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## Introduction

One of the fastest growing areas in the economic sciences is broadly defined area of finance, with particular emphasis on the financial markets, financial institutions and risk management. Real world challenges stimulate the development of new theories and methods. A large part of the theoretical research concerns the analysis of the risk of not only economic entities, but also households.

The first Wrocław Conference in Finance WROFIN was held in Wrocław between 22nd and 24th of September 2015. The participants of the conference were the leading representatives of academia, practitioners at corporate finance, financial and insurance markets. The conference is a continuation of the two long-standing conferences: INVEST (Financial Investments and Insurance) and ZAFIN (Financial Management – Theory and Practice).

The Conference constitutes a vibrant forum for presenting scientific ideas and results of new research in the areas of investment theory, financial markets, banking, corporate finance, insurance and risk management. Much emphasis is put on practical issues within the fields of finance and insurance. The conference was organized by Finance Management Institute of the Wrocław University of Economics. Scientific Committee of the conference consisted of prof. Diarmuid Bradley, prof. dr hab. Jan Czekaj, prof. dr hab. Andrzej Gospodarowicz, prof. dr hab. Krzysztof Jajuga, prof. dr hab. Adam Kopiński, prof. dr. Hermann Locarek-Junge, prof. dr hab. Monika Marcinkowska, prof. dr hab. Paweł Miłobędzki, prof. dr hab. Jan Monkiewicz, prof. dr Lucjan T. Orłowski, prof. dr hab. Stanisław Owskiak, prof. dr hab. Wanda Ronka-Chmielowiec, prof. dr hab. Jerzy Różański, prof. dr hab. Andrzej Sławiński, dr hab. Tomasz Słoński, prof. Karsten Staehr, prof. dr hab. Jerzy Węclawski, prof. dr hab. Małgorzata Zaleska and prof. dr hab. Dariusz Zarzecki. The Committee on Financial Sciences of Polish Academy of Sciences held the patronage of content and the Rector of the University of Economics in Wrocław, Prof. Andrzej Gospodarowicz, held the honorary patronage.

The conference was attended by about 120 persons representing the academic, financial and insurance sector, including several people from abroad. During the conference 45 papers on finance and insurance, all in English, were presented. There were also 26 posters.

This publication contains 27 articles. They are listed in alphabetical order. The editors of the book on behalf of the authors and themselves express their deep gratitude to the reviewers of articles – Professors: Jacek Batóg, Joanna Bruzda, Katarzyna Byrka-Kita, Jerzy Dzieża, Teresa Famulska, Piotr Fiszeder, Jerzy Gajdka, Marek Gruszczyński, Magdalena Jerzemowska, Jarosław Kubiak, Tadeusz Kufel, Jacek Li-

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*Wanda Ronka-Chmielowiec, Krzysztof Jajuga*

**Andrzej Rutkowski**

University of Warsaw  
e-mail: arutkowski@wz.uw.edu.pl

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## CAPITAL STRUCTURE AND TAKEOVER DECISIONS – ANALYSIS OF ACQUIRERS LISTED ON WSE

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### STRUKTURA KAPITAŁU A DECYZJE O PRZEJĘCIACH – ANALIZA SPÓŁEK NABYWCÓW NOTOWANYCH NA GPW W WARSZAWIE

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**Summary:** The aim of the research presented in the article is to assess the impact of acquisitions on the capital structure of acquiring companies. The study was conducted on a sample of 431 companies listed on the WSE. To ensure comparability of data only companies that are not financial institutions were analysed. The test sample included companies that made acquisitions in the period 2006-2013. The control group consisted of companies with no takeover history. The study analysed the capital structure of acquirers before and after the acquisitions by analysis ratios such as: debt to book value of total assets, debt to the market value of the whole company, debt-to-EBITDA. According to the non-parametric Mann-Whitney U tests, there is no significant statistical evidence that medians of debt ratios are different in groups of acquiring and non-acquiring companies. Mann-Whitney U tests confirm that increases of debt level are significantly higher for acquiring than for non-acquiring companies.

**Keywords:** takeovers, mergers & acquisitions, capital structure, corporate debt, capital market.

**Streszczenie:** Celem badań przedstawionych w artykule jest ocena wpływu przejęć na zmiany struktury kapitałowej spółek przejmujących. Prezentowane w artykule badanie prowadzone było na próbie 431 spółek notowanych na GPW w Warszawie. Aby zapewnić porównywalność danych analizowano jedynie spółki nie będące instytucjami finansowymi. Próbę porównawczą stanowiły spółki nie dokonujące przejęć. Analizowano strukturę kapitału spółek poprzez analizę wskaźników takich jak: relacja długu do sumy aktywów, relacja długu do wartości rynkowej spółki, relacja długu do wartości EBITDA. Wykorzystując nieparametryczne testy U Manna Whitneya nie stwierdzono istotnych statystycznie różnic w poziomie zadłużenia spółek przejmujących i nie przejmujących. Wykorzystując powyższe testy stwierdzono natomiast statystycznie istotne większe względne przyrosty kwot zadłużenia w spółkach przejmujących w porównaniu do spółek nie przejmujących.

