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Graduate School of Management

Master in Corporate Finance

Influence of Working Capital Structure on Company Performance in Mergers and Acquisitions

Master’s Thesis by the 2nd year student

Concentration — Corporate Finance

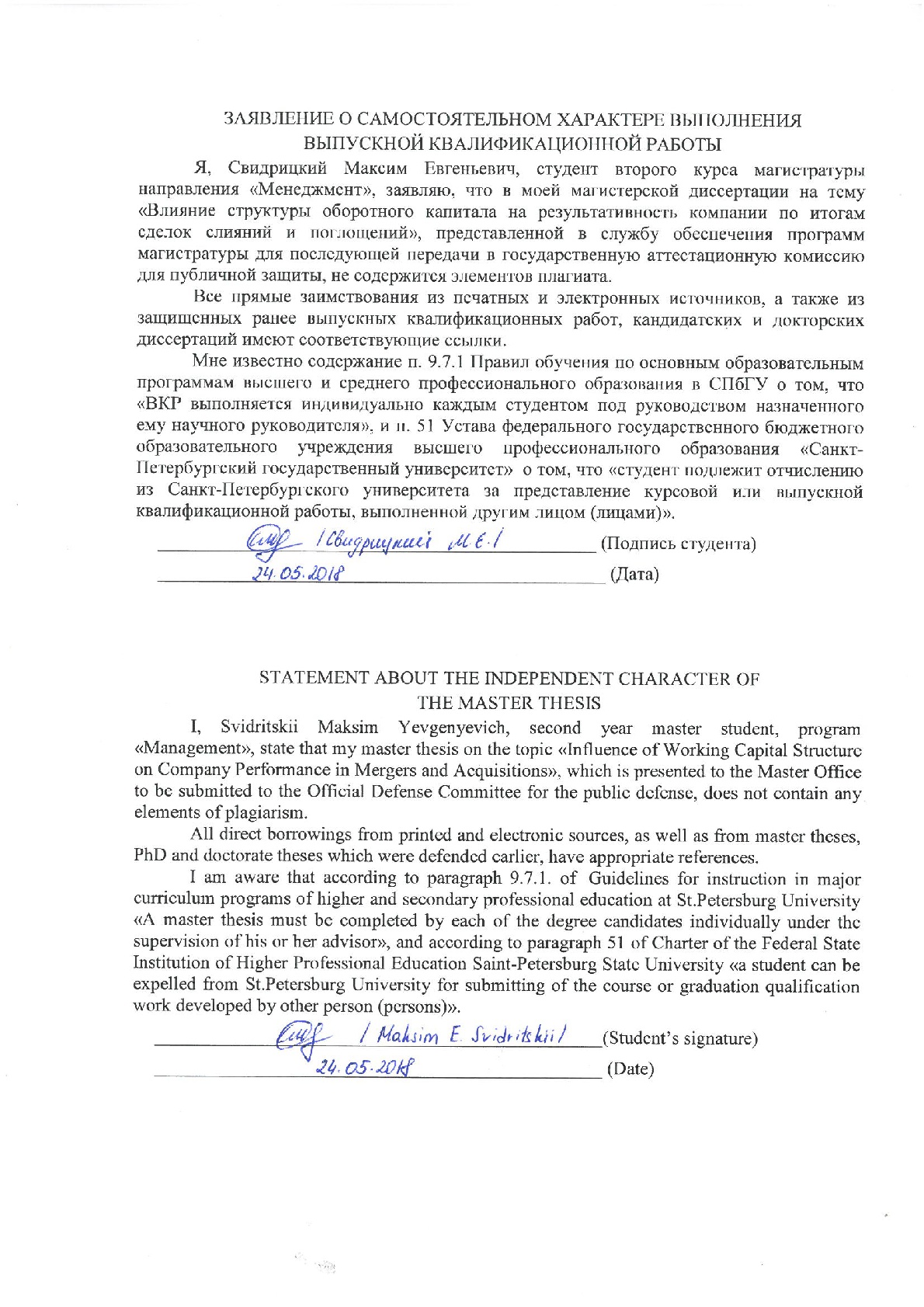
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**АННОТАЦИЯ**

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| --- | --- |
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| Название магистерской диссертации | Влияние структуры оборотного капитала на результативность компании по итогам сделок слияний и поглощений |
| Факультет | Высшая Школа Менеджмента |
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| Научный руководитель | Доцент, Никулин Егор Дмитриевич |
| Описание цели, задач и основных результатов | Основная цель исследования состоит в том, чтобы определить взаимосвязь между структурой оборотного капитала и результатами деятельности компании по итогам сделок слияний и поглощений.  Задачами данного исследования являются: определение основных характеристик оборотного капитала и управления оборотным капиталом фирмы; определение целевых показателей оборотного капитала компании как базу для дальнейших расчетов; определение ключевых показателей эффективности управления оборотным капиталом для компаний, которые будут отслеживаться для оценки взаимосвязи между управлением оборотным капиталом и результативностью по итогам сделок; разработка предложений по управлению оборотным капиталом для компаний, участвующих в деятельности по слияниям и поглощениям.  Результаты работы — это четкое понимание взаимосвязи между структурой оборотного капитала и результатами деятельности компании при слияниях и поглощениях. В результате разработан и охарактеризован набор ключевых показателей, которые будут рассмотрены руководством, участвующим в сделках M&A. |
| Ключевые слова | Слияния и поглощения, оборотный капитал, результативность, Тобинс-кью, дебиторская задолженность, кредиторская задолженность, запасы |

**ABSTRACT**

|  |  |
| --- | --- |
| Master Student's Name | Maksim Svidritskii |
| Master Thesis Title | Influence of Working Capital Structure on Company Performance in Mergers and Acquisitions |
| Faculty | Graduate School of Management |
| Main field of study | Corporate Finance |
| Year | 2018 |
| Academic Advisor’s Name | Senior Lecturer, Egor D. Nikulin |
| Description of the goal, tasks and main results | The main research goal of the paper is to identify the relationship between working capital structure and after deal company performance.  Objectives of this research are: identify the main features of working capital and working capital management of the firms; identify the target working capital ratios of companies as a proxy for the further calculations; identify key performance indicators of working capital management for companies to be tracked to assess the relationship between WC management and after-deal performance; develop suggestions on working capital management for companies involved into mergers and acquisitions activities.  The result of the paper is a clear understanding of the relationship between the working capital structure and company performance in mergers and acquisitions. As a result, the set of key indicators to be considered by the management engaging into the M&A deals is developed and characterized. |
| Keywords | Mergers and Acquisitions, working capital, performance, Tobin’s Q, accounts receivable, inventories, accounts payable |

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# Introduction

Nowadays mergers and acquisitions market transformed and changed its models of deals and value creation significantly since 1990s and early 2000s when the majority of competent researches have been made. It is time to revise the theory and introduce new prepositions and implications to the world of takeovers.

Besides there is no doubt that there are a great variety of different factors that may influence the possibility of a deal, and the future post-merger performance of the company. One of such factors is the working capital management in the company. There is no secret that managing working capital today is one of the crucial task of the management of the company. Besides the rules of target working capital have been also changed.

Now it is not a surprise to see a very aggressive and steadily negative working capital in the technological company or, on the opposite, still conservative ratios of much higher assets over liabilities for manufacturing companies. But does it influence company’s operations before and after the deal? That is why the reason of this work will be to determine the key features of these indicator and explain the possible reason and potential implications.

The main research goal of the paper is to identify the relationship between working capital structure and after deal company performance. The main research questions to be answered are:

* What are the key performance drivers in M&A transactions?
* What are the main features of working capital and working capital management of the firms?
* What is the relationship between working capital structure and after-deal corporate performance?
* What is the optimal structure of working capital in M&A transactions that maximizes performance of the companies?

The main research objectives to be solved are:

* The main features of working capital and working capital management of the firms;
* Identify the target working capital ratios of companies as a proxy for the further calculations;
* Identify key performance indicators of working capital management for companies to be tracked to assess the relationship between WC management and after-deal performance;
* Develop suggestions on working capital management for companies involved into mergers and acquisitions activities.

The main research implication of this paper will be an established view on how working capital structure influences firms’ performance after the deal. Of course, working capital should not be the only concern of the company trying or already engaging into the mergers and acquisition deals, but this paper will show that companies still have to take a closer look at this indicator.

The main research method of the analysis is the econometrical modelling of the effects between dependent and independent variables. Based on the results of these analysis, relevant conclusion will be stated, and appropriate research implication will be developed. The methodology of the research will be further described in detail in the second chapter of this work.

As the main result of these paper we aim to meet all the research objectives defined previously and answer the above stated research questions. The results of the empirical part should be useful for the company management involved into mergers and acquisitions transactions, as well as for the other side of the deal participants, such investors and creditors. We aim to give a clear outlook on how the working capital management can help to increase performance of the companies in the mergers and acquisitions deals and therefore help all the parties involved in these deals.

The paper consists of the 5 main parts: introduction, three chapters and conclusion. The first chapter covers theoretical background of the working capital management of the firms, as well as clear view on which key indicators this metric and more important how the working capital structure itself influences the company performance. First chapter is also devoted to the identifying key mergers and acquisition resources that help to increase company performance involved, and tries to find out theoretical association between working capital management and M&A performance. In the second chapter we state clear hypotheses to be tested further and define research methodology that will be used to answer the research questions and accept or reject the stated hypotheses. The third chapter is the summary of the empirical data obtained during the analysis. It also includes the research interpretations and gives managerial implications, as well as research limitations and further room for the research. In the conclusion part we summarize all the prior results of the paper and present the conclusions in accordance with those results.

# Chapter 1. Theoretical grounds of working capital management and M&A market

## Corporate performance in mergers and acquisitions transactions

Mergers and acquisitions have a global impact on the world economy and the economies of individual countries. The enlargement of business makes it nowadays more and more influential. Therefore, there is a problem of regulation and control not only from the national governments, but also from the international economic organizations. The process of mergers and acquisitions has been at the center of many research in management for several decades. More often such deals are considered by companies as an efficient and quick way to expand their presence in the new markets, to strengthen their performance. However, empirical studies show that most of the deals do not achieve their goals, 61% of all such transactions do not pay back the investments invested in them, and 57% newly formed companies are left behind similar competing firms and are forced to separate into independent businesses (KPMG, 2012). However, managers continue to make such transactions significantly both in quantitative monetary terms. This suggests that the system of analysis of key financial indicators and factors when making management decisions, as well as the entire corporate governance system in the case of mergers and acquisitions transactions may not work efficiently and should be studied more thoroughly. It is very important to understand the drivers of successful M&A deals in order to identify current gap in the research conclusions and find the most relevant control variables for the research analysis that will be done further in this paper.

First of all, in order to estimate the impact of different factors onto the M&A deal performance we need to understand how to value that influence. The approaches differ in the use of different indicators to assess the effect form the deal, which largely determines for whom the efficiency of the transaction is calculated. Most scientists share the view that the result should be determined by the increase in the company's share price (Alhenawi and Krishnaswami, 2015).

In addition, approaches differ in terms of the calculation horizon length. There are short-term and long-term effects of the transaction assessment. The most common method of analyzing the effectiveness of M&A transactions in the scientific literature is the method of estimating changes in the yields of shares on a short-term interval. The popularity of this approach is easily explained, since the data for analysis are relatively accessible to all public companies. The basis of this short-term study is the methodology of the event study. The method of profitability of shares in the short-term period is subjected to special criticism from part of the researchers. It was found that when performance is estimated through short-term performance of stock prices, the actual performance is not estimated, but, instead, the expectations of market participants regarding the effectiveness of this transaction (Sudarsanam, 2011). Besides, it is proved that in the process of assessing the short-term profitability of company shares, factors that can affect the effectiveness of transactions are not taken into account (Larsson R. and Finkelstein S., 1999). For example, the reaction of company personnel and the level of operational integration. On the other hand, long-term models used to evaluate firms’ performance over a relatively long period of time are not approved by researchers because of their low statistical significance (Sudarsanam, 2011). Therefore, despite the wide variety of methods for assessing the effectiveness of mergers and acquisitions, each has many shortcomings and limitations, and therefore there is no consensus on one priority and universal method. There is the need for an integrated approach to the analysis of efficiency, where it is possible to use several techniques simultaneously, which will overcome the shortcomings of one technique due to the advantages of the other.

