-	+	+	-	-	+	1	2	1				1.00	1.00	0.37
Malta	-	-	+	+	+	+	-	+	1	1			1		1.67	0.60	0.55
Netherlands	-	-	-	+	+	+	-	+	1	1		1			1.33	0.75	0.47
Poland	-	+	-	+	+	+	-	+		2		1			1.67	0.60	0.55
Portugal	-	-	+	+	+	-	-	+	2	1		1			1.00	1.00	0.37
Romania	-	+	+	+	-	+	-	+		2		1			1.67	0.60	0.55
Slovakia	-	+	+	+	-	+	-	+		2		1			1.67	0.60	0.55
Slovenia	-	-	-	+	+	+	-	+	1	1		1			1.33	0.75	0.47
Spain	-	-	+	+	+	-	+	+	1		1	1			1.67	0.60	0.55
Sweden	-	-	+	+	+	+	-	+	1	1			1		1.67	0.60	0.55
EU 27	-	-	+	+	+	+	-	+	1	1			1		1.67	0.60	0.55
World	-	-	+	+	+	+	-	+	1	1			1		1.67	0.60	0.55

Source: Created by the author based on Table 2.

Analysis and determination of favorable trends in the import of travel-related services from EU countries to Ukraine

To analyze the dynamics of financial indicators of the import of tourist services from the EU countries to Ukraine, Table 4 was created.

According to Table 4, in 2014–2021, tourism services from Cyprus, Germany, Greece, and Malta worth more than 10 million US dollars were imported to Ukraine annually (except for the indicator from Greece for 2020); from Denmark, Ireland, Luxembourg – in the amount of less than 1 million US dollars (except for the indicator from Denmark for 2019).

The total amount of imports of European travel-related services to Ukraine increased in all years except 2015, 2016 and 2020.

To identify favorable trends in import indicators, Table 5 was constructed. Note that in Table 5, for better visualization of the data, positive fluctuations of the series are also highlighted in blue, negative fluctuations in yellow. According to Table 5, the longest positive trends in the dynamics of import indicators were observed for such countries as Czechia, Italy, Malta, Poland, Spain (for 4 years) and Lithuania, Portugal, Romania (for 5 years), as well as for the total indicators for the world (for 4 years).

Table 4. Import of travel-related services from EU countries to Ukraine, thsd. USD

Country	2014	2015	2016	2017	2018	2019	2020	2021
Austria	4,041.4	2,614.4	3,794.9	4,765.3	4,601.0	4,568.4	2,694.3	3,316.7
Belgium	1,953.8	1,149.7	1,753.9	1,943.0	2,733.4	2,246.2	1,747.7	2,238.8
Bulgaria	3,540.4	5,952.3	5,575.1	4,771.1	7,021.5	10,882.9	4,014.4	37,666.9
Croatia	2,046.0	1,901.0	3,534.9	4,118.2	4,154.1	3,965.7	2,983.2	7,828.3
Cyprus	195,384.5	78,419.3	32,004.9	57,558.9	94,623.8	161,122.0	64,457.3	137,440.1
Czechia	4,479.5	3,579.7	3,755.4	5,053.0	6,305.4	9,296.3	4,701.8	4,651.8
Denmark	559.7	370.1	771.8	692.0	895.7	1,944.8	695.3	912.6
Estonia	2,644.6	3,901.2	3,358.1	4,724.6	5,140.6	4,123.6	1,931.6	2,405.8
Finland	2,079.6	1,993.3	2,034.8	2,087.5	2,287.6	2,087.8	944.1	1,078.2
France	9,400.8	7,732.1	4,689.8	6,258.0	8,263.5	10,291.7	4,173.2	6,827.3
Germany	17,442.1	10,174.2	10,399.3	20,205.1	19,461.8	17,679.5	12,528.9	12,732.6
Greece	23,245.0	14,923.3	13,460.9	11,388.7	19,243.9	27,673.9	2,888.5	30,516.6
Hungary	2,612.3	2,138.0	2,038.5	4,104.2	3,618.8	4,286.4	2,120.4	3,805.5
Ireland	146.2	162.7	135.2	359.3	191.0	394.1	119.8	179.0
Italy	8,858.0	8,049.2	9,773.6	11,176.8	17,019.7	20,904.3	7,494.4	8,061.8
Latvia	959.0	5,771.6	13,645.5	13,589.8	11,909.7	10,175.3	1,928.8	1,432.5
Литва	1,131.0	1,671.2	2,560.6	2,643.9	2,728.5	3,965.3	1,558.6	1,656.0
Luxembourg	64.3	103.1	130.8	83.6	103.9	139.3	32.7	50.1
Malta	82,090.7	75,218.9	83,793.5	101,804.4	136,787.2	154,797.4	100,285.4	211,153.1
Netherlands	2,162.2	2,384.7	2,345.2	2,923.1	2,999.9	4,049.0	2,273.9	2,983.7
Poland	11,555.1	8,128.2	9,856.6	12,392.2	15,984.5	23,367.2	18,529.4	26,441.6
Portugal	323.1	376.9	390.8	1,091.0	1,465.3	1,609.6	556.3	853.6
Romania	500.5	660.6	849.4	1,457.3	1,913.4	2,099.0	1,089.1	1,470.8
Slovakia	2,397.7	1,788.7	1,263.2	1,390.7	1,688.4	1,458.5	695.5	1,051.0
Slovenia	870.6	725.8	853.9	915.0	1,537.8	1,249.8	466.2	614.4
Spain	14,049.5	8,618.4	11,145.9	12,234.9	16,196.0	21,497.1	4,534.7	12,636.7
Sweden	997.4	628.5	741.2	638.3	1,155.8	770.0	845.3	1,021.0
EU 27	395,534.6	249,136.9	224,657.9	290,369.6	390,032.0	506,644.8	246,291.0	521,026.0
World	681,021.7	597,645.5	603,216.5	794,973.9	990,392.9	1,299,287.9	702,922.3	1,598,761.7
Share of EU 27	58.08	41.69	37.24	36.53	39.38	38.99	35.04	32.59

Source: Created by the author based on data from the State Statistics Service of Ukraine (2023a, 2023b) [9; 10].