**Słowa kluczowe:** przejęcia spółek, fuzje i przejęcia, struktura kapitału, zadłużenie, rynek kapitałowy.

## 1. The essence of decisions on mergers and acquisitions

The decision to acquire another entity is an investment decision of a strategic nature. It requires significant capital expenditure. This is necessary to finance the purchase, as well as for subsequent periods to finance the significant expenditure on the integration of entities which until recently functioned separately and were sometimes even competitors. The effects of unions are usually long-term in nature. A change of position occurs among the tendering companies in the product market and the capital market. The successful realization of such transactions requires significant investment over a relatively long period.

To fund this type of expenditure, it is advisable to gather sufficiently large financial resources in advance. The other option is to mobilize external or foreign equity. This can be done by issuing new shares or raising new debt through bank loans or corporate bonds. The decision to obtain these funds can significantly change the capital structure. In addition, obtaining external capital is associated with the company's entry into new groups of stakeholders who will want to pursue their corporate governance. As a further consequence, the possibility of paying dividends to the owners, changes.

Acquiring new financial sources is associated with the new distribution of power between these groups of interest, which could result in the transfer of value and risk between groups of owners and creditors. At the same time, through difficult to identify option contracts, as a result of changes in the financing structure, there may be significant changes to the flexibility of the company for the acquisition of new capital and thus the possibility of making further significant investments.

The price paid for the acquired entity influences the decisions on the capital structure of the purchasing company. Taking into account the current capital structure of the company at a given time, the valuation of its shares on the public capital market has an impact on the price of the acquisition and the method of payment, resulting in a choice: should payment be made in cash or in shares?

Over the long term, the decision to acquire shapes the structure of assets and creates new opportunities for achieving market and financial benefits. It enables the achievement of the operational synergy effect through the adoption of new joint activity. Furthermore, the decision to acquire changes the structure of financial and business capital, enabling the achievement of significant financial synergies [Eccles et. al. 1999]. Optimization of capital structure is expected to lead to lower financing costs, the maximization of the value of the combined entities, and consequently the long-term success of the acquisition.

For the realization of an acquisition, adequate financial means are necessary, meaning that the entity undertaking the acquisition is in the possession of significant cash resources [Harford 1999]. This applies particularly to companies operating on imperfect capital markets.

Acquisitions are an important subject of research. It should be pointed out, however, that in this field there are no conclusive theories describing the relationship between setting capital structure and the decisions made about an acquisition, for example, regarding its *timing* [Morellec, Zhdanov 2008]. The issue of forming capital structure in connection with decisions about M&A is relatively less recognized than the separately discussed issues of capital structure and mergers and acquisitions. Attempts have been made to explain corporate behaviour in shaping capital structure using a number of theories, such as [Gajdka 2002]:

- the Modigliani–Miller theory, according to which companies increase the share of debt in order to reduce tax payments, reduce capital costs involved and thus lead to an increase in the value of the company;
- the theory of bankruptcy costs, according to which companies make a compromise, taking into account the fact that excessive debt levels leads to increased risk of loss of the ability to handle debt, which in the extreme could lead to bankruptcy;
- the theory of agency costs [Jensen, Meckling 1976], assuming that the individual stakeholder groups operate in their particular interests, not wanting to cause the loss of their influence in the company as a result of changes in capital structure;
- the theory of information asymmetry, including the theory of the hierarchy of financial sources and signalling theory. The theory of the hierarchy of financial sources [Myers, Majluf 1984] should ensure the effective implementation of the company's projects. According to this approach, the company selects the source of funding loaded with the smallest asymmetric information, i.e. equity from retained earnings, low-risk debts, or equity derived from the issue of new shares. In the second approach, i.e. according to signalling theory, insiders send a signal that the company is overvalued. This means that the market is inefficient;
- market timing theory [Baker, Wrugler 2002] assumes that companies raise external equity and loans by observing trading on the capital market. Changes in share prices on the market have a significant impact on the capital structure. From this perspective, there is no optimal capital structure. The current structure is the result of historical and current valuations of shares on the capital market.

Beyond the area of this analysis are the theories of capital structure formation in acquired units. The analysis is conducted from the perspective of the company making the acquisition. The possibility of using the above-mentioned theories should be considered in the context of making decisions on mergers and acquisitions. At the core of each of these theories there are many assumptions about different levels of significance. Each of these theories addresses the issue of market efficiency in different ways.

The aim of the present paper is to show the relationship between the decisions about acquisitions and the changes in capital structure. Decisions about the choice of capital structure and decisions about unions should lead to an increase in the value of the analysed entities.

According to the scope of the present study, the following research questions are raised:

- Do decisions about acquisitions accompany the changes in capital structure, and the changes in the level of debt?
- Do companies incur additional debt in order to implement acquisitions?
- Through acquisitions, do companies increase their equity?

## 2. Overview of empirical research on M&A and capital structure on developed markets

The dependencies between the decisions on mergers and acquisitions and capital structure are the subject of many studies undertaken on developed capital markets. They concern the model of theoretical analyses on motives for acquisitions in the context of funding choices and their benefits [Lewellen 1971], optimizing acquisition strategy and the choice of short-term funding structures that increase the likelihood of acquisitions [Leland 2007; Morellec, Zhdanov 2008].

The second line of analysis consists of empirical studies describing the phenomenon of mergers and acquisitions with a focus on the determinants of capital, motives for acquisitions and the effects of acquisitions on changes in capital structures in combined units.

