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Risk arbitrage in emerging Europe: are cross-border mergers and acquisition deals more risky?

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ABSTRACT

Speculation spread in mergers and acquisitions (M&A), measured as the percentage difference between the offer price and the closing stock price of a target the day after the announcement, is the starting point for risk arbitrage returns, a topic receiving greater consideration both in practice and in the empirical literature. Reflecting the degree of risk in merger arbitrage investments, we found no significant difference between the speculation spread in domestic and foreign Polish deals, between 2000 and 2013. However, we found higher returns for cross-border portfolio, therefore investors seem more pessimistic with regards to the expected risk in cross-border deals. Also, on average, deal spreads do not correctly reflect the level of risk in merger arbitrage strategies with Polish targets.

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1. Introduction

The mergers and acquisitions (M&A) activity creates opportunities not only for the companies directly involved in the process of merging or acquisition, but also for the mergers arbitrageurs, seeking to benefit from the risk surrounding announced M&A transactions. Invariably, the market price of a target company is automatically adjusted upward following the pronouncement of an acquisition offer. The spread between the bid price and the market price on the day subsequent to the acquisition announcement constitutes the base for merger arbitrage strategies. Evidence shows that merger arbitrageurs are extremely dynamic traders and they get heavily involved in M&A, trading the target and/or the acquirer's stock in the days around the announcement.

Merger arbitrage, also known as risk arbitrage, is a strategy that attempts to capture the difference (also referred as the spread) between the price of the target immediately after the transaction announcement, and the offer price that the acquiring company made public (Umber, 2010). The objective of this investment strategy is to benefit from this arbitrage spread, which exists due to the uncertainty that the transaction will take place in the same conditions as it was announced. The arbitrage spread is captured between the acquisition or

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merger's announcement and its consummation date. Successful transactions have spreads narrowing to zero by the closing date. However, risk arbitrage also involves some risk because the arbitrageur will register a loss if the transaction fails. Hence, the size of the spread depends on the perceived risk of the deal closing, but also on the length of time expected until transaction completion.

More to the point, merger arbitrage involves risks, but they are compensated by large excess returns. According to the literature, the returns from risk arbitrage have historically beaten the returns on short-term treasuries, money market funds or other short-term investments, if a similar period is considered. Nevertheless, the substantial excess returns in this case present a higher risk of principal loss, since investing in merger arbitrage do not generate an income stream like fixed income investments.

The global financial crisis (GFC) created a perfect framework for risk arbitrageurs. Nawrocki and Wielgus (2011) found evidence that during 2008 unusually large spreads between the bid price and the target stock price post-announcement were reported, due to investors' increasing concerns that bidders could not finance the transactions. In this context, when a cash M&A offer was announced, the risk arbitrageur could have bought the target stock, in order to capture the spread. Similarly, when a stock M&A offer was made public, the risk arbitrageur could have bought the target stock and shorted the bidder – this strategy aiming to hedge against a possible decline in the value of the acquiring firm.

Given the complex structure of risk arbitrage investment strategy, with all the advantages and risks involved, it is particularly interesting to observe how and if they differ when cross national companies are involved.

This article examines Polish domestic and cross-border transactions and the focus is on the relation between the *ex ante* indication (as measured by deal spreads) and the *ex post* completion in risk arbitrage. We aim to determine to what extent the speculation spread anticipates the subsequent offer risks. Next, how do investors perceive domestic deals as compared to cross-border ones? We expect to find larger spreads or higher returns for cross-border deals, to compensate for the additional risk involved by at least two different legal, cultural and political systems (unlike domestic transactions, were such costs do not apply). What are the main determinants of the speculation spread? To what extent do bid characteristics such as the bid premium, the target managerial attitude, or the duration affect the dimension of the speculation spread? Are these different in cross-border deals, or they are indifferent to national barriers?

This article shows that neither bid premium nor deal spreads differ in domestic deals, as compared to cross-border transactions. We employ risk arbitrage investment portfolios to assess the post-announcement deal consummation. Automatically, every stock in the portfolio incorporates investors' expectations pertaining to the risk factors in such an investment strategy, and these are time till completion, probability of deal failure and price adjustments. We show that merger arbitrage cross-border portfolio gained higher monthly returns than the domestic portfolio, however with higher risks, since the Sharpe ratio is considerably lower.

The rest of the study is structured as follows. Section 2 reviews the main literature on the typical risk arbitrage investment strategy, main advantages and risks of merger arbitrage and the profitability of merger arbitrage. Section 3 describes the institutional background of M&A transactions in Poland. Section 4 present the data used to investigate the risk in merger arbitrage. In Section 5 we test the main determinants of the speculation spread and

analyse it in relation with target and bid characteristics, both known and unknown at the announcement date. We also develop merger arbitrage investment portfolios, to measure the performance and the associated risk of domestic and cross-border transactions. The article ends with some concluding remarks.

2. Literature review

This article focuses on risk arbitrage, an event-driven process, which involves betting on the outcome of corporate events, like merger and acquisition announcements. Merger arbitrage was an inconspicuous activity which started to become a more known process in the mid-1970s, with the emergence of Ivan Boesky and the boom in the takeover activity. Investment banks developed special departments for risk arbitrage. However, more recently, as the volume of these investments increased, the spreads narrowed and the target stock price reacts more quickly after a takeover announcement. Nowadays, risk arbitrage has become more popular in the financial landscape, given the bull market from the 2003–2008 period, as well as the frenzy in M&A activity (see, e.g., Martynova & Renneborg, 2008; Williams & Liao, 2010).

For the purposes of this article, *merger* is defined as a combination of two firms, and the outcome is that one of the merging companies ceasing to exist. The dominating firm in the deal preserves its own legal personality and acquires all the assets and liabilities of the other company. Conversely, an *acquisition* (or takeover) may be defined as the purchase by one firm, generally economically stronger, of the shares or assets of another entity, with the scope of gaining control over it. The most important characteristic of the acquisition is the transfer of rights to control and manage the business from one group of shareholders to another. It should be considered that in the literature these definitions are repeatedly used interchangeably and the distinction between M&A is unclear and mostly conventional (see Gaughan, 2007, p. 279).

The focus in this article is on merger arbitrage, which involves taking a position in the target or in the acquirer company. Therefore, we must have a clear view of the acquirer's and the target's identity, even in the case of 100% acquisition, i.e., a merger. In the case of a hostile acquisition, usually the larger company or the one that initiates the merger is considered the bidder. Moreover, when the two companies that merge have approximately the same value, we consider that the acquirer company is the one whose shares continue to exist after the merger.

In the business practice, the most frequent forms of transaction are cash based or stock based M&A.[1] As Goergen and Renneboog (2004) argue, when a *cash offer* is concerned, the simplest arbitrage strategy requires the purchase of the target's stock, which would be kept until the consummation date. At that moment, the arbitrageur sells the shares to the bidder for cash, therefore gaining the difference between the purchase price and the offer price (also called speculation spread). Ultimately, the arbitrageur may purchase put options on the target's stock in order to hedge against a fall in value if the deal is not completed in the same terms as stated at the announcement date. In the case of a cash offer, there are two major sources of profit for the risk arbitrageur: the speculation spread and the dividend paid by the target company.

Secondly, when a *stock offer* is involved, the merger arbitrageur will buy the target's stock and in the same time sell short the stock of the bidder. Taking a short position in the

acquirer's stock protects the arbitrageur's downside risk, in the case of a decrease in the price of the acquirer company's stock. Unlike the cash offers, stock offers imply three sources of profit. First, the spread between the price gained from the short sale of the bidder's shares and the price paid for the target's shares. Second, the dividend paid for the shares hold in the target company. Still, this is not a true source of profit, since it is offset by the payment of dividends for the acquirer's shares, which were borrowed and sold short. Last, the interest that the arbitrageur's broker paid on the proceeds from the short sale transaction.

The related literature underlines the advantages of investing in risk arbitrage. Ineichen (2002, p. 117), Gaurav and Xinyu (2010) and Garfinkel and Hankins (2011) reveal a few of them: the returns from risk arbitrage are not correlated with the market returns; risk arbitrage returns are less volatile than the returns of Standard & Poor's 500 Index; in the long-term, they are higher than the returns obtained from investing in traditional instruments.