Since the main idea of the research is to identify the indicators of the company performance, it is very crucial to understand the best possible indicator to measure such kind of performance. To calculate the effect of the mergers and acquisition deals, several methods can be used. This includes outcome studies that investigate the results shared before and after the merger, as well as accounting-based studies, for which special attention is drawn to accounting ratios and the results of operational activities. This methodology of calculation of results is most often used by economists of industrial organizations. The analysis of the results is evaluated both before and after M&A transactions, by comparing the involved firms with the relevant firms or with the underlying industry. Using this approach, Müller (1986) found that acquiring firms suffer from loss of market share and rate of return on capital after mergers and acquisitions activity. Consistently, using the same methodology, Ravenscraft and Scherer (1987) found a similar deterioration effect for other cases. In accordance to the obtained studies’ results several limitations appeared. If the target firm has relatively little turnover compared to the acquiring firm, less than 5% of the acquiring firm, the financial contribution of the target firm is likely to be "piled up" in the consolidated statements for the entire corporate entity (Ravenscraft & Scherer, 1989). It is equally difficult to identify the industry of a new incorporated firm and to find suitable comparable firms (Ravenscraft & Scherer, 1987). A similar method of accounting-based research does not always take into account changes in the field of technological and regulatory changes, which in turn are the main reasons for mergers and acquisitions (Mitchell & Mulherin, 1996). This fact indicates that accounting research is rather blurred and approximate.

Most often, researchers use a method that is based on an assessment of the change in firm value as a result of a merger. This method is known as the event-study method. Particular attention in in this methodology is paid to the behavior of the stock market at the time of the event. The methodology of the event study assumes that the market is effective, and therefore changes in the share price of the involved firms reflect the cost of the economic impact of the event, in this case the merger. Most often this change is tested for general market movements and systematic risk.

However, the event study approach captures only the short-term stock returns and does not disclose long-run performance of the companies. There are other market value indicators to be mentioned: Tobin’s Q, P/BV, market-adjusted stock market return, etc. Based on the definition, Tobin Q is the ratio between the market value of the firm's assets and the replacement value of its assets. In modern literature, the use of Tobin q is quite common, although there are usually no theoretical aspects of research, including the notion of its use as an indicator of business. According to Famá & Barros (2000), Tobin’s Q is entrenched as a consolidated variable of undeniable adequacy in various applications, whether in theoretical works or in empirical tests. Using Tobin’s Q allows researchers to study not only the results obtained in companies (past performance), but also indicates growth opportunities in accordance with the value of q (future performance).

That is how the influence of the various factors in mergers and acquisition deals could be evaluated. But for now, we also need to understand what factors are there to bring the key success in such deals. There are thousands of researches on that theme that already studied a great variety of factors that might have any influence in M&A. All those factors were already proved or rejected. Further the most common and well-studied factors will be presented.

*Deal size.* With the increase in the amount of the transaction, its effectiveness is decreasing. Large transactions can lead to a significant deviation from the initially chosen ways of business development and strategic goals, which imposes significant risks on the buyer company. The complexities associated with large M&A deals include additional financial and time costs for the integration of companies, which, failing, is capable of causing significant economic problems in the operation of the enterprise. In the course of small transactions, it is easier to conduct comprehensive training and mobilize the resources needed to implement a complex integration process (Kozlov and Tupikova, 2015). It was also observed, that even though the increase in deal size brings smaller premiums paid by acquirers for targets, large targets still tend to destroy more shareholder value in such transactions (Alexandridis, Fuller, Terhaar and Travlos, 2013).

*Acquirer and target similarity.* It was previously proven that mergers and acquisitions transactions between companies from different industries are less effective than intra-industry transactions (Polikarpova, 2014). The complexity of integration can arise when parties of a merger and acquisition transaction belong to different industries. Many players try to avoid acquisitions of unrelated companies, try to find "binding threads" in companies for the purpose, which may consist of similar products, technologies or processes. There were also studies that focused mostly on the strategic similarity between merging companies rather than operational (Healy, Palepu, Ruback, 1992; Ramaswamy, 1997; Iankova 2014). Researchers examined the impact of the strategy similarities between acquiring and the target companies on the post-merger performance. The results suggested that transactions between strategically similar companies reach higher key performance indicators and stock returns than unrelated companies. As the reasons for such results authors mainly consider opportunities for economies of scale and scope, business synergies and increased market power.

*Source of financing.* In case of the type of transaction financing sources there were different opinions and discussions. However, the opinion about cash as the best instrument for deals financing in terms of post-deal performance is prevailing in the modern literature. For example, Hayward (2003) examined post-merger performance of companies involving investment banks expertise in the deal structuring. The results of the search showed that complicated deal engineering including complex mix of financial instruments lead mostly to a higher banks commission rather than higher performance and stock returns. On the opposite, author suggests that simple cash financed transactions showed much better results. Another study on the same topic by Andre, Kooli and L’Her (2004) found out that companies involved into stock financed deals show weaker performance than cash financed. However, some authors introduce different and more flexible ideas, they suggest financing takeovers with stocks only if those stocks are overvalued and by cash when stocks are underestimated (Loughran and Vijh, 1997). Nevertheless, some authors even found no evidence of the relationship between the source of financing and long-run after-deal corporate performance (Healy, Palepu and Ruback, 1992).

*Acquisition type*. Acquirers choose between expanding their operations in their own country, domestic transactions, or in another country, cross-border transactions. Cross-border mergers and acquisitions represent a way of entry to a new foreign market. Often this process is accompanied by linguistic and cultural barriers, regulatory and institutional differences, as well as less efficient transmission of information and higher fixed costs for organizing transactions. Evidence of productivity divergence between cross-border and domestic deals is owned by Moller and Schlingemann (2004) who discovered it. Consequently, research data showed that buyers have significantly lower stock and operational indicators for cross-border transactions than for internal transactions. This suggests that there is an incorrect assessment by buyers of synergies in cross-border mergers and acquisitions (Moller & Schlingemann, 2004).

*Deal atmosphere*. The transaction is a method of acquisition that is divided into two types: friendly and hostile transactions. Hostile takeovers are carried out regardless of opposition of the target company. Typically, the closing price of hostile takeovers exceeds the market price before the bidding. This process makes them more expensive and unusual than friendly deals. It can be assumed that only hostile takeovers with high expected synergies will be successful. And this, as a consequence, means that hostility in corporate takeovers should be linked to the positive performance of the combined company. In turn, empirical evidence does not support this theory (Ghosh, 2001; Powell & Stark, 2005).

Below summary of the main factors that were studied in the business literature and considered as main drivers of the overall results of M&A deals (Table 1). The results of the researches are sometimes ambiguous and contradictory. Different authors find opposite results from those found previously by other authors.

1. Summary on the main factors of M&A performance

|  |  |  |
| --- | --- | --- |
| Factor | Article and authors | Results of the research |
| Deal size | Kozlov, Tupikova 2015 | Smaller target acquisitions are more beneficial, due to easier resources mobilization and integration processes. |
| Alexandridis et. al, 2013 | Premiums paid for bigger targets are smaller related in percentage of the total deal value. However, bigger deals tend to destroy more shareholder value than smaller ones. |
| Acquirer and target similarity | Polikarpova 2014 | Intra-industry deals are more effective |
| Healy, Palepu, Ruback 1992 | Transactions between strategically related firms are more efficient in terms of KPIs and stock returns, than between unrelated companies. |
| Ramaswamy 1997 |
| Iankova 2014 |
| Source of financing | Hayward 2003 | Simple cash-financed deals are more efficient |
| Andre, Kooli and L’Her 2004 | Stock financed deals show weaker performance |
| Loughran and Vijh | Use of stock if overvalued, and use of cash when stocks are undervalued |
| Healy, Palepu and Ruback, 1992 | No evidence of financing type and company performance |
| Deal atmosphere | Ghosh 2001 | No evidence of hostile takeovers to outperform friendly ones |
| Powell, Stark 2005 |

Despite the presence of a large number of motives for mergers and acquisitions, often these transactions have different effects on the value of participating companies. Besides there are many factors that influence the results of such transactions. We already mentioned some of the financial factors previously, but there are much more strategic, managerial and other types of these forces that may have an impact on the firms’ performance. However, it should be noted that none of the previous major studies have considered working capital as one of the significant factors influencing firms in mergers and acquisitions.

## Working capital management and corporate performance

The topic of working capital management in the literature and practice has recently played a very important role, but despite this, the theme yet is underestimated and seems not very well studied. Especially it is hard to find any evidences of working capital management influence during M&A deals. But first we have to understand what exactly working capital and working capital management mean.

According to Bhattacharya (2009), the term of working capital was developed by Karl Marx in 1914, however at that time it was mentioned as “variable capital”. Nowadays the term “working capital” is mostly attributable to the balance sheet values of current assets and current liabilities, while the difference between current assets and current liabilities is defined as “net working capital” (Brealey, Myers, Allen, 2014). The concept of working capital leads to understanding of nature of short-term assets financing (Figure 1). When current assets exceed current liabilities, it means that part of current assets are financed by long-term liabilities, while the opposite means short-term financing of long-term or fixed assets.



1. Working capital financing. Source: (Meyer, 2007)

While all that we discussed previously is an absolute monetary value amounts, there also working capital ratios, such as current ratio, quick ratio and cash ratio that value how many times current assets (current assets less inventories for quick ratio, or simply cash for cash ratio) exceed current liabilities.

The main goal of managers is to make invested into their companies’ capital as profitable as possible and working capital management is one of the keys for success. Studies of big US and Europe companies showed that balance sheets of these companies in average hold for a quarter more cash in working capital than they need. Such an unreasonably high level of liquidity is often associated with especially high levels of receivables, unnecessary stock levels, higher operating costs or debt, which are often accompanied by poor implementation of strategic initiatives. As a result, large losses in the possible cash flows generation, profits or distribution for shareholders, and higher vulnerability to possible takeover. Now it is obvious that the need for effective and optimized working capital management is becoming more and more important than in the past. Large and even medium-sized companies have understood the contribution that optimization of capital can make for integrated and enhanced cost control (Nuhiu, 2017).

The theme of working capital management has also become important because companies tried to explore different ways to finance their operations since in the past the cost of long-term financing increased, and the costs were too high (Nuhiu, 2017). Therefore, we can conclude that working capital management is important to balance firm’s profitability and risk.

Furthermore, to reach the previously stated research problem, it is obligatory now to identify the main factors that influence the working capital in the firm. This theme is also widely spoken in the business literature and covered by many authors. A great number of previous studies already proved a direct relationship between working capital level and firm value. There a number of previous studies devoted to working capital management with different views and from different economies perspectives. These studies are very useful and important for the present study.

One of the first researchers, who devoted his attention to the working capital management efficiency were probably Jose et al. (1996). They studied the impact of “long run equilibrium measures of working capital management efficiency” in relation to firms’ profitability. To assess the impact of working capital management onto companies’ profitability researchers used different scientific methods, including nonparametric data analysis, multiple regressions and correlation analysis on the data sample of US firms during 1974-1993.They found out the more aggressive working capital management firms use the higher was the performance. These findings brought a new model to the working capital management literature. Matching the working capital structure to the firm’s profitability, they showed that capital adjustments could bring higher profitability to the firms, implying that a decrease in the amount of working capital could in fact lead to a higher performance.

