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## Impact of dual listing of companies' shares on their liquidity

**Abstract.** The article deals with the impact of double listing of companies' shares on their liquidity on the domestic market. The research covers data relating to trade in shares both before and after placing them on international markets.

Empirical testing of the main liquidity indicators, such as the spread and the volumes of trade, which was carried out before (32 weeks) and after (31 weeks) the share issue on the market which is different from the domestic one where the main operating activities of the company were conducted and where initial public offering took place is the basis of the present research.

Historical data of the Warsaw, Prague and Budapest Stock exchanges provide the information basis of the present study. The abovementioned stock exchanges are large regional players, which makes it possible to analyse the specifics of Eastern European companies. The companies included in the sample relate to the following: banks, chemical industry, retailing, oil and gas industry, resources, power generation, media and telecommunications.

Most of the share issues on the foreign markets relating to the companies under consideration date back to the 2014-2015 period. The specifics of the choice of companies is that a significant time frame of about 60 weeks, which is more than one calendar year, is required to conduct the analysis. We analysed local companies from the selected region that accessed external capital markets in the period between 2016 and 2018. Yet, after considering the companies, we did not include them in the analysis due to a lack of sufficient relevance.

The study shows how significant the impact of share issue on foreign markets on liquidity of shares of companies on the domestic market can be.

Accessing foreign capital markets increases the investment attractiveness of individual companies and the securities market of the country as a whole, provided there is a sufficient number of reliable issuers, which in turn leads to the development of investment potential.

The research results show that there is a decrease in the spread of shares and a positive effect on the growth of trading volumes on the domestic stock market after the placement of shares on other markets in relation to similar average indicators of the relevant markets.

**Keywords:** Share; International Listing; Stock Exchange; Liquidity; Spread; Volumes of Trade; Double Listing

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**Вплив подвійного лістингу акцій компаній на їх ліквідність**

**Анотація.** У статті досліджено вплив подвійного лістингу акцій компаній та ліквідність акцій на внутрішньому ринку. Під час дослідження були проаналізовані дані торгів акціями до розміщення їх на міжнародних ринках та після.

Дане дослідження показує, наскільки істотним може бути вплив емісії на зовнішніх ринках на ліквідність акцій компаній на внутрішньому ринку.

Вихід на зовнішні ринки капіталу підвищує інвестиційну привабливість окремих компаній та, при наявності достатньої кількості якісних емітентів, ринку цінних паперів країни в цілому, що, в свою чергу, веде до розвитку інвестиційного потенціалу.

У результаті було отримано підтвердження, що простежується зниження спреда акцій та позитивний ефект від зростання об'ємів торгів на внутрішньому ринку акцій компаній після розміщення на інших ринках по відношенню до аналогічних середніх показників відповідних ринків.

**Ключові слова:** акція; міжнародний лістинг; фондова біржа; ліквідність; спред; обсяг торгів; подвійний лістинг.

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**Влияние двойного листинга акций компаний на их ликвидность**

**Аннотация.** Исследовано влияние двойного листинга акций компаний и ликвидность акций на внутреннем рынке. В ходе исследования были проанализированы данные торгов акциями до размещения их на международных рынках и после.

Данное исследование показывает, насколько существенным может быть влияние эмиссии на внешних рынках на ликвидность акций компаний на внутреннем рынке.

Выход на внешние рынки капитала повышает инвестиционную привлекательность отдельных компаний и, при наличии достаточного количества качественных эмитентов, рынка ценных бумаг страны в целом, что, в свою очередь, ведет к развитию инвестиционного потенциала.

В результате было получено подтверждение, что наблюдается снижение спреда акций и положительный эффект от роста объемов торгов на внутреннем рынке акций компаний после размещения на других рынках по отношению к аналогичным средним показателям соответствующих рынков.

**Ключевые слова:** акция; международный листинг; фондовая биржа; ликвидность; спред; объем торгов; двойной листинг.

**1. Introduction**

The growth of international integration of world capital markets since the 1970 has been partly due to the intention of corporations to find additional ways to promote their shares and corporate bonds on international markets.