As for the risks, the literature recognises the completion risk as the most important risk in merger arbitrage strategies, followed by the uncertainty around the losses volume in the case of deal failure (see, e.g., Gaurav & Xinyu, 2010; Umber, 2010). Moreover, deal terms (and the most important one is the time till consummation) are also subject to uncertainty, since any change may affect directly the investment's performance. Since merger arbitrage returns are compensating for these risks, any adjustment in the risks will be reflected in the arbitrage spread (Baker & Savasoglu, 2002).

Specific for the emerging markets are antitrust issues that may block some deals. Moreover, shareholder dissent may prevent some deals to be completed and take legal measures to prevent it, if the majority of the shareholders are against the deal. Management issues are also a risk factor, because the integration part is essential for the success of every M&A deal.

Demeter (2007) divide risk arbitrage risks in two main categories: deal risk and portfolio risk. He defines deal risk as comprised of all the factors that could prevent or delay the consummation of the deal, such as market risk, interest rate risk and the target company's financial situation, legal aspects, agreement terms or the acquirer becoming a target. In the portfolio risk's category, he includes all the factors that affect the assembly and management of the merger arbitrage portfolio, like the use of leverage and the merger arbitrage portfolio diversification issue.

Umber (2010) argues that cross-border deals present different risks as compared to cross-border transactions. Beside higher transaction costs (that he accepts yet does not model in his paper) and additional costs (arising from gathering data in two languages, holding portfolios in different currencies), cross-border transactions also include higher information asymmetries and potentially more agency conflicts. Therefore, one would expect higher speculation spreads for cross-border deals, in order to compensate for the additional risks.

The basis for speculative returns relies heavily on the post-announcement market price of a target company, which deducted from the initial offer price generates the *speculation spread*. Basically, the spread labels perfectly the market pricing of any announced M&A conditional on the pronounced offer price and the observed bid characteristics. In essence, the speculation spread is the pedestal of risk arbitrage returns.

Several factors can impact on speculation spreads and on deal premiums. The most important ones are the existence of rumours, the target managerial attitude (friendly or hostile), toeholds (the percentage that the bidder has in the target prior to the announcement), the method of payment (cash, stock or a combination of the two), completion,

duration, and deal value. However, due to missing data, we will further analyse some of them, as well as several other factors that are important for our sample. Moreover, using these factors allow for obtaining relevant and robust results. Hence, we will continue with *bid premium, pennystock, rumours*, *duration, competition, the cross-border effect, deal value, EU Tax Merger Directive, GFC.*

The relationship between the *bid premium* and the speculation spread is a positive one. As Officer (2007) shows that the higher is the premium, the larger is the spread, because arbitrageurs have more premium to lose if the transaction is not completed according to the initial terms.

The focus of this research is the comparison of cross-border versus domestic deals. Therefore, one of the main factors which directly impacts the deal spread and the profitability of the merger arbitrage investment strategy is the *cross-border indicator*. The rationale is that foreign bids handle different economic settings and thus the risks involved are higher. This is further transposed in higher spreads and potentially higher returns (which are, however, strongly diminished by transaction costs).

Pennystocks may be viewed as an indicator for companies in financial distress, whose stock trade at low prices (in our case, we have considered €5) and eventually the companies want to be acquired. In this case, those target-initiated deals might present different premium and spread characteristics.

Regarding the indicator *deal began as a rumour*, there are many conflicting opinions in the literature. For instance, Jarrel and Poulsen (1989) and Nawrocki and Wielgus (2011) argue that rumours about the planned deal usually attract more potential buyers, which lead to an increase in price and a decrease in premiums. On the other hand, Jindra and Walkling (2004) show that there is an inverse relationship between deal spreads and the existence of rumours.

Deal size is another important factor that impact the speculation spread. Deals of relatively small size do not significantly affect the bidder, hence the investors are likely to believe that lower execution risks are related with such transactions and thus there is a negligible impact on the firm's stock price. On the other hand, larger transactions generally have higher premiums associated, because the risks are also higher.

On 1 May 2004, Poland fully adopted the *EU Tax Merger Directive*. According to this directive, mergers between Polish firms and resident companies in EU Member States have the same treatment as domestic mergers. Therefore, one would expect that the implementation of this directive impacts the deal spread, meaning that lower taxes or higher transparency should reflect into lower spreads.

The GFC is another factor that strongly affected not only the M&A activity in Poland and worldwide, but also the speculation spreads. Higher uncertainties, funding constraints, limited investment opportunities determined arbitrageurs to ask for higher spreads when investing in merger arbitrage and betting on the favourable outcome of the deal. Moreover, the related literature (see, e.g., Jindra & Walkling, 2004) suggests that deal spreads anticipate price amendments and *deal duration*. Similarly, Officer (2007) found a positive correlation between deal spreads and duration. When the deal is expected to be quickly completed, the spread is lower, because investors will get the offered compensation in a short time frame.

Abovementioned factors which are critical for the speculation spread in risk arbitrage activity are confirmed by numerous researchers. Still, they have divergent opinions in what

regards the amplitude and the influence of these factors on deal spreads and the overall success of risk arbitrage strategies. We aim to contribute to the existing literature by focusing on the determinants of speculation spreads in Polish M&A transactions and their differences in two sub-samples, i.e., foreign vs domestic deals.

The empirical literature on deal spreads and risk arbitrage may be viewed as small or not enough researched. The next paragraphs present the most important studies on this topic. One aspect commonly addressed is the return of risk arbitrage investments. The existing literature argue that the target's stock earns high returns. Early empirical researches on risk arbitrage returns find abnormal returns. Some of them analysed repurchase offers, Lakonishok and Vermaelen (1990), while others focused on cash tender offers: Larcker and Lys (1987), Dukes, Frohlich, and Ma (1992), and Karolyi and Shannon (1999).

More recent studies got to the same conclusions. Mitchell and Pulvino (2001) inspected 4750 cash and share deals from 1963 to 1999. They find positive excess returns even after accounting for transaction costs (their portfolio of only domestic deals has an annual rate of return of 16.05%, which becomes 10.64% after including transaction costs).

Baker and Savasoglu (2002) analysed deals ranging from 1981 and 1996 and they find lower but positive abnormal return of 0.6–0.9% per month. Jindra and Walkling (2004) found that arbitrage strategies involving 362 cash tender offers in the US (1981–1995) lead to monthly abnormal returns of 2% above the market index. Mengkiat (2008) analysed over 800 deals from emerging markets, in the period ranging from 2001 to 2007, and found excess return of 7.1%. Umber (2010) inspected deal spreads of European M&A transactions in the 1991–2007 period, and find annualised excess returns of 21% for the domestic merger arbitrage portfolio, while the cross-border merger arbitrage portfolio performance was much inferior, of only 12.76%.

Another aspect documented in the literature is the *deal spread*. Most M&A transactions register positive deal spreads. The target company's stock price is usually slightly lower than the offer price at the announcement date, reflecting the deal consummation timing, the likelihood of failure, and the probability of deal revising. These are the most important risk factors in merger arbitrage. Hence, deal spreads can reflect the perceived risk in merger arbitrage.

There are numerous studies dealing with the examination of deal spread. Some of them are those of Mitchell and Pulvino (2001), Baker and Savasoglu (2002), Jindra and Walkling (2004), and Walkling (1985). They examined the evolution of arbitrage spread since the announcement day to the resolution day. These studies found that for successful deals, the arbitrage spread gradually narrowed once the resolution date got closer; however, for unsuccessful deals, the arbitrage spread increased on the termination announcement.

Overall, deal spreads react on the expected time to deal completion. This also applies to all other risk factors in a similar manner: in general, better conditions reduce the deal risk; hence, it should translate in smaller deal spreads. Accordingly, Jindra and Walkling (2004) shows that deal spreads anticipate deal duration and the probability of price revision. Officer (2007), which inspected a wide sample of mergers and tender offers (1985–2004), report that there is no correlation between deal spreads across contemporaneous deals. Umber (2010) finds no significantly difference between domestic and cross-border deals, suggesting a similar degree of arbitrage risk.