Another study by Shin and Soenen (1998) used the Net Trade Cycle[[1]](#footnote-1) to assess the impact of the working capital management onto firms’ performance. Analyzing the sample of almost 60 thousand US firms for the period of 1974-1994, they found out a strongly negative relationship between the Net Trade Cycle and profitability. That in fact means, that the reasonable reduction in the amount of Net Trade Cycle companies can improve their performance.

In a further study by Deloof (2003) author confirmed, that the majority of the firms have a large sum of cash invested in working capital. Researcher studied a data sample of listed Belgian companies. He tried to assess the relationship between working capital management and performance during 1992-1996. This study again showed significant negative relationship between profitability and number of days in accounts receivable, inventories and payables. By decreasing the number of days in accounts receivable and inventories, managers can bring higher profit margins into the company and create more value for shareholders. Nevertheless, negative coefficient of the days in accounts payable is not that obvious. Author assumed that this result could be explained by the fact that less profitable firms tend to delay their payments to suppliers. Moreover, he did not find any impact of the cash-conversion-cycle on the performance, due to a possible unobservable heterogeneity problem.

One more research was devoted to the relationship between corporate profitability, cash conversion cycle and its constituents (Lazaridis and Tryfonidis, 2006). To analyze these relationships, they used a sample of companies listed on Athens Stock Exchange for the period 2001-2004. As the factors in the regression analysis, they used fixed assets, sales, leverage ratio, cash conversion cycle and its constituents: days in accounts receivable, days in inventories and days in accounts payable. As the dependent variable, authors used gross operating profit. The results of the research showed negative impact of leverage and cash conversion cycle on the performance, while fixed assets had a positive effect. However, after they switched cash conversion cycle onto its components they found again negative relationship with days in accounts receivable and days in inventories, while, unlike from Deloof (2003), days in accounts payable showed positive relationship. They explained it by the fact that company can increase profits by optimizing working capital structure and keeping its components to an optimal level.

Padachi (2006) in his paper studied the trends of working capital management and its influence on the company performance. The results of the research showed, that increase in the amount of inventories and receivables leads to a lower profitability results. Furthermore, he showed days in inventories and cash conversion cycle positively affects company performance. Nevertheless, days in accounts receivables and payables are negatively bounded to the profitability.

Research by Ganesan (2007) was applied to the working capital management efficiency of telecommunication firms. The results of the study showed that even though cash conversion cycle is negatively related to company performance, in their research it was not significantly influencing profitability of the firms in the telecommunication industry. These contrary results were against the study of Chowdhury and Amin (2007), who had found positive relationship between working capital management and performance of the companies in Bangladesh.

In the study by Raheman and Nasr (2007) a sample of listed Pakistani firms for the period 1994-2004 was analyzed to distinguish the effects of working capital management onto liquidity and profitability. The study was devoted to the effects of the different factors influencing working capital, including average collection period and current ratios. The results of the study showed strong negative influence of these factors onto company performance. Thus, according to the authors, managers can increase company value by reasonably decreasing the length of cash conversion cycle. They also found the relationship between size of the firm, liquidity and profitability.

In the research by Samiloglu and Demirgunes (2008), a sample of Turkish firms for the period of 1998-2007 was studied to analyze the effect of working capital management on company profitability. The results of the research showed that days in accounts receivables, inventory and leverage are negatively correlated with company performance. They also found that cash conversion cycle, size and fixed assets had no statistically significant impact onto profitability.

Some studies suggest that higher working capital levels allow firms to increase their revenues and get higher discounts on earlier payments (Deloof, 2003), thus increasing value of the firm. On the other hand, higher working capital levels require more costly financing and, consequently generate financing pressure on the firm profitability and increase the probability of going bankrupt (Kieschnick, LaPlante, and Moussawi, 2011). There are also studies that could see a broader picture of working capital influence on firm’s profitability introducing the inverted U-shaped relationship (Baños, García and Martínez, 2014). That inverted U-shaped curve implies that for a certain firm exists an ideal level of working capital, that maximizes firm’s value. At first increasing level of working capital brings higher revenues and offsets slowly by rising financing costs. After peek value of inverted U-shape comes the downward slope, that implies higher financing costs and negative marginal firm’s value. Besides there are findings that suggest uneven influence of working capital management (Enqvist, Grahamb and Nikkinen, 2014). There were evidences that the quality of working capital management is more pronounced in economic downturns than during economic booms.

Below the summary on the main working capital management studies is provided (Table 2).

1. Summary on the main working capital management studies

|  |  |  |
| --- | --- | --- |
| Impact on performance | Article and authors | Results of the research |
| Negative linear relationship | Deloof 2003 | Negative relationship between profitability and days accounts receivable, inventories and payables |
| Lazaridis, Tryfonidis 2006 | Negative relationship between profitability and cash conversion cycle |
| Ganesan 2007 | Negative relationship between working capital amount and profitability of the telecommunication industry |
| Non-linear relationship | Baños, García, Martínez 2014 | Inverted U-shaped relationship between profitability and the amount of working capital |
| Enqvist, Grahamb, Nikkinen, 2014 | Uneven influence at different economic cycles |

There is a wide-range of different studies devoted to the problem of working capital management and the corporate performance relationship. However, the results of these studies show a standard patter: there are only two big flows of the results. First is devoted to the linear relationship between these variables. Besides all the researches spotted negative linear relationship. Actually, it is obvious and logical and widely explained in the literature. Another was of interpreting the relationship is the non-linear inverted U-shaped curve, that postulates the existence of the optimal level at which the performance of the company is maximized.

## Working capital determinants

In accordance with the above-mentioned studies, it is worth noting that this section will focus on the impact of causes on working capital management, to better understand exactly how literature tries to explain the influence of factors on working capital. Interconnections are important to understand how the previous relationship with profits is built. At the moment, there are many researchers who offer factors that affect working capital measures. These include, in particular: ability to generate cash flows, leverage, growth opportunities, size, profitability and industry.

*Ability to generate internal resources*. As mentioned before, information that is asymmetric leads to an increase in the cost of external financing of the company, since, as a rule, this leads to a conflict of interests between shareholders and creditors. Of course, in this case, creditors require an increased risk premium (Myers, 1977), which in turn leads to an increase in the cost of external financing, which accordingly leads to prioritized attention to resources that are generated domestically from debt and new capital (Myers, 1984). Fazari and Pettersen (1993) studied investments in working capital that are related to the cash flow for the sample of US manufacturing firms in 1970-1979. Scientists have found that firms with a greater ability to generate internal resources have a higher level of current assets, which is probably due to lower cost of working capital financing for these firms. For sampling of Taiwanese firms between March 1996 and December 1998, Chiou et al. (2006) found that cash flow has a significant positive relationship with the net liquid balance, but negative impact on working capital requirements. The result goes against the results outlined above, and suggests that firms with higher cash flows have a more efficient working capital management. More recently, various empirical studies have been found with opposite results, differing from Chiou et al. (2006). For Baños-Caballero et al. (2010), Taleb et al. (2010) and Abbadi (2013), the cash flow has a relatively strong positive impact on working capital measures, being in the same direction as those described above. Another empirical study of Thai firms for a period between 2000 and 2005 have showed that capital expenditures and operating cash flowshave a strong impact on working capital management (Appuhami, 2008).

*Leverage.* Typically, when managing the cost of working capital financing, companies with a higher leverage ratio must pay a higher risk premium in accordance with the studies mentioned above. These results are consistent with previous empirical data and the capital structure theory. And the studies analyzed proved that there is a significant negative relationship with working capital measures when firms increase their leverage (Chiou et al., 2006; Rahman and Nasr, 2007; Baños-Caballero et al., 2010; Taleb et al., 2010 and Abbadi and Abbadi, 2013). This indicates that to increase the level of leverage, more attention should be given to firms to reduce capital associated with current assets. As companies with a higher level of debt seek to achieve lower working capital requirements.

*Firm Size.* This aspect is a set of empirical studies that prove that size affects working capital management in the firm. Kieschnick et al. (2006) and Chiou et al. (2006) found a positive relationship with the size and measures of working capital management. This is because the cost of financing used to invest in current assets decreases with the size of the firm, as smaller firms have greater asymmetries of information (Jordan et al., 1998; Berger et al., 2001), higher information opacity (Berger and Udell, 1998), and are less followed by analysts (Baños-Caballero et al., 2010). The arguments presented above correspond to the trade-off theory. For larger companies, there are far more chances to survive the bankruptcy procedure, than for small, as large firms are diversified. According to Petersen and Rajan (1997), companies with greater access to capital markets expand trade credit, while smaller companies are likely to face major financial constraints (Whited, 1992 and Fazzari and Petersen, 1993), which in turn leads to an increase in the level of trade credits, as they do not have access to other sources of funding (Petersen and Rajan, 1997), or similar chances of obtaining funding have already been exhausted (Walker, 1991; Cuñat, 2007). According to Baños-Caballero et al. (2010), small companies have higher costs to finance their current assets, which can reduce receivables and inventories. According to the above theories, small firms use more trade credit from suppliers and for Baños-Caballero et al. (2010), the size is expected to have a positive effect on working capital figures (and cash conversion cycle).

It was also found that operating cycle (represented by the number of days in accounts receivables plus number of days in inventories) and market capitalization have positive impact on the amount of working capital, while leverage ratio has negative relationship with the working capital requirements (Nazir and Afza, 2008).

*Return.* It is one of the major determinants of working capital requirements in the firm. Previous empirical studies have found the appropriate impact, but the relationship is not clear, since there are data made by Chiou et al. (2006) and Baños-Caballero et al. (2010). These researchers found that the return on assets (ROA) is negatively associated with working capital measures. These results are consistent with Petersen and Rajan (1997), as researchers have shown that firms with higher productivity receive from the existing suppliers higher level of creditworthiness and, according to Shin and Soenen (1998), companies with higher returns are characterized by higher productivity in working capital management, because of their dominance on the market, and because of their ability to bargain in the market with suppliers and customers. In addition, Chiou et al. (2006) confirms the information that firms with higher productivity can occupy a more profitable niche and gain access to external financing, and then invest in more profitable projects. However empirical evidence from Nazira and Afza (2009) and Abbadi and Abbadi (2013) found a positive relationship between firm returns and working capital measures. Nazir and Afza (2009) and Mehmet and Eda (2009) argue that companies with higher efficiency are less interested in effective working capital management.

The summary of the key factors that influence the working capital structure in the firm is presented below (Table 3).

1. Summary on the key working capital structure factors

|  |  |  |
| --- | --- | --- |
| Factor | Article and authors | Results of the research |
| Ability to generate internal resources – Cash flows | Fazzari and Pettersen 1993 | Working capital related to cash flow generation |
| Chiou et al. 2006 | Cash flow has negative relation to the working capital requirements |
| Baños-Caballero et al. 2010, Taleb et al. 2010, and Abbadi and Abbadi 2013 | Cash flow has opposite positive relationship to working capital requirements |
| Leverage | Chiou et al. 2006; Rahman and Nasr 2007; Baños-Caballero et al. 2010; Taleb et al. 2010 and Abbadi and Abbadi, 2013 | Significant negative relationship between leverage and WC |
| Size | Kieschnick et al. 2006 and Chiou et al. 2006 | Firm size implies positive relationship with WC requirements, because… |
| Jordan et al. 1998; Berger et al. 2001 | Bigger firms have lower financing costs |
| Operating cycle | Nazir and Afza, 2008 | Positive relationship between OC and WC |
| Return | Chiou et al. 2006 and Baños-Caballero et al. 2010 | ROA and WC have negative relationship |
| Capital expenditures | Appuhami, 2008 | Strong impact WC management |

The problem of working capital management has been known for very long time. It is now obvious that the level of working capital has a direct impact on the firm’s value and profitability. It can even get company into serious financial troubles when it is managed poorly. Thus, working capital management still highly matters and should be included into firm’s management agenda. However, the structure – value relationship is ambiguous and should be treated accordingly to a certain firm and economic situation. It is also very important not to focus on the working capital meaning only as the difference between current assets and liabilities. It is much more complicated and requires a closer look.