**Lewellen [1971]** was one of the first to analyse the consequences, and above all, the benefits created by the union of conglomerates. He analysed the model of the relationship between capital structure and the risk of the acquisition transaction. He points to the benefits of connecting conglomerates; as the results of his analysis show, individual conglomerates are relatively more indebted. In the new unit the risk varies for the loan contract. The ability to contract further loans increases. From the point of view of the bank, the probability of loss (non-recovery) on the loan is reduced. Lewellen draws attention to the financial benefits obtained through these unions.

**Kim and McConnell [1977]** analysed the conglomerate mergers popular in the 60s. The study involved transactions carried out on the US market in the period 1960 to 1973, and included only completed transactions. The initial sample included 2,286 companies. Furthermore, it made a number of restrictive assumptions. Assets acquired by smaller companies had to be at least 10% of the book value of assets of larger entities. No other transactions were taking place in the firms analysed at the time, ensuring that there were no effects from other unions. The combined units of debt were traded on the public market. As a result of this selection, the number of trials investigated for transactions was significantly reduced to 39 cases. Kim and McConnell showed that any benefits of the merger are not captured by bondholders.

**Shrieves and Pashley [1984]** studied the effects of making large transactions on the US market in 1970-1977. An important condition was met, that the assets of the acquired company accounted for at least 10% of the assets of the purchaser and the

purchaser could not be a holding company. The sample was limited to manufacturing companies, none of which belonged to foreign companies, the transactions did not drag on over many years, and there was no distortion of competition. Large companies with total assets greater than \$200 million were studied. The size of the buyers was similar. To ensure uniformity the analysis carefully matched a control group for 50 transactions, 50 buyers and 50 acquisitions. The units were operating in the same industry and were not involved in other significant mergers. Shrieves and Pashley found that in a significant portion of the unions the liabilities of newly established units increased. In their view, this phenomenon was caused, among others, by the accounting method of settlement. As their research shows, mergers increase the ability to borrow (ITD theory) and, as a result of the newly formed entity's capital structure, to reduce the risk of its operation, the equity constitutes a new security (coinsurance theory).

The issue of the motives behind mergers and acquisitions was addressed by **Bruner [1988]**. He analysed mergers and acquisitions undertaken in the period 1955-1979 by major US companies out of 1000 on the "Fortune" list of 1979. All companies were listed on the NYSE. The initial sample included 161 buyers and 106 companies purchased. As a result of selection the sample was limited to 75 pairs of companies. The research shows that the purchasers were relatively less in debt prior to takeovers (than the control group). In the next period, i.e. over the two years following takeover, debts grew. The strength of a union depends on whether and how quickly benefits can be achieved. This is consistent with the Myers–Majluf theory (1984), financing profitable ventures of the acquired company. Bruner's study confirms the importance of financial motives inclined to accomplish unions.

**Maloney, McCormick and Mitchell [1993]** studied the effects of capital structure (debt level) of companies on the selection of projects, i.e. objects of acquisitions. To ensure uniformity the research did not take into account regulated companies or railway companies and excluded transactions where it was difficult to determine who the acquirer was. The sample was divided into three parts. The first analysis covered 428 mergers undertaken between 1962 and 1982 by companies listed on the NYSE. The second group involved 389 less uniform transactions carried out between 1982 and 1986. The third group related to 173 acquisitions carried out between 1978 and 1990, where a very significant increase in leverage was observed for the purchaser, compared to the period before the acquisition. According to the above research, debt improves the decision making process. According to agency theory, the debt market disciplines the managers. At the same time, an increase in debt leads to an increase in abnormal returns for the buyer.

**Harford [1999]** investigated the consequences of disposing of large reserves of cash for decisions on acquisitions. The analysis included US companies in the period 1950-1994 operating in 19 industries. Companies gather resources of liquid assets to ensure their safety in order to maintain flexibility in case of various circumstances that may arise in the future. Harford studied companies with cash resources (or

equivalent) sufficient to finance the acquisition of companies, without having to refer to other previously generated internal resources. This does not require changes in the capital structure. Companies with large amounts of cash are inclined towards acquisitions. The results of his study are in accordance with agency theory and Jensen's free cash flow theory in imperfect market conditions. Lack of external control allows the managers to make decisions about acquisitions, which helps to reduce their value. The possession of excessive cash resources led to a significant decrease in value as reflected in a fall in prices and subsequent decrease in the operating results of the combined companies.

**Safieddine and Titman [1999]** analysed financial performance in companies which are the objects of failed acquisitions. The study involved 573 companies, which failed to be taken over in 1982-1991. In this group of companies in the years after a failed takeover attempt, debt levels increased. According to the researchers, this was a defensive action against another potential takeover attempt. At the same time, one can observe a lot of positive restructuring measures, such as restrictions on investments, sale of assets, reduction in employment, focus of activity and maintaining cash flow. The following 5 years saw the share prices' increase. These activities were geared to achieving the interests of the existing owners; it seems that similar actions would have been undertaken by the new buyer, had their attempt ended successfully.

