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# Stock exchanges go public.
# The case of Warsaw stock exchange

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**Abstract.** Over the last twenty years the competition pressure affected the ownership structure of stock exchanges. Demutualization is a worldwide phenomenon which changed the traditionally member-owned stock exchanges into corporations often listed on their own markets. The purpose of this study is to assess the financial market reaction on the Initial Public Offer (IPO) of the Warsaw Stock Exchange. We perform the analysis of the WIG20 index based on the event study methodology. The obtained results confirm that market participants anticipated the undertaken action. The study helps to shed some light on the demutualization process of stock exchanges that take place in the transition countries.

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## INTRODUCTION

On October 4th, 2010 Warsaw Stock Exchange (WSE) announced that it plans to issue own shares on the main market. This time the plans have been implemented and the initial public offering (IPO) took place on the November 9th, 2010. That day ended the long lasting debate over the need for privatization of Polish stock market. The undertaken action was in line with organizational changes that had been started in 1993 by the demutualization of Stockholm Stock Exchange – institution that inspired the worldwide motion in stock exchanges industry (Swartz, Reto 2004). Starting from this turning point an increasing number of stock exchanges decided to go through the demutualization process which significantly transformed their business from being 'non-profit' organizations to companies that are designed like other business entities to bring profit for its owners (shareholders).

Demutualization and public offerings of stock exchanges should not be however perceived as a stand-alone process. On the contrary it occurs together with other important trends in the recent history of international financial markets e.g.: liberalization of financial markets, glo-balization, internationalization as well as technological improvement of business processes. Aggarwal and Dahiya (2006) distinguish main driving forces that affected this change in the ownership process, namely: diverging interests between existing owners of stock exchanges and competitive pressure arising from alternative trading systems (Electronic Communication Networks, ECNs) that forced stock exchanges to undertake large investments in the trading system's technology.

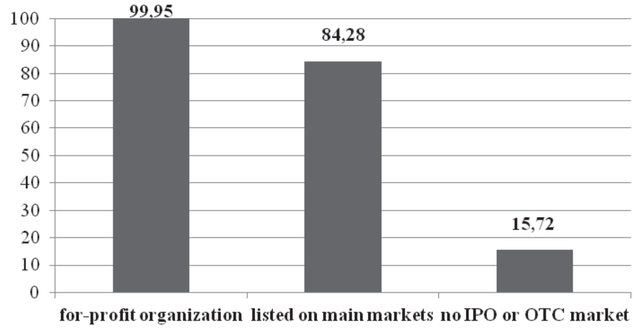
Since the above processes affect the whole global economy, with no exemption to transition and emerging countries, over the years also the stock exchanges coming from this group of countries decided to undertake organizational reforms and changed its ownerships structure (Lee 2010; Lee 2003). In comparison to more mature capital markets the ownership changes of stock exchanges occurring in this group of countries attracted less attention in the empirical literature. There is a strong need to fulfil this gap by carrying out more detailed analysis of the stock exchanges representing the transition and emerging countries. Since Warsaw Stock Exchange is an outstanding trading floor in terms of capitalization, transaction turnover and number of listed companies in this group of countries, we decided to concentrate on this particular case.

The aim of this paper is to assess the reaction of the Polish financial market on the WSE IPO decision. Additionally we provide assessment of the WSE operating performance The goal of the paper – the response of the Polish financial market on the WSE Initial Public Offering is reached by employing the event study methodology to the performance of the WIG20 index. WIG20 is the blue-chip index calculated for twenty the biggest and the most liquid companies listed on the WSE main market. The empirical part of the paper refers to the main authors in the area of event studies who investigated the impact of the IPOs on the companies' performance (Ritter 1991; Ritter 1998; Brav et al. 2000). The findings are however partly preliminary since the assessment is conducted on the one particular case-study – WSE. As far as we do not use the sample of events but only one specific event for chosen company, we intentionally neglect to verify the statistical significance of the obtained results.

The remainder of the paper is organized as follows. The section following introduction provides the general review of the market situation concerning demutualization as well as stock exchanges IPO). Section 3 presents short history and overall description of the Warsaw Stock Exchange, while in section 4 the general financial performance of WSE company is given. In the fourth section the WSE equity performance is conducted. This part of the paper includes methodology description, empirical results and discussion of the obtained outcomes. In the last section concluding remarks are provided.

## STOCK EXCHANGES – MARKET OVERVIEW

Traditionally most of the stock exchanges were organized as non-profit organizations governed by its members (Swartz, Reto 2004 p. 252). In other words the organizational structure of stock exchange was closed to outsiders, situation often described as 'club of brokers' (Akhtar 2002, p. 3). Stock exchanges can operate as mutual or member-owned cooperatives (Seabrook 2012), which offer their members exclusive rights concerning ownership, voting and trading (Akhtar 2002). According to Mendiola and O'Hara (2003) the member-owned organisations can be indeed recognized also in other markets (especially in insurance market, savings banks as well as non-commercial settings).




