"Competitiveness in the Ukrainian stock market and local crisis of 2013–2015"

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COMPETITIVENESS IN THE UKRAINIAN STOCK MARKET AND LOCAL CRISIS OF 2013–2015

Abstract

This paper investigates competitiveness in the Ukrainian stock market during local crisis of 2013–2015. The following hypothesis is tested: crisis decreases competitiveness in the stock market. The analysis is carried out for the most liquid stocks in the Ukrainian Exchange (UX) over the period from 2010 to 2017 using both traditional measurements of market concentration (Hirschman Index, Lerner Index, Comprehensive Concentration Index, Entropy Index, Gini coefficient, etc.) and some alternative methods like regression analysis with dummy variables and Kruskal-Wallis test. The results suggest that the current degradation of the Ukrainian stock market is closely related with significant changes in the market concentration which are caused by the local crisis.

Keywords   Ukrainian stock market, competitiveness, concentration

JEL Classification   D41, D42, D53, E44, G10, G14

INTRODUCTION

Stock market provides a significant impact on the economy of the country. Beck et al. (2015) using correlation analysis find evidences in favor of strong dependence between the trade volumes in the stock market and economic growth. Growth of the EU stock market by 1/3 causes long-term growth of the economy by 1/5. But this dependence is absent for the case of less developed countries.

The last decade was very painful for the Ukrainian stock market. Internal and external shocks, global financial crisis of 2007–2009, end of the commodity super cycle hurt all the segments of the financial market and stock market as well during 2008–2010.

As a result, in 2012, Ukraine was ranked 2nd (after Cyprus) in the world as the country with the biggest decline of stock market. Ukrainian stock market lost 35% of capitalization during 2012. Degradation of the stock market continued in 2013–2015. It was caused by the Russian aggression, devaluation of Hryvnia (Ukrainian national currency), catastrophic decline in international reserves, local banking crisis, and sharp decline in GDP, etc.

In such conditions, Ukrainian stock market finally ceased to perform its basic functions and turned into a pale shadow of itself. Its role in 2016–2017 was reduced to a purely nominal – to show that Ukraine has stock market. These processes are extremely negative for the whole Ukrainian economy; that is why it is quite important to understand their real causes. In this paper, the following hypothesis is tested: crisis decreases competitiveness in the stock market.

To do this, competitiveness in the Ukrainian stock market is investigated. The analysis is carried out for the most liquid stocks in the Ukrainian Exchange (UX) over the period from 2010 to 2017. To measure market concentration, traditional measurements of market concentration (Hirschman Index, Lerner Index, Comprehensive Concentration Index, Entropy Index, Gini coefficient, etc.) and some alternative methods like regression analysis with dummy variables and Kruskal-Wallis test are used.

The remainder of the paper is organized as follows. Section 1 reviews the existing literature on the market concentration analysis and Ukrainian stock market. Section 2 describes the methodology used in this study. Section 3 discusses the empirical results. Last section provides some concluding remarks and implications.

1. LITERATURE REVIEW

Competition in the stock market is widely discussed among academicians. Still there is no any unified methodology or overall theory for it. Expressed views are rather polar: from the absolutism of stock market as a highly competitive structure with optimal resource distribution to the justification of monopoly nature of the stock market. Overall existing studies can be divided into 3 groups:

1. Optimal resource allocation and high competitiveness in the stock market. Merton and Subrahmanyam (1974) demonstrated the optimality of a competitive stock market, using Pareto optimum and restrictive limitations for the companies. Stiglitz (1981) also discussed Pareto optimality and competition in the USA stock market. Soros (1994) and Madhavan (1996) prove the positive role of the competitiveness for the stock markets.

2. Market microstructure models and competitive models in the stock market. Grossman and Hart (1979) explore competitive equilibrium in the stock market. Talmain (2007) developed a dynamic stochastic general equilibrium approach to study monopolistic competition in the stock market. Models of the competitive stock trading are developed by Wang (1994), Huffman (1987), Campbell et al. (1993), Scheinkman and Weiss (1986), Dumas (1989) and others. Insider trading models, manipulation models and other models based on unequal information distribution are proposed by Kyle (1985), Admati and Pfleiderer (1988), Foster and Viswanathan (1990, 1993), Dalko et al. (2016), Maxim and Ashif (2017).

