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**The Bank Card Market: a Comparative Analysis of Ukraine
and its Neighboring Countries**

Abstract

The purpose of this study is to define the major determinants of the bank card market to investigate the banking sector of different countries. Using three models of ranking, we discuss what can be used to rank the financial market and how it translates into the ranking of the bank card market. We use comparative analysis to verify our assumption, referring to a total of 8 countries: Ukraine and its neighboring countries. Afterward, we conduct a more in-depth analysis of two cases (Poland and Ukraine) as two similar bank card markets. The research question is founded on the assumption that for a comparative analysis, it is necessary to use a system of interrelated indicators of bank payment cards, ATMs and POS terminals as the explicative variables.

Keywords: bank; Poland; indicators; ranking of countries; index

JEL: G15; G21; O12

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1. Introduction

Country rankings and investigations into their position among neighboring countries to estimate the development of the banking sector abroad is a topic discussed in the academic literature. The markets of Ukraine and its neighboring countries (by land) – Romania and Moldova in the southwest, Hungary, Slovakia and Poland in the west, Belarus in the north, and Russia in the northeast and east – are very diverse. This diversity can be viewed as a comparison between countries with different banking sectors, which is reflected in the constantly increasing interest in this phenomenon from management scholars every year.

The estimate of the economic and business rank of Slovakia, including analysis of the country's position in the European Union, was studied in the work of Klement et al. (Klement 2016, pp. 115–126). They also gave specific recommendations to focus on the position of Slovakia among Visegrád Group countries – Slovakia, Poland, Hungary and the Czech Republic.

Following this line of investigation, Ramskyi et al. (Ramskyi 2017, pp. 163–174) analyzed the relationship between the banking system transformation and effective development of the Ukrainian economy, and determined Ukraine's integration into the European Union as a way to strengthen the business environment.

In their work entitled *The problems of entry modes and liability of foreignness effects: evidence from Russian firms on the German market*, Panibratov et al. (Panibratov 2018, pp. 106–122) expressed the idea that exporters and investors experience significant negative effects from the lack of proper institutional and business knowledge of the host financial market.

There is a growing number of small and medium business firms venturing abroad and attempting to expand outside their region – encompassing mainly neighboring countries. However, they have little experience in foreign cashless payments, are not always able to make the right choice of payment instruments and do not have any guidelines on how to estimate the bank card market in other countries.

The paper is structured as follows: in the first section, we provide an overview of existing international methods such as the Legatum Prosperity Index 2017, the BDO International Business Compass 2017, and the Index of Economic Freedom 2018, emphasizing the context of markets of neighboring countries such as Belarus, Hungary, Moldova, Poland, Romania, the Russian Federation, Slovakia and Ukraine. Next, we present the results of an empirical analysis of the bank card market. Then, we introduce the research settings and explain the rank method chosen and, finally, we make conclusions followed by a definition of the bank card market index (BCM Index) and further rank Ukraine and its neighboring countries. Then, we conduct a comparative analysis of two cases (Poland and Ukraine) as two similar bank card markets. Using this index method, we draw conclusions

about deepening the cooperation between Ukraine and Poland in the framework of Euro-integration which could contribute to an increase in the level of the bank card market developing in both countries.

2. Data, variables and methods

Small and medium enterprises enter foreign markets and face negative effects because of the lack of business knowledge about the operation of financial and credit instruments such as bank payment cards. The information on an accessible network of cash withdrawal points and non-cash payment points is very important for organizing work with buyers and suppliers.

Accordingly, it is necessary to study the bank card market of neighboring countries in order to understand the potential for development of SME businesses. The purpose of the research is to make a comparative analysis of the bank card markets of Ukraine and its neighboring countries to determine the connection between the influence of credit-financial instruments and the stimulation of the business development.

This study uses two data sources. First, data are extracted from the Legatum Prosperity Index 2017, the BDO International Business Compass 2017 and the Index of Economic Freedom 2018 surveys in neighboring countries such as Belarus, Hungary, Moldova, Poland, Romania, Russian Federation, Slovakia and Ukraine. This study employs data from the years 2017 and 2018. Through the data, many useful indicators, such as the Economic, Politico-Legal and Socio-cultural Conditions, the Rank of Business, Economic, and Government Conditions, and Business, Investment and Financial Freedom are recorded.

Another data set is taken from the websites of the central banks of the countries. The panel of information offers three directions of indicators for 2017. These indicators include information about Cards, ATMs and Point of Sale terminals (POS terminals). Studying the two data sets together, we can obtain a dataset to understand the possibility of developing a bank card business in each of the countries.

The Legatum Prosperity (LP) Index 2017 survey makes indices covering 149 countries, which is a unique global benchmarking tool to determine the potential for business development in a country. The degree of attractiveness of business development is essential. So, to assess the level of development and business conditions, the ranking of Business, Economic, and Government conditions, defined by the Legatum Prosperity Index method, is analyzed. The comparative analysis of Economic Rank in Ukraine and its neighboring countries over ten years is presented in Table 1.

Table 1. Legatum Prosperity Index for Ukraine and neighboring countries, 2008–2017

Country	LP Country Economic Rank									
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belarus	53	43	42	54	47	40	41	47	48	42
Hungary	47	53	57	56	59	60	59	54	53	57
Moldova	92	99	96	91	91	86	79	84	84	90
Poland	38	37	36	36	39	41	37	37	37	34
Romania	60	59	63	64	68	84	75	71	71	60
Russia	69	79	77	73	70	72	60	66	66	70
Slovakia	34	33	38	44	48	49	50	50	50	49
Ukraine	73	75	76	76	87	77	77	88	88	84

Source: https://www.prosperity.com/download_file/view_inline/3479 (accessed: 28.10.2018)
The Legatum Prosperity Index 2017.