Despite the differences in returns and risks that characterise merger arbitrage investment strategy, it makes the purpose of this study to shade some light over the unanswered question

'Are cross-border M&A deals perceived as more risky by investors? If so, are the returns higher to compensate for the associated risk profile?'

3. M&A in Poland

We analyse target stock prices both before and after the announcement date, in order to observe potential differences between domestic and cross-border M&A transactions in Poland. As the literature suggests (see, e.g., Allen, Golab, & Powell, 2010), investing in Central and Eastern European (CEE) countries became increasingly interesting, due to a lot of factors. The main determinants explaining why investors prefer targets located in CEE region are the sustainable growth perspectives. As the World Bank data shows, 3.4% GDP growth was recorded for the CEE region, for 2015, compared to 1.7% growth in the Euro Area and 2.4% GDP growth in the US. The Warsaw Stock Exchange (WSE) is the largest national stock exchange in the CEE and one of the fastest-growing exchanges in Europe. It is considered the financial centre of CEE region and one of the key markets on the continent. It is the second largest stock exchange, when looking at Eastern Europe, behind Moscow Exchange, both in terms of market capitalisation and penetration – or market capitalisation divided by gross domestic product. Another reason that makes Poland particularly interesting for this research is that, in recent years, WSE has become one of Europe's most dynamic Initial public offerings (IPO) markets. For several years now, the WSE has been a leading European exchange by the number of IPOs. It was the second largest market for IPOs in 2010 in Europe behind the London Stock Exchange. The London Stock Exchange led in funds raised (US$8.9 billion), whereas the WSE registered the most transactions (95 deals),[2] including the largest one, US$2.7 billion from the privatisation of Poland's largest insurance company, PZU SA in Warsaw. The next year, 2011, revealed an intensive development of the WSE in terms of number of listed companies, which increased by 33% (compared to 2010) placing WSE the first in the world, outperforming even China's Shenzhen Stock Exchange, with a 21% year on year growth. In 2013, WSE ranked second in Europe by the number of IPOs with 54 IPOs on both equities markets. The IPOs in Warsaw represented 20.2% of all IPOs in Europe in 2013 (WSE, 2014). The equity turnover growth indicator for 2011, standing at the level of 25%, ranked WSE on the fifth place in the best stock markets in the world and the leader in Europe. According to the PwC's IPO Watch Europe report, in 2012 WSE occupied the first place on the continent at the number of IPOs (105), and the fifth (however, the first in the CEE region) when looking at their value (€731 million).

Poland may be viewed as a European success story. At the same time as other European countries met recession or economic stagnation, economic growth in Poland has progressively continued during the last five years.

Today it is the sixth largest EU state in terms of economic output, with growth forecasts for the next couple of years being considerably higher than the EU average (Investor's Guide for Manufacturing Companies, 2016). Poland has turned out to be one of the most effervescent and flourishing business locations in Europe. Its 38 million inhabitants form a great domestic market, with a vibrant increase in consumption. Besides being a strategic location for M&A, it is an opportunity for risk arbitrageurs to gain from betting on the outcome of these transactions.

Figure 1 illustrates the evolution of the M&A announcements in Poland, based on their numbers and volume, during 1993–2013 period. We can notice that in recent years there was

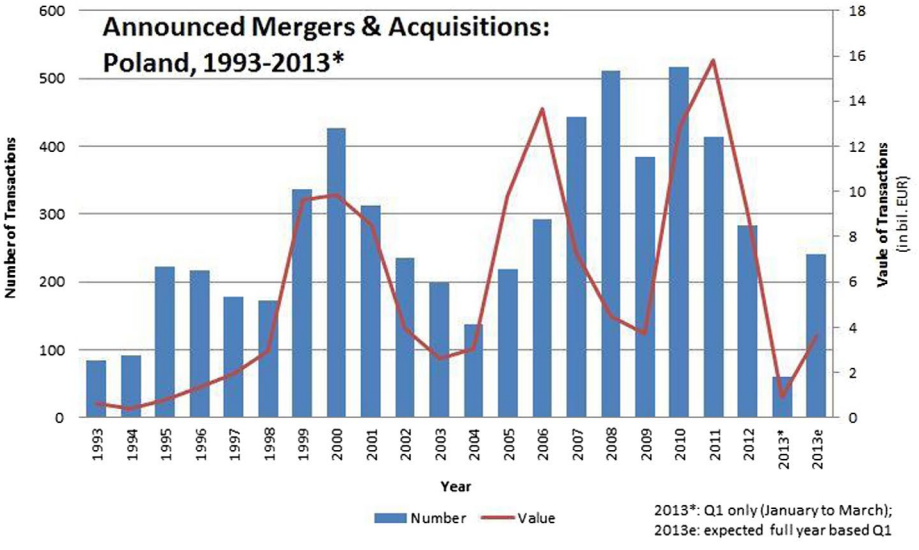

Figure 1. Evolution of M&A market in Poland. Source: https://www.imaa-institute.org/statistics-mergersacquisitions.html#MergersAcquisitions_Poland.

a slowdown in the M&A activity which was strongly impacted by the recent GFC. However, this year is expected to be an interesting one in what concerns the M&A activity in Poland. This is mainly attributable to the privatisation strategy of the Polish government and also to the consolidation trends in some sectors. Moreover, it is also expected that several large global and Polish capital groups will put on the market part of their assets, due to their as global restructuring strategy. On the other hand, in addition to privatisation, which is expected in Poland in the future, the Ministry of State Treasury will also press on additional restructurings of capital groups where it holds a stake. As a result, one could expect some important sale offers in next years.

This study adds more value to the existing literature, because, to our knowledge, it is the first article focusing on Polish deal spreads, by analysing deal spreads across different samples, which in our case are domestic versus cross border M&A Polish transactions.

The recent GFC determined a slump and a serious slowdown of the M&A activity worldwide, including Poland. Consequently, M&A is perceived as one of the riskiest investments, since a single investment mistake can be very costly in our time, given the cost of capital has augmented, while its availability has decreased.

The literature agrees that a revitalisation of the Polish M&A activity depends heavily on full liquidity being recaptured in the banking sector. Besides this, numerous other factors influence the activity of M&A Polish market. First of all, in contrast to the US or even some western European countries, where authorities are involved in the M&A activity very actively, the Polish M&A market has not yet benefited from the governmental financial support to revive falling sectors. Concerns have appeared that groups from other states that have Polish subsidiaries will attempt to reduce the effects of the GFC at the cost of units operating in the rather healthy economic environment in Poland. As a result, this could translate into an outflow of funds and, in the end the bankruptcy of Polish subsidiaries belonging to cross-border groups. Next, in Poland there are many financing sources, most

of them coming from the EU, particularly those granted to infrastructure projects (Poland is the biggest receiver of EU funds). In addition, notable financing sources are represented by private equity funds, which have lately been functioning in Poland with considerable caution.

One important weakness that characterises the preparation of M&A Polish transactions comes from economic aspects. A major issue is that the decisions to buy undertakings are frequently taken based on incomplete evaluations. This difficulty could have as a cause the lack of any tradition of referring to the services of firms giving M&A consultancy.

In Poland, the regulation of acquisition of shares and assets is made by general Civil Code rules and for shares, to a certain extent by pertinent provisions of the Code of Commercial Companies. There are efforts in changing or adapting the Civil Code of 1964 with other new regulations, more compatible with the challenges of the current economic environment.

Polish tax and legal systems were subject to significant changes starting early 1990s, in order to deal with the needs of a market economy and to adapt to EU law, required by Poland's accession to the EU (1 May 2004). Substantial changes were made regarding the tax provisions for corporate restructurings, but the law still needs further adjustments, especially where more sophisticated structures are involved. Poland has completely incorporated the Merger [90/434/eC] and the EU Parent Subsidiary [90/435/eC] Directives. Moreover, EU-Swiss Savings Agreement (which was signed on 26 October 2004) and the Interest and Royalties Directive [2003/49/eC] were implemented on 1 July 2005, although Poland was given an eight-year derogation period for full implementation (period ending 30 June 2013).