3. Competition in the segments of the stock market is discussed by Smidt (1971) who analyzed the conditions of the effective competitiveness. Cantillona and Yinb (2011) explore competition between exchanges and how the organizational model of stock exchange can influence the competitiveness in the market.

According to the Efficient Market Hypothesis, stock markets are efficient and as a result, they are highly competitive. Still, there are many evidences in the academic literature in favor of the opposite. To assess concentration of the market, both special indicators (Hirschey, 2008; Naldi & Flamini, 2014) and statistical models can be used (Mynhardt et al., 2017).

Ukrainian stock market as a rather young structure was recently analyzed mostly from the position of market anomalies: calendar anomalies (Caporale & Plastun, 2017) and the weekend effect (Caporale et al., 2016), overreactions (Mynhardt & Plastun, 2013). As a result, for the Ukrainian stock market, there are no specific models or methodologies to assess concentration. And still there are no complex studies devoted to the competitiveness of the Ukrainian stock market.

At the same time, the case of the Ukrainian stock market is rather interesting, because it provides the most recent evidences of stock market degradation in the world. For example, trade volumes in the Ukrainian Exchange (one of the leading stock exchanges in Ukraine) declined by 30 times (see Figure 1) and stock markets actually stopped performing their basic functions.

Sharp decrease in the volumes is accompanied by the market monopolization both for the case of or-
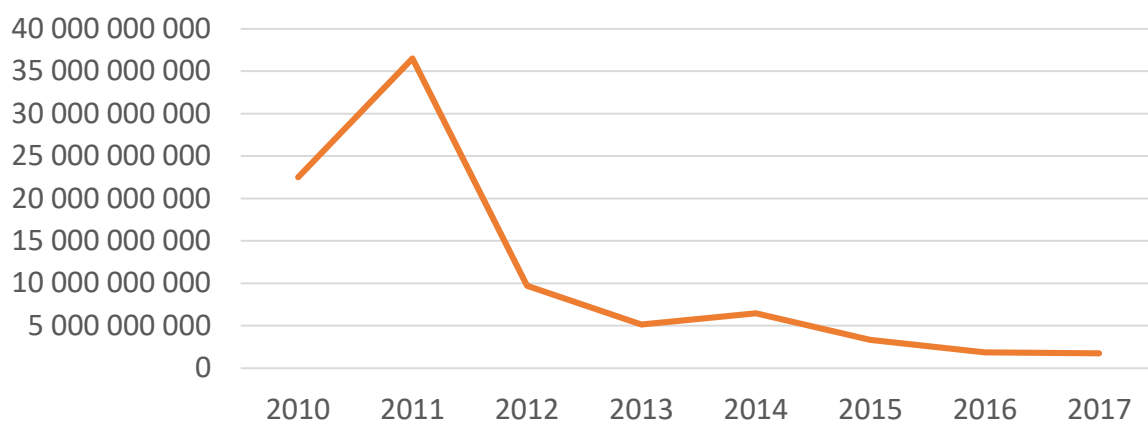
Figure 1. Trade volumes in the Ukrainian Exchange during 2010–2017 (UAH)

ganizers (Table 1), financial instruments (Table 2), issuers and depositary/clearing institutions.

As can be seen in Table 1, stock market volume was concentrated in the stock exchange "Perspective" during last years. There were two types of reasons: 1) sharp increase in government bond trading volume; 2) cancellation of licenses of PFTS and UX.

This is rather unique situation for the modern economic systems. That is why its anatomy is quite important. In this study the whole specter of cause-effect relationships wouldn't be discussed. It will be concentrated on the very concrete aspect: competitiveness. Hypothesis to be tested: crisis decreases competitiveness in the stock market.

2. DATA AND METHODOLOGY

This study is based on the data from the Ukrainian Exchange (http://www.ux.ua/) for the period 2010–2017. The choice of the period is explained by the following reasons: start of degradation phase, data availability. To assess the competitiveness of the market trade volumes, the key issuers are used. The list of issuers (Appendix B) is based on the structural analysis of the trades. To do this, data from two periods (extreme points for the trade volumes in the Ukrainian stock market) are used: 2011 and 2017. Companies which break the threshold of round 1% get in the list. Structural analysis of the trade volumes is presented in Appendix A.