* Data include stock exchanges from: Greece, Spain (BME), Croatia, Slovakia, Romania, Hungary, Bulgaria, Cyprus, Germany (Deutsche Börse Group), Ireland, Slovenia, United Kingdom (London Stock Exchange Group), Luxembourg, Malta, NYSE Euronext (Belgium, France, Netherlands, UK, Portugal), OMX Nasdaq Group(Sweden, Finland, Estonia, Lithuania, Latvia, Denmark, Iceland), Norway, Czech Rep., Switzerland (SIX Group), Poland, Austria.

**Figure 1. Structure of European countries* stock exchanges in 2012 (% of capitalization)**
Source: Own compilation. Data obtained from Federation of European Stock Exchanges and World Federation of Stock Exchanges.

The process of demutualization which started in 1993 by Stockholm Stock Exchange reached other continents and countries characterized by different level of development. Demutualization process can be defined as a change in the legal status from mutual ownership to a share-ownership structure, which technically includes the conversion of membership into traditional shares (Hughes 2002). Schwartz and Reto (2004) argue that changing the ownership structure does not necessarily lead to unified outcome in legal status of exchanges, since it can vary among institutions. One of the possible and widely discussed ways chosen in the aftermath of demutualization is IPO – Initial Public Offer. Thus along the issuance of equities stock exchange becomes publicly traded company. Avoiding the historical description of the stock exchanges that decided to go through demutualization process[1], we would like to describe the contemporary structure of European stock market (figure 1).

According to the statistics not all European stock exchanges demutualized, however in terms of the market capitalization in the year 2012, almost all of them are profit organizations. Moreover in terms of capitalization 84% of the market is conducted by stock exchanges that are listed on the main market. Only 15,7 % of the market is governed by companies which have other legal status (no IPO or shares traded over the counter market).

## THE MOTIVATION FOR CHANGE

In comparison to highly developed countries, the history of Polish capital market is rather short, since it was re-established in April 1991 (Ziarko-Siwek 2007/2008)[2]. The deve-lopment of the Polish stock market in terms of capitalization, turnover and number of listed companies in comparison to other Central and

[1] Interesting case studies of mostly East-Asian countries can be found in Akhtar (2002). More recent work of Sarioğlu (2012) depicts the worldwide process of changing the legal status of stock exchanges in the years 1992-2010.

[2] The re-establishment (re-opening) term comes from the fact that Poland actually had stock exchanges already in the year 1817 (Ziarko-Siwek 2007/2008, p. 347).

Eastern European countries (CEE) can be positively valued. Figure 2 indicates the relative importance and strength of the WSE in terms of regional stock market capitalization in the 2012.

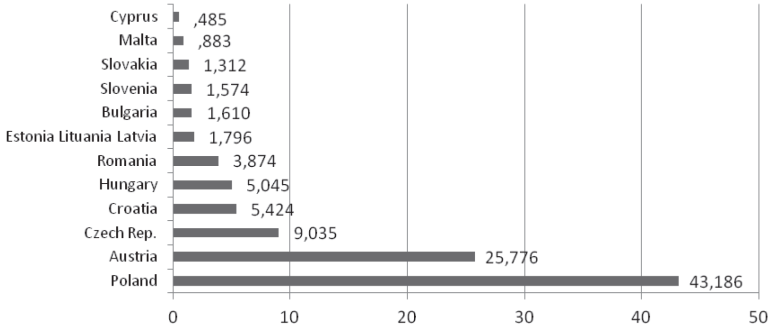



**Figure 2. Share of stock exchanges in the regional stock market capitalization in 2012** (%)
Source: Own calculations based on data obtained from: WDI Database, databank.worldbank.org (30.11.2013); World Federation of Exchanges, world-exchanges.org (30.11.2013); Zagreb Stock Exchange, www.zse.hr (30.11.2013); Nasdaq-OMX Baltic Bulletin December 2012 www.nasdaqomxbaltic.com (30.11.2013).
Estonia, Latvia and Lithuania measured together. In particular cases data in national currencies where changed into euro by exchange rate coming from Thomson Reuters under the partnership agreement between Thomson Reuters and University of Gdansk.

In 2012 the WSE market covered more than 43% of regional capitalization and outdistanced one of the most important competitors in the region – Vienna Stock Exchange. In table 1 basic characteristic of WSE is provided. Data clearly prove the growing number of the companies listed on the main market and capitalization growth in nominal terms (in PLN). However less desirable are indicators of volume turnover and capitalization in terms of GDP. The importance of the stock exchange in the economy measured by percentage points of GDP is definitely smaller than in highly developed countries.