4. Data used

Our analysis is based on merger and acquisition announcements taken from *Zephyr* database (published by *Bureau Van Dijk*), the most comprehensive database of M&A transaction information. The preliminary search criteria for the use of this article were as follows: we selected all tender offers for publicly-listed target firms at WSE, between 1 January 2000 and 15 May 2013. The deal status of the transactions that we included was completed, rumoured and withdrawn. We ended up with 301 observations (which compose what we will further refer to as *preliminary sample*). However, we exclude all transactions without information on the tender or exchange offer period, as well as on the target's stock price. Hence, due to missing information, our *final sample* contains 30 observations. The stock prices were downloaded from *https://stooq.us/*. The transactions included in the sample were verified one by one and assigned to one of the following categories: cross-border or domestic.

Table 1 contains selected descriptive statistics of our preliminary sample of Polish deals. Panel A shows the distribution of transaction types per year. We differentiate between transaction types in relation to the bidder competition, the deal status, and the origin of the bidder, which gives the two sub-samples: domestic vs cross-border. Panel A also shows that the 301 tender offer announcements are distributed unequally over the 13-year observation period. The period following 2009 is the most concentrated, while in 2000–2002 only a few transactions respect our selection criteria.

Kalinowski (2012) documented this issue in the context of the crisis' impact on WSE and argued that at the beginning of the financial crisis (2008) the capitalisation of the WSE decreased in 2008 by 56% from its 2007 level (i.e., from 1000 billion to 465 billion Polish zloty (PLN)). In the years 2009 and 2010 there was a growth of Polish stock market

Table 1. Descriptive statistics – preliminary sample.

Panel A. Distribution of transaction types per year

		Competition		Outcome		Origin	
Year	Total	Single bidder	Multiple bidder	Completed	Withdrawn	Domestic	Cross border
2013	30	9	4	14	16	11	2
2012	79	31	3	29	50	26	7
2011	27	10	3	15	12	11	2
2010	28	16	2	9	19	13	5
2009	40	26	5	22	18	18	10
2008	16	8	3	6	10	8	3
2007	8	2	-	2	6	2	0
2006	14	6	-	4	10	3	3
2005	14	10	-	5	9	8	2
2004	15	8	-	10	5	4	5
2003	10	9	1	7	3	2	8
2002	6	5	-	6	0	3	2
2001	8	7	1	5	3	4	4
2000	6	5	1	6	0	1	5
Total	301	152	23	140	161	114	58
	100%	87%*	13%*	47%*	53%*	66%*	34%*

Panel B. Selected Descriptive Statistics

Indicator	Mean	25%	50%	75%	St. Dev.
Deal premium – rumour date	–9.84%	–15.00%	–7.17%	–5.27%	7.93%
Deal premium – announced date	–8.11%	–10.29%	–7.17%	–5.27%	5.68%
Deal value (th. EUR)	73,715	964.74	4053.55	22783.91	377576.3

Indicator	Percentage
Pennystocks	58.54%
Rumours	35.29%

Note: This table shows descriptive statistics of our preliminary sample of Polish M&A announcements. Panel A contains the distribution of transaction types per year. We differentiate transaction types in relation to the bidder competition, to the realised deal outcome and to origin of the acquirer. Panel B shows the mean, standard deviation, and quartiles for selected variables. The lower part contains percentages of the main subsamples.
*percentage of available data.
Source: Own calculations based on Zephyr database.

capitalisation attributed mainly to domestic companies (which is confirmed by our data, composed mainly by domestic deals in this period). Moreover, when looking at the number of IPOs at WSE, there was a sharp decrease during the financial crisis, from 81 in 2007 to 13 in 2009. Data illustrates that the financial crisis affected the WSE through the destabilisation of the deal outcome: most of the withdrawn deals are recorded during the GFC.

In what concerns the competition aspect, Panel A shows that for most of the deals there only single bidders involved. However, in 2013 the competition increased significantly, underlying an improvement in the M&A activity, in the context of a return of investors' confidence.

Surprisingly, the average bid premium, as provided by *Zephyr* database (both at the rumour date and at the announcement date) is negative, around -9%, meaning that the target firm's stock price trades below the offer price in the day following the announcement. However, this is in line with the findings of Umber, which also documented a negative premium (-19%) for his sample of European deals.

After analysing the main characteristics of all the deals announced according to our selection criteria (i.e., the preliminary sample), we will further move to the final sample. As mentioned above, we eliminate the deals for which we have not the offer price or the announcement date, as well as the stock prices. Lastly, we end up with 30 transactions that

compose our *final sample* that we will further analyse. Table 2 contains the deals that create our final sample of Polish deals. Panel B presents selected descriptive statistics. As it can be observed, data is almost equally divided in domestic (57%) and cross-border deals (43%). Competition is very low, with only 1 case that involved a multiple bidder.[3] One aspect that was met by the preliminary sample and is also characterising the final one is the high presence of pennystocks (53%), quite a common feature for emerging markets. Next, most of the transactions were completed (83%), while only 17% were withdrawn. Forty per cent of the cases manifested acquisition rumours, much more than other studies documented. More than half of the deals had a value higher than €9.35 million and the average duration from the announcement till the completion is 62 days.

Another fact that is in line with the characteristics of the preliminary sample is the negative average bid premium, around 14% at the rumour date, meaning that the target firm's stock price trades below the offer price in the day following the rumour. Next, the average bid premium at the announcement day is a bit lower than at the rumour date (-11%), meaning that the target stock price trades below the offer price in the day following the announcement. However, this also suggests that, on average, the target's stock price is more sensitive following an announcement as compared to rumours only.

This article aims to investigate the difference between foreign and domestic offers, regarding deal spread and premium. Following the methodology of Umber (2010), we calculate the bid premium as the difference between the announced offer price and the average stock price of the target between 30 and 10 trading days before the announcement date. Next, deal spreads are computed as the difference between the pronounced offer price and the closing stock price on the first day after the announcement.

Average daily spreads for our sample may be observed in Figure 2. For each trading day around announcement, the distribution of the median and the mean deal spreads is presented. They both present a similar trend. Looking at the mean deal spread, we observe that it starts at roughly 14%, and accelerates to fall to roughly 2% on the day after the announcement. This pre-offer run-up pattern is well documented in the literature (Schwert, 2000). After the announcement, the spread shows a slow decline, meaning that investors already incorporated the information regarding the acquisition in the stock price.

5. Empirical analysis

In this section, we run a multivariate regression to determine the factors influencing the deal spread in domestic and foreign transactions. Next, we move to the profitability analysis, where we create two portfolios of domestic and cross-border deals respectively, to compare their return and the risks associated, as measured by the Sharpe ratio. For this section, we employ the methodology developed by Umber (2010).

5.1. Determinant of bid premium and deal spread

To recognise the importance of the factors influencing the deal spread, suitable interaction variables are added to the Ordinary Least Squares (OLS) regression equations. The model takes the form of equation 1, with the deal *Spread* as a dependent variable, or equation 2, when the deal *Bid premium* is the dependent variable.

Table 2. Deals composing the final sample.