Table 1. Structure of the Ukrainian stock market by organizers in 2008–2015, %

Stock exchange	2008	2009	2010	2011	2012	2013	2014	2015
Perspective	3.64	32.40	27.29	33.58	55.21	67.23	79.15	76.98
PFTS	90.02	39.62	46.46	37.74	33.93	23.78	15.47	18.58
UX	0.00	9.33	20.95	26.96	9.11	2.35	1.38	2.34
Others	–	18.65	5.3	1.72	1.75	6.64	4	2.1
Overall	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 2. Structure of the Ukrainian stock market by financial instruments in 2008–2016, %

Financial instrument	2008	2009	2010	2011	2012	2013	2014	2015	2016
Stocks	31.1	37.6	33.3	29.1	8.2	9.2	4.2	2.0	0.8
Bonds	44.0	19.6	5.1	9.1	10.0	10.0	5.4	4.7	2.9
Government bonds	22.6	22.7	46.4	42.1	67.8	74.7	87.9	87.1	84.8
Investment certificates	0.5	19.8	12.3	9.4	2.2	1.3	0.6	0.9	0.6
Others	1.8	0.3	2.9	10.3	11.8	4.8	1.9	5.3	10.9
Overall	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Tested hypothesis is as follows: crisis decreases competitiveness in the stock market.

To test this hypothesis, methodology developed by Mynhardt et al. (2017) is used. It includes both specific indicators used to analyze the competitiveness of the market (Herfindahl-Hirschman Index (HHI), Rosenbluth Index, Comprehensive Concentration Index (CCI), Lorenz curve, Gini coefficient, Entropy Index, The Lerner Index, concentration ratio, etc.) and additional statistical techniques (Kruskal-Wallis test, regression analysis with dummy variables) to increase authenticity of the results.

At the first stage of analysis, some specific statistical tests are used. They provide preliminary evidences in favor of the tested hypothesis. Data are divided into groups which are checked for the affiliation to the same general population.

To define the class of the statistical tests to be used (parametric or non-parametric tests), data set needs to be checked for normality.

To do this, Pearson's and Kolmogorov-Smirnov criteria are applied. The results are presented in Table 3. Since the critical values exceed calculated values of the Pearson's and Kolmogorov-Smirnov criteria, it may be concluded that data are not normally distributed and therefore only non-parametric tests are valid.

Table 3. "Normality" test of the data

Parameter	Value
Chi-square	337
Chi-square distribution critical value ($p = 0.95$)	242
Null hypothesis	Rejected
Kolmogorov-Smirnov d	0.28
Kolmogorov-Smirnov critical value ($p = 0.95$, $n = 208$)	0.0943
Null hypothesis	Rejected
Conclusion	Data are not normally distributed

That is why in this study, Kruskal-Wallis test is used. It is used instead of Mann-Whitney test because of the large number of the analyzed groups.

The null hypothesis (*H0*) in each case is that the data belong to the same population, a rejection of the null representing the differences in the ana-

lyzed groups of data (groups are uneven) and, thus, market is not freely competitive.

As an additional element to confirm the Kruskal-Wallis test results, multiple regression analysis with dummy variables is used. Overall model is presented below:

$$Y_t = a_0 + a_1 D_{1t} + a_2 D_{2t} + \ldots + b_n D_{nt} + \varepsilon_t, \qquad (1)$$

where Y_t – value on the period t; a_0 – mean value for the whole generation population (Ukrainian stock market); a_n, b_n – mean value for specific data group (certain company); D_{nt} – dummy variable for specific data group, equal to 0 or 1. D_{nt} is 1 when data belong to the specific group (for example, data belong to company with ticker BAVL and specific data group is BAVL). D_{nt} is 0 when data don't belong to the specific group (for example, data characterize CEEN, but specific data group is BAVL); ε_t – random error term for period t.

The size, sign and statistical significance of the dummy coefficients provide information about possible differences between groups. If dummy coefficient is statistically significant ($p < 0.05$), it is concluded that this group belongs to another general population. And this indirectly evidences in favor of unevenness of the Ukrainian stock market.

If the preliminary statistical assessments generate evidence in favor of the tested hypothesis (Ukrainian stock market is non-competitive), the next stage of the analysis is started – quantitative assessments of the competitiveness. To do this, specific indicators are used.

