Empirical Analysis of the Working Capital-Profitability Relationship: Consequences of the Global Financial Crisis of 2008

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A Quantitative Study of Swedish Wholesale SMEs

Master Thesis

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Abstract

Purpose: The purpose of this thesis is to analyze the relationship between working capital management (measured by CCC) and firm profitability to find out whether there is a significant difference in working capital management during (2008-2009) and after (2010-2015) the global financial crisis of 2008/09 in Swedish wholesale SMEs.

Design/methodology/approach: This thesis makes use of multiple correlation and multiple regression analysis to analyze a data sample of 1,532 SMEs operating in the wholesale industry.

Findings: The study provides empirical evidence for a significant relationship between profitability and working capital management as well as for a significant difference in working capital management during and after the global financial crisis of 2008/09. Furthermore, the firm-level control variables for age, size, and leverage show a significant relationship with firm profitability. This holds also true for the lagged dependent variable and the crisis dummy variable.

Research limitations/implications: The present study is limited to a rather underperforming sample of SMEs operating in the Swedish wholesale industry. Further research could examine the generalizability of findings for other countries, more industries, or a greater time horizon.

Practical implications: The results of this thesis can support the management of Swedish SMEs with their working capital policies to improve their profitability by reducing their CCC with special regard to economic crises. Moreover, these findings can be of interest for policy makers as well as debt- and stakeholders.

Originality/value: The present study contributes to previous research by adding the perspective of small and medium-sized enterprises on the working capital-profitability relationship during and after the global financial crisis. To the best of the author's knowledge, there exists no other study addressing this issue neither in the Swedish environment nor with special regard to the wholesale industry.

Keywords: Small and medium-sized enterprises, Working capital management, Global financial crisis, Firm profitability

Paper type: Master thesis

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List of Abbreviations

AFP … aggressive financing policy

AIP … aggressive investment policy

ANOVA … analysis of variance

CCC … cash conversion cycle

CD … crisis dummy variable

Cp. … compare

DR … debt ratio

EBIT … earnings before interests and taxes

e.g. … exempli gratia (for example)

EU … European Union

FEM … Fixed Effects Method

GDP … gross domestic product

GMM … Generalized Method of Moments

GOI … gross operating income

GOP … gross operating profit

i.a. … inter alia (among others)

ibid. … ibidem (in the same place/ same as last entry)

i.e. … id est (that is)

LDV … lagged dependent variable

mEUR … million euros

mSEK … million Swedish crowns

NDAP … number of days accounts payable

NDAR … number of days accounts receivable

NDI … number of days inventory

NOP … net operating profit

NTC … net trade cycle

OLS … Ordinary Least Square

PROF … proxy for profitability

R … R-Value

R^2 … R-Square

Reg. Date … date of registration

List of Abbreviations

REM … Random Effects Model

ROA … return on assets

ROE … return on equity

SIZ(LN) … natural logarithm of sales

SME … small and medium-sized enterprise

sni … svensk näringsgrensindelning (Swedish Standard Industrial Classification)

TA … total assets

UP … University Press

U.S. … United States

VIF … Variance Inflation Factor

WCCC … weighted cash conversion cycle

WCM … working capital management

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1. Introduction

Effective working capital management is an essential part of a company's financial management and can according to previous research findings increase firm value.[1] Generally, working capital can be defined as current assets minus current liabilities.[2] Hence, managing working capital comprises the administration of current assets and current liabilities.[3]

Deficient working capital management is responsible for a great amount of business failures.[4] E.g. Dunn and Cheatham or Cielen, Peeters, and Vanhoof explain that this is particularly true for small companies.[5] Baños-Caballero, García-Teruel, and Martínez-Solano follow these conclusions and suggest that working capital management plays a more significant role for small and medium-sized enterprises (SMEs) than for larger firms.[6]

The global financial crisis came, as crises usually do, as a shock to the global market and led i.a. to a market collapse, unemployment, and business failures. Following the sudden turmoil, companies struggled to survive the depression period lasting from approximately end of 2007 until 2009.[7] Many firms, particularly SMEs, have suffered from profit losses and e.g. had to introduce reduced working hours, dismiss staff, or in the worst case file for bankruptcy. Companies that efficiently manage their working capital can however increase firm profitability and thus might be able to reduce the impact of a crisis.[8]

Thus, this thesis investigates the relationship between working capital and firm profitability concerning Swedish SMEs operating in the wholesale sector during two different observation periods, namely the crisis period and the post-crisis period.

1.1 Problem Background

Before Smith, the majority of literature concerning financial management concentrated on long-term financial decisions, practically neglecting the relevance of short-term financing.[9] How-

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[1] Cp. SHIN/SOENEN (1998), pp. 40-43; Cp. WANG (2002), pp. 164-168; Cp. DELOOF (2003), pp. 578-585; Cp. ELJELLY (2004), pp. 53-59; Cp. LAZARIDIS/TRYFONIDIS (2006), pp. 30-34; Cp. GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2007), pp. 172-175; Cp. ANSER/MALIK (2013), p. 86
[2] Cp. WESTON/COPELAND (1986), p. 285
[3] Cp. ibid
[4] Cp. SMITH (1980a), p. 3
[5] Cp. DUNN/CHEATHAM (1993), pp. 1-13; Cp. CIELEN/PEETERS/VANHOOF (2004), pp. 526-532
[6] Cp. BAÑOS-CABALLERO/GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2010), pp. 512-525
[7] Cp. KESIMLI/GUNAY (2011), pp. 52-54
[8] Cp. ENQVIST/GRAHAM/NIKKINEN (2014), pp. 38-48
[9] Cp. SMITH (1980a), p. 3

ever, Smith and Van Horne increased attention paid to working capital management by introducing the tradeoff between liquidity and profitability as well as the risk-return tradeoff.[10] This tradeoff implies that reducing working capital leads to a decrease in liquidity which entails an increase in risk. But this reduction simultaneously leads to an increase in profitability and vice versa.[11] Thus, this tradeoff reflects the constant conflict between two major firm goals, i.e. liquidity and profitability, and explains why working capital management should play such an important role in a company's financial decisions. This was studied e.g. by Shin and Soenen who found supporting empirical evidence for an inverse relationship between working capital and firm profitability i.e. increases in firm risk for a reduction in working capital.[12] Following these findings, a number of studies, e.g. Wang, Deloof, Eljelly, Lazaridis and Tryfonidis, Padachi, and García-Teruel and Martínez-Solano, empirically investigated the relationship between working capital management and firm profitability and agreed that a reduction of working capital can increase firm profitability.[13] Contrarily, e.g. Afza and Nazir, and Gill, Biger, and Mathur come to opposing conclusions and suggest that increasing working capital leads to an increase in firm profitability.[14] This controversially indicates that the working capital-profitability relationship is influenced by several factors that are not yet fully understood.

With the global financial crisis of 2008/09, companies faced severe financial constraints and liquidity shortages.[15] Haron and Nomran suggest that companies might have worsened their financial situations by mismanaging their working capital.[16] Moreover, a study conducted by PWC finds that companies did not react appropriately to the crisis because "during the 2007/08 global financial crisis companies were slow to respond to declining sales, [… which resulted] in excess inventory. Combined with the reduced payment morale this led to a steady increase in working capital ratios"[17]. This signifies that companies need further advice on how to manage their working capital especially in times of economic distress.