The effect of acquisitions on changes in debt level is the subject of investigation undertaken by **Ghosh and Jain [2000]**. They analysed 239 cases of mergers fully implemented in the US market in 1978-1987. Their research shows that the share of debt financing increases after the merger to match the size of the company after the merger and to a specific level appropriate for the sector. In their view, this indicates that companies use their unused earlier debt capacity, benefitting from its growth after the merger. The increase in debt after the acquisition was accompanied by the increase in share price.

**Gugler and Konrad [2002]** analysed about 45,000 business unions undertaken in the period 1985-1998, half of which were implemented on the US market. Due to lack of data, the necessity of rejecting outliers based on size, and the fact that many companies were involved in more than one acquisition, the study group was limited to 1,432 companies. Gugler and Konrad's research shows that after the acquisition a revision of the acquiring company's debt takes place, establishing a level close to the industry average. The strength of this revision depends on the previous differences. It was also noted that purchasing companies with high debts chose companies with lower debt levels and vice versa. In their opinion, the method of payment for the acquired units did not match the later capital structure.

**Vermaelen and Xu [2012]** studied the influence of capital structure management and the effect of misvaluation carried out on the capital market on decisions about the method of payment for an acquired company. They analysed 3,097 mergers and acquisitions undertaken between 1980 and 2005 on the US public capital market.

In their opinion, acquisition decisions in terms of the choice of payment methods are explained by trade-off theory and market timing theory. In 80% of the transactions, the choice was based on a fixed target capital structure. At the same time, in many cases there is cash payment, though optimization would indicate payment in shares. Overvalued buyers are not willing to pay in shares. Their offer could be regarded as hostile and would lead to failure.

The problem of optimizing the capital structure in mergers and acquisitions has been addressed by **Harford, Klassa and Walcott [2009]**. The authors analysed large mergers and acquisitions carried out in the years 1981-2000 on the US market. The selected transactions had to be complied with certain conditions: the ratio of the assets of the acquired subsidiary to the assets of the buyer must be at least 20%, and the payment was made with only cash or only shares. Transactions financed by both cash and shares were rejected. As a result, 1,538 transactions were investigated. According to the results obtained by the authors of the study, companies sought to maintain the established capital structures. In cases where private resources were too little and at the same time the target level of debt was exceeded, the companies raised a new debt to finance the transaction. The payment offer for the acquisition was constructed by taking into account the optimal target level of debt share. In cases of deductions from the optimal level of debt, the target was found to be reached within five years after the acquisition. Any differences were a result of new growth opportunities.

**Uysal [2011]** studied the interdependency of financial and investment decisions. He analysed the impact of a company's capital structure on decisions about acquisitions. This study included American public companies between 1990 and 2007 with sales in excess of \$10 million (at 1990 prices). Financial firms and regulated utilities were rejected. Only the transactions worth more than \$1 million were taken into account. To provide the opportunity to observe changes as a result of the transaction, acquisitions in which the assets of the acquired company were less than 1% of the acquirer's assets were rejected. In total, the effects of 7,814 acquisitions were analysed. In companies with relatively high debt in relation to the optimum level, there is less chance of undertaking acquisitions and paying for them in cash. They usually take over smaller companies and pay lower acquisition bonuses. Acquirers with greater leverage make more efficient acquisitions.

**Bouraoui and Ping [2014]** studied the impact of capital structure on performance of US acquirers. Their study covered 850 companies from 48 sectors undertaking 904 M&A transactions completed during a period from 2003 to 2006. They analysed financial data for 850 acquiring firms and its target for at least 5 years after mergers. They find that capital structure and its changes have different effects in terms of ROA (Return on Assets) and ROE (Return on Equity) for acquiring companies in short-term and in long-term. According to their conclusion acquisitions that move capital structure towards the optimal level in short-term increase its ROA and ROE. However, in longer period acquirers which decrease its leverage have higher financial flexibility, can easily tighten financial constraints and can more effectively improve its performance (ROA and ROE).

It should be emphasized that all the discussed research studies on mergers and acquisitions in the context of changes in capital structures were carried out in the developed American capital market (except for the research of Gugler and Konrad [2002]). In practice, it is difficult to clearly compare the empirical research results presented above. It is also difficult to compare them with other possible future studies. This is due to several factors, including:

- different ways of calculating capital structure (taking into account the size of accounts, size of the market, value of gross and net capital),
- different periods of research, different waves of mergers,
- the state of the economy during the analysed period,
- geographical location (national, international, regional),
- character of the capital market (developed, emerging; efficient, inefficient),
- research time interval (3 years, 55 years),
- period of acquisition effect assessment (1, 2, 3, 4 years, whole period of study),
- size of the group of transactions studied (50 transactions,  $\approx 30,000$  transactions),
- size of the group of companies studied,
- size of the comparison group (transactions, companies),
- size of transactions (certain transactions are overlooked),
- different sizes of companies studied (sales, assets),
- different relationships between the size of the purchasing company and the target company,
- type of union (conglomerate, vertical merger, horizontal merger).

In this article the dependencies between takeover decision made by the companies listed on Polish public capital market and the changes of their capital structure are studied. Polish capital market in comparison to capital markets in developed countries has a short history and significantly smaller number of listed companies. Also, on the Polish market for corporate control a lower number of mergers & acquisitions are undertaken. This results in a significant reduction of possibility to analyse and to create homogeneous groups of merging companies, e.g. from the same industry.