Starting from 1991 decision makers were criticized by market professionals and scientists for the chosen regulatory framework and institutional structure of Polish stock market. It must be highlighted that the main goal of the WSE establishment in 1991 was to enable to smooth privatization which was to be conducted from the beginnings of economic transition. In the Parliament resolution coming from February 1991 we can read that stock market was perceived as the key element of the privatization. According to this document, strict time requirements of the planned privatization impeded natural and gradual establishment of WSE and somewhat forced the State to take charge over the construction of the Warsaw Stock Exchange (Uchwała 1991). This belief about the necessary role of the State in the Polish capital market not only resulted in public ownership of WSE, but also disturbed capital market in the effective fulfilment of its functions in Polish economy (Janicka 2005, Pietrzak 2004, Dzierżanowski 2004). Janicka (2005) stresses that privatization was the most important motive prevailing the WSE construction in contrary to effective capital allocation.

Table 1

Basic characteristics of the main market of the Warsaw Stock Exchange 1995-2012 (selected years)

| Number of listed companies | 1995 | 2000 | 2005 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|
| | 65 | 225 | 255 | 400 | 426 | 438 |
| Capitalization (PLN milions) | 11 271 | 130 085 | 424 900 | 796 482 | 642 863 | 734 048 |
| Volume turnover (PLN milions) | 13 668 | 169 096 | 197 033 | 468 576 | 268 138* | 202 880* |
| Average volume turnover per trading session (PLN milions) | 54,9 | 676,4 | 785 | 1 852,1 | 1 068,3* | 814,8* |
| Market capitalization of listed companies (% GDP) | 3,3 | 18,3 | 30,9 | 40,5 | 26,8 | 36,3 |
| Stocks traded, total value (% GDP) | 2,0 | 8,5 | 9,9 | 16,5 | 18,6 | 13,7 |

* Data: 31.12.2010 turnover value on the WSE have been counted twice, since 1.01.2011 year is counted separately.

Source: Own calculations based on WSE Annual Reports for years 1996 (p. 2), 2001 (p. 34), 2006 (p. 45), 2011 (p. 77), 2012 (p. 78), 2013 (p. 76). Market capitalization in % of GDP and stocks traded in % of GDP are coming from WDI Database, databank.worldbank.org (30.11.2013).

Polish government and regulatory institutions introduced several programmes aimed at developing the Polish capital market in recent twenty years. However the exact necessity of WSE privatization was expressed by capital market supervisory board in 1998 and dated for 2002. In the document from 2008 we can find that WSE privatization was planned from 1991 and State Treasury stake in stock exchange should be perceived as an anachronism in the regional capital market (Ministerstwo Skarbu Państwa 2008). For the real change in the ownership structure WSE had to wait until November 2010 due to the unfavourable situation on the international financial markets as well as the lack of political support. The IPO changed the ownership structure, however it should be noted that State Treasury is still a large insider shareholder owing 35 % of outstanding shares. The undertaken privatization plan favored State Treasury also by allocation of preference shares and thus entitled to more than 51% of voting shares.

## WSE OPERATING PERFORMANCE

The discussion about the consequences of stock markets demutualization is dominated by legal and organizational aspects. Unlike in other areas of empirical finance the amount of papers on demutualization and IPO actions on the operating performance of the stock exchanges is somehow limited. Sarioğlu (2012) argues that the lack of empirical literature in this particular area is caused by the very recent characteristic of the demutualization process. We connect scarcity of literature with variety of reasons. Stock exchanges chose different paths in demutualization process as well as in the aftermath do not consist the homogenous group in terms of legal status. Moreover even if the IPO process is being enforced, State Treasury (or other kind of insider shareholder) can still play a dominant role in the company's business strategy. It should be noted also after Aggarwal and Dahiya (2006) that stock exchanges can also be legally protected against hostile takeovers. Also in comparison to other business areas, conducting sophisticated research on the operating performance of stock exchanges can be difficult due to low number of companies (objects) and different development levels of stock exchanges (selection problem).

The existing empirical results on the topic of stock exchanges performance after demutualization are ambiguous. In the paper of Mendiola and O'Hara (2003) authors confirmed an increase in return-based measures, which were even greater that market indices of stock exchanges (Sarioğlu 2012). However in the part of the chosen accounting measures (including ROA, ROE) the obtained results did not allow to draw more clear conclusions on the value enhancement impact of the demutualization (Mendiola, O'Hara 2003).

The results obtained by Aggrawal and Dahiya (2006) proved that most of the exchanges covered in the analysis experienced well performance in subsequent years after IPO event as well as dynamic profit growth. Also in the paper of Seabrook (2012) the profitability ratios improved after demutualization. In the study the author analysed three exchanges from developing countries India and Iran.

Table 2

Main financial ratios of the Warsaw Stock Exchange 2008-2012

| Ratios | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|
| Operating profit change* (%) | -51,4 | 11,8 | 15,4 | 45,7 | -6,3 |
| EBITDA change* (%) | -50,1 | 14,4 | 16,7 | 34,4 | -8,3 |
| EBITDA margin (%) | 49,7 | 52,7 | 54,3 | 61,3 | 55,2 |
| Operating profit margin (%) | 38,5 | 39,9 | 40,7 | 49,7 | 45,7 |
| Return on equity (ROE) (%) | 10,2 | 13,9 | 18,1 | 25,6 | 19,7 |

*Change to the previous year (own calculations).