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[10] Cp. SMITH (1980b), p. 549; Cp. VAN HORNE (1980), pp. 535-547
[11] Cp. SMITH (1980b), pp.549-562; Cp. VAN HORNE (1980), pp. 535-547
[12] Cp. SHIN/SOENEN (1998), pp. 37-45
[13] Cp. WANG (2002), pp. 164-168; Cp. DELOOF (2003), pp. 578-585; Cp. ELJELLY (2004), pp. 53-59; Cp. LAZARIDIS/TRYFONIDIS (2006), pp. 30-34; Cp. PADACHI (2006), pp. 49-56; Cp. GARCÍA-TERUEL/ MARTÍNEZ-SOLANO (2007), pp. 172-175
[14] Cp. AFZA/NAZIR (2009), pp. 25-28; Cp. GILL//BIGER/MATHUR (2010), pp. 6-8
[15] Cp. ENQVIST/GRAHAM/NIKKINEN (2014), p. 40
[16] Cp. HARON/NOMRAN (2016), p. 461
[17] PWC (2015), p. 3

Considering that, since the crisis, an increasing number of studies continued the previously mentioned research on the working capital-profitability relationship[18] with comparable outcomes, one might expect to find also a considerable number of studies linking the issue to the economic crisis 2008/09. However, only a handful of studies investigate how the economic depression is related to working capital management. Enqvist, Graham, and Nikkinen for example analyze the relationship of working capital management and firm profitability in different business cycles for Finish listed companies and find that the importance of effective inventory and accounts receivable management increases in depression periods.[19] They thus conclude that efficient working capital management should be included in a company's financial management especially in regard to economic downturns.[20] Ramiah, Zhao, and Moosa find that a majority of survey participants adapted their working capital practices to the crisis in Australia, e.g. by cutting capital expenditure and reducing inventories.[21] Haron and Nomran indicate that some factors, e.g. profitability and free cash flow, affect working capital management in listed Malaysian companies particularly during the crisis.[22] They show nevertheless that working capital management matters regardless the economic condition and emphasize the need for further research in this area.[23] This thesis hence aims to partly fill this research gap. To the best of my knowledge, there exists no study analyzing the working capital-profitability relationship with respect to the global financial crisis of 2008/09 with special regard to small and medium-sized enterprises.

1.2 Problem Formulation

Therefore, this thesis analyzes the working capital-profitability relationship for Swedish wholesale SMEs comparing the crisis period with the post-crisis period. This thesis aims at investigating the relationship between working capital management and firm profitability concerning Swedish SMEs operating in the wholesale industry using correlation and regression analysis. Hence, the research focus lies in the question whether there is a significant difference when comparing working capital management during the crisis (2008 to 2009) to working capital management after the crisis (2010-2015).

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[18] Cp. CHARITOU/ELFANI/LOIS (2010), pp. 63-68; Cp. MATHUVA (2010), pp. 1-11; Cp. ANSER/MA-LIK (2013), pp. 83-87; Cp. YAZDANFAR/ÖHMAN (2014), pp. 442-452; Cp. AFRIFA/PADACHI (2016), pp. 44-63; Cp. HUY-CUONG/MANH-DUNG/DUC-TRUNG (2016), pp. 55-62

[19] Cp. ENQVIST/GRAHAM/NIKKINEN (2014), pp. 38-48

[20] Cp. ibid

[21] Cp. RAMIAH/ZHAO/MOOSA (2014), pp. 332-354

[22] Cp. HARON/NOMRAN (2016), pp. 466f.

[23] Cp. ibid

Research question: Is working capital management related to the profitability of Swedish

wholesale SMEs during and after the crisis?

In line with previous research, e.g. Deloof, Lazaridis and Tryfonidis, and García-Teruel and Martínez-Solano, it is expected to find an inverse relationship between working capital management and firm profitability.[24] Furthermore, it is assumed that profitability and working capital management improved in the post-crisis period which could help to explain the comparatively rapid economic recovery of Sweden after the global financial crisis.[25]

1.3 Purpose of the Study

It is the aim of this study to analyze how working capital management is related to firm profitability in Swedish wholesale SMEs during the crisis (from 2008 to 2009) and after the crisis (from 2010 to 2015). By doing so, this thesis adds the Swedish perspective of working capital management in times of economic turmoil as well as during economic recovery to previous research that studied the working capital-profitability relationship and the relationship of economic crises and working capital management. This thesis is of high practical relevance for Swedish SMEs and their financial management who aim at maximizing firm profitability and wish to be able to successfully cope with economic turmoil as the next crisis is sure to come.

1.4 Division of this Thesis

The remaining part of this thesis begins with a short theoretical background chapter including a review of previous research. This is followed by the methodological chapter which is intended to unfold the conceptual and methodological framework employed in this study. The main part is the presentation and analysis of study results which includes descriptive statistics, correlation and regression analyses as well as an analysis of these results. Finally, this thesis is concluded by summarizing and discussing research results and giving an outlook over study limitations and future research possibilities.

2. Theoretical Background

This chapter will not only provide the reader with a solid background knowledge covering all relevant economic concepts, with special regard to working capital management, and economic terms pertinent for understanding this thesis, but it will also present previous research results that are relevant to enable the reader to contextualize the results of this thesis.

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[24]Cp. DELOOF (2003), pp. 580-583; Cp. LAZARIDIS/TRYFONIDIS (2006), pp. 30-34; Cp. GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2007), pp. 175-177
[25]Cp. OECD (2011), p. 9

2.1 Definition of Economic Terms and Concepts

In the first place, to ensure that every reader has the same understanding of the employed economic concepts and terms, the most relevant ones will be defined in the following.

2.1.1 SME

To start with, the category of small and medium-sized enterprises, or short SMEs, must be outlined for the understanding of the reader because even though the term SME is widely used in contemporary discourses, there exist numerous different definitions. According to the second OECD Conference of Ministers Responsible for Small and Medium-sized Enterprises (SMEs), Sweden has adopted the definition proposed by the European Union in 2003 and considers SMEs to be "enterprises with less [than] 250 employees"[26]. The standardized definition by the European Union is that "[t]he category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million"[27]. Thus, this definition is also applied for classifying the sampled SMEs in this thesis.

2.1.2 Working Capital

Considering that the main topic of this thesis is to analyze working capital management in Swedish SMEs, it is essential to define the overall term of working capital before going into details concerning working capital management or even thinking of empirically analyzing the working capital management of Swedish wholesale SMEs.

Most generally, working capital is defined as current assets minus current liabilities.[28] Even though some researchers differentiate between working capital and net working capital, in line with Weston and Copeland, these terms are combined in this thesis as working capital because, considering the nature of working capital as current assets minus current liabilities, splitting these terms would be redundant.[29]

Provided that current assets are "accounts that will normally turn into cash over the course of the operating or business cycle of the firm […] [and [c]urrent liabilities are accounts that will come due for payment over the operating or business cycle"[30], one can conclude that working

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[26] OECD (2004), p. 148
[27] THE COMMISSION OF THE EUROPEAN COMMUNITIES (2003), p. 39
[28] Cp. WESTON/COPELAND (1986), p. 285
[29] Cp. ibid
[30] BROOKS (2016), p. 57

capital is an integral part of a company's short-term financial decisions. On the asset side, the main components of working capital are accounts receivable, inventories, and cash holdings whereas on the liabilities side, the major component is accounts payable.[31]

In a nutshell, working capital can thus be summarized as "[t]he part of the capital of a company that is employed in its day-to-day trading operations"[32].

2.1.3 Profitability-Liquidity Tradeoff

Because this thesis investigates the working capital-profitability relation for Swedish wholesale SMEs, the tradeoff between profitability and liquidity is an essential concept to keep in mind.

Most generally, the Oxford Dictionary of Economics defines tradeoff as "[t]he requirement that some of one good or one objective has to be given up to obtain more of another"[33]. Following Smith, such a tradeoff can be found in the relationship between profitability and liquidity.[34] This implies that some of the profitability of a firm has to be given up to obtain more liquidity. While, in economics, such a tradeoff occurs frequently, for the purpose of this thesis only the tradeoff between profitability and liquidity together with the risk-return tradeoff will be explained further.

Smith suggests that parallel forecasts of profitability and liquidity could allow the management to identify advantageous strategies, e.g. concerning inventory management.[35] Despite mentioning that this procedure could be "equally useful for examining the impact of capital budgeting, capital structure, leasing, and other management policies"[36], the focus lies in the sensitivity to working capital policies which mainly involve accounts receivable, inventory, accounts payable, and other accruals.[37] Hence, a possible managerial measure could be to tighten the collection period of receivables, reduce inventories, prolong the payment period for accounts payable, and slow down the cash payments for salaries and administrative expenses.[38] These measures reduce the amount of liquidity held by a company and, following the principle of tradeoffs, should increase firm profitability.