Panel A. M&A – sample of announced transactions

No	Target	Acquirer	Country	Deal value (th. EUR)	Announcement date
1	FON SA	DAMF INVEST SA	Poland	3,941,925.0	19/04/2013
2	ZELMER SA	BSH SPRZET GOSPODARSTWA DOMOWEGO SP ZOO	Poland	375,529.3	17/04/2013
3	FERRUM SA	HW PIETRZAK HOLDING SP ZOO	Poland	293,924.2	03/04/2013
4	ZAKLADY AZOTOWE PULAWY SA	ZAKLADY AZOTOWE W TARNOWIE – MOSCICACH SA	Poland	264,654.9	18/02/2013
5	ZAKLADY AZOTOWE PULAWY SA	ZAKLADY AZOTOWE W TARNOWIE – MOSCICACH SA	Poland	147,844.6	16/01/2013
6	BANK GOSPODARKI SA	RABOBANK INTERNATIONAL HOLDING BV	Netherlands	135,898.4	08/07/2012
7	POLISH ENERGY PARTNERS SA	MANSA INVESTMENTS SP ZOO	Poland	110,385.3	10/01/2012
8	NARODOWY FUNDUSZ SA	XANDORA HOLDINGS LTD EMPIK CENTRUM INVESTMENTS SARL	Cyprus, Luxembourg	98,672.8	06/06/2012
9	TOWARZYSTWO FINANSOWE SPÓLDZIELCZYCH KAS OSZCZEDNOSCIOWO-KREDYTOWYCH SA	STOWARZYSZENIE KRZEWIENIA EDUKACJI FINANSOWEJ	Poland	83,321.3	01/10/2012
10	GWARANT AGENCJA OCHRONY SA	IMPEL SECURITY POLSKA SP ZOO	Poland	75,385.8	18/10/2012
11	ZAKLADY URZADZEN KOMPUTEROWYCH ELZAB SA	COMP SA	Poland	59,679.4	23/08/2012
12	BANK ZACHODNI WBK SA	BANCO SANTANDER SA	Spain	49,000.0	04/01/2011
13	ZAKLADY CHEMICZNE POLICE SA	ZAKLADY AZOTOWE W TARNOWIE – MOSCICACH SA	Poland	19,866.4	19/08/2011
14	PEMUG SA	PRZEDSIEBIORSTWO USLUGOWE AB CONSULTING SP ZOO	Poland	12,003.0	20/05/2010
15	MW TRADE SA	GETIN HOLDING SA	Poland	6,710.3	29/07/2010
16	ALTERCO SA	STONESHORE CONSULTANTS LTD	Cyprus	6,288.8	25/05/2010
17	BANK BPH SA	DRB HOLDINGS BV	Netherlands	4,042.4	29/09/2009
18	ECARD SA	TOWARZYSTWO UBEZPIECZEN WZAJEMNYCH SPOLDZIELCZYCH KAS OSZCZEDNOSCIOWO-KREDYTOWYCH	Poland	2,838.5	14/12/2009
19	WIKANA SA	MR ADAM BUCHAJSKI	Poland	2,817.9	26/06/2009
20	FIRMA OPONIARSKA DEBICA SA	GOODYEAR SA	Luxembourg	1,766.7	16/11/2009
21	MOSTOSTAL WARSZAWA SA	ACCIONA SA	Spain	1,392.3	21/08/2006
22	GRUPA ZYWIEC SA	BRAU-UNION AG	Austria	1,074.7	02/09/2005
23	BRE BANK SA	COMMERZBANK AG	Germany	966.1	09/11/2003
24	ZAKLADY URZADZEN KOMPUTEROWYCH ELZAB SA	MULTIMEDIA WEB CASH REGISTER SPA	Italy	844.0	30/10/2003
25	GETIN HOLDING SA	MR LESZEK CZARNECKI	Poland	658.7	28/02/2003
26	ZAKLADY TLUSZCZOWE KRUSZWICA SA	CEREOL SA	France	199.8	14/04/2003
27	GETIN HOLDING SA	MR LESZEK CZARNECKI	Poland	141.4	17/12/2002
28	BEST SA	BRE BANK SA	Poland	129.0	17/07/2001

29	BANK HANDLOWY W WARSZAWIE SA	CITIBANK OVERSEAS INVESTMENT CORPORATION	USA	119.2	27/07/2000
30	PFLEIDERER GRAJEWO SA	PFLEIDERER AG	Germany	787,776.6	04/08/2000

Panel B. Selected Descriptive Statistics

Indicator	Mean	25%	50%	75%	St. Dev.
Deal premium – rumour date	−13.33%	−18.47%	−12.57%	−7.43%	7.32%
Deal premium – announced date	−10.73%	−12.73%	−9.43%	−7.43%	4.87%
Deal value (th EUR)	216,195	1154.1225	9356.665	107457.13	722450.55
Duration	62	23	39.5	72.5	66.50

Indicator	Percentage
Cross-border	43.33%
Domestic	56.67%
Negative spread	23.03%
Multiple bidders	3.00%
Pennystock	53.00%
Completed deals	83.12%
Rumours	39.13%

Note: This table shows the transactions that compose our final sample of M&A deals. In Panel A, we present the target (located in Poland), the acquirer and its country of origin, the deal value as well as the announcement date. In Panel B, we present selected descriptive statistics of our sample.
Source: Own calculations based on Zephyr database.

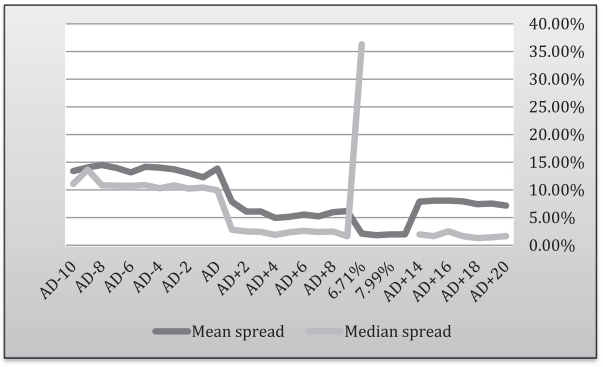

Figure 2. Deal spread around announcement. This graph illustrates the distribution of spreads between offer price and stock price for each trading day around announcement date (AD). The black line depicts the average spread and the grey line show the median spread. Ten days before announcement (AD-10) the average spread is actually the offer premium in the period prior to announcement. Source: Own calculations based on Zephyr database.

$$SPREAD_i = \alpha + \beta_1 * Crossborder_i + \beta_2 * Bidpremium_i + \beta_3 * Crisis_i + \beta_4 * Deal\_value_i + \beta_5 * Directive_i + \beta_6 * Duration_i + \beta_7 * Rumours_i + \beta_8 * SpreadWIG_i + \varepsilon_i \quad (1)$$

$$Bid\_Premium_i = \alpha + \beta_1 * Crossborder_i + \beta_2 * Crisis_i + \beta_3 * Deal\_value_i + \beta_4 * Directive_i + \beta_5 * Duration_i + \beta_6 * Rumours_i + \beta_7 * SpreadWIG_i + \varepsilon_i \quad (2)$$

In these equations, the dependent variable, *Spread,* is calculated according to Umber (2010) as the difference between the offer price and the closing stock price starting with the first day after the announcement. The *Bid premium* is computed as the difference between the offer price and the average target's stock price between 30 and 10 trading days before announcement. The *Crossborder* variable marks all the bids by foreign acquirers. *Non-crisis* is a dummy variable, which assigns the value of 0 for deals announced before 2008 and 1 otherwise. *Deal value* indicates the amount of each deal (number of shares multiplied with the offer price per share). *Directive* is again a dummy variable that refers to the EU tax Merger Directive. From 1 May 2004, M&A between companies originated in Poland and resident firms in EU Member States are treated just as domestic M&A. The next indicator variable, *Duration*, measures the number of days since the announcement of an M&A till the completion or withdrawal. Following Umber (2010), if the duration exceeds one year, we will consider 252 days (this is the case for 3 deals in our sample). *Rumours* is an indicator taken from the *Zephyr* database to show if rumours about the deal existed before the announcement date. Finally, the *Spread_wig* measures the average excess return (triggered starting the first day after the announcement till completion or withdrawal) for each stock above the Warsaw Stock Exchange WIG Total Return Index (WIG).

Table 3 shows the results of the multivariate regression analysis, having as the dependent variable the *Deal spread* and the *Bid premium.* The table reports on the left side the *Bid premium* (pre-offer), while on the right side of the table, we consider the deal spread (post-offer) as the dependent variable. Model 1 reports a plain OLS regression, where the cross-border coefficient is not significant hence there is no evidence of differences between

Table 3. Multivariate regression on bid premium and deal spread.