The presented study strives to answer the following questions:

- Does making an acquisition lead to changes in the capital structure of the purchasing company in terms of book value and market value?
- Does making an acquisition lead to changes in the financial risk, risk of debt repayment?

### **3. Research on purchasing companies listed on the WSE**

#### **3.1. Study sample**

The analysis covers a total of 431 companies listed on the Warsaw Stock Exchange (entire analysed group). These companies are not financial institutions or funds in order to provide a comparability of the data obtained from their financial reports.

The analysed companies form a group of quite homogeneous operating firms. In the period from 2006 to 2013 915 transactions in total were conducted, which were mostly carried out on the private capital market.

The research covered the effects of the acquisitions on the companies' capital structure during the years 2007-2013 (inferential statistics) and during the years 2006-2013 (descriptive statistics). Studies were conducted separately for each year. In the entire analysed group there are companies undertaking mergers in this period (in subsequent years) and companies which did not undertake any mergers.

For the study, each year a group of companies which took over other entities (acquirers, surveyed group) and a group of companies which did not undertake any mergers (non-acquiring companies, control group) were separated in the whole analysed period from 2006 to 2013.

In particular years, within the group of companies listed on the WSE (the entire group analysed), the companies which in a given year did not undertake any mergers, but they undertook them later, were not included in the study. In a given year they were included neither in the study group, nor in the control group. Only later on, in the year when they implemented mergers, they were included in the group surveyed. Synthetically, sizes of particular groups are presented in Table 1.

Similarly, when analysing the consequences of transactions in a given year, these companies which in a given year did not undertake any mergers, however they took over other entities earlier, were not included in the surveyed group or the control group. The companies could be included in the surveyed group (acquirers) later on, if they resumed their activities in the field of mergers.

In particular years, the number of the observed companies, later qualified for the surveyed group and the control group, was different. This resulted from the fact that some companies were excluded from the public market, while other became publicly traded.

**Table 1.** Numbers of companies in the analysed, surveyed and control groups

Year	Entire analysed group	Surveyed group (acquirers)	Control group (non-acquirers)
2006	231	57	128
2007	297	101	136
2008	335	85	137
2009	342	74	137
2010	355	81	143
2011	372	62	138
2012	376	49	136
2013	369	48	133

Source: Author's own study.

The study of the capital structure includes the companies from various industries. It seems that conducting studies within homogeneous sectors would be more justified. The general approach applied in the study, without any division into sectors results from the fact that on the Polish public capital market (WSE) a relatively small number of companies are listed, conducting business activities in a relatively large number of sectors. Numbers of companies in each sector were relatively small. Additionally, it should be stated that due to a relatively low number of transactions, sizes of the surveyed groups (acquirers) in each sector were very low, which would make the statistical analysis more difficult. It seems that the general approach applied in the study does not impact the assessment of consequences of mergers in the form of e.g. relative changes of the percentage level of debt or relative changes of the size of debt (relative increase of the debt amount).

### 3.2. Methodology

In this study statistical tests were used to demonstrate significant differences between the means (or medians) of the analysed measures (variables) in two groups (acquirers and non-acquirers). The Student's t-test was used, and in cases where its assumptions were not met, the non-parametric U Mann-Whitney test was used. The significance level was set at 5%. The truthfulness of the hypotheses was tested at the end of each successive year from 2007 to 2013.

Presented research of the companies involved and non-involved in takeovers activity was established by analysing the measures of companies' capital structure, calculated at the end of the same periods, such as:

- Debt ratio (DA), as the ratio of the book value of total debt to the book value of assets. This indicator is a measure of the level of debt priced by accounts;
- Debt ratio (DV), as the ratio of the book value of the debt to the market value of the entire company (i.e. to the sum of capitalization of the company and the debt). Its size reflects the market value of the company's equity;
- D/EBITDA indicator (DEb), as the ratio of debt to EBITDA. This ratio, calculated in years, is a measure of the ability to handle debt and at the same time is a measure of financial risk.

The analysis took into account absolute indicators and relative changes (growth rates) of indicators in the three or four years following the acquisition (from year zero to year three or four). These results for group of acquirers were compared with the group of companies that had not made any acquisitions. Table 2 presents the list of variables (ratios) used in the study in a synthetic manner.

The growth rates (gE, gD, gDA, gDV, gDEb) are calculated as the relations of the index from a given post-analysis year (from the base year  $t = 0$  to  $t = 4$ ) to the base value of the index from the year preceding the transaction ( $t = 1$ ).

According to the assumptions, the study aims to answer the following questions:

- Does making an acquisition lead to changes in the capital structure of the purchasing company, calculated as the ratio of the size of accounts of total liabilities to total assets (DA)?

**Table 2.** List of variables

	Variable	Name of variable	Formula
1	DA	Debt ratio (book value)	Total debt/Total assets
2	DV	Debt ratio (market value)	Total debt/(Total Debt+Capitalization)
3	DEb	Debt to EBITDA ratio	Debt/EBITDA
4	gE	Equity growth rate	$(Equity_t - Equity_{t-1}) / Equity_{t-1}$
5	gD	Debt growth rate	$(D_t - D_{t-1}) / D_{t-1}$
6	gDA	Debt ratio growth rate (book value)	$(DA_t - DA_{t-1}) / DA_{t-1}$
7	gDV	Debt ratio growth rate (market value)	$(DA_t - DA_{t-1}) / DA_{t-1}$
8	gDEb	Debt to EBITDA ratio growth rate	$(DEb_t - DEb_{t-1}) / DEb_{t-1}$

Source: Author's own study.