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[31] Cp. ROSS et al. (2008), pp. 745-746
[32] LAW (2016), no page
[33] BLACK/HASHIMZADE/MYLES (2009), no page
[34] Cp. SMITH (1980b), pp. 549-562
[35] Cp. ibid
[36] SMITH (1980b), p. 562
[37] Cp. ibid, pp. 550-562
[38] Cp. ibid, pp. 558f.

Van Horne pursues this observation and finds a tradeoff between risk and return.[39] He explains that decisions determining a company's level of working capital affect liquidity and that "these decisions are influenced by a tradeoff between profitability and risk"[40]. On the asset side, the main factor is the liquidity of assets, i.e. how fast a company can turn assets into cash.[41] Because if this turnover takes a long time, the company's risk of running out of cash increases.[42] Hence, to determine the appropriate amount of liquidity implies a tradeoff between risk, i.e. for example the risk of running out of cash, and profitability.[43] A similar relation can be detected on the liabilities side.[44] Moreover, Brooks explains that there is no general rule applicable to decide whether it is advantageous to take the additional risk; this decision is dependent on one's individual risk attitude.[45]

These tradeoffs can help to explain the relevance of working capital management in a firm's overall financial management.

2.1.4 Cash Conversion Cycle

As a measure of working capital, the cash conversion cycle or short CCC is, according to Richards and Laughlin, advantageous compared to traditional static liquidity ratios like e.g. the current ratio.[46] This is due to the dynamic nature of the CCC that reduces the "potential for misinterpreting a firm's relative liquidity position"[47].

"Essentially, [… the cash conversion cycle] measures how quickly a company can convert its products or services into cash"[48]. Thus, it covers the time from paying for a product/material until making money out of this purchase when finally selling the product (see Figure 1). Or in other words, the CCC is "the time lag between the expenditure for the purchases of raw materials and the collection of sales of finished goods"[49].

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[39] Cp. VAN HORNE (1980), pp. 535-548
[40] Ibid, p. 535
[41] Cp. ibid, p. 536
[42] Cp. ibid
[43] Cp. ibid
[44] Cp. ibid, pp. 536f.
[45] Cp. BROOKS (2016), pp. 259f.
[46] Cp. RICHARDS/LAUGHLIN (1980), pp. 34-36
[47] Ibid, p. 36
[48] BROOKS (2016), p. 412
[49] DELOOF (2003), p. 574

Figure 1: Components of the Cash Conversion Cycle

Source: CFA INSTITUTE (2014): Chapter 8: Working Capital Management, in: Corporate Finance: A Practical Approach Lecture Kit 2014, p. 7, last access on: 17.04.2018, Web: https://www.cfainstitute.org/learning/products/publications/inv/Pages/corporate_finance_lecture_kit.aspx

The average CCC can be calculated by adding up the number of days accounts receivable (NDAR), i.e. the time it takes to pay the company's receivables, and the number of days inventories (NDI), i.e. the time the product stays in the company's inventory until it is sold, minus the number of days accounts payable (NDAP), i.e. the time it takes the customer to pay for the product:[50]

$$CCC = NPAR + NDI - NDAP \tag{I}$$

A long CCC indicates that a company takes a long time to recycle its cash expenditures whereas a shorter CCC implies a fast turnover of money.[51] Thus, a short CCC indicates a low level of liquidity which, following the concept of the profitability-liquidity tradeoff, is accompanied by a high level of profitability. At the same time, the risk-return tradeoff implies that profitability increases because a low liquidity level corresponds to a renunciation of security and thus an increase of firm risk. This indicates that a company can control its liquidity level and its profitability level by appropriately managing its CCC.

Nevertheless, "[t]he CCC focuses only on the length of time funds are tied up in the cycle and does not take into consideration the amount of funds committed to a product as it moves through the operating cycle"[52]. To eliminate this problem, Gentry, Vaidyanthan, and Lee developed the concept of a weighted cash conversion cycle, short WCCC. "The weight used to perform the adjustment is determined by dividing the amount of cash tied up in each component by the final value of the product"[53]. However, the necessary data to calculate the WCCC is not available for this study's sample which is why the CCC is employed in this thesis even though the WCCC

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[50] Cp. LAZARIDIS/TRYFONIDIS (2006), p. 28
[51] Cp. ibid, p. 28
[52] GENTRY/VAIDYANTHAN/LEE (1990), p. 90
[53] Ibid

could provide an even more accurate picture. Not only Lazaridis and Tryfonidis, but also Deloof and numerous more researchers consider the CCC as an adequate measure of working capital management which is why it is employed in this thesis as well.[54]

2.1.5 Working Capital Management

Because current assets, which are prone to volatility, represent a large share of a company's total assets, working capital management should play an essential role in a company's financial management.[55] This holds true especially for small firms, as according to Grablowski, "[s]mall firms are frequently subject to money constraints that prevent them from operating in the same way larger firms do"[56]. Also, e.g. Petersen and Rajan suggest that SMEs often have problems with getting bank loans and other forms of outside financing.[57] Therefore, they must focus on possibilities of inside or short-term financing, like trade credit or short-term bank loans. This makes management of working capital such an important topic especially for SMEs.[58]

In a very broad sense, working capital management, or short WCM, includes all components of managing current assets and current liabilities.[59] It is hence "[t]he process of managing the day-to-day operations of the company through its current assets and current liabilities so as to improve the flow of funds"[60]. This "involves the selection of inventory levels, payment policies, and short-term cash holdings"[61]. Thus, WCM can also be referred to "as the short-term financing activities of the company [… and it can be concluded that WCM] focuses on short-term operating needs and the company's day-to-day finance requirements"[62].

As working capital is mainly influenced by inventories, cash holdings, accounts receivables, and accounts payables (see section 2.1.2), WCM can be split up into inventory management, cash management, accounts receivable management, and accounts payable management.[63] In the following, these will be presented on a superficial level to provide a basic understanding of WCM approaches.

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[54] Cp. DELOOF (2003), p. 574; Cp. LAZARIDIS/TRYFONIDIS (2006), p. 27
[55] Cp. WESTON/COPELAND (1986), p. 277
[56] GRABLOWSKY (1984), p. 59
[57] Cp. PETERSEN/RAJAN (1994), p. 3
[58] Cp. GRABLOWSKY (1984), p. 59; Cp. WESTON/COPELAND (1986), p. 277
[59] Cp. WESTON/COPELAND (1986), p. 285
[60] BROOKS (2016), p. 634
[61] Ibid
[62] BROOKS (2016), p. 634
[63] Cp. RAMIAH/ZHAO/MOOSA (2014), p. 332

2.1.5.1 Inventory Management

> Inventories are the most difficult of a company's physical assets to manage. If mismanaged, they are the quickest way for a company to get into trouble. They are hard to measure and value, their value may change very quickly, and they are subject to fraud. [...] Frequently, inventory was where the trouble started.[64]

This quote lucidly reveals the significance of inventory management and points out that a lack of inventory management or wrong inventory management can lead to a company's failure.

Concerning the wholesale industry, inventory management is somewhat easier to handle than for other industries like for example the manufacturing industry that must consider processing procedures whereas in wholesale, companies just buy products from manufacturers and sell them to retailers which usually does not imply a modification of the products.[65] Inventory management is nevertheless indispensable for successful WCM also for companies operating in the wholesale industry as "[i]nventory constitutes an important part of their assets"[66].