## Research gap

The theory of the M&A transactions is widely spoken all over the globe. A lot factors already proven to be significant in such transactions. Many suggestions and recommendations already developed by the researches. Nevertheless, there is no direct evidence that the structure of the working capital influences company performance in such transactions. Most of the factors attributable to deal characteristics, such as: deal size, type of financing, industry similarity and so on. There are also operational and economic-wide factors that were already studied thoroughly. Yet there is now clear evidence about the relationship between working capital and company performance in mergers and acquisitions.

However, the relationship between working capital structure and performance of the companies engaged into M&A activity is still niggardly studied. There are no solid studies that distinguish factors that influence the relationships during M&A transactions. Beside this topic becomes much more urgent, if we take into account recent M&A activity in the world and steadily developing M&A market in the Russian Federation. On the other hand, there is always a growing threat of unsuccessful mergers or acquisitions due to innumerable complications that are involved into such transactions. According to statistics, there are less deals that become valuable for the company and bring additional value to the stakeholders than the number of unsuccessful outcomes. This makes the necessity of a closer study on the theme of working capital management in M&A practice.

# Chapter 2. Research methodology

## Data summary

The main research objective of this paper is to define the relationship between working capital structure and the long-run performance in mergers and acquisitions transactions. In order to do that several steps were done. First of all, as the research field oil & gas industry was chosen, because for the recent years it was one of the most active industry in terms of the number and value of mergers and acquisitions. But what is more important is that this industry remains dominant in Russian Federation with the market share of 27.5% - twice higher than the second largest industry – Banking and Insurance (KPMG, 2018). Secondly, transactions were selected by a set of necessary criteria, representing subsequently a set of 129 companies from all over the world. Further the necessary regression model was built, and research hypothesis were tested.

Data collection was held in the Bureau van Dijk system. Initially, 250 deals with the highest deal values based on the pre-defined criteria, were chosen (Table 4). This research will be focused on the acquirer returns because of the two reasons. Firstly, it is impossible to demerge operations of the combined firms and analyze returns and performance separately. Secondly, most of the M&A targets simply become unlisted right after the transactions and are already included in the share prices of its acquirer. The time period of the research is between 2009 and 2012, because this research is aimed at measuring long-run performance. Hence at least 5 years of operations since the transaction should be included in the report and that is why it is impossible to analyze deals after 2012 year. The deal value threshold of $10 million was selected on the basis that small transactions and, accordingly, the small companies behind these transactions would be unrepresentative for subsequent research and could distort results, since the processes of capital management, the motives of mergers and the performance of such companies differ from bigger companies and because the preposition of comparable results across all the data should be always followed.

1. Data collection criteria

|  |  |  |
| --- | --- | --- |
| # | Criteria | Value |
| 1. | Company type | Listed acquirer |
| 2. | Deal type | Acquisition, merger |
| 3. | Current deal status | Completed |
| 4. | Deal value | > $10 million |
| 4. | Time period | 01/01/2009 – 31/12/2012 |
| 5. | Geography | Worldwide data sample |
| 6. | Acquirer industry | Oil and gas |

As was already mentioned, initially 255 deals for the specified time period met the search conditions. However, in the end only 123 deals remain. Most of the observations were excluded from the data sample due to the lack of information in one of the years of observation. Unfortunately, it was not possible to use data that lacked at least one figure. Thus, 128 transactions were eliminated. In addition, 5 deals were eliminated because of extremely unstable results and very strong outliers in comparison to other observations. This situation could happen in connection with the use of accounting indicators. In addition, companies could be in an unstable financial position and such outliers reflected these conditions. Another source of information was used is Thompson Reuters DataStream. It allowed to obtain crucial indicators to build econometrical models and achieve the research goal stated.

Considering the geographic distribution of obtained sample (0), we can see that the highest number of deals in terms of acquirer and target country of origin belongs to the North-American market – USA and Canada. It is not surprising since both countries are oil & gas producers and importers. Besides both companies liberalized this industry and allow private relatively small firms to operate on the market. Unlike from US and Canada on the third largest oil & gas M&A market in Russia large state corporation dominate. That is why even much higher extraction amounts and much bigger market in terms of revenues and other financial and operating metrics “produced” smaller amounts of deals. The full list of the deal companies can be found in the Appendix 1.

1. Deals geographic distribution

## Model specification

To answer the research question first of all we need to specify the research design and identify research models that will be used further to answer the above stated questions. All the further mentioned specifications and calculations will be based on the previously described literature review and authors own considerations and inferences. Besides, the aim of this research is to identify the relationship between working capital management and short-, medium- and long-term company performance. In order to do that, three identical regression models will be applied but for different time horizons. As a representation of short-term results T+1 (one year after deal execution) will be considered. In the same way as medium-term and long-term results T+3 and T+5 data will be used. As a starting point key hypothesis that will be tested further should be formulated. To answer above stated research questions four sets of hypotheses stated are presented below:

**Hypotheses 1:**

There is significant relationship between working capital structure and company performance in M&A deals.

**Hypotheses 2:**

There is non-linear relationship between working capital structure and company performance.

Essentially by stating these hypotheses we are determined to find evidences, that changes in working capital structure actually impact the after-deal company performance. Besides, by the second set of research hypotheses the very important problem is raised. It is widely known and studied, that the amount of working capital in the firm behaves not linearly. There is an optimal point at which the efficiency of the company is maximized. By lowering or increasing the amount of working capital in the firm we would actually decrease our profitability. So, basically the relationship between working capital amount and company performance looks like inverted U-shaped curve on the graph. In order to check for this relationship, we also introduce quadratic term in the regression analysis. To answer these questions the below stated model was developed (Formula 1 and Table 5):

CTQ(t+i) = α + β1 \* AR(t+i) + β2 \* AR2(t+i) + β3 \* Inv(t+i) + β4 \* Inv2(t+i) + β5 \* AP(t+i) + β6 \* AP2(t+i) + β7 \* DS(t-1) + β8 \* IS(t-1) + β9 \* FT(t-1) + β10 \* CLR(t+i) + β11 \* GDP(t+i) + β12 \* OPR(t+i) (1)

where:

CTQ(t+i) – change in Tobin’s Q ratio i-years after the deal completion;

AR(t+i) – change in number of Days in accounts receivable i-years after the deal completion;

Inv(t+i) – change in number of Days in inventories i-years after the deal completion;

AP(t+i) – change in number of Days in accounts payable i-years after the deal completion;

DS(t-1) – deal size in terms of value paid;

IS(t-1) – acquirer and target industry similarity;

FT(t-1) – deal financing type;

CLR(t+i) – change in leverage ration i-years after the deal completion;

GDP(t+i) – GDP growth i-years after the deal completion;

OPR(t+i) – change in oil prices i-years after the deal completion.

1. Variables summary

|  |  |  |
| --- | --- | --- |
| Variable | Name | Proxy |
| CTQ(t+i) | Change in Tobin’s Q ratio |  |
| AR(t+i) | Change in Days Accounts Receivables |  |
| Inv(t+i) | Change in Days Inventories |  |
| AP(t+i) | Change in Days Accounts Payable |  |
| DS(t-1) | Deal size |  |
| IS(t-1) | Industry similarity | First two digits of NAICS 2017 code: 1 – first two digits are the same, 0 – for unequal digits. |
| FT(t-1) | Financing type | 1 – for cash; 2 – for stock; 3 – for mix |
| CLR(t+i) | Change in Leverage ratio |  |
| GDP(t+i) | GDP growth |  |
| OPR(t+i) | Change in Oil prices |  |

To predict the change in corporate performance prior to M&A deal execution Change in Tobin’s Q ratio is used. This metric was chosen based on the literature review and the advantages this metric provides for this research. First of all, in the numerator we have the market value of company which is not the accounting term and cannot easily be manipulated. Besides by scaling the market value at total assets value we account for the change in the company value due to the merging of the firms. So, in some way this indicator is the true value of the firm and by evaluating the change in it after the deal, we can notice the increase or decrease in performance of the company.

Changes in Days in Accounts receivables (AR), Days in Inventories (Inv) and in Days in accounts payable (AP) are considered as the main independent variables. These variables show the adjustments in working capital structure to the one year before the deal moment of time (t-1) in comparison to values after the deal execution (t+i). Using these metrics, the relationship between the working capital management and companies’ performance is tested. So, if we spot that change in Days in accounts in any way lead to the increase or decrease of company performance, it can be evidence that working capital structure and working capital management indeed influences corporate performance in mergers and acquisitions. Besides, as it was previously discussed, the quadratic terms of these variables are introduced to check for the non-linear relationship between working capital structure and company performance. Essentially, the inverted U-shaped curve is anticipated.

Besides, to truly specify the regression model and to account for possible influence of other variables onto company performance, following control variables were introduced. As the most favorable, spotted and discussed variables in the literature of M&A performance researches Deal Size, Industry Similarity and Financing type were introduced. Deal size is measured as the natural logarithm of value paid by the acquirer for the target company. Industry similarity was derived using the first two digits of NAICS 2017 codes of industry attachment. In case of similar digits for the acquirer and target the value of “1” was assigned and in case of the difference in NAICS 2017 codes, the value of “0” was assigned. Somewhat differently Financing type was treated. There three main categories of M&A deals financing and considered this time in this research. They are cash payment, stocks and mixed type of stocks and cash. In case of the full cash payment the value of “1” was assigned, in case of stocks – “2” and for mix payment “3”.

Moreover, the Tobin’s Q ratio is influenced not only by the specifics of the M&A deal itself. Even after the deal company continues to operate and many other factors may apply and change the environment and efficiency of the company. That is why the model above includes such control variable as the Leverage ratio of the firm. It is one of the most relevant and widely studied factor that influences firm profitability and thus stock values. Another possible influence is usually caused by the economic conditions of the country in which the company operates. To control for this impact, we included the GDP growth rate, since it is the most obvious indicator of the country economic situation.

Besides, since we consider Oil & Gas industry it is important also to control for industry specific indicators. The one invaluable indicator for this industry might be Oil prices, since it is actually the main determinant of the company profits and performance in terms of stock prices also. The higher the oil price, the higher the profits and stock returns, which in turn leads to the increase of Tobin’s Q ratio.

For now, it is the main prepositions that will be used in order to answer the research questions and test the hypotheses 1. Based on this model we will check if there is actually any evidence of the relationship between the working capital structure and corporate performance in the short-, medium- and long-term after deal horizon.

To answer the next research question of whether the target amount of the working capital in the company exists, that maximizes the performance of the company the following research hypotheses were stated and accordingly the research model was developed.

**Hypotheses 3:**

H0: There is significant relationship between target working capital and company performance;

To answer the research hypotheses further research methodology was divided into two steps. First of all, we try to identify industry specific optimal value of working capital in the firm based on the widely-known indicators, that influence the structure of the working capital. Previously, we produced comprehensive literature review of the key determinants for the working capital structure and the below stated model fully reflects the previous research (Formula 2 and Table 6):

T\_WC= α + β1 \* CFO+ β2 \* OC + β3 \* ROA + β4 \* LR + β5 \* CAPEX + β6 \* S + ε (2)

where:

T\_WC – target working capital;

CFO – cash flow from operations deflated by total assets;

OC – operating cycle;

ROA – return on assets;

LR – leverage ratio;

CAPEX – capital expenditures deflated by total assets

S – size of the firm.