Source: Basic financial data for period 2007-2013, Warsaw Stock Exchange.

In table 2 basic financial data of the Warsaw Stock Exchange is given in the period of 2008-2012. The operating performance can be positively assessed however the selected ratios differ widely in the given period. Similar to Aggrawal and Dahiya (2006) and Seabrook (2012) the subsequent year after IPO describes significant improvement in the operating performance.

## WSE EQUITY PERFORMANCE

The response of the Polish financial market on the WSE Initial Public Offering is assessed on the basis of WIG20 index performance. WIG20 represents twenty the major and top-performing companies from the WSE Main List. At the end of November 2013 their market value was equal to 45,5% of the WSE Main List total capitalization[3].

In the research the event study methodology is employed. In the empirical finance this methodological approach intends to measure and assess the impact of specified economic events on the performance of companies exposed to the investigated events. Event study methodology became the standard approach in examining security price behavior around the event. The event is usually defined as a public announcement of the new information related to the company's performance (e.g. quarterly financial results) or activity (e.g. M&A), which are already undertaken or just planned.

[3] Own calculations based on the WSE data, see: http://www.gpw.pl/analizy_i_statystyki_en (30.11.2013).

The catalogue of events is naturally broader and incorporates mainly: stock splits, stock dividends, dividends announcements, changes in company's dividend policy, earnings announcement, analysts' earnings forecasts, analysts' recommendations (to buy, hold or sell shares of a given firm), IPOs and SEOs[4], shares repurchases and buy backs, tender offers announcements, mergers and acquisitions announcements.

The literature on the event studies is abundant therefore presenting the world literature review is beyond the scope of this paper. It is worth noting that first works are coming from 1930s and relate to stocks splits impact on the share prices performance (Dolley 1933a, 1933b). The one of the most cited piece of work which contributed to the rapid development and growth of the event studies literature was published by Fama et al. (1969). Clearly presented basic methodology can be found in Strong (1992), Campbell et al. (1996, pp. 149-180) and MacKinlay (1997). In more recent publications of Binder (1987), Serry (2002), Gurgul (2006), Kothari and Warner (2007) the reviews of the event study methodology are presented.

Event study analysis is being employed also in the research concerning the Polish stock market. The synthetic summary of works devoted to the shares prices' reaction of companies listed on the WSE around the announcements of the specific events are presented in table 3.

Table 3

Review of event study literature – evidence from the WSE

| Event | Authors, year of publication |
|---|---|
| Analysts' recommendations | Gurgul, Majdosz (2004b) |
| Changes in the WIG20 index list | Gurgul (2006) |
| Convertible bonds offering announcements | Frackowiak ed. (2001), Pasińska (2010) |
| Dividends announcements | Gurgul (2006), Frąckowiak ed. (2001), Gurgul, Majdosz (2005) |
| Earnings announcements | Frąckowiak ed. (2001), Szyszka (2002a) |
| Earnings forecasts announcements | Gurgul, Majdosz (2004a), Gurgul (2006), Szyszka (2002b), Szyszka (2010a) |
| IPO | Jelic, Briston (2003), Blajer-Gołębiewska, Czerwonka (2012), Sieradzki (2013) |
| Mergers and acquisitions announcements | Piecek (2004) |
| Shares buy backs and repurchases | Frąckowiak ed. (2001), Gryglewicz (2004), Gurgul, Majdosz (2005), Gurgul (2006) |
| Stock splits | Tarczyński (1997), Frąckowiak ed. (2001), Matuszewski (2002), Kopczewska (2004), Buczek (2005), Gurgul (2006), Fiszeder, Mstowska (2011), Słoński, Rudnicki (2011) |
| Tender offers announcements | Szyszka (2010b) |

Source: Own compilation.

Our research contributes to the WSE empirical research made on the grounds of the event study methodology by providing the findings about the influence of IPO announcement (and IPO as an event *per se*) on the WSE stock market behavior. We consider the impact of the WSE company's IPO on the performance of the whole Polish stock market which is measured by the WIG20 index performance. Since we concentrate on the one particular event, not on the sample of events, our analysis is purely descriptive (for detailed

[4] Initial Public Offerings and Seasoned Equity Offerings respectively.

information of the event study statistical properties see e.g. Aktas et al. (2003), Gurgul (2006), Kothari and Warner (2007)).

Applying the event study methodology in our research we start with calculating the actual rates of return of WIG20 index. Terms "rate of return" and "return" are used in the paper interchangeably and refer to the continuously compounded return for period [$t$ - 1, $t$]:

$$r_t = \ln\left(\frac{P_t}{P_{t-1}}\right),$$

where $P_t$ – closing price of WIG20 at day t, ln – natural logarithm.