Following Moles and Terry, inventory management is "[t]he process of managing the trade-off between holding inventory (with its costs of storage, handling, reordering, obsolescence, and wastage) and production scheduling"[67]. This implies that managers have to decide how many goods they should buy at what time and at which price.[68] The difficulty herby, especially in times of volatile demand, is to figure out the exact amount of inventory to, on the one hand, offer a great product variety and thereby maintain a high level of customer service and, on the other hand, consider the costs of holding excess inventory.[69] This implies that managers should be able to anticipate the demand for their products.[70] "[M]ost inventory problems [...] arise because management buys or produces too much of the wrong merchandise at the wrong price"[71]. This can e.g. be due to a wrong assessment of sales growth or, using the example of a clothing store, due to a sudden change in fashion and hence a change in demand.[72]

"The natural tendency of a sales-oriented entrepreneur is to increase the level of inventory to avoid stockouts. On the other hand, return on investment can be increased by reducing funds tied up in inventories"[73]. This reflects the constant conflict between profitability and risk (see

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[64] SIHLER/CRAWFORD/DAVIS (2004), p.125
[65] Cp. ibid
[66] WANG/ZHANG (2010), p. 2907
[67] MOLES/TERRY (2005b), no page
[68] Cp. SIHLER/CRAWFORD/DAVIS (2004), p. 126
[69] Cp. CHEN/FRANK/WU (2007) p. 430
[70] Cp. SIHLER/CRAWFORD/DAVIS (2004), p. 126
[71] SIHLER/CRAWFORD/DAVIS (2004), p. 126
[72] Cp. ibid
[73] Ibid, p. 141

section 2.1.3) – keeping a large stock reduces the stockout-risk but decreases profitability; minimizing stock increases profitability but increases the risk of running out of goods. And even though "[l]arge inventories allow the company to produce and purchase economically by avoiding production stoppages and taking advantage of decreased ordering costs"[74] and additionally enhance flexibility, the disadvantages of having large stocks prevail.[75] These not only include storage expenses, but also capital tie-up and obsolescence of goods.[76] This explains why most experts, e.g. Smith, Weston and Copeland, and Brooks, advise companies to reduce their investment in inventories to a reasonable level.[77]

The amount of inventory a company needs is highly dependent from industry but also company-individual factors, e.g. size, are not to be neglected.[78] Therefore, various models to calculate a company's optimal level of inventory exist but to explain any of these would go beyond the scope of this thesis. For the purpose of this thesis, it is sufficient to keep in mind that for efficient WCM it is possible and necessary to manage inventories.

2.1.5.2 Cash Management

"The most important rule for the financial management of smaller companies is not to run out of cash. […] It is lack of cash, not lack of profits, which forces firms into bankruptcy"[79]. Weston and Copeland list the most common motives for holding cash: (1) the transaction motive, (2) the precautionary motive, (3) the need to meet future needs, and (4) to compensate balance requirements.[80] However, "the lower the investment in cash (or any other asset), the higher the return on the entrepreneur's investment"[81]. Thus, the overall aim of cash management is to resolve the conflict between the desire to maintain a comfortable level of cash and the request for profitability which is to resolve the conflict between risk and return, respectively the profitability-liquidity tradeoff. Brooks suggests that the "target cash balance involves a trade-off between the opportunity costs of holding too much cash and the trading costs of holding too little"[82]. This conflict is crucial to all the presented components of WCM. Thus, not only inventory management but also cash management is key to successful WCM.

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[74] ABEL (2008), p. 13
[75] Cp. ibid
[76] Cp. ibid, pp. 13f.
[77] Cp. SMITH (1980b), pp.559-562; Cp. WESTON/COPELAND (1986), pp.321-336; Cp. BROOKS (2016), pp. 428f.
[78] Cp. SIHLER/CRAWFORD/DAVIS (2004), p. 141
[79] Ibid, p. 73
[80] Cp. WESTON/COPELAND (1986), p. 290
[81] SIHLER/CRAWFORD/DAVIS (2004), p. 97
[82] BROOKS (2016), p. 772

According to Moles and Terry, cash management is "[t]he planning, monitoring, and control of liquidity. It includes the day-to-day management of an organization's cash balances, short-term borrowings and investments, domestic and foreign money transfers, and payables and receivables"[83]. Factors that influence a firm's cash management are i.a. risk preferences, banking relationships, and customers' paying habits.[84]

The starting point for managing cash must always be forecasting and budgeting funds.[85] To do so, there exist numerous forecasting techniques to be able to estimate the amount of cash needed but to present these would go beyond the scope of this thesis and is of no further interest for the understanding of this work.

2.1.5.3 Accounts Receivable Management

Accounts receivable management or credit management covers the decision whether to grant credit and is according to Ross et al. one of the most important decisions made by the seller.[86] Credit management decisions vary from firm to firm. Typically, the average receivables period for companies operating in the wholesale industry is much shorter than for other industries because customers usually tend to pay cash.[87]

The decision to grant credit is up to every company, however to grant credit usually increases sales as a longer "credit period effectively reduces the price paid by the customer"[88]. Some factors that, according to Ross et al. (2008), should be taken into account when setting one's credit period are the risk of default, the size of the account, and the extent of perishability.[89] It follows, that non-perishable, high-cost sales from a customer with low default risk will probably be granted a long credit period. Whereas companies will hardly grant credit for cheap and perishable goods purchased by a high-risk customer. Commonly, companies offer cash discounts to accelerate the payment period which enhances profitability – but naturally only if the tradeoff against the cost of the discount is advantageous.[90]

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[83] MOLES/TERRY (2005a), no page
[84] Cp. SIHLER/CRAWFORD/DAVIS (2004), pp. 97f.
[85] Cp. ibid, p. 74
[86] Cp. ROSS et al. (2008), p. 795
[87] Cp. ibid
[88] Ibid, p. 796
[89] Cp. ibid
[90] Cp. ROSS et al. (2008), p. 796

On the one hand, offering trade credit might lead to losses due to debt default and results in additional costs for holding accounts receivable. On the other hand, it can lead to an increase in sales.[91] Therefore, it is the management's task to detect the optimal credit policy because at the optimal credit level, "the incremental cash flows from increased sales are exactly equal to the carrying costs from the increase in accounts receivable"[92]. This optimum (see Figure 2) minimizes the total cost of credit, which is opportunity costs plus carrying costs. Carrying costs are defined as "costs associated with granting credit and making an investment in receivables. Carrying costs include the delay in receiving cash, the losses from bad debts, and the costs of managing credit"[93]. Opportunity costs represent the costs that arise when refusing to offer credit.[94] The relationship between opportunity costs and carrying costs can be seen in the following illustration (Figure 2):
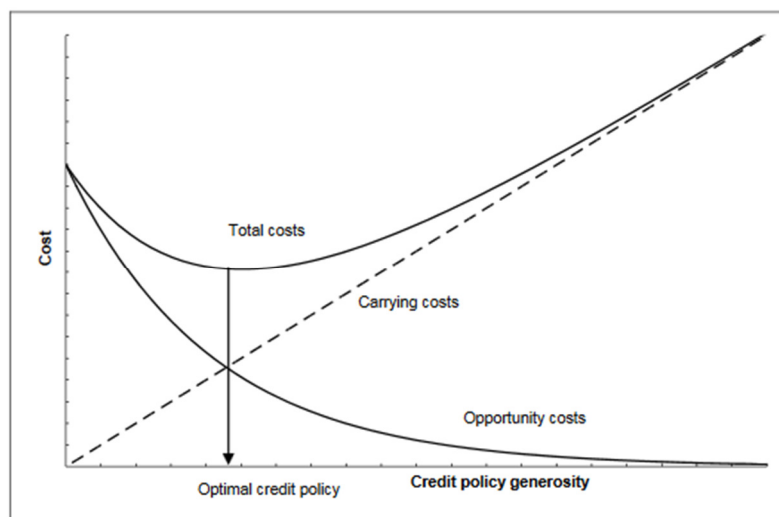
Figure 2: Optimal Credit Policy

Source: ABEL, Maxime (2008): The Impact of Working Capital Management on Cash Holdings: A Quantitative Study of Swedish Manufacturing SMEs, master's thesis, Sundsvall: Mid Sweden University, 2008, p. 15

This figure exhibits that offering no credit is disadvantageous - as is offering too much credit. Companies will therefore try to maintain a balance between offering a generous amount of credit to increase sales and the desire to minimize risk by not offering credits. By doing so, the illustration demonstrates the profitability-liquidity tradeoff as well as the tradeoff between risk and return which are generic to all three components of WCM. Hence, once again the overall aim of accounts receivable management must be to maintain an optimal amount of receivables to maximize profitability.