Concentration ratio

Concentration ratio is used to measure the level of market control of the largest firms in the market and to illustrate the degree to which market is oligopolistic. The concentration ratio is the percentage of market share held by the largest n firms in an industry.

$$CRn = R_1 + R_2 + \ldots + R_n, \qquad (2)$$

where CRn – concentration ratio; n – the number of the largest market participants; R_i – share of the market held by the i-th participant.

Depending on the value of the CR, the level of market competition can be characterized as follows (based on Naldi & Flamini, 2014):

- 0% – no concentration. Means perfect competition;

- 0%-50% – low concentration. Depending on concrete size of the CR market competition ranges from perfect competition to an oligopoly;

- 50%-80% – medium concentration. Usually is typical for the oligopoly;

- 80%-100% – high concentration. Market ranges from an oligopoly to monopoly;

- 100% – total concentration. The market is monopoly.

Herfindahl–Hirschman Index (HHI)

HHI is used to measure the size of firms in relation to the whole market. This is an indicator of the competition level in the market.

$$HHI = \sum_{i=1}^{n} \left(\frac{R_i}{R} \right)^2. \qquad (3)$$

It ranges in the interval [0; 1] (based on Hirschey, 2008):

- 0 – no concentration;
- from 0 to 0.1 – low concentration;
- from 0.10 to 0.18 – medium concentration;
- above 0.18 – high concentration.

Rosenbluth Index

The Rosenbluth Index includes not only the firm market share, but also the firm rank.

$$I_R = \frac{1}{2 \cdot \sum_{i=1}^{n} (i \cdot R_i) - 1}. \qquad (4)$$

The Rosenbluth Index deviates in the range [1/n; 1]. The higher the value of the Index, the more monopolized the market is.

Comprehensive Concentration Index (CCI)

Comprehensive Concentration Index reflects both relative dispersion and absolute magnitude of the biggest market participant share.

$$CCI = R_1 + \sum_{i=2}^{n} R_i^2 \cdot \left(1 + \left(1 - R_i \right) \right). \qquad (5)$$

CCI ranges from 0 to 1. The higher the CCI, the less competitive is market.

Entropy Index

The Entropy Index is a measure of "evenness" – the extent to which groups are evenly distributed among organizational units. It can also be interpreted as the difference between the diversity (entropy) of the system and the weighted average diversity of individual units, expressed as a fraction of the total diversity of the system.

$$E = \frac{1}{n} \sum_{i=1}^{n} R_i \cdot \ln \frac{1}{R_i}. \qquad (6)$$

Small values of the Entropy Index reflect high concentration.

Gini coefficient

The Gini coefficient measures the inequality among values of a frequency distribution (for example, market shares).

$$G = \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} \left| R_i - R_j \right|}{2n^2 \overline{R}}. \qquad (7)$$

The Gini coefficient deviates from 0 (perfect competition in the market) to 1 (monopoly).

As additional indicator of market inequality, the Lorenz curve is used. It provides the visual (graph) interpretation of the market unevenness. The cumulative percentage of companies is plotted on the x-axis, the cumulative percentage of market share is on the y-axis. In theory, absolutely equal distribution of the market is characterized by the bisector coming out of the start point of the coordinate system. The more actual distribution deviates from the theoretical empirical distribution, the greater the degree of inequality is observed in the market.
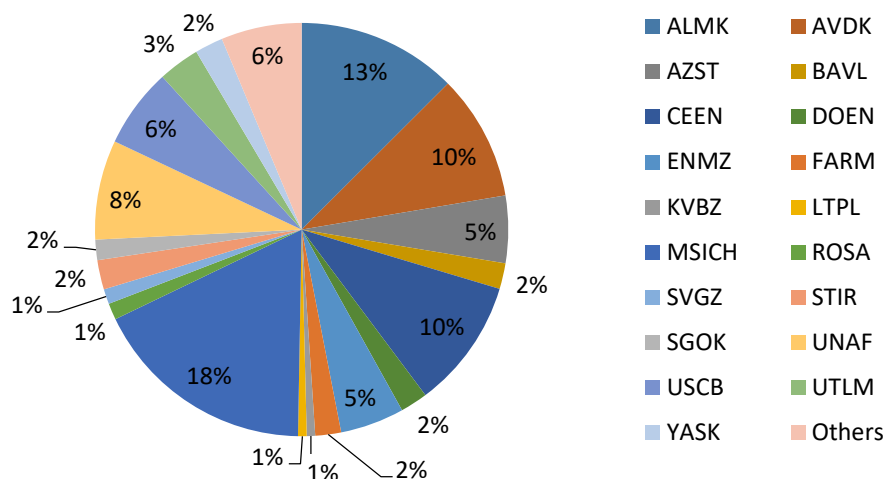
Figure 2. Structure of trades in the Ukrainian Stock Exchange: case of issuers in 2011