Earlier studies by authors such as G. Alexander, C. Eun and S. Janakiraman (1987) prove that double listing makes it possible for a company to reduce capital costs, increase liquidity of its securities and ease the flow of information [1].

According to J. McConnell, H. Dybevik, D. Haushalter and E. Lee (1996) [2], and G. A. Karolyi, (1998) [3], most works on international listing are focused either on ways to place shares of companies in American stock exchanges or describe placement of shares of American companies on European or Asian markets.

The findings from such research and development studies cannot be considered to be consensus-based in relation to European markets due to both the differences in listing models and variations within corporate cultures and practices of European and non-European companies.

European companies have a long tradition of placing their securities outside their local market. Before 1990, most cases of international placement of shares were on other European stock exchanges. However, in recent years, a growing number of European companies have been placing their shares on stock exchanges in the USA. In the period from January 1993 to December 1998, European companies accounted for the largest segment of the total number of foreign companies that placed their securities on the New York Stock Exchange (NYSE). At the end of 1998, a total of 133 European companies with their market capitalisation of USD 2,639 billion were registered on the NYSE [4].

According to survey results, a vast majority of corporate managers believe that access to a wider range of investors and an increase in the liquidity of securities are the main advantages of double listing. M. Lasfer (2009) claims that shares of companies are placed on other markets when the quantity of issued shares exceeds the internal capacity of the market.

In addition, the domestic market often has limited liquidity. This problem can be resolved by issuing depositary receipts on foreign markets.

Moreover, M. Lasfer argues that the price of shares may be more attractive on the foreign market, especially if there is market segmentation and depositary receipts offer diversified benefits to investors. Besides, domestic investors can also take advantage of the fact that due to double listing companies become more visible at the international level.

Scientists have developed several independent theories describing reasons why companies may be willing to enter external markets. For example, A. N. Licht states that we are observing evolution of theories and research from purely financial aspects of double listing to other business motives.

A significant number of scientific and research works and the growing popularity of international listing among companies suggest that this approach is increasingly used as a means of both improving the level of competitiveness of companies in capital markets and enhancing the level of corporate governance.

**2. Brief Literature Review**

Our research deals with a large part of scientific literature that analyses the interrelationship between volumes of trade and stock revenues with regard to short-term and mid-term investment horizons.

Several papers focus on the dependency between profitability and volumes of trade (G. Duffee, (1992) [7], R. Gallant, P. Rossi, & G. Tauchen (1992) [8]; B. LeBaron (1992) [9] and J. Y. Campbell, S. J. Grossman, & J. Wang (1993) [10].

A number of articles by, for example, D. Morse (1980) [11]; J. Conrad, A. Hameed, & C. M. Niden (1994) [12]; R. I. Antoniewicz (1993) [13]; S. E. Stickel, & R. E. Verrechia (1994) [14]; M. Cooper (1999) [15]; S. Gervais, R. Kaniel, & D. Mingelgrin (2001) [16]; L. Blume, D. Easley, & M. O'Hara (1994) [17] study the relationship between return on capital and volumes of trade.

Ukrainian scholars also draw attention to the importance of double listing of securities in terms of additional opportunities for enterprise development in modern conditions and increasing investment attractiveness of the country as a whole (N. Kharchenko (2013) [18], K. Gladchuk (2015) [19]).

Thus, liquidity indicators, namely volumes of trade and the spread of share prices, have a direct impact on profitability and stock returns in the trading process on a stock exchange.

**3. Purpose**

The purpose of the study is to provide a scientific basis to develop a concept of international listing as a means to increase liquidity of shares which results in enhanced corporate reputation among investors and an increasing number of shareholders. The development of the concept is based on a theoretical analysis of the impact of share issue on foreign markets on liquidity of shares of companies on the domestic market.

**4. Methodology**

Empirical testing of the main liquidity indicators, such as the spread and the volumes of trade, which was carried out before (32 weeks) and after (31 weeks) the share issue on the market which is different from the domestic one where the main operating activities of the company were conducted and where initial public offering took place is the basis of the present research.

The authors of the research use the *t*-statistic to compare indicators with a 90% probability interval. A *t*-test is a type of a statistical test which is used to compare the indicators of two groups. This is one of the most widely used tools of statistical hypothesis testing applied when analysing data sets.