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[91] Cp. ibid, p. 802
[92] Ibid, p. 801
[93] Ibid, p. 802
[94] Cp. ibid

Naturally, this model is over-simplistic and neglects further factors that influence credit policy. To keep this theoretical background as simple and short as appropriate, this thesis omits an in-depth discussion of the problem.

2.1.5.4 Accounts Payable Management

Accounts Payable are one of the main components of current liabilities and hence they represent a major part of working capital and WCM. Even though accounts payable can hardly be influenced by a firm as they are subject to another company's accounts receivable management, it is essential to mention them in the context of WCM because as explained in section 2.1.4, a company can shorten its CCC by lengthening its accounts payable which leads to an increase in profitability. Thus, in accounts payable management, the tradeoff between profitability and liquidity is reflected in the possibility of increasing profitability when reducing liquidity, which in this case entails postponing payments.

A company can use trade credit as a sort of short-term financing. Hence, when the company is offered trade credit, it should generally make use of this credit and not pay before the maturity date.[95] However, sometimes suppliers offer discounts (see also section 2.1.5.3) for paying immediately, in which case companies should calculate whether using these discounts is in fact advantageous.[96] To do so, the buyer can compare the discount rate to the interest rate that would be applicable to the firm for a bank loan over the same period.[97] Is the discount rate higher, the company should use the discount and finance its financial needs with a loan.[98] However, is the discount rate lower, it makes sense to ignore the discount and not pay the payables before their maturity date.[99]

2.1.5.5 Working Capital Policies

As pointed out, WCM is of great importance for firms and especially for SMEs. However, every firm manages its working capital differently. Weston and Copeland name this approach "working capital policy"[100]. This policy includes maintaining an appropriate level of cash to pay bills and employees, managing inventories to neither run out of goods nor to have a surplus of goods in stock, and negotiating payment policies to fix the payment period for suppliers and customers.[101]

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[95] Cp. MANESS/ZIETLOW (2005), p. 235-238
[96] Cp. ibid
[97] Cp. ibid
[98] Cp. ibid
[99] Cp. ibid
[100] WESTON/COPELAND (1986), pp. 277-285
[101] Cp. BROOKS (2016), p. 35

According to Weston and Copeland, there are two crucial aspects of working capital policy: (1) the risk-return tradeoff for current assets and (2) the financing of current assets.[102]

Concerning (1) the risk-return-tradeoff, it can be distinguished between mainly two different strategies of WCM: conservative and aggressive working capital policy.[103] A conservative approach would be to keep a relatively high and constant level of current assets to maintain a high level of liquidity (meaning low risk), whereas the aggressive strategy aims at reducing current assets and hence reducing working capital.[104] Naturally, the firm risk increases with a decrease of liquidity, and thus working capital, but it can lead to increased firm profitability.[105] However, it is unreasonable to maintain a higher level of current assets than necessary for paying current liabilities due to opportunity costs and costs for value retention.[106] Hence, companies should be aware of this risk-return tradeoff and manage their current assets accordingly.

Regarding (2) the question of financing, it can first be distinguished between average working capital financing, aggressive working capital financing, and conservative working capital financing.[107] Therefore, Weston and Copeland differentiate between fixed assets, permanent current assets, and fluctuating current assets.[108] Average working capital financing aims at aligning the maturity pattern of assets and liabilities entirely. In aggressive working capital financing "all fixed assets are financed with long-term capital, but part of the permanent current assets are financed with temporary short-term credit"[109]. Finally, conservative working capital financing partly uses long-term capital to finance short-term assets.[110] Then, firms can also decide between short-term and long-term financing. This decision is i.a. influenced by the current interest rate but will not be analyzed further for the purpose of this thesis.[111]

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[102] Cp. WESTON/COPELAND (1986), p. 285
[103] Cp. JAWORSKI (2011), p. 23
[104] Cp. ibid
[105] Cp. SMITH (1980b), pp. 549-562
[106] Cp. SURE (2014), p. 20
[107] WESTON/COPELAND (1986), pp. 281-283
[108] Cp. ibid
[109] Ibid, p. 282
[110] Cp. ibid, p. 283
[111] Cp. WESTON/COPELAND (1986), p. 283

2.2 Literature Review

Research in the field of WCM mainly involves two subject matters, namely the determinants of WCM[112] and the relationship between WCM and firm profitability[113].

Even though first studies were already published in the mid of the nineteenth century, the relevance of WCM seems to have increased during the last two decades and especially in the aftermaths of the global economic crisis of 2008.[114] This is reflected in the accelerating number of studies that have been conducted in the research field of WCM. Thus, the crisis must have put new emphasize on the importance of short-term financial management.[115] Notably, since the crisis studies concentrate more on developing countries whereas before the crisis the majority of studies was discussing developed markets, mainly the United States. Scientific WCM publications have been covering various special research fields; studies have i.a. focused on different industries, different countries, and different company types.

Despite this regained attention, only few studies dedicate their working capital research to the effects of the global economic crisis or even relate WCM to economic conditions in general.[116]

The most renowned WCM studies and the most relevant ones for this particular thesis are summarized in the following. For a greater overview of previous research or a more detailed description of research results see Appendix A.

2.2.1 WCM and Firm Profitability

A considerable number of studies in the field of WCM deal with its relation to firm profitability. The most commonly used proxy for WCM is the CCC[117] even though several studies also employ e.g. the net trade cycle (NTC)[118] or liquidity ratios[119]. The measures of profitability are

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[112] Cp. RIMO/PANBUNYUEN (2010), pp. 1-63; Cp. UYAR (2010), pp. 186-193; Cp. GILL (2011), pp. 30-40; Cp. DUGGAL/BUDDEN (2012), pp. 753–756; Cp. BAÑOS-CABALLERO/GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2013), pp. 978-992; Cp. NASER/NUSEIBEH/AL-HADEYA (2013), pp. 11-30; Cp. HARON/NOMRAN (2016), pp. 461-468

[113] Cp. SHIN/SOENEN (1998), pp. 37-45; Cp. DELOOF (2003), pp. 573-588; Cp. LAZARIDIS/TRYFONIDIS (2006), pp. 26-35; Cp. RAHEMAN/NASR (2007), pp. 279-300; Cp. AFZA/NAZIR (2009), pp. 19-30; Cp. MATHUVA (2010), pp. 1-11; Cp. BAÑOS-CABALLERO/GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2012), pp. 517-529; Cp. YAZDANFAR/ÖHMAN (2014), pp. 442-452

[114] Cp. ENQVIST/GRAHAM/NIKKINEN (2014), p. 39

[115] Cp. ibid

[116] Cp. LAMBERSON (1995), pp. 45-50; Cp. KESIMLI/GUNAY (2011), pp. 52-69; Cp. DUGGAL/BUDDEN (2012), pp. 753–756; Cp. SCHOLLEOVA (2012), pp. 79-92; Cp. ENQVIST/GRAHAM/NIKKINEN (2014), pp. 36–49; Cp. RAMIAH/ZHAO/MOOSA (2014), pp. 332-351; Cp. HARON/NOMRAN (2016), pp. 461-468

[117] Cp. DELOOF (2003), pp. 573-588; Cp. LAZARIDIS/TRYFONIDIS (2006), pp. 26-35; Cp. MATHUVA (2010), pp. 1-11; Cp. ANSER/MALIK (2013), pp. 83-87

[118] Cp. SHIN/SOENEN (1998), pp. 37-45

[119] Cp. LAMBERSON (1995), pp. 45-50; Cp. ELJELLY (2004), pp. 48-61

more diverse, but some frequently used are return on assets (ROA)[120], return on equity (ROE)[121], gross operating profit (GOP)[122], and Tobin's q[123]. Overall results suggest that there might be an inverse relationship between profitability and WCM.[124] However, for example Lyroudi and Lazaridis, Afza and Nazir, Gill, Biger, and Mathur, and Abuzayed find contradictory results.[125] A possible reason for this dispute could be the usage of different samples, i.e. companies from different countries, contexts, size, or industries. Beside these overall results, studies also find very diverse results for their respective control variables. Further research could contribute to soothe the controversy of findings.