- Does making an acquisition lead to changes in the capital structure of the company, calculated as the ratio of the book value of liabilities to the market value of the entire company (DV)?
- Does making an acquisition lead to changes in the risk of debt repayment, calculated as the ratio of the market value of the debt to EBITDA (DEb)?

The study poses the following null hypotheses:

### **Hypothesis 1**

Companies undertaking acquisitions are characterized by the same level of debt, calculated as the ratio of debt to book value of assets (DA), as companies not undertaking acquisitions.

### **Hypothesis 2**

Companies undertaking acquisitions are characterized by the same level of debt, calculated as the ratio of debt to the market value of the entire company (DV), as companies not undertaking acquisitions.

### **Hypothesis 3**

Companies undertaking acquisitions are characterized by the same level of ability to repay debt, calculated as the ratio of debt to EBITDA (DEb), as companies not undertaking acquisitions.

### **Hypothesis 4**

Companies undertaking acquisitions are characterized by the same rate of changes in equity (E) as companies not undertaking acquisitions (gE).

### **Hypothesis 5**

Companies undertaking acquisitions are characterized by the same rate of change in debt value (D) as companies not undertaking acquisitions (gD).

### **Hypothesis 6**

Companies undertaking acquisitions are characterized by the same growth rate of debt ratio (DA) as companies not undertaking acquisitions (gDA).

### Hypothesis 7

Companies undertaking acquisitions are characterized by the same growth rate of debt ratio (D/EV) as companies not undertaking acquisitions (gDV).

### Hypothesis 8

Companies undertaking acquisitions are characterized by the same growth rate in ability to repay debt (D/EBITDA) as companies not undertaking acquisitions (gDEb).

Hypotheses from 4 to 8 were raised in reference to the rate of improvement (change) of relations.

The rejection of these hypotheses will provide a reason to conclude that the relevant relationships are different for these two groups of surveyed companies (smaller and bigger).

**Table 3.** Significance level of Mann Whitney U test of hypothesis 5 (gD) and growth rates of WIG-Index for 2007-2013

Year	WIG-Index growth rate	Significance level for subsequent post-analysis periods				
		0	1	2	3	4
2007	10.4%	0.006	0.000	0.000	0.000	0.000
2008	-51.1%	0.007	0.013	0.009	0.012	0.085
2009	46.9%	0.213	0.106	0.072	0.276	0.132
2010	18.8%	0.016	0.061	0.213	0.079	n/d
2011	-20.8%	0.003	0.008	0.012	n/d	n/d
2012	26.2%	0.548	0.952	n/d	n/d	n/d
2013	8.1%	0.003	n/d	n/d	n/d	n/d

Source: Author's own study.

Each of the eight hypotheses was tested 25 times in total: for subsequent years (from 2007 to 2013) and subsequent post-analysis periods (from year 0 to year 4). The post-analysis scheme applied in relation to hypothesis 5 is presented in table 3 (Mann Whitney U test).

### 3.3. Results

With the assumed significance level of 5% there was no reason to reject the null hypotheses about equal levels of debt (DA) and (DV) and the level of ability to handle debt (DEb) and rate of changes in the size of equity gE), i.e. hypotheses 1, 2, 3 and 4.

With the assumed significance level of 5% there was no basis to reject the null hypotheses about equal increments of relative debt level (gDA) and equal growth in relative ability to handle debt (gDEb), i.e. hypotheses 6 and 8.

For the period under review, 2007-2010, at the assumed significance level of 5%, the null hypothesis about equal rate of change in debt ( $\Delta D$ ) to EV (gDV) in the groups of acquiring and non-acquiring companies (hypothesis 7) is rejected (in 2011-2013 there were no statistically significant differences). This means that in the period 2007-2010, companies making acquisitions recorded a statistically significant greater relative increase in the ratio DV (gDV) in the year of transaction ( $t = 0$ ) and the following year ( $t = 1$ ), compared to the year preceding the transaction ( $t = -1$ ). This involves greater risk increments of debt handling.

Mann-Whitney U tests of hypothesis 5 (growth rates of amount of debt – gD) deliver unequivocal conclusion (Table 3). For the studied period, 2007-2013 (except for the years 2009 and 2012), for the majority of post-analysis periods at the assumed significance level of 5%, the null hypothesis about the equality of the relative changes in the value of debt (gD) in the groups of acquiring and non-acquiring companies is rejected. This means that for the majority of the period studied, companies making acquisitions recorded a statistically significant greater relative increase in debt in the year of transaction ( $t = 0$ ) and the following year ( $t = 1$ ), compared to the year preceding the transaction ( $t = -1$ ). At the same time this group of companies did not experience a statistically higher rate of equity growth.

Analysing the data included in Table 3 we can conclude that merging companies undertake actions which lead to a faster relative growth of the debt amount than the group of companies which do not merge. The growth rate is not unambiguously higher. It may lead to the conclusion that in these post-crisis years, the periods of decreases of market indices, companies get into debts more carefully. Significant decreases of stock market indices in 2008 and 2011 (Table 3) may result in greater caution in 2009 and 2012.