The abnormal return is defined as a difference between actual return of WIG20 and the expected return $Er_t$:

$$AR_t = r_t - Er_t \ ,$$

where $Er_t$ is defined and calculated in two different ways:

on the basis of *single-index model*, (1)

on the basis of *market-adjusted model*. (2)

In the first approach the Sharpe's single-index model is employed (Sharpe, 1963):

$$Er_t = \hat{\alpha} + \hat{\beta} \cdot r_{mt},$$

where $r_{mt}$ – market rate of return, reflected by rate of return on MSCI Poland Global Standard index, $\hat{\alpha}$, $\hat{\beta}$, – parameters estimated with the usage of OLS method on the basis of the estimation period (pre-event period) covering (-150, -50) days before the event day.

In the second approach $Er_t$ is simply approximated by the return of MSCI Poland Global Standard index:

$$Er_t = r_{mt} \ .$$

MSCI Poland Standard Index is one of the Global Standard Country Equity Indices calculated by the MSCI[5]. The performance of WIG20 and MSCI Poland indices in the period 2.11.2000-31.20.2013 measured by natural logarithms of its daily closing prices is presented in figure 3.

Similar performance of the indices, the methodology of calculation (they are both price indices) and the portfolio limited to the major and most liquid companies account for using MSCI Poland Standard as a proxy for WIG20.

[5] Detailed methodology of calculation MSCI indices is available at http://www.msci.com/eqb/methodology/meth_docs/MSCI_Nov13_IndexCalcMethodology.pdf.


**Figure 3. Index performance for WIG20 and MSCI Poland Standard, 2.11.2000-31.10.2013**

Source: Own compilation. Data obtained from Thomson Reuters under the partnership agreement between Thomson Reuters and University of Gdansk.

The event day is defined in two different ways:

– as an announcement day, when the information of IPO was officially released by the WSE (October 4th 2010),
– as an exact IPO day (November 9th 2010).

It is important to note that neither of the event day's definitions mentioned above fulfills at least one of the four conditions which are obligatory for event study (Tabak and Dunbar (1999)): "*There is no reason to believe that the market anticipated the news*". WSE IPO – either the announcement or the issue – was broadly anticipated by the market.

In order to assess the short-term reaction of the market on the event, the cumulative abnormal returns on WIG20 are calculated:

$$CAR_t = \sum_{t=t_1}^{t_2} AR_t \ ,$$

where $[t_1, t_2]$ is the certain short-term period around the event (event period, event window).

The results of calculation are presented in table 4.

Table 4

Cumulative abnormal returns (CARs, %) of index WIG20 for selected event periods

| Event Period $[t_1, t_2]$ | Event day | | | | Event Period $[t_1, t_2]$ | Event day | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 4.10.2010 | | 9.11.2010 | | | 4.10.2010 | | 9.11.2010 | |
| | (1) | (2) | (1) | (2) | | (1) | (2) | (1) | (2) |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| [-50; +49] | -7,45 | -7,51 | -0,58 | -8,08 | [+1; +10] | -2,04 | -3,07 | 1,06 | 3,05 |
| [-10; +9] | -4,41 | -8,65 | 1,30 | 4,51 | [0; +1] | 0,65 | -0,27 | 0,07 | 0,26 |
| [-50; 0] | -7,12 | -10,56 | -1,44 | -5,94 | [0; +2] | 0,35 | -0,57 | 0,65 | 2,34 |
| [-40; 0] | -4,89 | -5,09 | -2,45 | -5,53 | [0; +3] | -0,48 | -0,72 | 0,76 | 2,11 |
| [-30; 0] | -4,27 | -9,16 | -0,55 | -5,61 | [0; +4] | -0,65 | -0,31 | 0,59 | 2,94 |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| [-20; 0] | -2,69 | -6,79 | 1,00 | -0,07 | [0; +5] | -0,65 | -0,68 | 0,80 | 2,98 |
| [-10;0] | -2,03 | -5,07 | 0,84 | 0,86 | [0; +10] | -1,26 | -2,21 | 1,02 | 2,53 |
| [-5; 0] | -0,87 | -1,51 | 0,83 | -0,77 | [0; +20] | -1,90 | -2,23 | 4,66 | 2,67 |
| [-1; 0] | -0,26 | -0,77 | 0,71 | -0,83 | [0; +40] | 1,15 | 7,11 | 1,37 | -1,51 |
| [-1; +1] | -0,39 | -1,90 | 0,83 | -0,06 | [0; +49] | 0,44 | 3,91 | 0,82 | -2,65 |
| [-5; +5] | -2,29 | -3,05 | 1,67 | 2,73 | [+10; +49] | 2,04 | 6,63 | 0,40 | -5,79 |
| [+1; +5] | -1,42 | -1,54 | 0,84 | 3,50 | [+20; +49] | 2,02 | 4,83 | -3,09 | -3,53 |

Explanations: (1) CARs obtained using *single-index model*, (2) CARs obtained using *market-adjusted model*

Source: Own calculations.