1. Target working capital variables summary

|  |  |  |
| --- | --- | --- |
| Variable | Name | Proxy |
| T\_WC | Target working capital |  |
| CFO | Cash from operations |  |
| OC | Operating cycle |  |
| ROA | Return on assets |  |
| LR | Leverage ratio |  |
| CAPEX | Capital expenditures |  |
| S | Size of the firm | Ln (Total assets t-1) |

Based on the above described model regression analysis will be done to estimate beta coefficients and propose the model to define optimal structure of working capital in the firm. Further on, using the model and estimated beta coefficients the target working capital structure will be calculated for each specific deal and company. As we can see from the **Ошибка! Источник ссылки не найден.** all the variables used are taken from the time (t-1) that is related to one year before the deal. Hence, if the merger or acquisition was made in, for example, 25.02.2009 year, then value of the 2008 year-end of an acquirer will be used in the model.

The dependent variable essentially represents the amount of Net working capital in the firm proportionally to the amount of total assets in this specific firm. As a set of the determinants for optimal value of the working capital in the firm relevant prior studies were researched and based on that the model was developed. Represented independent variables are the most well-studied and proven variables that influence the working capital in the firm management. Thus, all of the variables are anticipated to be statistically significant and coefficients should be easily interpreted.

Further on, the second step of the methodology belongs to the hypotheses set number 4. Here we try to prove that the target working capital structure indeed influences the performance of the company. In order to do that, very similar model to the first one was developed (Formula 3 and Table 7):

CTQ(t+i) = α + β1 \* WCD(t+i) + β2 \* WCD2(t+i) β3 \* DS(t-1) + β4 \* IS(t-1) + β5 \* FT(t-1) + β6 \* CLR(t+i)

+ β7 \* GDP(t+i) + β8 \* OPR(t+i) (3)

where:

CTQ(t+i) – change in Tobin’s Q ratio i-years after the deal completion;

WCD(t+i) – working capital deficit i-years after the deal completion;

DS(t-1) – deal size in terms of value paid;

IS(t-1) – acquirer and target industry similarity;

FT(t-1) – deal financing type;

CLR(t+i) – change in leverage ration i-years after the deal completion;

GDP(t+i) – GDP growth i-years after the deal completion;

OPR(t+i) – change in oil prices i-years after the deal completion.

1. Working capital deficit variables summary

|  |  |  |
| --- | --- | --- |
| Variable | Name | Proxy |
| CTQ(t+i) | Change in Tobin’s Q ratio |  |
| WCD(t+i) | Working capital deficit |  |
| DS(t-1) | Deal size |  |
| IS(t-1) | Industry similarity | First two digits of NAICS 2017 code: 1 – first two digits are the same, 0 – for unequal digits. |
| FT(t-1) | Financing type | 1 – for cash; 2 – for stock; 3 – for mix |
| CLR(t+i) | Change in Leverage ratio |  |
| GDP(t+i) | GDP growth |  |
| OPR(t+i) | Change in Oil prices |  |

This model is identical to first one that was used to assess the impact of working capital structure onto the company performance. This time we use the same model since the nature of the effect that we try to predict is approximately the same. In order to do that we introduced special independent variable called Working Capital Deficit (WCD). Basically, this variable tries to value the relationship between the company performance and the deviations of working capital amount from the modelled optimal working capital structure. In addition, working capital deficit controls for the relevance of the target working capital in explaining the performance of the firms. So that if Working Capital Deficit proves to be statistically significant, this can mean that target working capital ratio can be in theory used to define the appropriate level of working capital in the firm relatively to its assets in order to maximize the after-deal performance. Since the nature of this effect is the same we use again the previously defined set of independent variables and industry specific control variables.

# Chapter 3. Empirical analysis and results

## Influence of working capital structure estimation

Based on the predefined research methodology there were performed several steps in order to answer the research question of this work. First of all, in order to identify possible influence of working capital structure onto companies’ performance and answer the first set of stated hypotheses, the model expressed in Formula 3 was run. But first of all, the data sample was studied thoroughly and prepared. Below we can see summarized descriptive statistics and correlation matrixes for the data (Table 8)*.*

1. Descriptive statistics of working capital influence model data

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Total sample (N = 123)** | **CTQ** | **AR** | **Inv** | **AP** | **WCD** | **DS** | **IS** | **FT** | **CLR** | **GDP** | **OPR** |
| Mean | -13,6 | -1,5 | 2,0 | -14,6 | -31,0 | 12,4 | 0,6 | 1,6 | 54,8 | 8,5 | 4,3 |
| SD | 55,6 | 62,5 | 21,8 | 100,0 | 796,0 | 1,7 | 0,5 | 0,8 | 190,7 | 7,7 | 44,7 |
| Minimum | -96,2 | -252,4 | -49,8 | -637,6 | -5 979,4 | 9,5 | 0,0 | 1,0 | -716,4 | -8,9 | -62,1 |
| Maximum | 292,1 | 726,4 | 396,7 | 149,2 | 7 206,1 | 17,5 | 1,0 | 3,0 | 1 121,0 | 61,6 | 79,8 |

According to the descriptive statistics table the most important variables for us to consider are CTQ (Change in Tobin’s Q ratio), AR (Change in Days accounts receivables), Inv (Change in Days inventories), AP (Change in Days accounts payable), and WCD (Working capital deficit). As we can see the mean value for the change in Tobin’s Q is -13,6 that basically means that in average companies in the sample tended to decrease their performance after the M&A deal. However, the standard deviation figure for this indicator is somewhat high at 55,6. This means that the data sample was varying heavily in this time horizon and while mean value was negative, some companies showed way above average performance. The maximum and minimum figures as well show very high spread between this indicator. Now if we look at the changes in Days accounts receivables, inventories and payables we may found out that in average companies tended to decrease the length of time of counterparties to pay their debts in favor of these companies. At the same time accounts payable had a tendency for decreasing, meaning that outstanding debts were paid back faster than before. At the same time inventories were in average slightly rising. The standard deviation, minimum ad maximum values as for the CTQ suggest about high fluctuations in the data sample. And as for the working capital deficit, mean value suggest that companies tended to keep the working capital amount lower than target working capital ratio may suggest for them. Standard deviation again is very high, as well as minimum and maximum values. This might also be an early evidence of the bias in the target working capital ratio estimation. Since the deviations are so high, there could be some misinterpretation in the methodology of deriving optimal working capital structure.

To further asses the relationships between the tested variables the correlation matrix was build (Table 9). As we can see from the table, there is no severe dependence between variables. The highest correlation coefficient can be seen between the GDP growth rate and oil prices. And that is obvious, because the major oil & gas producing countries economies, including Russian Federation, heavily depend on the oil revenues. Thus, the economy growth is highly dependent on the oil prices. Nevertheless, oil prices are not the only determinants of the economy growth and that is why the correlation coefficient is only 0,45. Overall, we do not see any other coefficients to be higher and that means that all of the variables can be used simultaneously in the further models.

1. Correlation matrix

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **CTQ** | **AR** | **Inv** | **AP** | **WCD** | **DS** | **IS** | **FT** | **CLR** | **GDP** | **OPR** |
| **CTQ** | 1,00 |  |  |  |  |  |  |  |  |  |  |
| **AR** | -0,48 | 1,00 |  |  |  |  |  |  |  |  |  |
| **Inv** | -0,69 | 0,43 | 1,00 |  |  |  |  |  |  |  |  |
| **AP** | -0,48 | 0,38 | 0,41 | 1,00 |  |  |  |  |  |  |  |
| **WCD** | 0,12 | -0,05 | -0,18 | -0,33 | 1,00 |  |  |  |  |  |  |
| **DS** | -0,04 | -0,14 | -0,04 | 0,08 | -0,13 | 1,00 |  |  |  |  |  |
| **IS** | -0,01 | -0,07 | 0,05 | -0,07 | 0,23 | 0,10 | 1,00 |  |  |  |  |
| **FT** | -0,03 | -0,03 | -0,08 | -0,02 | 0,13 | 0,01 | 0,27 | 1,00 |  |  |  |
| **CLR** | 0,04 | 0,02 | 0,08 | 0,07 | -0,08 | 0,06 | -0,01 | -0,19 | 1,00 |  |  |
| **GDP** | -0,33 | 0,13 | 0,18 | 0,06 | 0,08 | -0,15 | 0,05 | 0,19 | 0,12 | 1,00 |  |
| **OPR** | -0,34 | 0,06 | 0,12 | -0,02 | 0,03 | -0,10 | -0,01 | 0,04 | -0,08 | 0,46 | 1,00 |

Following the developed research methodology, the next step of the analysis is to identify the key indicators that influence the post M&A deal performance of the firms through a regression analysis. As the main variables we use the change in Days Accounts receivables (AR), Days in inventories (Inv) and Days in accounts payable (AP). These metrics are defined as the difference in days from the ratio at time t-1 (one year before the deal) and t+1, t+3 and t+5. By doing this we try to capture the influence of capital adjustments onto the corporate performance by regressing the independent variables over dependent performance measurement derived as the difference in Tobin’s Q ratio from the year t-1. For the time period of T +1 the following regression was undertaken (Table 10). Detailed results of the regression are presented in the Appendix 2:

1. Working capital structure regression results for T+1

|  |  |  |
| --- | --- | --- |
| Number of observations | 123 | |
| F-test, p-value | 0,00 | |
| R2 | 0,66 | |
| **CTQ** | **p-value** | **Coefficients** |
| AR (Days in Accounts receivables) | 0,02 | -0,25 |
| AR2 (Quadratic term) | 0,10 | -0,01 |
| Inv (Days in inventories) | 0,00 | -2,04 |
| Inv2 (Quadratic term) | 0,24 | 0,02 |
| AP (Accounts payable) | 0,00 | -0,26 |
| AP2 (Quadratic term) | 0,53 | 0,00 |
| DS (Deal size) | 0,07 | -2,40 |
| IS (Industry similarity) | 0,62 | 2,35 |
| CLR (Change in leverage ratio) | 0,06 | 0,01 |
| GDP (GDP growth) | 0,06 | -1,02 |
| OPR (Oil prices) | 0,00 | -0,22 |
| ft1 (Cash financing dummy) | 0,36 | -5,46 |
| ft2 (Stocks financing dummy) | 0,43 | -5,43 |
| cons | 0,02 | 39,67 |

According to the results of the regression analysis (Table 10) several key interpretations could be mentioned. However, first of all the model was tested for the heteroscedasticity and multicollinearity problem. Heteroscedasticity might be a big problem for the regression models and it appears when with the increase in value of the independent variable the variance of modelling errors increases. In order to check for the heteroscedasticity problem, we used the Breusch-Pagan test and obtained 1,71 statistics corresponding to 19,2% confidence level, that essentially means that we cannot reject the null hypothesis and that the data set is homoscedastic. Another problem of multiple regression analysis is multicollinearity between independent variables. Performing the VIF (Variance Inflation Factor) test we quantified the severity of multicollinearity between independent variables. According to the test results none of the reported VIF results was higher than 10, which in turn suggests that there is no severe multicollinearity between variables. In the Table 10 we might also see the results of F-test, R-squared, t-test and beta coefficients of the regressors. The F-test essentially shows us if the R-squared might be equal to zero and that the regression model has no power to explain any of the variations between tested variables. Of we look at the p-value of the F-test that is equal to 0,0000 we can conclude that the null hypothesis could be rejected and with the 99% confidence level conclude that the regression model has some power to interpret the variables tested. Further, the R-squared shows us that 66% of the variations could be explained with the model produced by the analysis. This result is slightly low, but still the model is statistically significant and can be used further.

Beside the changes in working capital structure expressed as AR, Inv and AP there are also DS (Deal Size), IS (Industry Similarity), ft1-ft2-ft3 (Financing Type dummy variables), CLR (Change in Leverage ratio), GDP (GDP growth) and OPR (Oil prices) as the control variables. Ft1 equals to 1 when financing type is “Cash” and 0 in all other cases. Ft 2 equals, in turn, 1 when Financing type is “Stocks” and 0 zero in all other cases. There is no possibility to introduce the third dummy variable of “Mix” financing type, since we can predict the value of ft3 based on the values of other dummy variables ft1 and ft2. That is why these three dummy variables are perfectly collinear and one of them is excluded (omitted) from the model. We will interpret the results of the individual variables further on and compare in all periods simultaneously.