Dependent:	(1) bid premium	(2) deal spread
Cross-border	1.008	0.198
	0.783	0.129
Bid premium	-	(0.185)*
		0.040
Non-crisis	0.084	0.150
	1.692	0.264
Deal value	0.000	0.000
	4.698	7.350
Directive	(3.836)**	(1.345)*
	1.752	0.315
Duration	0.031*	0.004**
	0.008	0.002
Rumours	0.368	(0.160)
	0.732	0.115
Spread_WIG	(34.466)	(8.260)**
	21.692	3.669
Constant	1.823***	1.113*
	0.987	0.171
R adj.	0.609	0.604
F	5.900	5.188
N	30	30

Note: This table contains the results of our pooled time-series cross-section OLS regression analysis of deal premiums and spreads. Model (1) uses the *Bid premium* as the dependent variable, which is calculated as the difference between the offer price and the average target firm's stock price between 30 and 10 trading days prior to announcement. Model (2) employs the *Deal spread* on the first trading day following the announcement, which is determined as the difference between the bid price and the closing stock price. On the explanatory part we employ first of all the *Crossborder* variable, which marks all the bids by foreign acquirers. *Non-crisis* is a dummy variable, which assigns the value of 0 for deals announced before 2008 and 1 otherwise. *Deal value* indicates the amount of each deal (number of shares multiplied with the offer price per share). *Directive* is again a dummy variable that refers to the EU tax Merger Directive. From 1 May 2004, M&A between companies originated in Poland and firms resident in EU Member States are treated just as domestic M&A. The next indicator variable, *Duration,* measures the number of days since the announcement of an M&A till the completion or withdrawal. Following Umber (2010), if the duration exceeds one year, we will consider 252 days (this is the case for 3 deals in our sample). *Rumours* is an indicator taken from the *Zephyr* database to show if rumours about the deal existed before the announcement date. Finally, the *Spread_WIG* measures the average excess return (triggered starting the first day after the announcement till completion or withdrawal) for each stock above the WIG index.

The numbers we report in parentheses are standard errors, and *, **, and *** show the significance at the 10%, 5%, and 1% level respectively.

Source: Own calculations.

cross-border and domestic offers, as concerning the *Bid premium* so the perceived risks. This implies that foreign bidders offer as much as domestic ones.

On the right side of the table there are reported the results of the multivariate regression analysis, with *Deal spreads* as the dependent variable. The cross-border coefficient is not significant hence there is no evidence of differences between cross-border and domestic offers, as concerning the spread so the perceived risks.

One important outcome to analyse is the negative relationship between the *Bid premium* and *Deal spread*, as reported in model 2. Umber (2010) documented the same negative relationship, however other studies (e.g., Baker & Savasoglu, 2002; Jindra & Walkling, 2004) found a positive relationship. To put it differently, one would expect that bids offering high premium should also report high spreads. However, this is not the case in this study. One possible explanation is that investors might buy the target's stock before the announcement date (especially in rumoured transactions), yet after AD-10 (given that the method of computing the bid premium relies on the stock price in AD-30, AD-10).

In what concerns the *EU tax Merger Directive*, the regression results show that it is highly statistically significant and it influences negatively the *Deal spread* as well as the

Table 4. Testing the CLRM assumptions.

OLS-bid premium				OLS-deal spread			
Akaike info criterion	3.961611			Akaike info criterion	0.270289		
Schwarz criterion	4.356565			Schwarz criterion	0.714613		
Hannan-Quinn criter.	4.060941			Hannan-Quinn criter.	0.382035		
Durbin-Watson stat	2.137451			Durbin-Watson stat	1.715007		
Normality testing				*Normality testing*			
Jarque-Bera	2.342462			Jarque-Bera	1.071391		
Probability	0.309987			Probability	0.585262		
Heteroskedasticity Test: Glejser				*Heteroskedasticity Test: Glejser*			
F-statistic	2.742739	Prob. F(1,14)	0.1478	F-statistic	1.517071	Prob. F(1,14)	0.2366
Obs*R-squared	12.91204	Prob. Chi-Square(1)	0.0743	Obs*R-squared	10.68010	Prob. Chi-Square(1)	0.2205
Ramsey RESET Test				*Ramsey RESET Test*			
	Value	df	Probability		Value	df	Probability
t-statistic	5.818418	14	0.1973	t-statistic	3.594980	13	0.0933
F-statistic	33.85399	(1, 14)	0.0734	F-statistic	12.92388	(1, 13)	0.0743

Source: Own calculations.

Bid premium. Focusing on *Deal spreads*, we can state that neither after controlling for the implementation of the new tax merger directive, cross-border deal spreads are not statistically significantly different from zero. However, what we can state is that definitely the implementation impacted the deal spreads, since including this variable in our regression makes results more robust and the significance level for the cross-border indicator increases considerably.

Duration is significant in both regressions, which is in line with our expectations and with the empirical literature. The reported relationship is positive, meaning that transactions that take longer to complete are more risky. One of the main factors contributing to this is the lengthy regulatory review process that erodes the returns to risk arbitrage. Our results are supported by Jindra and Walkling (2004) that also found positive coefficients on the duration of a deal, consistent with longer deals being more expensive.

One additional insight from Table 3 is that the *Spread_WIG* matters for the deal spread. The negative relationship that we find between the deal spread and the excess return over the WIG index could be understood as follows: the higher the difference between the target's stock return and the WIG index return, the lower the spread. In other words, when the individual performance of the target's stock price is higher than the return of the market index, investors quickly incorporate this into the stock price and accordingly, into the deal spread. This is quite reasonable, because an over-performance means automatically lower risks, therefore lower speculation spread.

The presence of *Rumours* is not significant in the spread models. However, we report a negative relationship; offers preceded by a rumour determine lower spreads compared to deals where rumours do not exist. This finding is in line with previous results, and it could be explained as follows: when there are rumours, there is more competition and the bidding for target stock is higher, determining a lower difference between the offer price and the target stock price in the first day after the announcement, i.e., *Deal spread*.

As reported in Table 4, the tests conclude that the coefficients are robust and there is no evidence of heteroscedasticity either for the bid premium or for the deal spread's equation. Overall, the multivariate regression analysis shows that there is not a significant difference between deal premiums and spreads of domestic and cross-border bids. Hence, the capital market in Poland assesses domestic and cross-border transactions to contain similar levels of arbitrage risk. For this reason, we would still expect similar returns to merger arbitrage investments as we will focus on in the following paragraphs.

5.2. Profitability analysis

Merger arbitrageurs buy target stock shortly after the deal is announced, at a discount, and keep it until resolution date to receive the offer price. Their capital gain comes from the deal spread. The modern portfolio theory, which also applies to merger arbitrage, shows that higher portfolio risk has to be compensated by higher returns. Next, we construct an equally weighted portfolio, in order to assess the profitability of merger arbitrage investment based on our sample. Following Umber (2010), a deal is included in the portfolio the next day after the announcement.

Jindra and Walkling (2004) and Baker and Savasoglu (2002) considered the second day after the announcement; however, in our opinion, using the first trading day after the announcement is a realistic starting point, as arbitrageurs usually require only one trading day to conclude if to make an investment or not. The deal is removed from the portfolio at the date it is completed or withdrawn. Moreover, following Umber (2010), when the duration of a deal exceeds one year, we will only consider 252 days (this is the case for three deals in our sample).

For each stock, we calculate the return starting the next day after the announcement, till the resolution date. Next, we made an average return for each deal (by making an arithmetic average of all daily returns) and next we pass from the daily return to the monthly return, and got to the monthly compound rate of return. Since we do not include in our analysis transaction costs (due to missing data), the portfolio return is purely theoretical. However, Mitchell and Pulvino (2001) documented this issue and found that after including transaction costs, their portfolio (consisting of only domestic deals) return of almost 16% decreased to 10%. The purpose of this article is not reporting the magnitude of the total returns but rather understanding the relationship between its components (i.e., the deal spread and its determinants, target and bid characteristics) on the one hand, and the differences between domestic and cross-border portfolios, in terms of returns and risks, on the other hand. We obtain results comparable to other papers on returns to risk arbitrage.

As the multivariate regressions showed, cross-border offers do not show significant different spreads than domestic deals, which can be translated into a similar amount of risk perceived by the capital market regarding the outcome of cross-border deals. As a generally-accepted aspect, the deal spread includes all expectations on the success of the deal. Hence, higher spreads mean a higher probability of deal failure, of a larger duration, and of price amendments. If cross-border bids show similar spreads compared to domestic ones, than the profitability of merger arbitrage investment strategy should also be similar.