According to the data in the table, between 2008 and 2017, Moldova and Ukraine had the lowest Economic Rank of the LP Index among the analyzed countries. The highest ranking country was Poland. At the same time, for the majority of countries, 2015–2016 was the most stable period over the last ten years while the least stable was the period three years before. The most volatile country was Romania (–16) in the period 2012–2013, and the least volatile country was Poland (+4), in the period 2013–2014.

Also, the most well-known and most popular methodology for assessing the establishment and support of business is the “BDO International Business Compass” (BDO IBC). It is conducted by an international network of public accounting, tax, consulting and business advisory firms which perform professional services under the name of BDO in 174 countries across all continents.

According to the BDO IBC Index ranking, the best conditions for business development in 2017 were found in Poland (34th place), Slovakia (43rd) and Hungary (45th), which might provide a benchmark for Ukraine (134th) in determining the potential of business development.

The BDO IBC methodology is based on the assessment of various Economic, Politico-legal, and Socio-cultural conditions and indicators. The most appropriate to investigate the economic condition of the bank card market in different countries is the Economic ranking. A comparison of the attractiveness of Ukraine and its neighboring countries of the BDO IBC in 2008–2017 according to the Economic ranking is shown in Table 2.

As the table shows, according to the BDO IBC, in 2017, EU member states such as Poland – 24th place, Slovakia – 33rd, and Romania – 36th, are rated the highest in terms of their economic condition. At the same time, Ukraine has the lowest value – 80th.

Over the ten years, countries either maintained or increased their rankings. The most volatile countries are Belarus (–33) and Russia (+30), and the least volatile countries are Hungary (+12) and Poland (+13). Additionally, Poland has the best positive dynamic among Ukraine’s neighboring European countries. Poland im-

proved its economic rank over the ten years from 74th place in 2008 to 24th in 2017 (+50). Ukraine has a very good positive dynamic; over the ten years, it improved its economic rank from 139th place in 2008 to 80th in 2017 (+59).

Table 2. BDO IBC of Ukraine and its neighboring countries, 2008–2017

Country	BDO IBC Economic Rank									
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belarus	110	82	58	91	69	58	63	57	44	37
Hungary	45	41	47	46	51	54	54	54	42	41
Moldova	92	108	94	99	81	83	78	63	52	44
Poland	74	72	72	59	62	55	45	32	25	24
Romania	48	45	55	65	72	72	73	48	37	36
Russia	106	118	120	124	120	112	92	62	51	40
Slovakia	32	58	53	43	48	46	49	37	29	33
Ukraine	139	146	142	149	152	137	112	96	83	80

Source: <http://www.doingbusiness.org/content/dam/doingBusiness/media/Annual-Reports/English/DB13-full-report.pdf> (accessed: 28.10.2018); Doing Business 2013 Smarter Regulations for Small and Medium-Size Enterprises; https://www.bdo.de/getmedia/ccdbd06c-fe2a-48ce-8125-4c1fe417df10/BDOStudie_EN_Executive-Summary-2017_web.pdf.aspx (accessed: 28.10.2018) BDO International Business Compass 2017.

There is a new and popular methodology for assessing the establishment and support of business – the Index of Economic Freedom 2018, conducted in 186 countries around the World. To calculate the world rank for every country, 12 indicators were used: Property Rights, Judicial Effectiveness, Government Integrity, Tax Burden, Government Spending, Fiscal Health, Business Freedom, Labor Freedom, Monetary Freedom, Trade Freedom, Investment Freedom and Financial Freedom. The Index of Economic Freedom (EF) for Ukraine and its neighboring countries over the ten years is presented in Table 3.

Table 3. Index of Economic Freedom for Ukraine and neighboring countries, 2008–2017

Country	EF Economic Rank									
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belarus	45.3	45.0	48.7	47.9	49.0	48.0	50.1	49.8	48.8	58.6
Hungary	67.6	66.8	66.1	66.6	67.1	67.3	67.0	66.8	66.0	65.8
Moldova	57.9	54.9	53.7	55.7	54.4	55.5	57.3	57.5	57.4	58.0
Poland	60.3	60.3	63.2	64.1	64.2	66.0	67.0	68.6	69.3	68.3
Romania	61.7	63.2	64.2	64.7	64.4	65.1	65.5	66.6	65.6	69.7
Russia	49.8	50.8	50.3	50.5	50.5	51.1	51.9	52.1	50.6	57.1
Slovakia	70.0	69.4	69.7	69.5	67.0	68.7	66.4	67.2	66.6	65.7
Ukraine	51.0	48.8	46.4	45.8	46.1	46.3	49.3	46.9	46.8	48.1

Source: https://www.heritage.org/index/pdf/2018/book/index_2018.pdf (accessed: 28.10.2018). 2018 Index of Economic Freedom.

According to the table, among its neighboring countries, Ukraine had the best Economic Freedom Rank over ten years. This indicator varied from 51.0 in 2008 to 48.1 in 2017. At the same time, the Economic Freedom ranking in the group of European countries such as Hungary, Poland, Romania and Slovakia was the highest and roughly the same.

Thus, a comparative analysis of the business and economic conditions in Ukraine and neighboring countries to determine the potential for business development showed that such ratings as the LP Index 2017, the BDO International Business Compass 2017, and the Index of Economic Freedom 2018 do not determine the potential business development regarding the bank card market. However, the effective support and availability of non-cash payments, especially using bank cards, is very important for the development of business, especially for SMEs.