But the most important is the p-values of T-test for independent variables. As we can see based on the p-values AR (Days Accounts receivables), Inv (Days in inventories), AP (Days in accounts payable), CLR (change in leverage ratio), GDP (GDP growth), OPR (oil prices change) and DS (Deal Size) are statistically significant. AR2, Inv2, AP2, IS (industry similarity) and ft1- f2 (financing Types) are not statistically significant since the p-values are above 10% confidence level and we can reject the null hypotheses. However, T-test for ft1, ft2 and ft3 together showed us that we can reject the null hypothesis of ft1=ft=ft3=0, that is why all variables are not statistically insignificant when treated all together.

Further, we will try to estimate the medium-run influence of working capital structure onto the corporate performance. The model specification this time is exactly the same as it was previously. The only difference is that variables are taken for t+3 period of time (three years after the deal execution). Results of the regression analysis are presented in the table below (**Ошибка! Источник ссылки не найден.**).

1. Working capital structure regression results for T+3

|  |  |  |
| --- | --- | --- |
| Number of observations | 123 | |
| F-test, p-value | 0,00 | |
| R2 | 0,68 | |
| **CTQ** | **p-value** | **Coefficients** |
| AR (Days in Accounts receivables) | 0,00 | -0,46 |
| AR2 (Quadratic term) | 0,23 | -1,08 |
| Inv (Days in inventories) | 0,06 | -0,29 |
| Inv2 (Quadratic term) | 0,36 | 0,00 |
| AP (Accounts payable) | 0,05 | -0,30 |
| AP2 (Quadratic term) | 0,97 | 0,00 |
| DS (Deal size) | 0,22 | 27,84 |
| IS (Industry similarity) | 0,05 | -14,73 |
| CLR (Change in leverage ratio) | 0,03 | -0,09 |
| GDP (GDP growth) | 0,00 | -1,30 |
| OPR (Oil prices) | 0,06 | 0,14 |
| ft1 (Cash financing dummy) | 0,99 | 0,15 |
| ft2 (Stocks financing dummy) | 0,60 | -5,48 |
| cons | 0,20 | -184,98 |

To begin with another regression analysis for middle-run effect of working capital structure, we should start again with tests results. As previously this model lacks the heteroscedasticity and multicollinearity problems. At the same time F-test stated that the model has some explanatory power at 99% confidence level. As for the R-squared, its value is still around 68%. The summary of t-tests and interpretations of he individual variables will be summarized further on (**Ошибка! Источник ссылки не найден.**).

And the last regression analysis was performed to estimate the relationship between control factors and the long-run performance expressed in t+5 period of time for the same set of dependent variables. Summary of the last regression model is presented below (**Ошибка! Источник ссылки не найден.**).

1. Working capital structure regression results for T+5

|  |  |  |
| --- | --- | --- |
| Number of observations | 123 | |
| F-test, p-value | 0,00 | |
| R2 | 0,69 | |
| **CTQ** | **p-value** | **Coefficients** |
| AR (Days in Accounts receivables) | 0,03 | -0,03 |
| AR2 (Quadratic term) | 0,22 | -0,01 |
| Inv (Days in inventories) | 0,02 | -0,96 |
| Inv2 (Quadratic term) | 0,16 | 0,01 |
| AP (Accounts payable) | 0,00 | -0,03 |
| AP2 (Quadratic term) | 0,90 | 0,00 |
| DS (Deal size) | 0,56 | 1,51 |
| IS (Industry similarity) | 0,48 | -6,19 |
| CLR (Change in leverage ratio) | 0,01 | -0,01 |
| GDP (GDP growth) | 0,00 | -1,42 |
| OPR (Oil prices) | 0,02 | 0,47 |
| ft1 (Cash financing dummy) | 0,68 | 4,25 |
| ft2 (Stocks financing dummy) | 0,71 | 4,59 |
| cons | 0,69 | -14,43 |

First of all, it should be mentioned that the t+5 model is still homoscedastic and does not have severe collinearity between dependent variables according to VIF and Breusch-Pagan tests. We can also see the model itself has some explanatory power as the F-tests suggests. R-squared is still high low at 18,03%.

To summarize the results of all the regression analysis one previously Table 13 was build.

1. Summary of working capital structure regression analysis

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Regressors** | **T + 1** | | **T + 3** | | **T + 5** | |
| **p-value** | **coeff.** | **p-value** | **coeff.** | **p-value** | **coeff.** |
| AR | 0,021 | -0,25 | 0,001 | -0,46 | 0,032 | -0,03 |
| AR2 | 0,097 | -0,01 | 0,23 | -1,08 | 0,216 | -0,01 |
| Inv | 0 | -2,04 | 0,056 | -0,29 | 0,022 | -0,96 |
| Inv2 | 0,244 | 0,02 | 0,357 | 0,00 | 0,161 | 0,01 |
| AP | 0,002 | -0,26 | 0,048 | -0,30 | 0 | -0,03 |
| AP2 | 0,525 | 0,00 | 0,969 | 0,00 | 0,897 | 0,00 |
| DS | 0,068 | -2,40 | 0,223 | 27,84 | 0,556 | 1,51 |
| IS | 0,616 | 2,35 | 0,048 | -14,73 | 0,478 | -6,19 |
| CLR | 0,062 | 0,01 | 0,029 | -0,09 | 0,011 | -0,01 |
| GDP | 0,058 | -1,02 | 0,004 | -1,30 | 0,004 | -1,42 |
| OPR | 0,001 | -0,22 | 0,057 | 0,14 | 0,019 | 0,47 |
| ft1 | 0,363 | -5,46 | 0,986 | 0,15 | 0,681 | 4,25 |
| ft2 | 0,434 | -5,43 | 0,602 | -5,48 | 0,708 | 4,59 |
| Constanta | 0,023 | 39,67 | 0,197 | -184,98 | 0,69 | -14,43 |

At first sight we can see that working capital structure does have some influence onto the corporate performance in the short-, middle and long terms after the M&A deal execution. The p-values of AR (Change in Days accounts receivables), Inv (Change in Days inventories), AP (Change in Days accounts payable) are all statistically significant at 10% confidence level. The coefficients of at all the time periods are negative, which means that if the proportion of working capital to total assets increases, the Tobin’s Q ratio decreases and vice versa. Actually, this result could be predicted naturally. Indeed, with increase in the proportion of the working capital the financial costs of operating current assets increase. Besides oversupplying current assets leads to inefficient usage of the assets and inactivity. In the opposite case of decreasing the working capital ratios leads to the short-time increase in efficiency and financial performance. Increase of time for payments to suppliers, investing current assets into operating fixed assets all of these lead to higher profitability, but at the same time increases financial risks for the company. However, at the first sight the increase in Days accounts payable should naturally increase the performance of the company due to the increased time of pay outs to suppliers. However, this phenomenon was highly discussed in the literature and according to Deloof (2003) it happens due to the fact that in average less profitable firms tend to increase Days in accounts payable.

However, based on the previous analysis, working capital – profitability relationship lies on the inverted U-shaped curve (Baños, García and Martínez, 2014). Thus, there is the point of the highest profitability and the highest working capital value. Further increase in working capital amount leads actually to the lower profits. That is why linear specification might be misinterpreted and should have limitations for interpretations. Nevertheless, as we can see from the t-test results for – quadratic interpretation of the working capital structure (AR2, Inv2, AP2), there is no evidence of the significant relationship between the U-shaped working capital structure and the corporate performance. Very high p-values suggest that this interpretation is not the best one and that the linear fit is a much better example.

At the same time the regression analysis surprisingly showed no evidence of the steadily significant relationship between company performance in mergers and acquisitions and the historically highly discussed variables of financing type, industry similarity and the deal size through the whole 5-year horizon. None of the p-values showed significance at all the periods of the research.

As for the specific control variables, such as GDP growth rate, oil prices and leverage ratio, these variables proved to be statistically significant and have an impact onto the company performance. Nevertheless, beta coefficients showed somewhat interesting pattern throughout the different time periods. First of all, the beta coefficient of the Change in Leverage ratio shifts from the positive value in T+1 to the negative values for T+3 and T+5. This may be the result of the same behavioral pattern as for the working capital structure. Indeed, leverage ratio may also have inverted U-shaped curve relationship to company performance. However, this is not the objective of the current research and will not be tested further. Another “surprise” comes from the coefficient of the GDP growth that suggests that the higher the GDP growth rates in the country, the lower the performance of the company in mergers and acquisitions.

To further graphically follow the relationship between the main variables of CTQ and AR, Inv, AP look at the Figure 3.

1. Regression variables scatter plots for T+1

Source: author’s calculations

At the beginning of the research methodology specification there were several hypotheses stated. In accordance with the results of the research we can conclude, that Hypotheses 1 should be accepted. Indeed, there is a significant relationship between working capital structure and company performance, which is expressed in terms of p-values of the regression. However, Hypotheses 2, should be rejected. The results of the research showed no evidence of the non-linear relationship between company performance and the working capital structure. On the contrary there are strong results showing the existence of the linear relationship between tested variables.

## Optimal working capital level and company performance

In order to answer the second set of stated hypotheses a twostep analysis should be performed. On the first step the Target working capital ratio will be calculated using the predefined model (Formula 2). Further the calculated model for the target working capital ratio will be used to calculate the optimal working capital structure for each of the company in the sample for each of the time periods T+1, T+3 and T+5. Based on the optimal working capital calculations the deviations will be calculated by subtracting the actual amount of working capital. Further on these deviations (Working capital deficit) will be used to assess the relationship between the optimal working capital structure and company performance in mergers and acquisitions.

First of all, we start with the analysis of the input data sample for descriptive statistics and correlation matrix (Table 14 and Table 15).

1. Descriptive statistics for Target working capital estimation data

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Total sample (N = 123)** | **T\_WC** | **CFO** | **OC** | **ROA** | **LR** | **CAPEX** | **S** |
| Mean | 6,8 | 12,1 | 86,5 | 5,6 | 36,2 | 13,7 | 15,7 |
| SD | 11,1 | 8,2 | 52,9 | 10,7 | 33,3 | 9,1 | 2,3 |
| Minimum | -16,3 | -17,8 | 9,3 | -40,8 | 0,0 | 0,1 | 10,1 |
| Maximum | 49,9 | 31,8 | 331,8 | 36,8 | 159,8 | 47,6 | 19,5 |

As we can see the mean value of the target working capital ratios is equal to 6,8%. This basically means, that the net working capital (Current assets – Current Liabilities) is just 6,8% of the total assets of the companies in average. We can also observe negative values representing the excess of liabilities over assets. Actually, this is not traditional for the oil & gas companies and more frequently met at the technological companies. Still negative values may be treated as aggressive working capital management policy and still can be appropriate at some situations. There are no any other “surprising” results arising from the data sample.

1. Correlation matrix for Target working capital variables

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **T\_WC** | **CFO** | **OC** | **ROA** | **LR** | **CAPEX** | **S** |
| **T\_WC** | 1,0000 |  |  |  |  |  |  |
| **CFO** | -0,1990 | 1,0000 |  |  |  |  |  |
| **OC** | 0,0624 | -0,2847 | 1,0000 |  |  |  |  |
| **ROA** | 0,5316 | 0,3009 | -0,1655 | 1,0000 |  |  |  |
| **LR** | -0,3130 | -0,1081 | -0,0983 | -0,1622 | 1,0000 |  |  |
| **CAPEX** | -0,0866 | -0,0103 | 0,3003 | -0,0910 | -0,2593 | 1,0000 |  |
| **S** | -0,1854 | 0,4066 | -0,0908 | 0,2172 | 0,0910 | -0,3384 | 1,0000 |

As we can see from the table, there is no high value of correlation between variables. The highest correlation coefficient can be seen between the ROA and the tested T\_WC of 53%. While this coefficient is pretty high, we do not need to worry until the coefficient reaches 70% or above. Overall, we do not see any other coefficients to be higher and that means that all of the variables can be used simultaneously in the further models.