3. EMPIRICAL RESULTS

First, the structure of the trades in the Ukrainian Stock Exchange for the case of issuers during the most extreme periods (years with maximum and minimum trades) – 2011 and 2017 is analyzed. Results are presented in Figures 2 and 3.

Simple visual analysis shows significant changes in the structure of trades. The level of competitiveness between issuers decreased dramatically. As a result, in 2017, investors mostly have no investment alternatives. This partially explains sharp decline in trade volumes in the Ukrainian stock market.

Next statistical tests to confirm/reject hypothesis about non-competitiveness nature of the Ukrainian stock market are provided.

Kruskal-Wallis test

Results of the Kruskal-Wallis test are presented in Table 4.

Table 4. Kruskal-Wallis test results

| Parameter	Values
Adjusted H	177.02
d.f.	24
P-value	0.0000
Critical value	36.41
Null hypothesis	Rejected

As can be seen, data from different companies belong to the different general populations. This is indirect evidence in favor of the non-competitiveness of the Ukrainian stock market.

Regression analysis with dummy variables

Results of the regression analysis with dummy variables are presented in Table 5.

Table 5. Regression analysis results

Variables	Coefficients (B)	t	p-level
Average	0	8.40674	0.000000
ALMK	4.86077	2.34411	0.020106
AVDK	4.02006	1.93868	0.054022
AZST	0.54099	0.26089	0.794458
BAVL	0.73176	0.35289	0.724562
CEEN	7.75263	3.73872	0.000245
DNON	–3.31257	–1.59749	0.111818
DOEN	–1.32762	–0.64024	0.522785
ENMZ	0.51264	0.24722	0.805004
FARM	–2.64636	–1.27621	0.203440
KVBZ	–2.82401	–1.36188	0.174847
LTPL	–2.84770	–1.37330	0.171276
LUAZ	–3.17167	–1.52954	0.127794
MSICH	12.85456	6.19913	0.000000
PAAZ	–3.31446	–1.59840	0.111615
ROSA	–2.91238	–1.40450	0.161803
SHCHZ	–3.12500	–1.50704	0.133462
SVGZ	–2.35429	–1.13536	0.257654
SNEM	–3.39566	–1.63756	0.103168
STIR	–1.62252	–0.78246	0.434918
TATM	–3.28627	–1.58481	0.114672
SGOK	–2.19249	–1.05733	0.291704
UNAF	5.09849	2.45876	0.014837
USCB	1.40904	0.67951	0.497641
UTLM	–0.70703	–0.34096	0.733508
YASK	–1.86680	–0.90027	0.369117
Other	3.09199	1.49112	0.137589
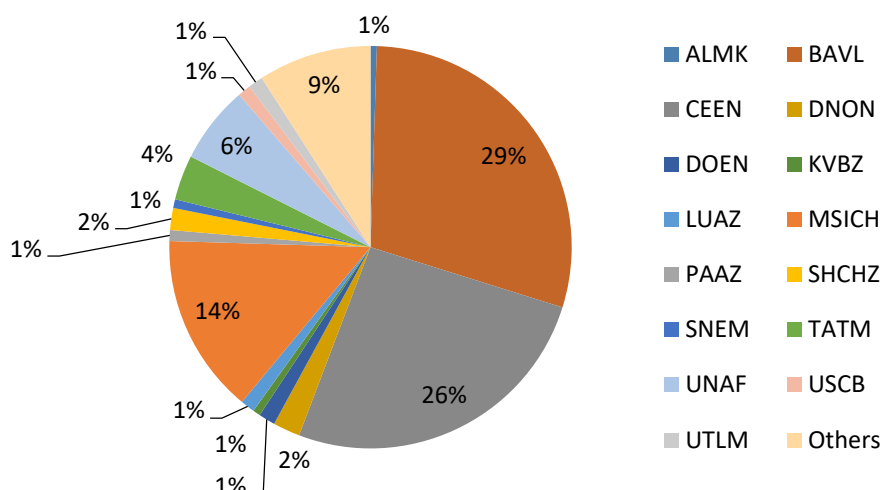
Figure 3. Structure of trades in the Ukrainian Stock Exchange: case of issuers in 2017

Regression summary:

$R = 0.57$; $R2 = 0.33$; Adjusted $R2 = 0.24$.