There exist two types of statistical inferences which are parametric and nonparametric methods. Parametric methods are related to the statistical methodology under which the

distribution of random variables is provided resulting in inferences about the distribution parameters of the expected value. When the distribution of probabilities cannot be done, non-parametric methods are used.

T-tests are a type of the parametric method; they can be used when the samples meet the conditions of normality, equal dispersion and independence.

A comparative analysis is used to compare information on volumes of trade and company spreads.

The one-off liquidity indicators can be divided into four groups. They can reflect the size of the company, the trading volume, and the time between transactions or the spread. Liquidity measures related to the size of the company have not yet been studied because there are no convincing studies that can confirm this hypothesis [20].

The liquidity indicators associated with the trading volume can be calculated as a certain quantity or number of shares per one unit of time. Generally, they are used to determine the liquidity depth, yet they are also related to timing, since a higher market capacity leads to a shorter time required for trading in a predetermined number of shares.

The trading volume was researched by C. M. C. Lee and B. Swaminathan (2000) in the context of impulse and value strategy. If the volume of trading in shares is high, then this is a sign of high liquidity [21].

The difference between the asking price and the bid price relating to the company's shares, along with the associated indicators, brings the value of the company's shares to the optimal value of trade. In addition to fees and taxes, the trader should consider the spread as additional costs required for the immediate execution of the transaction.

The spread is studied on a daily basis, for example in the research work by D. Acker, M. Stalker and I. Tonks (2002) who examine spreads and their behaviour relevant to the company's earnings announcement dates [22]. According to a research by F. H. d Harris, T. H. McInish and R. A. Wood (2002) comparing trade on different stock exchanges, the spread is used to determine fair prices.

Consequently, the smaller the number of indicators related to the spread we have, the more liquid the market is.

Historical data of the Warsaw, Prague and Budapest Stock exchanges obtained through the global financial portal <https://www.investing.com> provide the information basis of the present study.

### 5. Results

Given no data relating to the history of daily indicators relevant to bid-ask prices for shares of companies, we suggest using price information on the opening price and the closing price.

These indicators show the level of liquidity of shares and are interrelated bid-ask prices of shares, which is reflected in the works by A. Farshid and R. Angelo (2017) [24].

We suggest that the spread is calculated according to the following formula:

$$Spread = \frac{Opening\ price\ of\ shares - Closing\ price\ of\ shares}{Average\ price\ of\ shares} \quad (1)$$

The comparative portfolio includes companies from Poland, the Czech Republic and Hungary that come from Eastern Europe, the region where Ukraine belongs to. In order to conduct the analysis, we considered companies listed on the Prague, Budapest and Warsaw Stock Exchanges. The abovementioned stock exchanges are large regional players, which makes it possible to analyse the specifics of Eastern European companies.

The companies included in the sample relate to the following: banks, chemical industry, retailing, oil and gas industry, resources, power generation, media and telecommunications.

In our opinion, this approach allows us to minimise the impact of significant changes within certain industries and to analyse the securities market of the selected region as a whole.

Also, we analyse the most relevant data. Most of the share issues on the foreign markets relating to the companies under consideration date back to the 2014-2015 period (Table 1).

Tab. 1: Brief overview of companies included in the analysis

Company	Industry	Country	Issue date
Komerční Banka, A.S.	Banking	Czech Republic	17/01/2014
Alior Bank	Banking	Poland	28/04/2014
Asseco Poland	Information technology	Poland	14/02/2014
Bank Zachodni	Banking	Poland	04/05/2015
Cyfrowy Polsat	Process equipment	Poland	28/01/2014
Eurocash S.A.	Retailing	Poland	30/12/2013
Getin	Financial services	Poland	07/01/2014
Globe Trade Centre	Business property	Poland	02/01/2014
Grupa Lotos	Oil and gas industry	Poland	02/01/2014
Jastrzębska Spółka Węglowa	Extractive industry	Poland	13/01/2014
Lubelski Węgiel Bogdanka	Construction industry	Poland	26/02/2014
mBank	Financial services	Poland	29/11/2013
Tauron Polska Energia	Electric power industry	Poland	06/11/2013
ANY Security Printing Company	Other	Hungary	14/04/2014
Appennin Vagyonkezelő Holding	Business property	Hungary	17/03/2014

Source: <https://www.investing.com>

The specifics of the choice of companies is that a significant time frame of about 60 weeks, which is more than one calendar year, is required to conduct the analysis.