In order to identify the target working capital model the following regression analysis was modelled (Table 16).

1. Target Working Capital regression summary

|  |  |  |
| --- | --- | --- |
| Number of observations | 123 | |
| F-test, p-value | 0,00 | |
| R2 | 0,54 | |
| **T\_WC** | **p-value** | **Coefficients** |
| CFO (Cash flow from operations) | 0,00 | -0,40 |
| OC (Operating cycle) | 0,16 | 0,03 |
| ROA (Return on assets) | 0,00 | 0,61 |
| LR (Leverage ratio) | 0,00 | -0,09 |
| CAPEX (Capital expenditures) | 0,00 | -0,26 |
| S (Size of the firm) | 0,00 | -1,19 |
| cons | 0,00 | 29,74 |

Before interpreting the results of the regression, it should be mentioned that this regression lacks the main problems associated with it. The results of the Breusch-Pagan showed no evidence of the heteroscedasticity, while VIF test proved that there is no multicollinearity between variables. Of we look at the p-value of the F-test that is equal to 0,0000 we can conclude that the null hypothesis could be rejected and with the 99% confidence level conclude that the regression model has some power to interpret the variables tested. Further, the R-squared shows us that 54,4% of the variations could be explained with linear model produced by the analysis. This result is quite high and might be seen as a god model specification.

Coming to the results of the individual independent variables, firstly, we need to look at the results of T-test, that shows if the independent variables are statistically significant and can be used in the model. Accordingly, CFO (CFO-to-Total Assets), ROA (Return on Assets), LR (Leverage ratio), CAPEX (capital expenditures) and S (Size of the firm) have p-values of less than 5%, that means that the null hypothesis of statistical insignificance could be rejected – these variables have some degree of explanatory power in the model. In turn, OC (Operating Cycle) p-value is higher than 10% meaning statistical insignificance of these variable. Concluding on this, one might say that insignificant variables should be excluded from the model. However, OC will remain, because from the literature review we already know that this variable proved some influence on the amount of working capital in the firm. That is why we cannot reject this variable and shall use it in order to identify Target Working Capital of the firms.

Based on the results of the regression analysis Target Working Capital model for companies in the data set is shown below (Formula 4):

T\_WC= 29,74 – 0,4 \* CFO+ 0,03\* OC + 0,61\* ROA – 0,09\* LR – 0,26 \* CAPEX

– 1,19\* S (4)

where:

T\_WC – target working capital;

CFO – CFO deflated by total assets;

ROA – return on assets;

OC – operating cycle;

LR – leverage ratio;

CAPEX – capital expenditures deflated by total assets;

S – size of the firm.

Based on the specified model above there were calculated Target Working Capital amounts for every period after the M&A deal was executed. As it was told in the methodology, to evaluate capital structure impact, t+1 (one year after deal) for immediate, t+3 (three years after deal) for medium-run and t+5 (five years after deal) for long-run performance was considered. In the example below the procedure of modelled working capital amount calculation for period t+1 is presented based on the fictitious company data (Table 17**Ошибка! Источник ссылки не найден.**, Formulas 5 and 6). Accordingly target ratios for all companies were estimated.

1. Dataset example

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Company** | **CFO, %** | **ROA, %** | **OC, days** | **LR, %** | **CAPEX** | **S** |
| Company X | 0,23 | 13 | 42 | 11 | 8 | 20 |

T\_WC= 29,74 – 0,4 \* 0,23+ 0,03\* 42 + 0,61\* 13 – 0,09\* 11 – 0,26 \* 8 – 1,19\* 20 (5)

T\_WC = 6,2 (6)

Following the developed research methodology, the next step of the analysis is to identify the relationship between the optimal working capital structure and the actual amounts of working capital in the firms at each of the time periods T+1, T+3 and T+5. As the main variables to do that we use the working capital deficit. By doing this we try to capture the influence of capital adjustments onto the corporate performance by regressing the independent variable over dependent performance measurement derived as the difference in Tobin’s Q ratio from the year t-1.

This time we will not present all the results of the regression analysis for the Working capital deficit variable testing, because the model specification is approximately the same besides the only one main variable. The details of the regression analysis are presented in the Appendix 3. We have to say, of course, that the regression models passed the tests for multicollinearity and heteroscedasticity as it is still very important.

This time beside the Working Capital deficit the quadratic term of this variable is also tested, because as with the current ratio, this time the inverted U-shaped curve relationship is also anticipated. All other variables remain the same as with the working capital structure analysis. The combined results of the working capital deficit regression analysis are presented below (Table 18).

1. Summary of the optimal working capital structure regression analysis

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Regressors** | **T + 1** | | **T + 3** | | **T + 5** | |
| **p-value** | **coeff.** | **p-value** | **coeff.** | **p-value** | **coeff.** |
| WCD | 0,1 | 0,017 | 0,272 | 0,005 | 0,135 | -0,009 |
| WCD2 | 0,081 | 0,000 | 0,657 | -3,710 | 0,207 | -1,400 |
| DS | 0,302 | -2,537 | 0,886 | 0,44 | 0,933 | -0,202 |
| SS | 0,678 | 3,724 | 0,179 | -15,368 | 0,614 | -4,333 |
| CLR | 0,005 | 0,005 | 0,032 | -0,062 | 0,036 | -0,024 |
| GDP | 0 | -3,633 | 0,035 | -1,193 | 0,002 | -1,406 |
| OPR | 0,003 | -0,37 | 0,012 | 0,096 | 0,032 | 0,412 |
| ft1 | 0,462 | 7,984 | 0,321 | 13,444 | 0,844 | 2,021 |
| ft2 | 0,005 | 37,081 | 0,253 | 19,045 | 0,66 | 5,363 |
| Constant | 0,152 | 47,857 | 0,798 | -10,632 | 0,949 | 2,241 |

Right from the beginning we can easily spot the results for the Working capital deficit estimation. It is curious that for time period T+1 the coefficient is statistically significant at 10% confidence level. Moreover, quadratic term shows even lower p-value and is also shows that there is non-linear relationship between Working capital deficit and the Change in Tobin’s Q ratio. At the same time none of the results for WCD and WCD are statistically significant for the middle-term and long-term horizon. This lead to the conclusion that even the significance at the first-time period of T+1 might be a random result. Nevertheless, in my opinion, obtained results have severe limitations and cannot be interpreted accurately until the much greater data sample is tested. Indeed, it is very crucial to apply these model to a bigger result, since such ambiguous results may be just an error.

On the other hand, traditional control variables again showed its steady significance in interpreting the change in company performance in terms of the CTQ. Leverage ratio, GDP growth and Oil prices changes have proven that they indeed bring some sort of the influence onto the companies involved in the mergers and acquisitions in the oil & gas industry. Still the coefficients might not be treated easily. They still change their pattern from one period of time to another and this behavior should be studied separately.

And not surprisingly for now, the traditional M&A control variables showed no evidence of the significance in terms of company performance. Actually, all the results copy the results of the previous research since the model itself is almost the same. To further have a look at the graphical representation of the main tested variables, look at the scatter-plot expressed on the Figure 4.

1. Scatter plots of WCD relationship to CTQ

Source: author’s calculations

We started our research methodology specification from the identifying key Hypotheses to be tested further. And according to the obtained results we have to reject the Hypotheses 3. This means that we did not find strong evidence that there is significant relationship between the company performance and the obtained optimal working capital ratio. This basically means also that we cannot identify a universal optimal level of working capital. All the companies should treat itself according to the specific situation. However, it is still very important, and it was proven earlier that the working capital structure still has significant influence on the company performance engaging in the M&A transactions. Thus, this indicator should be treated accordingly and considered by the management at all times.

## Managerial implications

The paper is focused on deriving the relationship between working capital structure and corporate performance in the M&A transactions. So far, the results of the research suggest several key takeaways that might be useful for managers that engage in the M&A activity even before the deal execution. First of all, working capital structure does have some influence on the merging firms at the immediate, middle and long-run perspectives. Nevertheless, while working capital structure may cause its impact at all of the periods in time from short- to the long-run according to the empirical results, Working Capital Deficit showed us that the model of the optimal working capital amount cannot be used to determine the most efficient working capital structure prior and during the M&A deal execution.

Therefore, the main managerial implications of the paper should be the fact that even though the effect of working capital was not well-studied in accordance with M&A practice managers still have to give closer attention to the working capital structure. Using the defined metrics, the target ratios could be found and used to manipulate the capital structure in order to maximize the corporate value in perspective.

Besides, since current ratio adjustments have significant impact onto the company performance in the long-run, managers can bring additional value by minimizing the current ratios after the deal. This will lead to a higher productivity of the assets and higher values. However, management should be cautious about such practice since it might bring additional financial and non-financial risks for the company.

On the other side from the management, there are other sides of financial sector – shareholders, creditors, bondholders and others. This paper might have positive implication for all of these groups. By predicting the possible influence of capital management these parties can maximize their welfare and prevent from investing into poorly managed firm from the working capital perspective or, on the opposite, motivate to invest into successful firms.

And one more possible implication that actually can be applied to all of the sides of the M&A deals and even outside investors, is that taking working capital structure into consideration all the parties will be able to minimize mistakes of M&A valuation and obtain higher personal performance.

## Research limitations

This paper has several limitations that restrain the explanation results mentioned previously. There are qualitative and quantitative limitations.

*Quantitative limitations*. First of all, the data set of the firms might be not enough to capture all the effects and build the most precise model for the further managerial usage. The number of observations is only 124 for each of the periods.

Second of all, the factors that were taken for the model are used from the literature and were estimated before. And here arise two possible problems. Firstly, there might some other important factors that were not yet considered. Including other significant factors will increase the explanatory power of the model and will make it much more precise. Secondly, the factors that were significant in the past or for the one type of the data set, might have other value in the dataset that was used in this paper.

*Qualitative limitations*. The data set that was used in this paper includes only oil & gas companies, thus minimizing the managerial utility power to the similar types of companies. Even if the relationship between other types of companies still exist, the precise model will be completely changed, because the working capital management discipline differs substantially from one type of the company to another. Besides, the data set of the paper is taken from all over the world. That is why the research results are spread between all the companies used in it and cannot be attributed to the one exact country mechanically.

Besides, the environment changes around constantly, but the model that was produced is fixed in time. It should be adjusted permanently to stay up to date all the time. And another limitation from up to date perspective is retrospective pattern of the research. In order to estimate long-run influence we were forced to use the data no younger than 2012 year. That is why the real model may be slightly different due to the above mentioned already constantly changeable environment.

# Conclusion

The main idea of ​​this research paper was to identify the dependence of the company's performance in M&A transactions and the working capital structure. During the analysis, modern literature on this topic was analyzed. Unfortunately, at present the working capital structure is not a well-studied topic in mergers and acquisitions transactions and, therefore, there is a research gap exists that should be fulfilled. In turn, the behavior of companies from the point of view of other indicators and their impact on the company's value in the future was studied. In addition, an analysis of the main indicators that the effectiveness of mergers and acquisitions deals is affected was made. As the main indicator of the company performance Tobin’s Q was chosen, because it cannot be manipulated by accounting methods and reflects the real market value of the company. As the main variables for analysis of the influence of the working capital structure the change in the current ratio and the working capital deficit were chosen.