Jose, Lancaster, and Stevens included 2,718 U.S. firms in their study from 1974 to 1993 of profitability measures and management of ongoing liquidity needs. They control for industry and firm size and find that, for most industries, including the wholesale industry, aggressive working capital policy increases profitability.[126] Thus, they reveal a relationship between WCM, firm size and industry. A more quoted work by Shin and Soenen analyzed the impact of WCM, measured by the NTC, on firm profitability, measured by ROA and return on sales. They took a large sample of listed US firms covering eight industries over the period of 1975-1994 and find a very strong negative relationship between the NTC and profitability. This relationship "implies that a firm with a relatively short net trade cycle is more profitable and has a higher risk-adjusted stock return per unit of total risk"[127]. Being one of the first studies to investigate the working capital-profitability relationship, this study is regarded as one of the most primal works published in the field of WCM. Wang analyzed 1,555 Japanese and 379 Taiwanese firms over the period of 1985 to 1996. By applying multiple measures for profitability (ROA, ROE and Tobin's q ratio), the regression results show a significant negative relationship between CCC (proxy for WCM) and all measures of profitability.[128] Deloof took a sample of 1,009 firms listed on the Belgian stock market and studied the relationship between WCM (measured by CCC) and profitability (measured by gross operating income (GOI)) of Belgian

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[120] Cp. GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2007), pp. 164-177; Cp. AFZA/NAZIR (2009), pp. 19-30; Cp. ANSER/MALIK (2013), pp. 83-87

[121] Cp. JOSE/LANCASTER/STEVENS (1996), pp. 33-46; Cp. WANG (2002), pp. 159-169; Cp. ANSER/MALIK (2013), pp. 83-87

[122] Cp. LAZARIDIS/TRYFONIDIS (2006), pp. 26-35; Cp. GILL/BIGER/MATHUR (2010), pp. 1-9

[123] Cp. WANG (2002), pp. 159-169; Cp. AFZA/NAZIR (2009), pp. 19-30

[124] Cp. DELOOF (2003), pp. 573-588; Cp. GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2007), pp. 164-177; Cp. ANSER/MALIK (2013), pp. 83-87; Cp. YAZDANFAR/ÖHMAN (2014), pp. 442-452

[125] Cp. LYROUDI/LAZARIDIS (2000), pp. 1-31; Cp. AFZA/NAZIR (2009), pp. 19-30; Cp. GILL/BIGER/MATHUR (2010), pp. 1-9; Cp. ABUZAYED (2012), pp. 155-179

[126] Cp. JOSE/LANCASTER/STEVENS (1996), pp. 35-45

[127] SHIN/SOENEN (1998), pp. 38-44

[128] Cp. WANG (2002), pp. 163-168

firms for the period of 1992 to 1996. He used a Fixed-Effect Model (FEM) and a Plain Ordinary Least Square Method (OLS) and finds a significant negative relationship between GOI and financial debt, NDAR, NDI, and NDAP. Thus, he concludes that a reduction of NDAR and NDI, as well as a lengthening of NDAP can increase firm value. Furthermore, the regression analysis shows a positive and significant relationship between GOI and firm size, as well as sales growth, fixed financial assets, and variability.[129] Eljelly studied 29 joint stock companies from the agricultural, industrial, and service sector over the period from 1996 to 2000 in Saudi Arabia to investigate the relationship between liquidity and profitability. As measures of liquidity, the cash gap and the current ratio are calculated and separately regressed with the NOI as dependent variable. The regression results show a significant negative relationship between liquidity and profitability indicating that an increase in liquidity will negatively affect profitability. After dividing the companies into two groups, Eljelly finds that the longer the CCC the more important is liquidity. Furthermore, he uncovers a positive relationship between CCC, firm size and profitability for agricultural and manufacturing companies.[130] Lazaridis and Tryfonidis analyzed the relationship between WCM, measured by CCC, and profitability, measured by GOP, of 131 companies listed in the Athens Stock Exchange for the period of 2001 to 2004. Their regression analysis shows a significant negative relationship between GOP and CCC, financial debt, NDAP, and NDAR. In line with Deloof, they conclude that reducing NDAR and extending the NDAP leads to an increase in profitability. On top of that, the regression shows similar results to Deloof as for the positive impact of firm size and fixed financial assets on profitability. Moreover, Lazaridis and Tryfonidis find that a decrease of the CCC can generate profits for a firm.[131]

García-Teruel and Martínez-Solano started the debate concerning the effect of WCM on firm profitability in SMEs. Therefore, they conducted a study covering a seven-year period from 1996 to 2002 observing 8,872 Spanish SMEs applying the panel data methodology. They used ROA as dependent variable and CCC as a proxy for WCM. Their regression results suggest a significant and negative relation between ROA and CCC.[132] Mathuva also finds an inverse relationship between profitability and WCM. He analyzes 30 listed Kenyan firms for the period of 1993 to 2008. Using pooled OLS and fixed effects regression models, results show a significant negative relation between net operating profit (dependent variable) and CCC (proxy for

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[129] Cp. DELOOF (2003), pp. 575-585
[130] Cp. ELJELLY (2004), pp. 51-59
[131] Cp. LAZARIDIS/TRYFONIDIS (2006), pp. 27-35
[132] Cp. GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2007), pp. 167-177

WCM). He concludes in line with Shin and Soenen that, i.a. due to market power and minimal investment in current assets, firms can increase profits when decreasing the CCC.[133] Following García-Teruel and Martínez-Solano, Baños-Caballero, García-Teruel, and Martínez-Solano conduct a study to analyze the influence of WCM on firm profitability in Spanish SMEs. Supporting previous results, e.g. by García-Teruel and Martínez-Solano, they find that Spanish SMEs have an optimal level of working capital that can balance the risk-return tradeoff, suggesting that SMEs have a greater risk but also a greater profitability when maintaining low levels of working capital.[134] Anser and Malik include 155 listed manufacturing firms from Pakistan in their study. For the period of 2007 to 2011 they studied the relationship between working capital management, measured by the CCC, and firm profitability, measured by ROA and ROE. In accordance with previous studies, they come to the conclusions that a shorter CCC enhances profitability because their regression results show a significant negative relation with ROA and ROE. They therefore suggest reducing the receivable collection period and inventory selling period along with extending the payment period to increase profitability.[135] Yazdanfar and Öhman included a sample of approx. 23,000 Swedish SMEs operating in 4 different industries, namely restaurants, metal, wholesale, and retail, in their study. For their observation period from 2008 to 2011, their seemingly unrelated regression model shows a significant negative relationship between CCC (as a proxy for WCM) and ROA (as measure of profitability) across the four industries. The strongest relationship is found for the restaurant industry whereas the retail industry shows lowest results. They conclude that industry classification does impact the working capital-profitability relationship.[136]

Controversially, Lyroudi and Lazaridis, by analyzing the coherence between leverage ratios, liquidity, and profitability of 82 listed Greek companies operating in the food industry in 1997, find a positive relation between profitability and CCC.[137] Supporting these findings, Afza and Nazir determine a negative relation between the aggressiveness of WCM and profitability in their study. They include 204 listed, non-financial firms from 17 industrial sectors in Pakistan covering the period from 1998-2005 using panel data regression analysis in their study. They use Tobin's q and ROA as dependent variables and aggressive investment Policy (AIP), and aggressive financing policy (AFP) as independent variables calculated by the ratio of total current assets to total assets as well as the ratio of total current liabilities to total assets. Results