According to Table 5, in the short term (1 year), the following EU countries have the highest probability of a favorable trend (>0.65) for the indicators of the import of tourist services to Ukraine: Lithuania, Portugal, Romania.

CONCLUSIONS

The financial indicators of the export of Ukrainian travel-related services to the EU during 2014–2021 increased annually, except for 2015 and 2020. The decrease in indicators was influenced by the occupation of part of the territory of Ukraine in 2014, in particular the Autonomous Republic of Crimea, and the pandemic Covid-19. The largest recipients of Ukrainian tourist services were the following EU countries: Cyprus, France, Germany, Italy, Poland (more than 1 million US dollars annually).

The financial indicators of the import of travel-related services to Ukraine from the EU during the analyzed period also grew annually, except for 2015, 2016 and 2020. In particular, tourism services were imported to Ukraine from Cyprus, Germany, Greece, Malta annually in the amount of more than 10 million US dollars (except for the indicator from Greece for 2020).

Table 5. Fluctuations in the level of import of travel-related services from EU countries to Ukraine

| Country | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | The frequency of repetitions of a favorable trend, f_i | | | | | | $\overline{\tau}$ | λ | P |
									0 years	1 year	2 years	3 years	4 years	5 years			
Austria	-	-	+	+	-	-	-	+	2	1	1				0.75	1.33	0.26
Belgium	-	-	+	+	+	-	-	+	2	1		1			1.00	1.00	0.37
Bulgaria	-	+	-	-	+	+	-	+	1	2	1				1.00	1.00	0.37
Croatia	-	-	+	+	+	-	-	+	2	1		1			1.00	1.00	0.37
Cyprus	-	-	-	+	+	+	-	+	1	1		1			1.33	0.75	0.47
Czechia	-	-	+	+	+	+	-	-	2				1		1.33	0.75	0.47
Denmark	-	-	+	-	+	+	-	+	1	2	1				1.00	1.00	0.37
Estonia	-	+	-	+	+	-	-	+	1	2	1				1.00	1.00	0.37
Finland	-	-	+	+	+	-	-	+	2	1		1			1.00	1.00	0.37
France	-	-	-	+	+	+	-	+	1	1		1			1.33	0.75	0.47
Germany	-	-	+	+	-	-	-	+	2	1	1				0.75	1.33	0.26
Greece	-	-	-	-	+	+	-	+	1	1	1				1.00	1.00	0.37
Hungary	-	-	-	+	-	+	-	+	1	3					0.75	1.33	0.26
Ireland	-	+	-	+	-	+	-	+		4					1.00	1.00	0.37
Italy	-	-	+	+	+	+	-	+	1	1				1	1.67	0.60	0.55
Latvia	-	+	+	-	-	-	-	-	1		1				1.00	1.00	0.37
Lithuania	-	+	+	+	+	+	-	+		1				1	3.00	0.33	0.72
Luxembourg	-	+	+	-	+	+	-	+		1	2				1.67	0.60	0.55
Malta	-	-	+	+	+	+	-	+	1	1				1	1.67	0.60	0.55
Netherlands	-	+	-	+	+	+	-	+		2	1				1.67	0.60	0.55
Poland	-	-	+	+	+	+	-	+	1	1				1	1.67	0.60	0.55
Portugal	-	+	+	+	+	+	-	+		1				1	3.00	0.33	0.72
Romania	-	+	+	+	+	+	-	+		1				1	3.00	0.33	0.72
Slovakia	-	-	-	+	+	-	-	+	2	1	1				0.75	1.33	0.26
Slovenia	-	-	+	+	+	-	-	+	2	1		1			1.00	1.00	0.37
Spain	-	-	+	+	+	+	-	+	1	1			1		1.67	0.60	0.55
Sweden	-	-	+	-	+	-	+	+	1	2	1				1.00	1.00	0.37
EU 27	-	-	-	+	+	+	-	+	1	1		1			1.33	0.75	0.47
World	-	-	+	+	+	+	-	+	1	1				1	1.67	0.60	0.55

Source: Created by the author based on Table 4.

According to the probabilistic method of forecasting, the basis of which is the use of the Poisson distribution law, the following favorable trends of financial indicators for 1 year were revealed: Bulgaria, Cyprus and Finland have the highest probability of a favorable trend (>0.65) for indicators of the export of tourist services from Ukraine; Lithuania, Portugal, and Romania – for indicators of import of tourist services to Ukraine. It will be possible to compare the obtained results with the actual data in May-June 2023, when the State Statistics Service of Ukraine will publish statistical information for 2022. However, a war on the territory of Ukraine may prevent the predictions from coming true.

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