We analysed local companies from the selected region that accessed external capital markets in the period between 2016 and 2018. Yet, after considering the companies, we did not include them in the analysis due to a lack of sufficient relevance.

Among other factors that affected the decision to include a number of companies in the comparative portfolio, we can single out the following: a sufficient amount of relevant information on volumes of trade and selling prices of shares (Table 2), the fact that share issue on international market occurs after their placement on domestic markets, a sufficient time frame required to analyse the average indicators regarding the circulation of shares on domestic markets before the issuance on foreign markets (Table 3). Also, we exclude companies, shares of which are traded on Over-the-Counter markets. The obtained data were compared with the average market indicators, such as WIG and PX for the Warsaw and Prague stock exchanges, and information on trading volumes and spreads on the Budapest Stock Exchange, which is not related to double listing on international markets.

To obtain an unambiguous conclusion about a possible effect of share issue, we used the *t*-statistic with 90% probability intervals.

The choice of the credibility level for an interval determines the probability that the credible interval has a valid parameter

Tab. 2: Average spread and daily volume of shares traded before and after issue on international markets

Company	Average trading volume, thousand		Spread, %	
	Before issue	After issue	Before issue	After issue
Komerční Banka, A.S	43.80	92.53	1.99	1.69
Alior Bank	176.19	163.66	2.50	2.24
Asseco Poland	146.03	91.97	2.27	1.82
Bank Zachodni	65.99	58.42	2.33	2.91
Cyfrowy Polsat	421.71	381.80	3.10	2.52
Eurocash S.A.	490.92	515.87	4.02	3.02
Getin	428.14	474.07	3.23	3.45
Globe Trade Centre	378.98	462.62	3.51	2.63
Grupa Lotos	242.92	305.02	2.91	2.52
Jastrzębska Spółka Węglowa	168.02	305.91	3.14	2.72
Lubelski Węgiel Bogdanka	48.61	274.92	2.63	2.52
mBank	30.54	271.98	3.38	2.70
Tauron Polska Energia	2,909.29	1,001.27	2.43	2.60
ANY Security Printing Company	29.56	13.19	1.93	1.45
Appennin Vagyonkezelő Holding	63.25	36.14	3.00	2.89

Source: Compiled by the authors based on <https://www.investing.com>



Tab. 3: Average market rates of daily trading volumes and spread according to the issue date

Issue date	Average trading volumes, thousand		Spread, %	
	Before issue	After issue	Before issue	After issue
17/01/2014			1.21	1.09
28/04/2014	99,161	41,701	1.03	0.79
14/02/2014	96,933	57,735	1.08	0.89
04/05/2015	43,218	48,695	0.82	1.05
28/01/2014	97,367	62,668	1.15	0.89
30/12/2013	96,931	71,439	1.13	0.91
07/01/2014	96,479	70,204	1.12	0.92
02/01/2014	96,668	70,802	1.13	0.92
02/01/2014	96,668	53,836	1.13	0.94
13/01/2014	96,147	53,317	1.13	0.94
26/02/2014	100,001	49,169	1.06	0.94
29/11/2013	101,432	56,157	1.11	0.96
06/11/2013	105,005	57,934	1.15	0.96
14/04/2014	2.12	2.74	1.63	1.15
17/03/2014	2.25	2.79	1.76	1.13

Source: Compiled by the authors based on <https://www.investing.com>

value. A general choice for the credibility level corresponds to 0.90 and 0.95

Such figures correspond to percentage values of the area of the normal density curve. For example, the 90% credible interval covers 90% of the normal curve, with a probability of less than 0.1 outside the relevant area. Since the normal curve is symmetric, one half of the area is in the left tail of the curve, while the other half of the area is in the right tail of the curve. Regarding the *C*-level credible interval, the area in each of the tails is  $(1 - C) / 2$ . As for the 90% credible interval, the area of each tail is  $0.1 / 2 = 0.05$ .