3. Empirical results and discussions

The bank card markets in Central and Eastern European countries have different, specific conditions. On the one hand, countries need to adapt to the modern business environment for its economic development and investment attractiveness. For these countries, it is very important to understand their place among competing countries, which can be done based on ranking data.

On the other hand, foreign companies doing business in other countries have a number of advantages. They can make decisions based on information about the business environment relating to bank cards, make use of high-quality support infrastructure and they can also use ranking data to help. In addition, they have a convenient geographic location. So, two major criteria have been identified to estimate key indicators of the bank card market: the existence of cards and the existence of support devices for withdrawing cash and paying by card. The first is focused mainly on the distribution of bank cards and the second is aimed at the distribution of the ATM network and POS terminals.

The study was conducted in Ukraine and its seven neighboring countries (by land): Romania, Moldova, Hungary, Slovakia, Poland, Belarus and the Russian Federation. The countries were ranked in alphabetical order for analysis. A comparative analysis of key indicators of the bank card market in Ukraine and neighboring countries over the last ten years is presented in Table 4.

Table 4. Indicators of bank card market for analyzed countries, 2008–2017

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belarus										
Population, ml.	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
Cards, ml.pcs.	5.1	6.5	9.2	9.9	10.4	11.8	12.3	12.3	12.7	13.9
ATM, th.pcs.	2.1	2.5	3.1	3.3	3.7	4.1	4.4	4.4	4.4	4.4
POS, th.pcs.	10.0	17.0	29.6	40.7	56.8	73.6	91.8	111.7	139.6	150.9
Hungary										
Population, ml.	10.0	10.0	10.0	10.0	9.9	9.9	9.9	9.8	9.8	9.8
Cards, ml.pcs.	8.9	8.9	8.9	8.9	8.9	9.0	8.9	9.0	9.0	9.1
ATM, th.pcs.	4.6	4.8	4.8	4.9	4.8	4.8	4.9	4.8	5.0	5.1
POS, th.pcs.	60.8	64.0	66.6	73.7	84.7	90.8	104.9	111.7	121.1	147.5
Moldova										
Population, ml.	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Cards, ml.pcs.	0.7	0.7	0.8	0.9	1.0	1.2	1.3	1.3	1.5	1.7
ATM, th.pcs.	n/d	0.7	0.8	0.9	0.9	1.0	1.1	1.0	1.0	1.1
POS, th.pcs.	n/d	6.8	7.3	8.0	9.4	10.5	11.5	12.0	15.1	16.6
Poland										
Population, ml.	38.1	38.2	38.5	38.5	38.5	38.5	38.5	38.5	38.4	38.4
Cards, ml.pcs.	30.3	33.2	32.0	32.0	33.3	34.7	36.1	35.2	36.9	39.1
ATM, th.pcs.	13.9	15.7	16.4	17.4	18.2	18.9	20.5	22.1	23.4	23.2
POS, th.pcs.	197.6	215.5	246.5	266.4	289.5	326.3	398.2	463.4	536.2	624.4
Romania										
Population, ml.	20.5	20.4	20.2	20.1	20.1	20.0	19.9	19.8	19.7	19.7
Cards, ml.pcs.	13.5	13.0	12.8	13.3	13.7	14.1	14.5	15.0	16.0	16.4
ATM, th.pcs.	9.4	9.9	10.4	11.0	11.0	10.8	11.5	11.5	11.1	11.1
POS, th.pcs.	92.8	103.7	114.0	124.9	126.3	128.0	130.5	144.4	161.9	193.9
Russian Federation										
Population, ml.	142.7	142.8	142.8	143.0	143.2	143.5	143.8	146.4	146.7	146.5
Cards, ml.pcs.	119.2	126.0	144.4	200.2	239.5	248.6	278.5	286.2	315.3	268.5
ATM, th.pcs.	75.0	88.1	116.2	141.9	171.9	188.8	222.8	206.9	201.4	206.3
POS, th.pcs.	333.2	354.4	434.5	528.5	718.0	965.5	1288.7	1489.8	1778.0	2189.1
Slovakia										
Population, ml.	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Cards, ml.pcs.	5.2	5.1	5.2	5.3	4.6	4.8	5.3	5.6	6.0	5.7
ATM, th.pcs.	2.3	2.3	2.3	2.4	2.5	2.6	2.7	2.7	2.8	2.8
POS, th.pcs.	32.5	36.0	37.5	39.8	40.3	41.9	45.1	53.4	58.7	58.5

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Ukraine										
Population, ml.	46.2	46.0	45.8	45.6	45.5	45.4	45.2	42.8	42.6	42.4
Cards, ml.pcs.	38.6	29.1	29.4	34.9	33.1	35.6	33.0	30.8	32.4	34.9
ATM, th.pcs.	28.0	28.9	30.2	33.0	36.2	40.4	36.6	33.3	33.8	37.0
POS, th.pcs.	116.7	103.1	108.1	123.5	162.7	221.2	203.8	194.5	219.2	251.7