Next, we documented the difference between domestic and cross-border merger arbitrage portfolios. Table 5 shows the monthly returns generated by each portfolio over the 2000–2013 period. In total, the full sample of merger arbitrage investments registered a loss of 0.0466%. The domestic merger arbitrage portfolio lost 0.0850%, while the cross-border

Table 5. Portfolio risk and return.

	Return (%)	St. dev. (%)	Sharpe ratio
Domestic portfolio	−0.0850%	0.3560%	−17.09
Cross border portfolio	0.0037%	0.0287%	−208.59
Equally weighted portfolio	−0.0466%	0.2688%	−22.50

Note: This table details the number of investment positions, i.e., the M&A deals, the average monthly return, the corresponding standard deviation, and Sharpe-ratio for each portfolio. The Sharpe ratio is computed as the risk premium of the portfolio returns divided by its standard deviation and expresses the excess return per unit of risk taken.
Source: Own calculations.

portfolio gained 0.0037%. Hence, the cross-border portfolio registered a higher performance comparing to the domestic portfolio, however the difference between the two portfolios is not remarkable. Our results are not in line with findings of Umber (2010) that focused on larger portfolios, based on 795 total transactions, distributed in domestic and cross-border portfolios. He reports return of 385% for the domestic portfolio and 234% for the cross-border merger arbitrage portfolio. As we can see, he concluded that the cross-border portfolio's performance is dramatically inferior to the performance of the domestic portfolio. Unlike this, we find larger returns for the cross-border portfolio. We base this divergence on sample sizes and the corresponding level of diversification. Moreover, we are not able to continue with adjustments for equal portfolio sizes and with randomly drawn portfolios since the total number of transactions does not allow for it and this technique would aggravate our results.

In order to adjust the returns for the overall economic conditions, we propose a different approach. We compute the difference between the return of the target's stock and the return of the WIG index, with the aim to control for market downturns or booms, and obtain the adjusted return. We find different results: for the domestic portfolios, the average monthly return of 0.08% is higher than for the cross-border deals, with only 0.01%. However, the Sharpe ratio is similarly higher for the domestic deals, meaning a higher return per unit of risk, or likewise lower risks in case of domestic transactions.

As a measure of the risk, the most used indicator is the Sharpe-ratio (see, e.g., Jindra & Walkling, 2004; Mengkiat, 2008; Umber, 2010). This indicator measures the amount of excess-return per unit of volatility and it is computed by dividing the average risk premium of the portfolio by its standard deviation. When computing the risk premium, we used the Poland Government Bond for 15-year fixed rate bonds denominated in euro. In March 2000, Poland launched the 15-year Eurobond issue denominated in euro. The bonds are listed on the Luxemburg Stock Exchange and are paying a coupon of 6% annually, on a nominal amount of €1 billion.

However, we also recognise the weaknesses of this risk measure. Given that standard deviation measures the total level of risk, the Sharpe ratio does not conclude on what investment is best for a well-diversified portfolio, but it shows which deal is better of the two being evaluated. The total risk of an investment includes both company-specific and systemic risk, while a well-diversified portfolio should include practically no firm-specific risk since it is offset by the other securities. Hence, it may be suitable to select an investment with a lower Sharpe ratio for the sake of keeping a well-diversified portfolio (for a more detailed discussion, see Sharpe, 1994). However, in our case we obtained negative Sharpe ratios for the equally weighted portfolio as well as for the domestic one, meaning that risk free asset would have performed better than the two portfolios. We did not encounter this situation

in other studies; therefore, we should carefully interpret this. One possible reason is the sample size: the portfolios might not be well diversified and so the firm-specific risk might be actually incorporated in the Sharpe ratio. Additionally, the sample is comprised of 54% pennystocks. A reasonable assumption is that they might be affected by similar conditions in the economy, given that they are representing companies in financial distress, possibly willing to be acquired (Jindra & Walkling, 2004; Umber, 2010).

In Table 5, the domestic merger arbitrage portfolio indicates the highest Sharpe-ratio, however negative, of -17.09. This shows that domestic transactions provide the highest excess return per unit of volatility (or the lowest loss per unit of risk). Moreover, the lowest Sharpe ratio is obtained for the cross-border portfolio, documenting a higher risk in deal consummation of domestic transactions. If we look at others researches, we may observe similar results: Umber (2010) reports a higher value for Sharpe ratio for the domestic portfolio (0.81), compared to the cross-border deals (0.48). Once again, one major weakness of this measure of risk is that it is problematic to interpret especially when negative values are concerned. Therefore, we recognise that our portfolios present different excess returns per unit of volatility, however we cannot say much about the magnitude of these losses.

To summarise our findings, we put together report the results we obtained for both deal spread analysis (with the multivariate regression) and the portfolio performance analysis. Table 6 illustrates the risk in merger arbitrage strategy for the cross-border portfolio in relation to the domestic one. Each arrow shows the level of risk, and might be understood as follows: a higher level of risk is indicated by an upwards arrow, while similar level of risk is shown by an arrow pointing to the right. On the left hand side of the table, we put the qualitative information revealed by the regression coefficients on deal spreads. In accordance with Umber (2010), we name this the *ex ante* expectations by the capital market. As the cross-border coefficient is not significant, we assign an arrow pointing to the right. This indicates that the capital market expects the same risk for cross-border and domestic transactions. On the right hand side in column 2 we compare the outcomes of the arbitrage portfolio strategy, which returns the *ex post* realisation of the transaction. Although the cross-border portfolio is the only one reporting positive returns, the Sharpe ratio indicates the lowest excess return per unit of volatility. Hence, we assign an upwards arrow, meaning higher risks than its domestic counterpart.

In line with the results of the author whose methodology we followed, we find that overall, deal spreads do not correctly reflect the level of risk in merger arbitrage strategies, i.e., the deal consummation timing, the likelihood of failure, and the probability of deal revising.

Table 6. Comparison of risk between *ex ante* indication and *ex post* realisation.

	Indication by spread	Realisation in portfolio
Domestic	→	↑
Cross-border	→	↓

Note: This table illustrates the comparison of domestic and cross-border deals, based on the quantitative results from the regression analysis of deal spread and the merger arbitrage portfolio performance analysis. Based on the signs of the arrows, we compare the level of risk arbitrage: therefore, for the domestic deals, the arrows pointing up, down or right point up the levels of arbitrage risk as opposed to the cross-border portfolio. In other words, a higher level of arbitrage risk is revealed by an upwards arrow, while a similar level of risk is revealed by an arrow pointing to the right.
Source: Own calculations.

5.3. Robustness check

We conduct some robustness checks in order to validate our results of no significant relationship between bid premiums and deal spreads in domestic and cross-border M&A. First, so far we computed the bid premium following Umber (2010), as the difference between the offer price and the average target stock price on day 30 until 10 before the announcement. Now, we follow Jindra and Walkling (2004) and compute the premium as the difference between the offer price and the target stock price in the day 42 before the announcement. Yet, we did not find any statistically significant relation with the cross-border coefficient.

Next, we varied our base date for the analysis. The rationale behind this choice is that by using the spread analysis on the first day after the M&A announcement may possibly bound our results. Even if the process of collecting the data was precise and we used reliable sources, some M&A announcement dates from our sample could be inaccurate. As the literature on M&A suggests, some announcement dates might be incorrect and the true dates might diverge by a couple of days. Therefore, we use the spread between the offer price and the target's closing stock price starting 10 days prior to the announcement till day 10 after the announcement. We find a statistically significant relationship at 10% confidence level for the cross-border coefficient in day nine and eight before the announcement (we include in the regression analysis the same variables used in Table 3). Moreover, we observe that the cross-border coefficient evolutes from negative to positive in the period -10 to+10. This indicates that the offer price starting 10 days before the announcement is below the target market price and it is gradually adjusted only after the announcement is made, when the target stock price will trade above the offer price. However, this is not in line with the related literature (for an opposite finding, see Umber, 2010) and we can conclude that the capital market in Poland did not correctly incorporate information related to M&A announcements in pricing the target stocks.