To test the hypothesis that the volume of shares traded after their issue on international markets increased if compared with their average market rates, and the value of spread decreased if compared with the average market rates, we use a *t*-test, which is a method to test hypothesis (statistical criteria) based on Student's *t*-distribution.

Since parameter values and statistical characteristics tend to fluctuate along with the change in the sample volume, it is necessary to provide assurance that the values of the relevant indicators are not equal to zero in aggregate data, which is essential to refute the so-called null hypothesis, and that their magnitude is within certain credibility intervals.

The evaluation of the reliability of the parameters and statistical characteristics of the model, known as substantiality check, is determined by Student's *t*-distribution. Generally, a *t*-distribution is calculated as a ratio between the value of a certain indicator and its standard error.

On the basis of the collected data, a two-tier test with different dispersions for each of the hypotheses is conducted.

After conducting the *t*-test we will either accept or reject the *H*<sub>0</sub> hypothesis that mean values are equal to each other.

If the *H*<sub>0</sub> hypothesis is rejected, the probability of error is determined by the *p*-value which is calculated on the basis of the *t*-test.

The approbation of the hypothesis by using the *p*-value is an alternative to the classic verification procedure due to the critical value of the distribution (Table 4 and Figure 1).

The calculations were performed by using the MS Excel data analysis software package.

As a result of the statistical study with its credibility level of statistical findings equal to 96%, the *H*<sub>0</sub> hypothesis can be rejected. Thus, with a high probability, the volume of trading in shares of the selected companies increases after their issue on international markets, if compared with the average market rate.

In this case, the trading volume shares of selected companies averaged 85.6% after the issue. The dynamics of changes in the average volumes of trade over the relevant periods was negative and the market showed an average decrease of 26.9% (Table 5 and Figure 2).

Tab. 4: Statistical indicators for testing Hypothesis No. 1 - the volume of trading in shares with dual listing increases upon their issue when compared with the average market rate

	Variable 1 (shares)	Variable 2 (market)
Average	85.61%	-26.94%
Dispersion	5.45	0.08
Observation	15	14
Difference between hypotheticals	-	
Df	14.00	
t-statistic	1.85	
P(T<=t) one-sided value	4%	
one-sided critical value	1.76	

Source: Compiled by the authors

Tab. 5: Statistical indicators for testing Hypothesis No. 2 - the spread of shares with double listing decreases upon their issue, when compared to the average market rate

	Variable 1 (shares)	Variable 2 (market)
Average	-0.31%	-0.21%
Dispersion	0.00	0.00
Observation	15	15
Difference between hypotheticals	-	
Df	19.00	
t-statistic	(0.88)	
P(T<=t) one-sided value	19%	
one-sided critical value	1.73	