In this study descriptive statistics of arithmetic mean and median values are also calculated for the study group (companies engaged in acquisitions) and for the control group (companies not engaged in acquisitions). The mean and median values represent the following:

- asset debt ratio (DA) – Table 4,
- debt ratio of the whole company (DV), relationship to market values – Table 5,
- debt/EBITDA indicator (DEb) – Table 6.

**Table 4.** Debt to Assets (DA) for acquirers and non-acquiring firms in 2006-2013

Year of acquisitions	Year of analysis – after acquisitions			
1	2			
2006	0	1	2	3
Mean for group of acquirers	0.39	0.36	0.40	0.41
Mean for group of non-acquiring firms	0.56	0.49	0.41	0.48
Median for group of acquirers	0.39	0.35	0.38	0.37
Median for group of non-acquiring firms	0.46	0.43	0.40	0.38

Table 4, cont.

1	2			
2007	0	1	2	3
Mean for group of acquirers	0.37	0.41	0.42	0.47
Mean for group of non-acquiring firms	0.49	0.41	0.48	0.45
Median for group of acquirers	0.38	0.42	0.42	0.40
Median for group of non-acquiring firms	0.43	0.40	0.38	0.36
2008	0	1	2	3
Mean for group of acquirers	0.38	0.39	0.72	0.50
Mean for group of non-acquiring firms	0.41	0.48	0.45	0.40
Median for group of acquirers	0.38	0.37	0.40	0.42
Median for group of non-acquiring firms	0.40	0.38	0.36	0.38
2009	0	1	2	3
Mean for group of acquirers	0.42	0.42	0.46	0.63
Mean for group of non-acquiring firms	0.48	0.45	0.40	0.41
Median for group of acquirers	0.36	0.41	0.40	0.45
Median for group of non-acquiring firms	0.38	0.36	0.38	0.36
2010	0	1	2	3
Mean for group of acquirers	0.38	0.43	0.58	0.58
Mean for group of non-acquiring firms	0.45	0.40	0.41	0.41
Median for group of acquirers	0.34	0.40	0.41	0.38
Median for group of non-acquiring firms	0.36	0.38	0.36	0.35
2011	0	1	2	3
Mean for group of acquirers	0.40	0.50	0.57	n/d
Mean for group of non-acquiring firms	0.40	0.41	0.41	n/d
Median for group of acquirers	0.33	0.37	0.35	n/d
Median for group of non-acquiring firms	0.38	0.36	0.35	n/d
2012	0	1	2	3
Mean for group of acquirers	0.44	0.39	n/d	n/d
Mean for group of non-acquiring firms	0.41	0.41	n/d	n/d
Median for group of acquirers	0.39	0.35	n/d	n/d
Median for group of non-acquiring firms	0.36	0.35	n/d	n/d
2013	0	1	2	3
Mean for group of acquirers	0.37	n/d	n/d	n/d
Mean for group of non-acquiring firms	0.41	n/d	n/d	n/d
Median for group of acquirers	0.31	n/d	n/d	n/d
Median for group of non-acquiring firms	0.35	n/d	n/d	n/d

Source: Author's own study.

**Table 5.** Debt to Enterprise Value (DV) for acquirers and non-acquiring firms in 2006-2013

Year of acquisitions	Year of analysis – after acquisitions			
1	2			
2006	0	1	2	3
Mean for group of acquirers	0.22	0.21	0.43	0.34
Mean for group of non-acquiring firms	0.27	0.27	0.38	0.31
Median for group of acquirers	0.17	0.18	0.42	0.34
Median for group of non-acquiring firms	0.25	0.23	0.37	0.29
2007	0	1	2	3
Mean for group of acquirers	0.21	0.44	0.35	0.35
Mean for group of non-acquiring firms	0.27	0.38	0.31	0.29
Median for group of acquirers	0.18	0.43	0.37	0.33
Median for group of non-acquiring firms	0.23	0.37	0.29	0.25
2008	0	1	2	3
Mean for group of acquirers	0.38	0.31	0.31	0.44
Mean for group of non-acquiring firms	0.38	0.31	0.29	0.38
Median for group of acquirers	0.36	0.28	0.29	0.45
Median for group of non-acquiring firms	0.37	0.29	0.25	0.37
2009	0	1	2	3
Mean for group of acquirers	0.31	0.32	0.45	0.46
Mean for group of non-acquiring firms	0.31	0.29	0.38	0.39
Median for group of acquirers	0.29	0.32	0.45	0.44
Median for group of non-acquiring firms	0.29	0.25	0.37	0.38
2010	0	1	2	3
Mean for group of acquirers	0.30	0.43	0.42	0.40
Mean for group of non-acquiring firms	0.29	0.38	0.39	0.36
Median for group of acquirers	0.27	0.40	0.37	0.33
Median for group of non-acquiring firms	0.25	0.37	0.38	0.32
2011	0	1	2	3
Mean for group of acquirers	0.39	0.39	0.36	n/d
Mean for group of non-acquiring firms	0.38	0.39	0.36	n/d
Median for group of acquirers	0.36	0.33	0.27	n/d
Median for group of non-acquiring firms	0.37	0.38	0.32	n/d
2012	0	1	2	3
Mean for group of acquirers	0.38	0.36	n/d	n/d
Mean for group of non-acquiring firms	0.39	0.36	n/d	n/d
Median for group of acquirers	0.35	0.29	n/d	n/d
Median for group of non-acquiring firms	0.38	0.32	n/d	n/d

**Table 5, cont.**

2013	0	1	2	3
Mean for group of acquirers	0.29	n/d	n/d	n/d
Mean for group of non-acquiring firms	0.36	n/d	n/d	n/d
Median for group of acquirers	0.24	n/d	n/d	n/d
Median for group of non-acquiring firms	0.32	n/d	n/d	n/d

Source: Author's own study.