Source: Own calculations based on data from Banks of analyzed countries: http://www.nbrb.by/publications/bulletin/Stat_Bulletin_2018_02.pdf (accessed: 28.10.2018) Statistical Bulletin No. 2 (224) National Bank of the Republic of Belarus 2018; http://www.cbr.ru/statistics/print.aspx?file=p_sys/T14_11_17-0.htm&pid=psrf&sid=ITM_26139 (accessed: 28.10.2018) Number of payment and credit cards issued on the territory of the region, and operations with their use made on the territory of Russia and abroad, by types of clients (in a territorial context) Central Bank of the Russian Federation (Bank of Russia) 2017; <http://www.mnb.hu/en/statistics/statistical-data-and-information/statistical-time-series/xiv-payment-systems/payment-data> (accessed: 28.10.2018) Payment data Central bank of the Republic of Hungary 2017; http://www.nbp.pl/homen.aspx?f=/en/system_platniczy/system_cards.html (accessed: 28.10.2018) Payment system in Poland – Payment cards Narodowy Bank Polski 2017; <http://www.bnm.md/bdi/pages/reports/dsp/DSP1.xhtml> (accessed: 28.10.2018) Payments system statistics National Bank of Moldova 2017; <http://www.bnr.ro/Payments-Statistics-5312.aspx> (accessed: 28.10.2018) Payments Statistics National Bank of Romania 2017; <https://spectator.sme.sk/c/20491051/slovakia-has-more-re-payment-cards.html> (accessed: 28.10.2018) Slovakia has more payment cards The Slovak Spectator 2017; https://bank.gov.ua/control/en/publish/category?cat_id=9792432 (accessed: 28.10.2018) Key indicators of Ukraine's payment card market performance The National Bank of Ukraine 2017.

A comparison of the population of Ukraine and its neighboring countries showed that Poland is the closest indicator for Ukraine. With the exception of Russia, the remaining neighboring countries, in comparison with Ukraine, have significantly smaller populations and, accordingly, a smaller number of medium-sized businesses. Over the last ten years, the populations increased in Poland and the Russian Federation and decreased in Hungary, Romania and Ukraine.

Comparing the ATM network and POS terminals showed that the largest number of ATMs and terminals are in the Russian Federation. The smallest number is in Moldova. A Ukraine rank second after the Russian Federation by the number of ATMs and is third after the Russian Federation and Poland by number of POS terminals.

The number of ATMs and POS terminals increased in all analyzed countries over the last ten years, but POS terminals growth rates are much higher than the growth rate of ATMs. Between 2008 and 2017, the number of ATMs increased by 30% on average in most analyzed countries. At the same time, the number of POS terminals in most ranked countries more than doubled.

The situation with the number of bank cards and POS terminals in Ukraine is similar. Ukraine ranks third after the Russian Federation and Poland by number of bank cards. The smallest number of bank cards is in Moldova. So, at first glance, Ukraine has a developed network of ATMs and POS terminals among its neighboring countries.

According to the 2017 data the number of bank cards is smaller than the population in Hungary (−8%), Moldova (−53%), Romania (−17%) and Ukraine (−18%). One can surmise that each adult has one card only; children and the elderly have not cards.

The situation is reversed for countries such as Belarus (+46%), Poland (+2%), Russian Federation (+83%) and Slovakia (+5%). The number of cards in the Russian Federation is almost twice the population. One can surmise that most adults have two or three cards. On the one hand, these cards have different specific functions. For example, Salary Debit card and Private Credit card or Salary card and Co-brand card with Loyalty program or Deposit card with high rates and Virtual card only for payment in Internet. On the other hand, the second and third cards in this case are probably used rarely.

At the same time, these absolute figures do not reflect the real conditions of the bank card market. For comparable analyses of the real conditions on the bank card market, it is necessary to estimate the relative indicators. The best indicators are capacity and efficiency.

4. Methodology

Every year, the European Central Bank (ECB) publishes statistics on cash and non-cash payments in EU Member States. This data comprise the number of cards and the number of card transfers, indicators on access to and use of payment services and terminals, as well as volumes and values of transactions processed through payment systems. The statistics are published for each EU Member State, in addition to EU and euro area aggregates. However, these statistics do not contain a common indicator for the bank card market or a ranking of the EU Member States. Additionally, this dataset does not include information about other, non-EU countries.

So, it is necessary to study the key criteria and indicators of the bank card market in Ukraine and neighboring countries to understand the potential for business development. The data were collected through information from the websites of both the National Bank of Ukraine and the central banks of neighboring countries in 2017. The summary dataset of bank card market criteria and indicators collected from the websites is presented in Table 5.

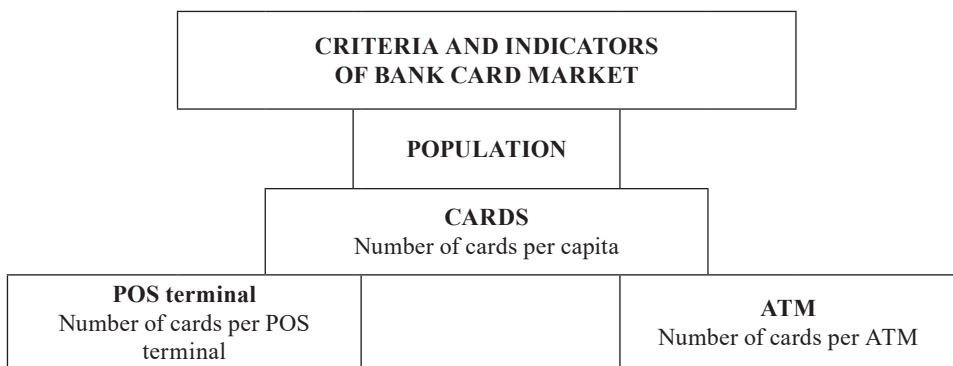
According to the table 5, Ukraine has full information for three criteria: the total number of cards, ATMs and POS terminals. A conceptual framework is presented in Figure 1.

The model is a visual representation of how the population of a country, cards, ATMs and POS terminals are interrelated.