The obtained findings differ along the selection of investigated event day (announcement day versus issue day).

CARs accompanying the announcement day (October 4th 2010) calculated both for the short periods around the event ([-1; +1], [-5; +5]) and after the event ([+1; +5], [+1; +10]) are all negative, no matter how the expected return $Er_t$ was defined. The CARs are also negative in majority of cases when the event period encompasses the event day, both before ([-50; 0], [-40; 0], [-30; 0], [-20; 0], [-10; 0], [-5; 0], [-1; 0]) and after the event ([0; +3], [0; +4], [0; +5], [0; +10], [0; +20]). In the shortest periods – one-day and two-days long, i.e. ([0; +1], [0; +2]) – CARs turned out to be positive. In the longer periods after the event ([0; +49], [+10; +49], [+20; +49]) CARs were also positive.

CARs measured for the IPO day (November 9th 2010) are negative for particular periods preceding the event ([-50; 0], [-40; 0], [-30; 0]) and positive for majority short periods around ([-5; +5]) and after the event ([+1; +5], [+1; +10], [0; +1], [0; +2], [0; +3], [0; +4], [0; +5], [0; +10], [0; +20]). For many other cases the signs of CARs differ according to the expected return estimation methodology employed (compare columns (1) and (2) in table 4). In longer periods, i.e. [-50; +49], [+20; +49], CARs attributable to IPO day turned out to be negative.

The above findings lead to the conclusion that the reaction of Polish financial market for the WSE Initial Public Offering was generally positive. Returns on WIG20 index were on the whole positive, especially in the shortest periods. On the contrary, the positive reaction for the official IPO announcement which was released one month earlier was very quickly discounted by the market.

## CONCLUSION

The paper examines different aspects of stock exchanges demutualization and public listing. In the recent years also stock exchanges coming from transition and emerging markets decide to undertake this process.

The impact of the IPO of the Polish stock exchange either on the activity of the WSE company itself or on the performance of the whole financial market is not easy to assess unambiguously. However, although the WSE went public on the 9th November 2010 and nearly 65% of its shares is owned by the private shareholders (in comparison to 35% of shares remaining at hands of State Treasury), the majority shareholding continuously belongs to the State Treasury. The State Treasury possesses the preference shares which entitle to the majority of votes (approximately 51,7%) at the general meeting of shareholders. Consequently the WSE remains dependent on the State Treasury, so the effects of the IPO cannot be distinct.

Furthermore, the WSE public offering was broadly anticipated by the market which makes impossible to treat that IPO as a precisely defined 'event' in terms of event studies. Therefore the empirical findings obtained with the usage of the event study methodology should be interpreted cautiously.

## REFERENCES

Aggarwal, R., Dahiya, S. (2006), Demutualization and public offerings of financial exchanges, *Journal of Applied Corporate Financing*, Vol. 18, No. 3, pp. 96-106.

Akhtar, S. (2002), *Demutualization of Asian stock exchanges – critical issues and challenges* [in:] Akhtar S. (ed.), Demutualization of stock exchanges. Problems, solutions and case studies, Asian Development Bank.

Aktas, N., de Bodt, E., Cousin, J-G. (2003), *Event study under noisy estimation period*, EFMA 2003 Helsinki Meetings, available at SSRN: http://ssrn.com/abstract=391566.

Binder, J., J. (1998), The event study methodology since 1969, *Review of Quantitative Finance and Accounting*, Vol. 11, Issue 2, pp. 111-137.

Blajer-Gołębiewska, A., Czerwonka, L. (2012), Long-run IPO overpricing: Evidence from the Warsaw Stock Exchange, *World Journal of Social Sciences*, Vol. 2, No. 1, pp. 34-44.

Brav, A., Geczy, C., Gompers, P. A. (2000), Is the abnormal return following equity issuances anomalous? *Journal of Financial Economics*, Vol. 56, Issue 2, pp. 209-249.

Buczek, S. (2005), *Efektywność informacyjna rynków akcji: Teoria a rzeczywistość*, Oficyna Wydawnicza Szkoły Głównej Handlowej w Warszawie, Warszawa.

Campbell, J.Y., Lo, A.W., MacKinlay, A.C. (1996), *The econometrics of financial markets*, Princeton University Press, New Jersey.

Dolley, J. (1933a), Characteristics and procedure of common stock split-ups, *Harvard Business Review*, Vol. 11, Issue 3, pp. 316-326.

Dolley, J. (1933b), Common-stock split-ups – motives and effects, *Harvard Business Review*, Vol. 12, Issue 1, pp. 70-81.