In order to find the answers for the research question and eventually to solve the research goal four key hypotheses were formulated and further on tested. In order to do that several regression analyses were carried out. The results of the analysis showed quite interesting results and cannot be treated very easily. First of all, Hypotheses 1 was accepted and meant that there is a significant relationship between working capital management and company performance in the M&A deals. At the same time Hypotheses 2 was rejected, because there was no evidence that the relationship between performance and capital structure specified as the non-linear function. Another interesting result of that research showed that previously widely-studied M&A variables such as deal size, financing type and industry similarity also showed no evidence of the influence on the company performance in the mergers and acquisitions. At the same time the introduced control variables of the economic conditions and leverage ratio inside the company also showed some impact on the company performance.

Further on the second part of the analysis was carried out in order to understand if the target working capital structure actually exists and if it can be used further by managers to increase the performance in mergers and acquisitions. However, the analysis brought us ambiguous results. There is some sort of the relationship between optimal structure of working capital and company performance. Nevertheless, none of the results showed steady influence in the long-run. The conclusion here is that the optimal level model should be revised and should not be based solely on the industry specific variables that influence working capital structure. Actually, working capital management should be very adaptable to any kind of situation and M&A transaction is one of such a situation.

Based on the obtained results, it has to be said even though the theme of the working capital management in mergers and acquisitions is yet poorly studied in the modern business literature, it has to be treated appropriately by the managers. Those who ignore this preposition risk to obtain lower performance or even get into financial troubles. I hope that this research will make such kind of an influence on the managers minds and also that this research will be continued and expanded further onto different industries, other variables tested and so on.

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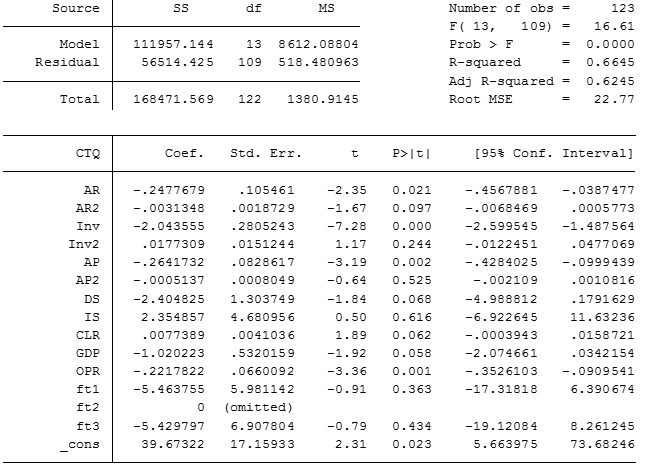
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# Appendix 1. List of companies

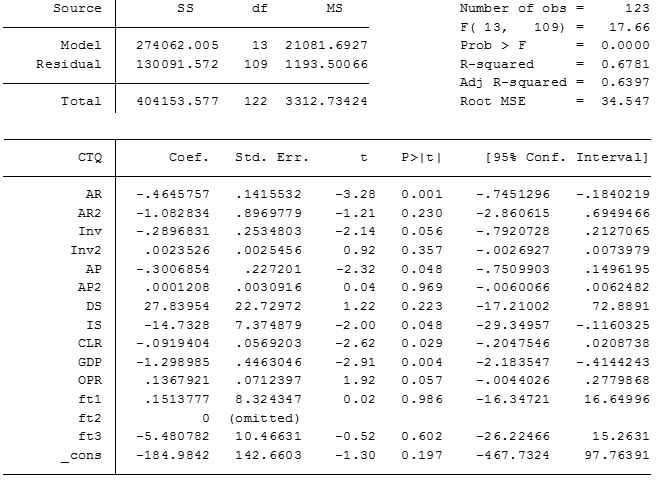
|  |  |  |
| --- | --- | --- |
| **#** | **Company name** | **Country** |
| 1 | Centrica plc | United Kingdom |
| 2 | Gazprom Neft OAO | Russian Federation |
| 3 | Ecopetrol SA | Colombia |
| 4 | Gas Natural SDG SA | Spain |
| 5 | Neftyanaya Kompaniya LUKoil OAO | Russian Federation |
| 6 | Gazprom OAO | Russian Federation |
| 7 | Obsidian Energy | Canada |
| 8 | Origin Energy Ltd | Australia |
| 9 | Novatek OAO | Russian Federation |
| 10 | Energen Corporation | United States of America |
| 11 | Grupa Lotos SA | Poland |
| 12 | Suncor Energy Inc. | Canada |
| 13 | Reliance Industries Ltd | India |
| 14 | Murphy Oil Corporation | United States of America |
| 15 | Crescent Point Energy Corporation | Canada |
| 16 | Aktsionernaya Neftyanaya Kompaniya Bashneft OAO | Russian Federation |
| 17 | Occidental Petroleum Corporation | United States of America |
| 18 | DCP Midstream Partners LP | United States of America |
| 19 | Anadarko Petroleum Corporation | United States of America |
| 20 | Beach Energy Ltd | Australia |
| 21 | Denbury Resources Inc. | United States of America |
| 22 | Ramba Energy Ltd | Singapore |
| 23 | OMV Petrom SA | Romania |
| 24 | BG Group plc | United Kingdom |
| 25 | Baytex Energy Ltd | Canada |
| 26 | Apache Corporation | United States of America |
| 27 | Cequence Energy Ltd | Canada |
| 28 | ExxonMobil Corporation | United States of America |
| 29 | Royal Dutch Shell plc | United Kingdom |
| 30 | TransAtlantic Petroleum Ltd | Bermuda |
| 31 | Gas Plus SpA | Italy |
| 32 | Sino Oil and Gas Holdings Ltd | Bermuda |
| 33 | Hess Corporation | United States of America |
| 34 | Strategic Oil & Gas Ltd | Canada |
| 35 | RH Petrogas Ltd | Singapore |
| 36 | ERG SpA | Italy |
| 37 | Chevron Corporation | United States of America |
| 38 | Gran Tierra Energy Inc. | United States of America |
| 39 | Petroleo Brasileiro SA | Brazil |
| 40 | Whitecap Resources Inc. | Canada |
| 41 | BP plc | United Kingdom |
| 42 | Senex Energy Ltd | Australia |
| 43 | Crew Energy Inc. | Canada |
| 44 | Tourmaline Oil Corporation | Canada |
| 45 | Genesis Energy LP | United States of America |
| 46 | YPF SA | Argentina |
| 47 | Santos Ltd | Australia |
| 48 | Eni SpA | Italy |
| 49 | Tethys Petroleum Ltd | Cayman Islands |
| 50 | Storm Resources Ltd | Canada |
| 51 | Premier Oil plc | United Kingdom |
| 52 | EnQuest plc | United Kingdom |
| 53 | GeoPark Holdings Ltd | Bermuda |
| 54 | Pioneer Natural Resources Company | United States of America |
| 55 | Parex Resources Inc. | Canada |
| 56 | Pengrowth Energy Corporation | Canada |
| 57 | Genel Energy plc | United Kingdom |
| 58 | Maurel & Prom SA | France |
| 59 | Western Gas Partners LP | United States of America |
| 60 | Peyto Exploration & Development Corporation | Canada |
| 61 | AltaGas Ltd | Canada |
| 62 | Madalena Ventures Inc. | Canada |
| 63 | SRC Energy Inc. | United States of America |
| 64 | Continental Resources Inc. | United States of America |

# Appendix 2. Working capital structure regression analysis results

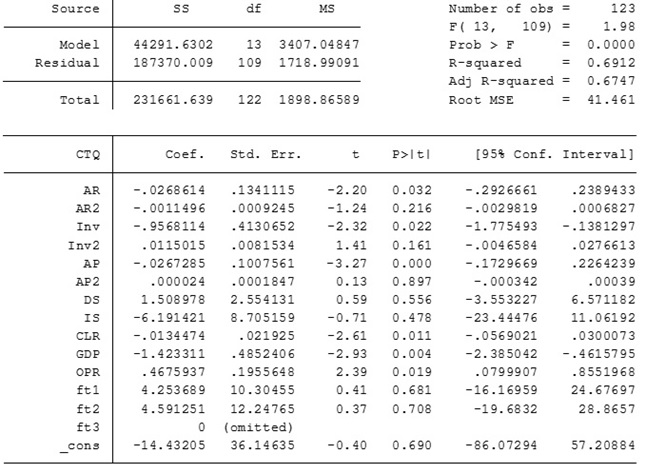
1. Regression analysis results for T+1



1. Regression analysis results for T+3

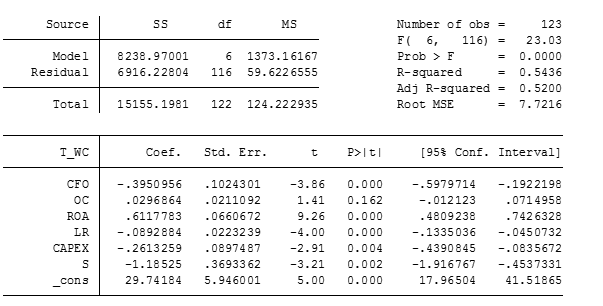


1. Regression analysis results for T+5

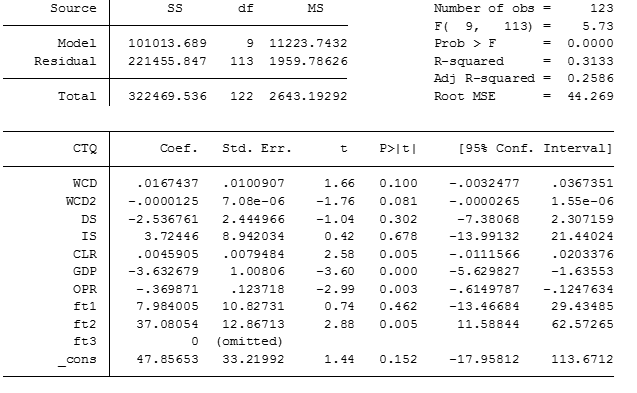


# Appendix 3. Working capital deficit regression results

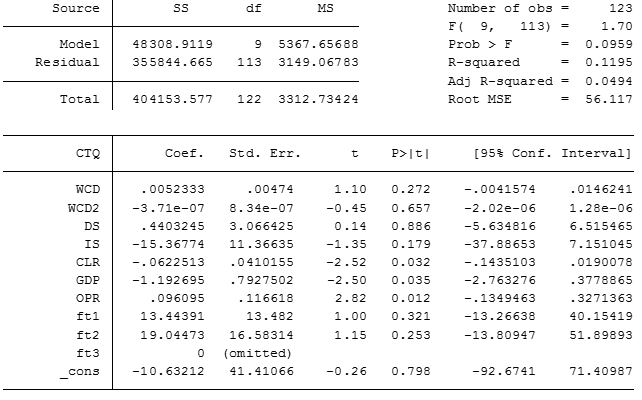
1. Regression analysis results for target working capital



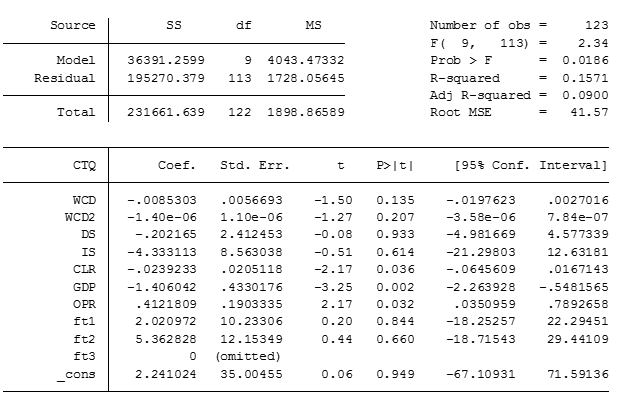
1. Regression analysis results for Working capital deficit T+1



1. Regression analysis results for Working capital deficit T+3



1. Regression analysis results for Working capital deficit T+5



1. Net Trade Cycle is the number of days in sales that the firm has to finance through its working capital. Net Trade Cycle = (inventory + accounts receivable - accounts payable) \*365/sales (Shin and Soenen, 1998). [↑](#footnote-ref-1)