Table 5. Criteria and indicators of the bank card market in analyzed countries

Criteria	Indicators	Belarus	Hungary	Moldova	Poland	Romania	Russian Fed.	Slovakia	Ukraine
Cards	Total number of cards	x	x	x	x	x	x	x	x
Card transactions	Number of transactions	x		x	x			x	x
ATM	Number of ATMs	x	x	x	x	x	x	x	x
ATM transactions	Number of transactions				x				
	Volume of transactions				x				
POS terminal	Number of merchants	x	x						x
	Number of POS	x	x	x	x	x	x	x	x
POS terminal transactions	Number of transactions		x		x				
	Volume of transactions		x		x				

Source: Own calculations based on data from the central banks as table 4 of the analyzed countries.

**Figure 1. Criteria and indicators of the bank card market for ranking countries**

Source: author's own study.

As the population of the country grows, the number of cards increases, which also accelerates the expansion of the network of ATMs and POS terminals. In this case, the two indicators – the networks of ATMs and POS terminals – are interconnected and interdependent. For example, as the network of ATMs grows, cash flow and cash payments increase, and the number POS terminals decreases. Similarly, the number ATMs decreases and non-cash payments increase as the network of POS terminals grows. And if both of these drivers sharply decrease, the result is a big drop in the number of cards.

Ukraine and its neighboring countries have different populations, so comparing the total number of payment cards does not reflect the real conditions of the bank card market. The best criterion for card availability is the number of payment cards per capita.

The strategy to decrease the ATM network in Ukraine and its neighboring countries creates the opportunity to expand non-cash settlements between the subjects of an entrepreneurial activity and to bring business out from the shadows. In this case, the optimal criterion for an ATM network is the number of cards per ATM.

Additionally, to expand the non-cash settlements between the two sides of an entrepreneurial activity and to draw business out from the shadows is a very important development for POS terminals. In this case the best criterion is the number of cards per POS terminal. The comparative analysis of the bank card market in Ukraine and neighboring countries is presented in Table 6.

Table 6. Comparative analysis of the bank card market for analyzed countries, 2008–2017

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belarus										
Cards per capita	0.54	0.68	0.97	1.04	1.10	1.25	1.30	1.30	1.34	1.46
Cards th.per ATM	2.45	2.60	3.02	2.97	2.82	2.89	2.83	2.80	2.89	3.15
Cards th.per POS	0.51	0.38	0.31	0.24	0.18	0.16	0.13	0.11	0.09	0.09
Hungary										
Cards per capita	0.89	0.89	0.89	0.90	0.90	0.91	0.90	0.91	0.91	0.93
Cards th.per ATM	1.92	1.85	1.85	1.82	1.87	1.86	1.82	1.86	1.79	1.79
Cards th.per POS	0.15	0.14	0.13	0.12	0.11	0.10	0.08	0.08	0.07	0.06
Moldova										
Cards per capita	0.21	0.21	0.23	0.26	0.28	0.32	0.37	0.36	0.43	0.49
Cards th.per ATM	n/d	1.03	1.07	1.07	1.09	1.15	1.20	1.33	1.45	1.58
Cards th.per POS	n/d	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.10	0.10
Poland										
Cards per capita	0.79	0.87	0.83	0.83	0.86	0.90	0.94	0.92	0.96	1.02
Cards th.per ATM	2.18	2.11	1.95	1.84	1.83	1.84	1.76	1.59	1.57	1.68
Cards th.per POS	0.15	0.15	0.13	0.12	0.11	0.11	0.09	0.08	0.07	0.06
Romania										
Cards per capita	0.66	0.64	0.63	0.66	0.68	0.71	0.73	0.75	0.81	0.84
Cards th.per ATM	1.44	1.32	1.24	1.21	1.25	1.31	1.26	1.30	1.43	1.48
Cards th.per POS	0.15	0.13	0.11	0.11	0.11	0.11	0.11	0.10	0.10	0.08
Russian Federation										
Cards per capita	0.84	0.88	1.01	1.40	1.67	1.73	1.94	1.95	2.15	1.83
Cards th.per ATM	1.59	1.43	1.24	1.41	1.39	1.32	1.25	1.38	1.57	1.30
Cards th.per POS	0.36	0.36	0.33	0.38	0.33	0.26	0.22	0.19	0.18	0.12
Slovakia										
Cards per capita	0.97	0.94	0.96	0.99	0.85	0.89	0.98	1.03	1.10	1.05
Cards th.per ATM	2.32	2.24	2.22	2.22	1.84	1.87	1.96	2.04	2.16	2.04
Cards th.per POS	0.16	0.14	0.14	0.13	0.11	0.12	0.12	0.10	0.10	0.10

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Ukraine										
Cards per capita	0.84	0.63	0.64	0.76	0.73	0.79	0.73	0.72	0.76	0.82
Cards th.per ATM	1.38	1.01	0.97	1.06	0.92	0.88	0.90	0.93	0.96	0.94
Cards th.per POS	0.33	0.28	0.27	0.28	0.20	0.16	0.16	0.16	0.15	0.14

Source: Own calculations based on data from the central banks as table 4 of the analyzed countries.

The comparative analysis of the number of bank cards per capita in Ukraine and neighboring countries showed that the indicator is slightly lower than in neighboring EU member states and about two times less than in Russia and Belarus. Thus, according to the indicators of the neighboring countries, there is a reserve to increase the distribution of bank cards in Ukraine. At the same time, Ukraine is the only one of the analyzed countries which systematically decreased the number of cards per capita over the ten years.