Dzierżanowski, M. (2004), *Integracja europejskiego rynku kapitałowego*, Biała Księga 2004, Polskie Forum Strategii Lizbońskiej, IBNGR, Gdańsk-Warszawa.

Fama, E. F., Fisher, L., Jensen, M. C., Roll, R. (1969), The adjustment of stock prices to new information, *International Economic Review*, Vol. 10, No. 1, pp. 1-21.

Fiszeder, P., Mstowska, E. (2011), Analiza wpływu splitów akcji na stopy zwrotu spółek notowanych na GPW w Warszawie, *Prace i Materiały Wydziału Zarządzania Uniwersytetu Gdańskiego*, No. 4 (8), pp. 203-210.

Frąckowiak, W. (ed.) (2001), *Z badań nad rynkiem kapitałowym w Polsce*, Wydawnictwo Akademii Ekonomicznej w Poznaniu, Poznań.

Gryglewicz, S. (2004), Stock repurchase as an alternative to dividend payout: Empirical evidence from Warsaw Stock Exchange, *CAF (Centre for Analytical Finance) Working Paper Series* No. 169, University of Aarhus.

Gurgul, H. (2006), *Analiza zdarzeń na rynkach akcji. Wpływ informacji na ceny papierów wartościowych*, Oficyna Ekonomiczna, Kraków.

Gurgul, H., Majdosz, P. (2004a), *The information content of earnings forecasts announcements: The case of the Polish Stock Exchange* [in:] W. Welfe, A. Welfe (eds.), MACROMODELS '2003: Proceedings of the 30th International Conference, Wydawnictwo Uniwersytetu Łódzkiego, Łódź, pp. 87-102.

Gurgul, H., Majdosz, P. (2004b), The information content of analysts' recommendations: The empirical evidence from the Warsaw Stock Exchange, *Statistics in Transition*, Vol. 6, No. 7, pp. 1151-1163.

Gurgul, H., Majdosz, P. (2005), Effect of dividend and repurchase announcements on the Polish stock market, *Badania Operacyjne i Decyzje*, No. 1, pp. 25-41.

Hughes, P.S. (2002), *Background information on demutualization*, [in:] Akhtar S. (ed.), Demutualization of stock exchanges. Problems, solutions and case studies, Asian De-velopment Bank.

Janicka, M. (2005), Polski rynek kapitałowy – powstanie rozwój i perspektywy w strukturach jednolitego rynku finansowego Unii Europejskiej, *Ekonomista*, No. 5, pp. 673-689.

Jelic, R., Briston, R. (2003), Privatisation Initial Public Offerings: The Polish experience, *European Financial Management*, Vol. 9, No. 4, pp. 457-484.

Kopczewska, K. (2004), *Wpływ splitów na kursy akcji notowanych na Warszawskiej Giełdzie Papierów Wartościowych*, [in:] Bernat T. (ed.), Rynek kapitałowy – mechanizm, funkcjonowanie, podmioty, Polskie Towarzystwo Ekonomiczne, Szczecin, pp. 203-214.

MacKinlay, A. C. (1997), Event studies in economics and finance, *Journal of Economic Li-terature*, Vol. 35, No. 1, pp. 13-39.

Khotari, S. P., Warner J. B. (2007), *Econometrics of event studies*, chapter 1 [in:] Eckbo B.E. (ed.), Handbook of corporate finance, Vol.1, Empirical corporate finance, North- Holland, The Netherlands, pp. 3-36.

Lee, R. (2003), *Changing market structures, demutualization, and the futures of securities trading* [in:] Lin R.E., Pomerleano M., Sundararajan V. (eds.), Future of domestic capital markets in developing countries, Brookings Institution Press, Washington DC USA, pp. 283-304.

Lee, R. (2010), *Running the World's markets: The governance of financial infrastructure*, Princeton University Press, Princeton USA.

Matuszewski, P. (2002), Statystyczna analiza ponadprzeciętnych stóp zwrotu z akcji notowanych w systemie jednolitego kursu dnia na GPW w Warszawie [in:] Jurek W. (ed.), Prace z ekonometrii finansowej, *Zeszyty Naukowe Akademii Ekonomicznej w Poznaniu*, Poznań, Vol. 18, pp. 254-300.

Mendiola, A., O'Hara, M. (2003), *Taking stock into markets: The changing governance of stock exchanges*, available at SSRN: http://ssrn.com/abstract=431580.

Ministerstwo Finansów (2004), *Agenda Warsaw City*, Warszawa.

Ministerstwo Skarbu Państwa (2008), *Podsumowanie pierwszego etapu prywatyzacji Giełdy Papierów Wartościowych w Warszawie SA*, Dokument dla członków Komisji Skarbu Państwa Sejmu, Warszawa.

Pasińska, D. (2010), Reakcja rynku kapitałowego na ogłoszenie zamiaru emisji obligacji zamiennych na akcje publicznych spółek w Polsce, *Acta Universitatis Lodziensis*, *Folia Oeconomica*, No. 236, pp. 73-85.