$F(26,190) = 3.61$; $p < 0.0000$.

According to these results, ALMK, CEEN, MSICH and UNAF data differ from the other companies and average values of the market. This evidences in favor of inequality in the Ukrainian stock market by the trade volumes between issuers and its high concentration.

Overall statistical tests provide evidences in favor of the non-competitiveness of the Ukrainian stock market.

To confirm these conclusions, some special indicators to measure market concentration are used.

Indicators of market concentration

Results of the of the market concentration indicators (concentration ratio (CR1), concentration ratio (CR4), Herfindahl-Hirschman Index (HHI), Rosenbluth Index, Comprehensive Concentration Index (CCI), Entropy Index and Gini coefficient) analysis are presented in Table 6.

To provide visual interpretation of the inequality of the Ukrainian stock market, the Lorenz curve is used (see Figure 4). Results evidence in favor of the inequality in the Ukrainian stock market and confirm the hypothesis of the non-competitiveness of the market.

General results of concentration indicators analysis are presented in Table 7.

As can be seen, level of competitiveness in the Ukrainian stock market changes dramatically. It was not highly competitive earlier, but during 2010–2017, it almost turned into oligopoly (case of trade volumes). It is divided between small numbers of issuers. Nowadays, opportunities to invest in liquid stocks are limited with 3-4 positions. As a result, it is mostly impossible to create a diversified investment portfolio. This

Table 6. Indicators of market concentration, 2010–2017

Indicator	2010	2011	2012	2013	2014	2015	2016	2017
Concentration ratio (CR1), %	15.25	17.58	24.16	33.10	33.59	29.02	40.41	25.94
Concentration ratio (CR4), %	41.06	50.09	61.56	55.48	76.64	75.82	82.00	75.97
Herfindahl-Hirschman Index (HHI)	0.08	0.09	0.12	0.16	0.19	0.19	0.23	0.19
Rosenbluth Index	0.09	0.10	0.14	0.15	0.22	0.22	0.26	0.20
Comprehensive Concentration Index (CCI)	0.15	0.19	0.23	0.28	0.33	0.33	0.39	0.33
Entropy Index, %	10.57	10.28	9.25	8.77	7.64	7.77	7.00	7.89
Gini coefficient	0.42	0.46	0.54	0.54	0.68	0.65	0.72	0.64

Table 7. General results of concentration indicators analysis for the Ukrainian stock market (cases of 2011 and 2017)

Indicator	2011	2017
Concentration ratio (*CR1*)	Dominating companies	Restricted oligopoly
Concentration ratio (*CR4*)	Dominating companies	Restricted oligopoly
Herfindahl-Hirschman Index (*HHI*)	Low concentration	High concentration
Rosenbluth Index	Low concentration	High concentration
Comprehensive Concentration Index (*CCI*)	Low concentration	High concentration
Entropy Index	A low level of uncertainty, and hence a high probability of the monopoly or oligopoly presence	A low level of uncertainty, and hence a high probability of the monopoly or oligopoly presence
Gini coefficient	High concentration	High concentration
Lorenz curve	Insignificant market inequality	Significant market inequality

negates the idea of investing in the Ukrainian stock market.

Overall, we find convincing confirmations of the basic idea: crisis decreases competitiveness in the stock market.

Ukrainian stock market needs urgent attention to prevent its total degradation. Analysis of the government programs for the Ukrainian stock market development (for example, the most recent one which is called "European choice – new possibilities for the progress and growth" and was developed for 2015–2017) shows no understanding from the authorities of the importance of the competitiveness in the stock market. In this legal act, almost everything can be found: from the investment stimulation measures to the infrastructure development. But there is nothing about the competitiveness.