**Table 6.** Debt to EBITDA (DEb) for acquirers and non-acquiring firms in 2006-2013

Year of acquisitions	Year of analysis – after acquisitions			
1	2			
2006	0	1	2	3
Mean for group of acquirers	4.32	0.00	0.63	4.92
Mean for group of non-acquiring firms	3.13	2.68	2.80	3.13
Median for group of acquirers	3.45	3.92	3.45	3.38
Median for group of non-acquiring firms	2.88	2.52	2.44	3.20
2007	0	1	2	3
Mean for group of acquirers	5.01	1.14	5.46	5.17
Mean for group of non-acquiring firms	2.68	2.80	3.13	1.51
Median for group of acquirers	4.37	4.14	4.50	6.04
Median for group of non-acquiring firms	2.52	2.44	3.20	2.89
2008	0	1	2	3
Mean for group of acquirers	-0.10	5.95	4.54	2.42
Mean for group of non-acquiring firms	2.80	3.13	1.51	3.86
Median for group of acquirers	3.24	3.54	3.88	4.80
Median for group of non-acquiring firms	2.44	3.20	2.89	3.38
2009	0	1	2	3
Mean for group of acquirers	5.13	2.47	4.44	5.41
Mean for group of non-acquiring firms	3.13	1.51	3.86	2.69
Median for group of acquirers	3.88	5.30	6.22	3.46
Median for group of non-acquiring firms	3.20	2.89	3.38	3.03
2010	0	1	2	3
Mean for group of acquirers	2.11	6.01	4.38	5.04
Mean for group of non-acquiring firms	1.51	3.86	2.69	4.55

1	2			
Median for group of acquirers	4.16	4.84	4.74	4.84
Median for group of non-acquiring firms	2.89	3.38	3.03	4.01
2011	0	1	2	3
Mean for group of acquirers	7.22	3.67	3.68	n/d
Mean for group of non-acquiring firms	3.86	2.69	4.55	n/d
Median for group of acquirers	5.27	5.02	4.05	n/d
Median for group of non-acquiring firms	3.38	3.03	4.01	n/d
2012	0	1	2	3
Mean for group of acquirers	1.43	1.95	n/d	n/d
Mean for group of non-acquiring firms	2.69	4.55	n/d	n/d
Median for group of acquirers	3.46	3.63	n/d	n/d
Median for group of non-acquiring firms	3.03	4.01	n/d	n/d
2013	0	1	2	3
Mean for group of acquirers	8.56	n/d	n/d	n/d
Mean for group of non-acquiring firms	4.55	n/d	n/d	n/d
Median for group of acquirers	5.58	n/d	n/d	n/d
Median for group of non-acquiring firms	4.01	n/d	n/d	n/d

Source: Author's own study.

The data in Tables 4, 5 and 6 shows that:

- for the vast majority of the analysed period (with the exception of 2010), the median debt ratios calculated as (DA) and (DV) were lower in the year of acquisition ( $t = 0$ ) in the acquiring companies;
- in subsequent years ( $t = 1,2,3$ ), the median debt ratios calculated as (DA) were higher in the acquiring companies;
- in the entire analysed period, 2007-2013, the median debt level (in years), calculated as D/EBITDA (DEb), was higher in the group of acquiring companies for each period post-analysis (with one exception in 2012, at post-analysis  $t = 1$ ).

#### 4. Conclusion

The decisions about acquisitions are complex investment decisions, often accompanied by significant changes in the capital structure. The mechanism for shaping these decisions was initially recognized in developed markets. Analysing data from Polish companies listed on the WSE and using non-parametric Mann-Whitney U tests, no statistically significant differences were found in the level of debt calculated using the size of accounts (debt to assets, debt to EBITDA) of acquiring

and non-acquiring companies, and there were no statistically significant differences in the relative changes in the debt of acquiring and non-acquiring companies.

However, these tests did find statistically significant higher relative increases in the amounts of debt in acquiring companies in the periods after acquisition, compared to non-acquiring companies over the same periods. Indirectly, this leads to the conclusion that companies making acquisitions change their capital structure by increasing debt. In addition, the size of arithmetic means and medians determined in the above group of the surveyed companies indicate a dependency relationship between the level of debt and the state of the economy. The matters regarding the potential impact of the negative experience from the periods of crisis (periods of declines in stock prices) on the decisions about getting into debt require further studies.

It seems that this is the first study on the capital structure of companies undertaking mergers and acquisitions on the Polish public capital market. Further studies on this topic should create more homogeneous groups for study and comparison.

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