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[133] Cp. MATHUVA (2010), pp. 3-10
[134] Cp. BAÑOS-CABALLERO/GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2012), pp. 519-527
[135] Cp. ANSER/MALIK (2013), pp. 84-86
[136] Cp. YAZDANFAR/ÖHMAN (2014), pp. 445-450
[137] Cp. LYROUDI/LAZARIDIS (2000), pp. 7-20

show a significant negative relation between ROA and AFP. However, they find a statistically significant positive relationship between Tobin's q and AFP. This indicates that investors give more weight to firms adopting an aggressive WCM. Finally, they find a positive relation between ROA/Tobin's q and AIP which indicates that when AIP increases, ROA increases and the degree of aggressiveness decreases.[138] Gill, Biger, and Mathur find affirmative empirical evidence for these conclusions by finding a significant positive relation between NOP and CCC. Analyzing the period of 2005 to 2007 and including 88 manufacturing firms listed in the United States, their regression analysis indicates that profitability rises when decreasing a company's debt ratio and firm value can be increased by increasing the CCC.[139] Abuzayed investigates 52 listed firms from 2000 to 2008 in Jordan. Her OLS and Fixed and Random Effects Model suggests a significantly positive relationship between profitability (Tobin's Q and GOP) and CCC as well as between profitability and NDAR, NDI, GDP, firm size, sales growth, and fixed financial to total assets. Thus, she concludes that firms with higher profits are less concerned with managing their working capital.[140]

This controversy of research results is again reflected in Habib and Huang who analyze 152 textile firms listed on the Karachi stock exchange from 2009-2016. They assume a non-linear relationship between working capital and firm profitability and they therefore suggest that a company's performance is determined by an optimal level of working capital. By applying OLS, FEM, and GMM, they find a negative relationship between working capital and profitability for companies maintaining a positive working capital level whereas companies with a negative working capital show a positive relation. These findings imply "that negative working capital is more efficiently responsible for increase of the profitability than the positive WCR"[141].

2.2.2 Determinants of WCM

Moreover, a wide range of scientific works concentrate more on the determinants of working capital and mostly use the CCC as a measure for working capital and therefore as dependent variable.[142] Rimo and Panbunyuen, Gill, and Naser, Nuseibeh, and Al-Hadeya for example find an inverse relation between working capital (CCC) and firm size as well as sales growth.[143]

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[138] Cp. AFZA/NAZIR (2009), pp. 22-28
[139] Cp. GILL/BIGER/MATHUR, pp. 4-8
[140] Cp. ABUZAYED (2012), pp. 161-175
[141] HABIB/HUANG (2018), p. 49
[142] Cp. RIMO/PANBUNYUEN (2010), pp. 1-63; Cp. UYAR (2010), pp. 186-193; Cp. BAÑOS-CABAL-LERO/GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2010), pp. 511-527
[143] Cp. RIMO/PANBUNYUEN (2010), pp. 54f; Cp. GILL (2011), p. 36; Cp. NASER/NUSEIBEH/AL-HA-DEYA (2013), pp. 20f.

Whereas e.g. Baños-Caballero, García-Teruel, and Martínez-Solano contrarily find a positive relation between working (CCC) capital and firm size and growth.[144] E.g. Baños-Caballero, García-Teruel, and Martínez-Solano, and Uyar suggest that there is a negative relation between working capital and profitability[145] whereas e.g. Rimo and Panbunyuen and Gill find a positive relation[146]. This points out that research results are very contradictory which explains why researchers dedicate more and more studies to the subject matter.

Baños-Caballero, García-Teruel, and Martínez-Solano analysed the WCM in SMEs for 4,076 Spanish SMEs during 2001 to 2005. Using OLS and FEM, their results show a significant negative relation between CCC and cash flow, leverage, profitability, and fixed assets and a significant positive relation between CCC and lagged CCC, growth, firm size, and firm age. These results suggest that the amount of working capital increases with a decrease in cash flow, leverage, profitability, and fixed assets, whereas a decrease in growth, size, and age leads to a decrease in working capital.[147] Rimo and Panbunyuen investigated 40 listed Swedish firms from 2007 to 2008. Their regression analysis shows a significant negative relationship between CCC and operating cash flow, firm size, and sales growth. This implies that smaller firms with less operating cash and a lower level of sales growth will have a higher CCC. The significant positive relationship between CCC and profitability indicates that more profitable companies have a higher CCC, hence more working capital. They also find a positive relation between CCC and their four industry classifications (materials, industrials, health care and information technology).[148] Uyar studies 166 listed Turkish corporations from seven industries in 2007. ANOVA and Pearson correlation analyses show that firm size and profitability are significantly negatively related to CCC. Thus, he concludes that bigger and more profitable firms have a shorter CCC. Furthermore, he finds that the retail/wholesale industry has the lowest CCC. He suggests that this might firstly be due to the nature of retail/wholesale companies that do not manufacture their goods but store goods that are ready for sale which reduces NDI. Secondly, retail/wholesale companies are often paid cash which reduces their NDAR. Finally, he also concludes that the retail/wholesale industry is also slower in paying their accounts payable and hence maximize their NDAP.[149] Using the OLS model, Gill also finds a significant negative relationship between CCC and growth as well as firm size for 166 listed Canadian firms (2008-2010). A

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[144] Cp. BAÑOS-CABALLERO/GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2010), pp. 522f
[145] Cp. BAÑOS-CABALLERO/GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2010), pp. 520-524; Cp. UYAR (2010), p. 191
[146] Cp. RIMO/PANBUNYUEN (2010), p. 53; Cp. GILL (2011), p. 35
[147] Cp. BAÑOS-CABALLERO/GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2010), pp. 518-525
[148] Cp. RIMO/PANBUNYUEN (2010), pp. 34-58
[149] Cp. UYAR (2010), pp. 189-192

negative relationship is found between CCC and operating cycle, profitability (ROA), internationalization, and industry.[150] This research was carried on by Naser, Nuseibeh, and Al-Hadeya who analyzed 30 firms listed in the United Arab Emirates during the period of 2010/2011. Their backward regression analysis shows a significant negative relation between CCC and sales growth and firm size. Furthermore, their results indicate a longer CCC for more indebted companies.[151] Azami and Tabar investigate 143 companies listed on the Teheran stock exchange from 2004 to 2014. By applying the Generalized Method of Moments (GMM), they reveal a positive relationship between CCC and lagged CCC, ratio of fixed assets, Tobin's q ratio and a negative relationship between CCC and leverage, profitability, GDP. Thus, they assume that companies tend to invest more in working capital during times of lower GDP, lower profitability, lower indebtedness, or higher information asymmetry.[152] A more recent study by Chauhan and Banerjee researches the relationship of size, leverage, cash flow, profitability, asset tangibility, growth opportunity, and the median industry cash cycle and working capital management (measured by the CCC) for a sample of 17,161 Indian manufacturing firms during the period of 1993 to 2015. The negative sign of cash flow, growth, leverage, asset tangibility, median industry cash cycle, and size in the regression analysis indicates that the CCC increases when one of these variables decreases. Chauhan and Banerjee find a positive relation between the CCC and lagged CCC, growth, and asset tangibility which implies that an increase of lagged CCC, growth, and asset tangibility entails an increase in working capital.[153]

Because the determinants of WCM are not of primary importance for the understanding of this thesis, only a handful of studies from this special research area were selected to give the reader a short overview of this important research topic. As pointed out, Appendix A can provide a deeper insight into the topic.

2.2.3 WCM in Economic Crises

Few studies in this research field somehow connect the economic situation to WCM. Therefore, there still exists a major gap in this research area as the few studies that have been carried out raise as many questions as they can answer. Generally, studies agree that efficient WCM is more relevant during economic crises than in times of economic expansion.[154] But notably,

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[150] Cp. GILL (2011), pp. 33-37
[151] Cp. NASER/NUSEIBEH/AL-HADEYA (2013), pp. 11-29
[152] Cp. AZAMI/TABAR (2016), pp. 1407-1413
[153] Cp. CHAUHAN/BANERJEE (2018), pp. 42-50
[154] Cp. LAMBERSON (1995), pp. 45-50; Cp. KESIMLI/GUNAY (2011), pp. 52-69; Cp. ENQVIST/GRAHAM/NIKKINEN (2014), pp. 36–49; Cp. RAMIAH/ ZHAO/MOOSA (2014), pp. 332-351

most of these studies concentrate on large, listed firms which leads to a lack of research concerning SMEs.