Still, state regulation is one of the key elements of the market development. Market failures, manipulations, speculative activities, and monopoly

regulation – all these aspects are quite important for the market development and ensuring competitiveness.

International Organization of Securities Commissions (IOSCO) developed Objectives and Principles of Securities Regulation. Among them are: Principles Relating to the Regulator, for Self-Regulation, for the Enforcement of Securities Regulation, for Cooperation in Regulation Principles for Issuers and some others. Their implementation in the Ukrainian stock market is crucial to create competitive environment with equal access to the market for different participants (investors, issuers, intermediaries, etc.) and monopoly prevention.

As for the concrete steps, the following ones can be mentioned:

- abolition of discriminatory access conditions for the stock market participants at different levels and segments (issuers, organizers, market intermediaries, depository and clearing institutions);
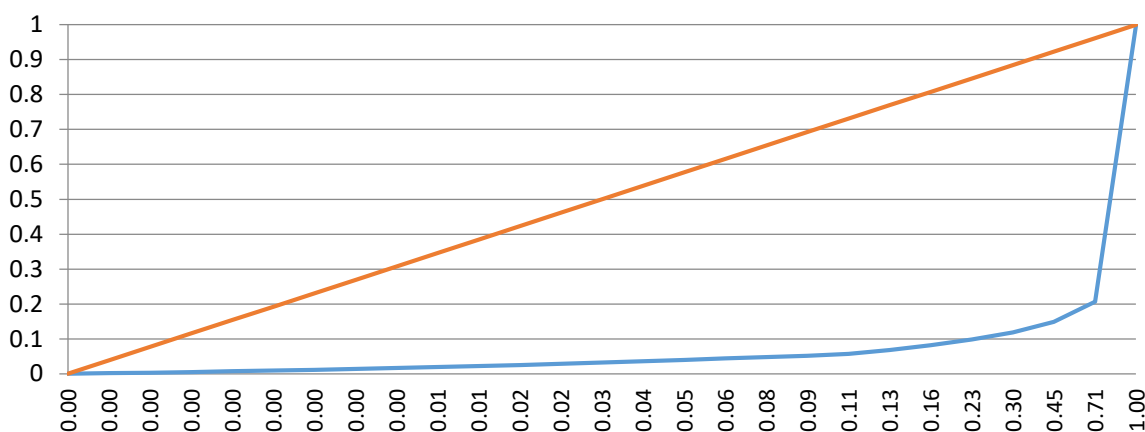
Figure 4. Lorenz curve for 2017

- effective coordination between different state authorities to provide effective competitive environment;

- further implementation of International Financial Reporting Standards (IFRS) as a basis for the openness and transparency of the stock market;

- expansion of new financial instruments and products in the stock market (like new derivatives to satisfy specific needs of the market participants);

- strengthening of the control over compliance with listing criteria, tariff policies and fair pricing in the market.

CONCLUSION AND IMPLICATIONS

This paper examines competitiveness in the Ukrainian stock market over the period 2010–2017. Using data from the Ukrainian Exchange, the following hypothesis was tested: crisis decreases competitiveness in the stock market. To do this, traditional measurements of market concentration were used (Hirschman Index, Lerner Index, Comprehensive Concentration Index, Entropy Index, Gini coefficient, etc.), as well as some alternative methods like regression analysis with dummy variables and Kruskal-Wallis test.

Strong evidences in favor of tested hypothesis are found. It can be concluded that market degradation is closely related with the level of competitiveness in the market and crisis in turn decreases competitiveness in the stock market.

The level of competitiveness in the Ukrainian stock market after crises changes dramatically. For the case of trade volumes, it almost turned into oligopoly and currently is divided between small numbers of issuers. Investment opportunities are limited with 3-4 positions of liquid stocks. As a result, it is mostly impossible to create a diversified investment portfolio. This negates the idea of investing in the Ukrainian stock market. And in such conditions, it is doomed. So appropriate measures and reforms are needed to change the situation.