Comparing ATM networks in 2017 showed that the largest number of ATMs is in the Russian Federation; however, the number of cardholders using ATMs is not the biggest, at 1.30 th. cards per ATM. The smallest number of ATMs is in Moldova; however, the indicator of cardholders using ATMs is higher than in the Russian Federation – 1.58 th. cards per ATM. In the neighboring countries, the biggest indicator is in Belarus – 3.15 th. cards per ATM, which is three times higher than in Ukraine.

Most of the ranked countries decreased the number of cards per ATM over the last ten years; only Belarus and Moldova increased the number in this period. Thus, Ukraine has the potential to reduce the ATM network, taking into account the average number of people per ATM in neighboring EU countries (1.63 th. cards per ATM) and Ukraine's efforts to reduce cash flow in order to combat the shadow economy.

In order to extend cashless settlements, countries increased the total number of POS terminals, so reducing the number of cards per POS terminal. Over the last ten years, Ukraine and its neighboring countries substantially decreased the number of cards per POS terminal. In this period, Ukraine reduced the number of th. cards per POS terminal from 0.33 to 0.14. Poland and Hungary reduced th. cards per POS terminal in 2008–2017 years from 0.15 to 0.06 accordingly.

Among the neighboring countries in 2017, Ukraine ranks first for the th. cards per POS terminal (0.14). At the same time, this indicator in European countries such as Hungary and Poland, are the much less than in other analyzed countries. In 2017 the number of th.cards per POS terminal in Hungary and Poland are roughly the same (0.06).

Thus, Ukraine has the opportunity to increase the number of POS terminals in order to extend cashless settlements and get is businesses out from the shadows. Focusing on neighboring EU countries, it should be noted that the best indicators of using the POS terminals are in Poland and Hungary. The average number of

th. cards per POS terminal in analyzed countries is about 0.09, which is almost 1.5 times less than in Ukraine (0.14).

Considering the above, for the comparable analysis bank card market recommended that three criteria are used for a comparative analysis of the bank card market to determine the potential for the innovative development of business: card availability, ATM network and POS terminals.

In the BCM Index, the three components are weighted equally so that the overall score is not biased toward any one component or direction. The purpose of the Index is to reflect the bank card market in every country studied in a way that is as balanced as possible. The data for each component are provided so that others can study, weight, and integrate for future investigations.

5. Data analysis

The opening up of the bank card markets, the removal of tariff and non-tariff barriers and the greatest possible freedom of movement for bank services generated completely new opportunities for the development of business.

Each of three mentioned criteria for the bank card market has the same significant effect on the state of the payment market in the country. It should be noted that when comparing countries and determining the rating, it is necessary to take into account certain features of each criterion of the bank card market. A high number of cards per capita and a large number of cards per ATM is a positive factor and corresponds to the highest rating. At the same time, a high number of cards per POS terminal indicates a lack of equipment and is a negative factor, and corresponds to the lowest rating.

Each variable was assigned a weight, indicating the level of importance it has in affecting the development of business. All variables were given an equal weight. The equal weighting was justifiable because the ranking covers a limited set of variables, i.e., cards, ATMs and POS terminals. In this case, an argument that the variables are of equal importance can be made. The mean of the three indicators yields a country's overall indices of the bank card market (BCM Index) score. Adopting this scheme allows us to express our views of what is significant to the development of business, while also keeping it within the range of evidence available from the countries' central banks and expert opinions.

The total indices of the BCM Index were calculated as the average of the three indicators to determine the state of the Ukrainian bank card market and to compare it with the markets of neighboring countries. A comparative analysis of the bank card market in Ukraine and its neighboring countries using the criteria of

the number of payment cards per capita, the number of cards per ATM and the number of cards per POS terminal, is presented in Table 7.

Table 7. Index bank card market (BCM Index) for analyzed countries, 2008–2017

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belarus	5.3	4.7	3.3	3.0	3.0	3.0	3.0	2.7	2.0	2.3
Hungary	3.0	3.0	4.0	4.0	2.0	2.3	3.0	3.3	3.3	3.0
Moldova	5.3	5.3	5.3	5.7	5.7	6.3	6.3	6.7	6.3	6.3
Poland	4.0	4.0	3.7	3.7	4.3	3.7	3.3	3.0	3.3	3.3
Romania	4.7	4.7	4.7	4.7	5.3	5.0	5.0	5.3	5.7	5.0
Russia	5.0	5.0	5.0	4.7	4.7	4.7	5.0	4.7	4.3	5.0
Slovakia	2.7	2.3	3.3	3.3	4.0	4.0	3.3	3.0	3.7	3.3
Ukraine	5.7	7.0	6.7	7.0	7.0	7.0	7.0	7.3	7.3	7.7

Source: Own calculations based on data from the central banks as table 4 of the analyzed countries.

According to the data in the table, taking into account the three criteria, Ukraine ranks last in the rating of the analyzed countries during the whole period under consideration. At the same time, among the 8 countries, the leading position during the ten-year period was occupied, alternately, by Slovakia, Belarus, Hungary and Poland. Slovakia's BCM Index worsened during the ten years, from 2.7 in 2008 to 3.3 in 2017. Belarus improved its rating from 5.3 to 2.3. Hungary had a more stable position, with an average indicator of 3.1, and Poland improved its rating from 4.0 to 3.3. Thus, Ukraine has the potential for development and improvement in comparison with these neighboring countries.