6. Conclusion

Regardless of active research on M&A, much remains unidentified on the subject of speculative activity around deal announcements and its consequence on the market pricing of a target company's stock. This article investigates the speculation spread, measured as the percentage difference between the offer price and the closing stock price one day after the announcement of a M&A. In theory, post-announcement deal spreads are a measure of risk in merger arbitrage investments, reflecting investors' perception on the expected time to completion, the likelihood of deal failure, as well as the probability of price amendments. This article contributes to the existing literature by being the first research (as far as we know) focusing on Polish domestic and cross-border transactions, on the relationship between the *ex ante* indication (as measured by deal spreads) and the *ex post* completion in risk arbitrage portfolios.

We found no statistically significant difference between deal spreads and premiums of domestic and foreign acquisitions. These results are robust to the variation of announcement dates. This finding is supported by the results of Umber (2010), who also found no difference in deal spread between domestic and foreign deals, in Europe.

As a consequence, capital markets assess domestic and foreign bids as equally risky. Consequently, we further expect similar level of returns to materialise in the *ex post* completion in risk arbitrage portfolios. Consistent with our model, a negative relationship between

the bid premium and deal spread is reported. Umber (2010) documented the same negative relationship, however other studies (e.g., Baker & Savasoglu, 2002; Jindra & Walkling, 2004) found a positive relationship. Moreover, we found that duration is a key factor to consider when investing in risk arbitrage. Similar to Jindra and Walkling (2004) we found positive coefficients on the duration, consistent with longer deals being more expensive.

The analysis of the two portfolios (i.e., domestic and foreign) revealed indeed higher returns on cross-border merger arbitrage investment than in domestic portfolio, with a corresponding higher level of risk. We cannot come to a decision concerning investors' expectations about transaction consummation, higher failure rates or numerous offer price cuts, but investors seem more pessimistic with regards to these factors in cross-border deals with Polish targets. In view of that, we state that risk arbitrageurs should be aware that even if the differences in spreads between domestic and foreign announced M&A are not significant, they can earn higher returns with a corresponding higher risk for the foreign biddings.

As a final reflection, taken as a whole, deal spreads do not correctly reflect the level of risk in merger arbitrage strategies with Polish targets. Maybe accounting for transaction costs would have lowered the cross-border portfolio returns, since investing in such deals impose additional costs. Thus, a future direction to consider for further research would be to include in the analysis transaction costs, in order to make results more robust. Another exciting debate that could make the point for a future research is the distinction between deals between emerging and developed markets. This is particularly interesting since the volume of cross-border transactions has increased in recent years.

Notes

1. There are also more complex M&A agreements, where the target company's shareholders exchange their stocks for a combination of cash, preferred stock and warrants. However, we did not find many studies dealing with speculation spreads in such deals, because concluding on the value of the hedge is not possible due to unavailabble data on the market values of hybrid instruments.
2. According to Global IPO trends, 2011, E&Y, available at https://www.ey.com/GL/en/Services/Strategic-Growth-Markets/Global-IPO-trends-2011---Europe
3. In the case of Xandora Holdings and Empik Centrum Investments, that launched an offer for a stake in NFI EMF; the board recommends the bid.

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References

Allen, D. E., Golab, A., & Powell, R. (2010). *Volatility and correlations for stock markets in the emerging economies of Central and Eastern Europe: Implications for European investors* (Working paper). Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1611472

Baker, M., & Savasoglu, S. (2002). Limited arbitrage in mergers and acquisitions. *Journal of Financial Economics, 64*, 91–115.

Demeter, M. (2007). Merger (risk) arbitrage strategy. *Aima Canada Strategy Paper Series, 7*, 1–8.

Dukes, W. P., Frohlich, C., & Ma, C. (1992). Risk arbitrage in tender offers. *Journal of Portfolio Management, 18*, 47–55.

Garfinkel, J., & Hankins, K. (2011). The role of risk management in mergers and merger waves. *Journal of Financial Economics, 101*, 515–532.

Gaughan, P. A. (2007). *Mergers, acquisitions, and corporate restructurings* (4th ed.). Hoboken (NJ): John Wiley & Sons, Inc.

Gaurav, J., & Xinyu, J. (2010). The shrinking merger arbitrage spread: Reasons and implications. *Financial Analysts Journal, 66*, 54–68.

Global IPO trends. (2011). E&Y. Retrieved from https://www.ey.com/GL/en/Services/Strategic-Growth-Markets/Global-IPO-trends-2011–Europe

Goergen, M., & Renneboog, L. (2004). Shareholder wealth effects of European domestic and cross-border takeover bids. *European Financial Management, 10*, 9–45.

Ineichen, A. (2002). Absolute returns: The risks and opportunities of hedge fund investing. *Wiley Finance*. ISBN 978-0-471-25120-0.

IPO Watch Europe. (2012). Retrieved from https://www.pwc.co.uk/audit-assurance/publications/ipo-watch-europe-2012.jhtml

Jarrel, G. A., & Poulsen, A. B. (1989). Stock trading before the announcement of tender offers: Insider trading or market anticipation? *Journal of Law, Economics, and Organization, 5*, 225–248.

Jindra, J., & Walkling, R. A. (2004). Speculation spreads and the market pricing of proposed acquisitions. *Journal of Corporate Finance, 10*, 495–526.

Kalinowski, M. (2012). Polish stock market development during the destabilization of financial markets started in 2007. *Economics and management, 17*, 466–473.

Karolyi, G. A., & Shannon, G. (1999). Where's the risk in risk arbitrage*? Canadian Investment Review, 12*, 11–18.

Lakonishok, J., & Vermaelen, T. (1990). Anomalous price behavior around repurchase tender offers. *Journal of Finance, 45*, 455–477.

Larcker, D., & Lys, T. (1987). An empirical analysis of the incentives to engage in costly information acquisition. *Journal of Financial Economics, 18*, 111–126.

Made in Poland. (2016). Investor's guide for manufacturing companies. Retrieved from https://www.jll.pl/poland/pl-pl/Research/Made_in_Poland_2016.pdf

Martynova, M., & Renneborg, L. (2008). A century of corporate takeovers: What have we learned and where do we stand? *Journal of Banking & Finance, 32*, 2148–2177.

Mengkiat, G. (2008). *Risk arbitrage in emerging markets* (Working paper). Retrieved from https://dspace.mit.edu/bitstream/handle/1721.1/46107/387987902.pdf 14

Mitchell, M., & Pulvino, T. (2001). Characteristics of risk in risk arbitrage. *Journal of Finance, 56*, 2135–2176.

Nawrocki, S., & Wielgus, A. (2011). *Mergers and acquisitions in Poland – Value creation in different types of transactions and the impact of culture on shareholders' wealth* (Working paper). Retrieved from https://pure.au.dk/portal-asbstudent/files/34395739/Thesis_2011_02_SN_AW.pdf

Officer, M. S. (2007). Are performance based arbitrage effects detectable? Evidence from merger arbitrage. *Journal of Corporate Finance, 13*, 793–812.

Schwert, G. W. (2000). Hostility in takeovers: In the eyes of the beholder? *Journal of Finance, 55*, 2599–2640.

Sharpe, W. F. (1994). The Sharpe ratio. *Journal of Portfolio Management, 21*, 49–58.

Umber, M. (2010). *Deal spreads in european cross-border M&A* (Working paper). Retrieved from https://www.southwesternfinance.org/conf-2011/swfa2011_submission_63.pdf

Walkling, R. A. (1985). Predicting tender offer success: A logistic analysis. *Journal of Financial and Quantitative Analysis, 20*, 461–478.

Warsaw Stock Exchange. (2014). Annual statistics. Retrieved from https://www.gpw.pl/pub/files/PDF/foldery/ulotka_EN_WSE2014.pdf

Williams, J., & Liao, A. (2010). Do win-win outcomes exist? A study of cross border M&A transactions in emerging markets. *Comparative Economic Studies, 50*, 274–302.