Piecek, G. (2004), Analiza ponadprzeciętnych stóp zwrotu w wyniku reakcji na informację o przejęciach i fuzjach – badania dotyczące polskiego rynku kapitałowego (cz. III), *Nasz Rynek Kapitałowy*, No. 4/5, pp. 84-91.

Pietrzak, E. (2004), *Traktat akcesyjny – ocena ogólna* [in:] Brodecki Z. (ed.) Finanse. Acquis communautaire, Lexis-Nexis, Warszawa, pp. 117-140.

Ritter, J. R. (1991), The long-run performance of Initial Public Offerings, *The Journal of Finance*, Vol. 46, No. 1, pp. 3-27.

Ritter, J. R. (1998), Initial Public Offerings, *Contemporary Finance Digest*, Vol. 2, No. 1, pp. 5-30.

Sarioğlu, S. E. (2012), Changes in the corporate governance and ownership structure in stock markets: Demutualization of Istanbul Stock Exchange, *Annales Universitatis Apulensis Series Oeconomica*, Vol. 2, Issue 14, pp. 547-560.

Seabrook, Z. (2012), Effect of demutualization of financial performance of stock exchanges in developing countries, *American Journal of Economics and Development*, Vol. 2, No. 2, pp. 10-16.

Serra, A.P. (2002), Event study tests: A brief survey, *Working Paper* No. 117, Faculdade de Ekonomia, Universidade de Porto, Portugal, available at: http://wps.fep.up.pt/wps/wp117.pdf.

Sharpe, W. F. (1963), A simplified model for portfolio analysis, *Management Science*, Vol. 9, No. 2, pp. 277-293.

Sieradzki, R. (2013), Does it pay to invest in IPOs? Evidence from the Warsaw Stock Exchange, National Bank of Poland, *Working Paper* No. 139, Warsaw.

Słoński, T., Rudnicki, J. (2011), Wpływ podziału akcji na stopę zwrotu z inwestycji w akcje, *Zeszyty Naukowe Uniwersytetu Szczecińskiego* No. 639, *Finanse, Rynki kapitałowe, Ubezpieczenia*, No. 37, pp. 323-333.

Swartz, R., Reto, F. (2004), *Equity markets in action: Fundamentals of liquidity, market structure and trading*, Wiley, Hoboken USA.

Strong, N. (1992), Modelling abnormal returns: A review article, *Journal of Business Finance & Accounting*, Vol. 19, Issue 4, pp. 533-553.

Szyszka, A. (2002a), Reakcja inwestorów. Kwartalne raporty finansowe, *Nasz Rynek Kapitałowy*, No. 1/2002, pp. 80-88.

Szyszka, A. (2002b), Reakcja inwestorów. Korekty prognoz finansowych, *Nasz Rynek Kapitałowy*, No. 2/2002, pp. 89-92.

Szyszka, A. (2010a), *Wpływ ogłoszeń kwartalnych raportów finansowych na kursy akcji notowanych na GPW*, E-wydawnictwo 2010, available at: http://www.e-wydawnictwo.eu/Document/DocumentPreview/139.

Szyszka, A. (2010b), *Studium wydarzeń: Reakcja inwestorów na publiczne wezwania do sprzedaży akcji*, E-wydawnictwo 2010, available at: http://www.e-wydawnictwo.eu/Document/DocumentPreview/140.

Tabak, D. I., Dunbar, F. C. (1999), Materiality and magnitude: Event studies in the courtroom, *NERA Working Paper* No. 34, available at http://ssrn.com/abstract=166408.

Tarczyński, W. (1997), Efektywność działania Giełdy Papierów Wartościowych w Warszawie, *Ekonomista*, No. 4, pp. 521-538.

Uchwała Sejmu Rzeczpospolitej Polskiej z dnia 23 lutego 1991 r. w sprawie podstawowych kierunków prywatyzacji w 1991 r., *Monitor Polski*, nr 13, poz. 86.

www. databank.worldbank.org, referred on [30.11.2013].

www.gpw.pl/analizy_i_statystyki_en, referred on [30.11.2013].

www.msci.com/eqb/methodology/meth_docs/MSCI_Nov13_IndexCalcMethodology.pdf, referred on [30.11.2013].

www.nasdaqomxbaltic.com, referred on [30.11.2013].

www.world-exchanges.org, referred on [30.11.2013].

www.zse.hr, referred on [30.11.2013].

WSE Annual Reports (Roczniki Giełdowe GPW) (1996, 2001, 2006, 2011, 2012, 2013).

Ziarko-Siwek, U. (2007/2008), *Giełda papierów wartościowych w Polsce – Giełda Papierów Wartościowych w Warszawie SA* [in:] Ziarko-Siwek U. (ed.), Giełdy kapitałowe w Europie, CeDeWu Sp. z o.o., Warszawa.