Table 8. Comparative analyses of economic variables for analyzed countries, 2008–2017

Country	BCM Index proposed by the author			LP Country Economic Rank			BDO IBC Economic Rank			EF Economic Rank		
	2008	2012	2017	2008	2012	2017	2008	2012	2017	2008	2012	2017
Belarus	5.3	3.0	2.3	53	47	42	110	69	37	45.3	49.0	58.6
Hungary	3.0	2.0	3.0	47	59	57	45	51	41	67.6	67.1	65.8
Moldova	5.3	5.7	6.3	92	91	90	92	81	44	57.9	54.4	58.0
Poland	4.0	4.3	3.3	38	39	34	74	62	24	60.3	64.2	68.3
Romania	4.7	5.3	5.0	60	68	60	48	72	36	61.7	64.4	69.7
Russia	5.0	4.7	5.0	69	70	70	106	120	40	49.8	50.5	57.1
Slovakia	2.7	4.0	3.3	34	48	49	32	48	33	70.0	67.0	65.7
Ukraine	5.7	7.0	7.7	73	87	84	139	152	80	51.0	46.1	48.1

Source: Own calculations based on data from Tables 1, 2, 3 and 6.

Combining the two data sets together, a unique panel dataset was created from the Legatum Prosperity Index 2017, the BDO International Business Compass 2017, the Index of Economic Freedom 2018 surveys and data from the websites

of the central banks of the countries observed. More specifically, for the dataset, Table 8 provides the definitions and statistical description of the main variables in the model.

As the table 8 shows, Belarus, Hungary, Poland and Slovakia have a BCM Index better than the other countries between 2008 and 2017. At the same time, according to the LP Country Economic Rank, Belarus, Poland and Slovakia take the leading positions among the eight countries. According to the BDO IBC Economic Rank, Hungary, Poland, Romania and Slovakia have the best positions. Meanwhile, Belarus, the Russian Federation and Ukraine have good conditions for investment according to EF Economic Rank.

Over the last ten years, Poland and Slovakia have had the best positions according to the estimate of the LP Country Economic rank, the BDO IBC Economic Rank and the EF Economic Rank, as well as the BCM Index proposed by the author. Comparative analyses for these variables are represented in Figure 2.

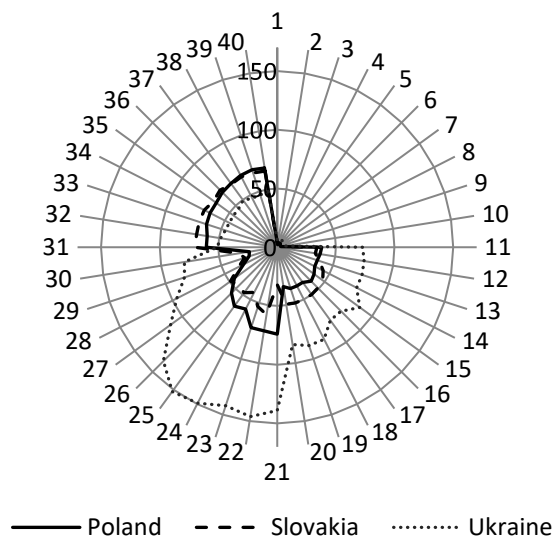


Figure 2. Criteria and indicators of the bank card market for Poland, Slovakia and Ukraine

Source: author's own study.

The model is a visual representation of how the LP Country Economic Rank, the BDO IBC Economic Rank, the EF Economic Rank and the BCM Index are interrelated in Slovakia, Poland and Ukraine.

The models for Poland and Ukraine in the graph are similar. Additionally, Poland and Ukraine have the same population and a similar language. Thus, we can conclude that deepening the cooperation between Ukraine and Poland in the framework of Euro-integration could contribute to an increase in the development of the bank card markets of both countries.

6. Comparing the bank card markets of Ukraine and Poland

The level of bank card market development has a special and important place in the development of the banking system. The level of the bank card market is a particular concept, and it is obvious that there is no perfect indicator characterizing it. In the phase of Euro-integration, Ukraine has faced such difficult tasks as the implementation of and compliance with the Basel III regulations in the Ukrainian banking system, and it urgently needs solutions. The bank card market is the most dynamic part of the banking sector. Bank cards combine elements of deposit, credit, settlement and currency-exchange functions. So, the bank card market is a simplified model of the banking system.

Among the countries in the survey, Poland is in first place with a very high LP Country Economic rank while Ukraine is in penultimate place. Poland is in second place in the BDO IBC Economic Rank rated very highly, while Ukraine is in last place. Ukraine comes second in the EF Economic Rank with a very high level of Financial Freedom while Poland is in last place. In recent years, the increased number of cards, ATMs and POS terminals. Table 9 presents the changes in the bank card market indicators in Ukraine and Poland between 2008 and 2017.

Table 9. The dynamics of bank card market indicators in Ukraine and Poland, 2008–2017

Years	Population, thousands		Number of bank cards, thousands		Number of ATMs		Number of POS terminals	
	Ukraine	Poland	Ukraine	Poland	Ukraine	Poland	Ukraine	Poland
2008	46,192	38,136	38,576	30,275	27,965	13,878	116,748	197,557
2009	45,963	38,167	29,104	33,213	28,938	15,714	103,063	215,509
2010	45,783	38,530	29,405	31,984	30,163	16,413	108,140	246,510
2011	45,598	38,538	34,850	32,045	32,997	17,392	123,540	266,429
2012	45,453	38,533	33,106	33,291	36,152	18,188	162,724	289,547
2013	45,373	38,502	35,622	34,659	40,350	18,876	221,222	326,340
2014	45,246	38,484	33,042	36,069	36,596	20,531	203,810	398,172
2015	42,759	38,455	30,838	35,209	33,334	22,143	194,478	463,366
2016	42,591	38,427	32,389	36,874	33,783	23,443	219,241	536,236
2017	42,415	38,422	34,858	39,096	37,003	23,230	251,681	624,434

Source: https://bank.gov.ua/control/en/publish/category?cat_id=9792432 (accessed: 28.10.2018); Key indicators of Ukraine's payment card market performance The National Bank of Ukraine 2017; http://www.nbp.pl/homen.aspx?f=/en/system_platniczy/system_cards.html (accessed: 28.10.2018) Payment system in Poland – Payment cards Narodowy Bank Polski 2017.