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APPENDIX A

Table A1. Structure of the trades in the Ukrainian Exchange during 2010–2017

Company	2010	2011	2012	2013	2014	2015	2016	2017
ALMK	8.6%	12.5%	11.1%	5.2%	1.7%	2.1%	0.4%	0.5%
AVDK	9.5%	9.8%	11.3%	5.3%	1.6%	0.9%	0.3%	0.0%
AZST	5.0%	5.3%	4.0%	4.7%	1.3%	2.3%	0.4%	0.0%
BAVL	3.4%	2.0%	3.8%	7.6%	11.4%	7.7%	14.8%	29.3%
CEEN	7.8%	10.1%	15.0%	9.4%	19.9%	29.0%	40.4%	25.9%
DNEN	0.4%	0.5%	0.2%	0.2%	0.4%	0.4%	0.3%	1.2%
DNON	0.0%	0.1%	0.2%	0.1%	0.0%	0.0%	0.1%	2.2%
DOEN	1.3%	2.1%	2.3%	4.5%	4.9%	3.8%	1.8%	1.3%
ENMZ	5.2%	5.0%	5.0%	4.2%	1.3%	1.0%	0.2%	0.0%
FARM	0.0%	2.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.4%
KVBZ	0.7%	0.7%	0.5%	0.8%	0.6%	0.6%	0.6%	0.6%
LTPL	1.0%	0.7%	0.6%	0.2%	0.1%	0.0%	0.0%	0.0%
LUAZ	0.3%	0.3%	0.2%	0.2%	0.0%	0.0%	0.1%	1.2%
MSICH	7.7%	17.6%	24.2%	33.1%	33.6%	26.0%	17.1%	14.4%
SHCHZ	0.6%	0.3%	0.1%	0.1%	0.0%	0.0%	0.1%	1.8%
SVGZ	2.2%	1.2%	0.9%	0.2%	0.1%	0.0%	0.0%	0.0%
SNEM	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%
STIR	3.4%	2.3%	1.0%	0.7%	0.1%	0.1%	0.1%	0.0%
TATM	0.0%	0.1%	0.0%	0.1%	0.1%	0.0%	1.4%	3.6%
SGOK	1.8%	1.6%	1.2%	1.0%	0.4%	0.6%	0.1%	0.0%
UNAF	15.2%	7.8%	3.0%	4.3%	11.8%	13.1%	9.7%	6.2%
USCB	7.2%	6.2%	6.3%	2.2%	0.4%	0.5%	1.0%	1.0%
UTLM	5.1%	3.2%	0.8%	0.9%	0.6%	3.0%	1.4%	1.2%
YASK	2.7%	2.2%	0.5%	0.6%	0.2%	0.2%	0.1%	0.2%
ZAEN	1.5%	0.4%	0.1%	0.3%	0.2%	0.2%	0.2%	0.6%
Others	9.3%	5.9%	7.6%	14.2%	9.5%	8.4%	9.3%	7.6%
Overall	100%	100%	100%	100%	100%	100%	100%	100%

APPENDIX B

Table B1. Transcription of the codes in listing (Ukrainian Exchange)

Code in listing	Transcription
ALMK	Public joint stock company "Alchevsk Metallurgical Plant"
AVDK	Public joint stock company "Avdeevka coke plant"
AZST	Public joint stock company "Azovstal"
BAVL	Public joint stock company "Raiffeisen Bank Aval"
CEEN	Public joint stock company "Centrenergo"
DNEN	Public joint stock company "Dnyproenergo"
DNON	Public joint stock company "DTEK Dnyprooblenergo"
DOEN	Public joint stock company "Donbasenergo"
ENMZ	Public joint stock company "Yenakiyevo Metallurgical Plant"
FARM	Public joint stock company "Farmak"
KVBZ	Public joint stock company "Kryukov Wagon Factory"
LTPL	Public joint stock company "Luganskteplovoz"
LUAZ	Public joint stock company "Bogdan Motors"
MSICH	Public joint stock company "Motor Sich"
SHCHZ	Public joint stock company "Shakhtoupravlinnye Pokrovske"
SVGZ	Public joint stock company "Stakhanov Wagon Factory"
SNEM	Public joint stock company "Nasosenergomash"
STIR	Public joint stock company "Stirol"
TATM	Public joint stock company "Turboatom"
SGOK	Public joint stock company "Pivnichniy GOK"
UNAF	Public joint stock company "Ukrnafta"
USCB	Public joint stock company "Ukrsotsbank"
UTLM	Public joint stock company "Ukrtelekom"
YASK	Public joint stock company "Yasynivskyi coke plant"
ZAEN	Public joint stock company "DTEK Zahidenergo"