Source: Modeling results

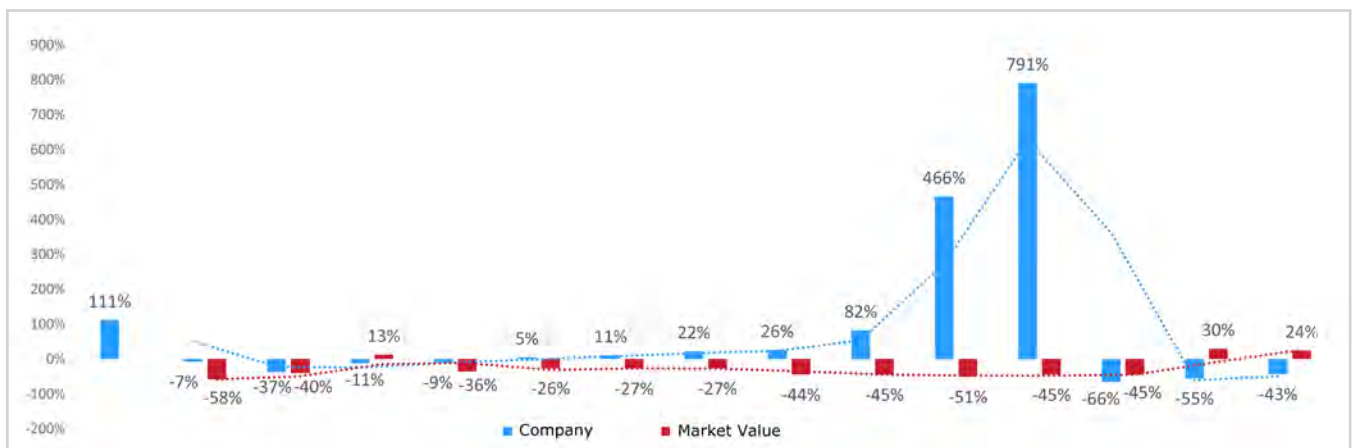


Fig. 1: Changes in the trading volume before and after the placement of shares on the international market

Source: <https://www.investing.com>

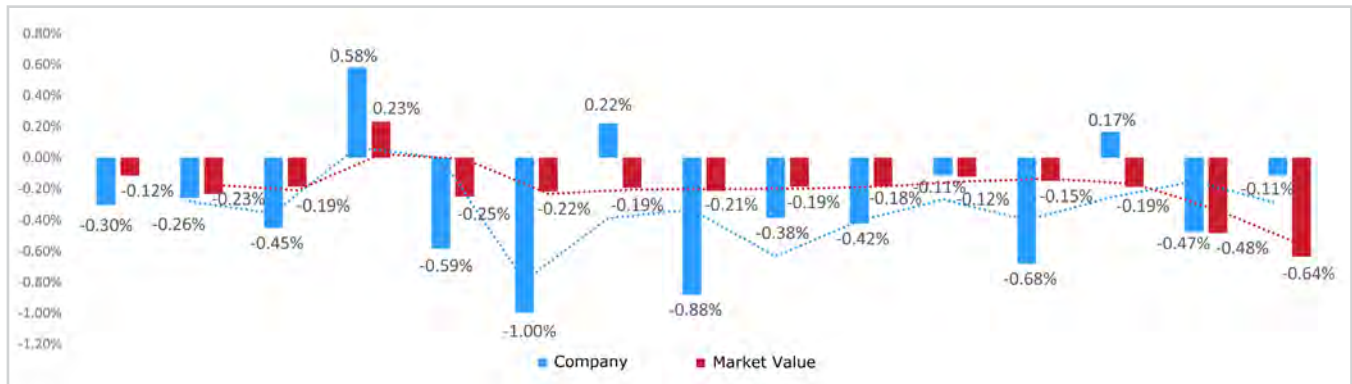


Fig. 2: Changes in the average spread before and after placement of shares on international markets

Source: <https://www.investing.com>

As a result of the statistical study with its credibility level of statistical findings equal to 81%, the  $H_0$  hypothesis can be rejected. Thus, with a high probability, the spread of shares of selected companies decreases after their issue on international markets, if compared with the average market rate.

In this case, the spread of share prices of selected companies decreased by 0.31%, along with a 0.21% decrease in the relevant market rate.

### 6. Conclusions

The conducted scientific analysis has proven that companies use international listing to increase liquidity of their shares, to work in capital markets, to improve the image of their companies amongst investors and to increase the number of shareholders. International listing is an effective strategy for companies accessing small, illiquid, inert and opaque segmented markets.

This study shows how significant the impact of share issue on foreign markets on the liquidity of the shares of companies on the domestic market can be.

L. Zingales (2007) argues that liquidity has always been one of the most important reasons why multinational compa-

nies access the US stock markets. However, more recent data from R. Dobbs and M. H. Goedhart (2008) [26] show that volumes of trade between American depositary receipts of European companies in the United States usually account for less than 3% of the total volumes of trade.

The use of international markets to increase the liquidity of shares of companies is a proven tool that is actively used in world practice.

Taking into account the fact that the Ukrainian stock market is very weak, the use of tools that increase the liquidity of companies' securities through placement of such securities on international markets is one of the few tools to increase companies' capitalisation in modern realities. Another positive effect is an increase in the overall liquidity of the domestic market, which leads to the improvement and development of the Ukrainian investment market and simplified access to capital, which, consequently, leads to a lower cost of the capital. This will increase the efficiency of financial markets, which, in turn, will have a positive impact on the economy of Ukraine as a whole.

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