We can see that both countries recorded improvements, although the situation is more desirable in Poland than in Ukraine. In both countries, the number of bank cards demonstrated frequent fluctuations in indicators between 2008 and 2017. During the last ten years, the number of ATMs grew from 27,965 to 37,003 in Ukraine and from 13,878 to 23,230 in Poland. During this period, the number of POS termi-

nals grew from 116,748 to 251,681 in Ukraine and from 197,557 to 624,434 in Poland. Even though the bank card market of Ukraine, especially POS terminals, is developing and expanding, the growth rates are still slow and insufficient.

At the same time, over the last ten years, the population has decreased from 46.192 million to 42.415 million in Ukraine, and in Poland it has grown slightly from 38.136 million to 38.422 million. In this case, the comparative analysis indices are more accurate than the comparative analyses of the bank card market indicators. The indices proposed and compiled by the author comparing Poland with Ukraine show that the following components are higher: the number of bank cards per capita (1.02) and the number of cards per ATM (1683). The same indicators accounted for slightly more than 0.82 and 942 in Ukraine, respectively.

Table 10. Indices of bank card market in Ukraine and Poland, 2008–2017

Years	Cards per capita		Cards per ATM		Cards per POS terminal	
	Ukraine	Poland	Ukraine	Poland	Ukraine	Poland
2008	0.84	0.79	1379	2182	330	153
2009	0.63	0.87	1006	2114	282	154
2010	0.64	0.83	975	1949	272	130
2011	0.76	0.83	1056	1843	282	120
2012	0.73	0.86	916	1830	203	115
2013	0.79	0.90	883	1836	161	106
2014	0.73	0.94	903	1757	162	91
2015	0.72	0.92	925	1590	159	76
2016	0.76	0.96	958	1573	148	69
2017	0.82	1.02	942	1683	139	63

Source: https://bank.gov.ua/control/en/publish/category?cat_id=9792432 (accessed: 28.10.2018) Key indicators of Ukraine's payment card market performance The National Bank of Ukraine 2017; http://www.nbp.pl/homen.aspx?f=/en/system_platniczy/system_cards.html (accessed: 28.10.2018) Payment system in Poland – Payment cards Narodowy Bank Polski 2017.

Table 10 describes the main indices of the bank card markets in Ukraine and Poland in the years 2008–2017. The number of bank cards per POS terminal decreased (or the number of POS terminals per thousand bank cards increased) in both countries during the observed ten years. Despite this fact, the number of bank cards per capita in Ukraine decreased from 0.84 to 0.82. This means that the level of cash payments had an upward trend during the period under study. Regarding Poland, the number of bank cards per capita increased from 0.79 to 1.02. Thus, there was a tendency to reduce cash payments in Poland.

The deepening cooperation between Ukraine and Poland in the framework of Euro-integration could contribute to an increase in the level of the bank card market development of both countries. However, it is not a short-term process, because both countries, especially Ukraine, have to overcome many political and economic challenges.

7. Conclusion

The strategies for the development of the bank card market in Ukraine and its neighboring countries had different directions. In the Russian Federation and Belarus, the market development strategy is characterized by a significant distribution of payment cards. For the EU countries analyzed, the market development strategy is through the development of the POS terminals to expand cashless settlements. Thus, the highest indicator for the number of payment cards per capita is taken by the Russian Federation and Belarus. The highest rating in terms of the number of cards per ATM goes to Belarus and Slovakia. Regarding the number of cards per POS terminal, the highest ranking is taken by EU member states, Poland and Hungary.

Therefore, it is proposed that industry and SMEs use the recommended methodology for a rapid review of the bank card market in almost every country. Updating data and an in-depth analysis on an annual basis will ensure that the BCM Index is always relevant to reliably compare the risks and opportunities of the market. Thus, our methodology can provide a solid foundation for innovative solutions that can make businesses even more successful.

Finally, future research should be conducted in other developed and emerging economies using the same methodology as in the current study to examine whether an association between the BCM Index and the level of development SMEs is found to be consistent beyond Ukraine and neighboring countries.

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Streszczenie

RYNEK KART BANKOWYCH: ANALIZA PORÓWNAWCZA UKRAINY I KRAJÓW SĄSIEDNICH

Celem niniejszej pracy jest określenie głównych wskaźników rynku kart bankowych, służących analizie sektora bankowego w różnych krajach. Korzystając z trzech modeli rankingowych przeanalizowano, jakie wskaźniki mogą być wykorzystane do stworzenia rankingu rynków finansowych oraz jak to się przekłada na ranking rynków kart bankowych. Do weryfikacji przyjętego założenia wykorzystano metodę analizy porównawczej, badając łącznie 8 krajów – Ukrainę i kraje sąsiadujące. Następnie dokonano szczegółowej analizy dwóch państw (Polski i Ukrainy) jako państw o podobnych rynkach kart bankowych. Analiza została oparta na założeniu, że do przeprowadzenia analizy porównawczej niezbędne jest wykorzystanie systemu wzajemnie powiązanych wskaźników dotyczących bankowych kart płatniczych, bankomatów i terminali POS.

Słowa kluczowe: bank; Polska; wskaźniki; ranking państw; wskaźnik