An early study by Lamberson tries to find evidence for changes in WCM of SMEs along with changes in economic activity. He selected 50 SMEs out of the list of the 200 best small companies published by Forbes between 1980 and 1991. By applying t-tests he finds that even though liquidity increased during economic expansions, there was no identifiable shift in WCM during economic downturns. Thus, he concludes that SMEs do not follow generally expected WCM practices and indicates that further research is necessary to analyze the relationship between economic conditions and WCM.[155]

To investigate the relationship between the global financial crisis 2008/09 and working capital practices, Kesimili and Gunay for example take a sample of 45 listed companies operating in the real sector in Turkey from 2004 to 2009. Thirteen liquidity ratios are analyzed by using Kolmogorov-Smirnov Test, paired sampled t-tests, and Mann Whitney u-tests. They conclude that five out of these thirteen ratios are significantly related to the crisis whereby receivables turnover ratio is one of the most affected ratios. Thus, a careful management of short-term assets and liabilities can reduce the risk of facing liquidity problems. Their study also confirms that companies in the Turkish real sector did not show relevant liquidity problems during the crisis. They further find that "[w]orking capital management is one of the cornerstones of business continuity and acts as a hedge against tightening credit and access to additional capital"[156]. Duggal and Budden perform paired t-tests to measure the effects of the global financial crisis 2008/09 on corporate WCM practices. They use a sample of 422 U.S. firms in 2007 and 2010 to compare pre-recession values to post-recession results. Findings show that the CCC is slightly higher after the crisis which is due to the fact that companies generally have more cash tied up in inventories and accounts receivable and further rely more on trade credits. Dividing the sample into different industries shows that some industries are more affected by the crisis than others, the IT industry apparently was hit hardest. They conclude that firms generally retain more cash and suggest that this development is due to the fear of further economic challenges.[157] Scholleova performed a questionnaire analysis to find empirical evidence for how the global economic crisis 2008/09 was related to WCM in Czech companies. She suggests that companies that were mainly growth-oriented and companies that have long been unprofitable and could only live on due to a demand surplus have been suffering most in the crisis. She finds that the

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[155] Cp. LAMBERSON (1995), pp. 46-48
[156] KESIMLI/GUNAY (2011), p. 60
[157] Cp. DUGGAL/BUDDEN (2012), pp. 754-756

reduced availability of capital has scaled down vendor demand and that during the crisis, companies heavily relied on trade credit which led to an increase in accounts payable and accounts receivable. Questionnaire evaluation shows that companies that applied a more conservative financing approach, which was considered to be inefficient, could handle the crisis more easily than companies that relied heavily on foreign financing. Finally, results suggest that companies suffer from uncertainty concerning the future economic development which leads to further difficulties concerning WCM.[158] Ramiah, Zhao, and Moosa used qualitative techniques, i.e. interviews and a survey questionnaire in 2009, to evaluate WCM in the economic crisis in Australia. They find that more than fifty percent of participants changed their WCM in the crisis; especially underperforming companies saw a need for changing their working capital practices after the crisis whereas most successful firms did not adjust their WCM. Generally, this shift points at an increasing risk aversion. A good credit score became more important as credit availability decreased and strategic measures like reducing CCC, investment costs, and inventories as well as preserving the level of cash were taken to try to reduce the impact of the crisis.[159]

Haron and Nomran investigate determinants of WCM before (2002 to 2006), during (2007 to 2008), and after (2009 to 2012) the crisis of 2008/09. Applying the REM, they analyze 57 listed Malaysian firms over an overall period from 2002 to 2012. Results indicate an inverse relation between profitability, firm size, sales growth, and the CCC for all three observation periods. Furthermore, they find a positive relation between CCC and debt before the crisis but a negative relation for the time after the crisis. For the time during the crisis, they find evidence for a positive relation between the CCC and free cash flow. Thus, they conclude that firms should particularly observe profitability, debt, sales growth and firm size during non-crises times.[160]

To the best of the author's knowledge, the only study that analyzes the relationship between WCM and firm profitability in different business cycles is Enqvist, Graham, Nikkinen. They analyze how firm profitability, measured by ROA and GOI, in different business cycles is related to WCM of Finish listed firms between 1990 and 2008. In accordance with e.g. Deloof, Lazaridis and Tryfonidis, Eljelly, and Anser and Malik, their correlation and regression results support the assumption that firms can improve their profitability by reducing the CCC.[161] Additionally, they include dummy variables for different economic states in their regression to

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[158] Cp. SCHOLLEOVA (2012), pp. 79-91
[159] Cp. RAMIAH/ZHAO/MOOSA (2014), pp. 335-346
[160] Cp. HARON/NOMRAN (2016), pp. 464-467
[161] Cp. DELOOF (2003), pp. 575-585; Cp. LAZARIDIS/TRYFONIDIS (2006), pp. 27-35; Cp. ELJELLY (2004),

analyze the impact of the economic cycle and find a significant negative relationship between profitability and the recession dummy. This reveals that the general meaning of WCM is higher in times of recession than it is during economic booms. Nevertheless, they don't find evidence for a difference in the relationship between CCC and profitability during thriving economic stages. Furthermore, as no significant results are found for profitability and accounts payable, they conclude that the relevance of accounts payable does not change in accordance with the economic situation. In contrast, a significant negative relationship is found for accounts receivable and profitability, indicating that in times of economic downturn less profitable companies prolong their accounts receivable conversion period. However, no significant change is found for economic booms. The significant negative relationship between profitability and inventories conversion period increases during recession but again no shift in significance can be found for economic booms.[162] Considering that this study only focuses on listed firms, it might be interesting to see how the WCM of SMEs is affected by the crisis.

Despite the tendency to neglect a relationship of economic crises and WCM in current research, a considerably higher amount of studies investigates the relationship between the global financial crisis and the capital structure of firms with a particular emphasize on SMEs.[163] However, to present the details of this research area would go beyond the scope of this thesis. Nevertheless, it should be pointed out that results indicate that the crisis, which was according to e.g. Carbó-Valverde, Rodríguez-Férnandez, and Udell particularly for SMEs characterized by a severe credit crunch, has enhanced the reliance of SMEs on trade credit.[164]

3. Methodology

This chapter describes and defends the methodological approach employed in this thesis to allow the reader to follow the decision process that led to the employed methods. Initially, the overall research aim is presented to be able to subsequently justify and explain the research approach. Then, the sample selection is presented in combination with the data collection process. Variables are defined and explained to present the hypotheses afterwards. The presentation of statistical methods and of the research model constitute the final part of this method chapter.

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pp. 51-59; Cp. ANSER/MALIK (2013), pp. 84-86; Cp. ENQVIST/GRAHAM/NIKKINEN (2014), pp. 41–48
[162] Cp. ENQVIST/GRAHAM/NIKKINEN (2014), pp. 41–48
[163] Cp. PROENÇA/LAUREANO/LAUREANO (2014), pp. 182-191; Cp. CARBÓ-VALVERDE/RODRÍGUEZ-FÉRNANDEZ/UDELL (2016), pp. 113-143
[164] Cp. CARBÓ-VALVERDE/RODRÍGUEZ-FÉRNANDEZ/UDELL (2016), pp. 131-137

3.1 Research Aim

This thesis aims at providing empirical evidence for the working capital–profitability relationship in Swedish wholesale SMEs during and after the crisis (see research question). Thus, the overall study period from 2008 to 2015 is divided into two observation periods: (1) from 2008 to 2009 to represent the crisis period, and (2) from 2010 to 2015 to represent the time of economic recovery. Results are gained by performing statistical analyses in the SPSS software based on companies' balance sheet and income statement information. Therefore, the primary research aim of this thesis is to detect statistical relationships between the employed variables to be able to make valid statements concerning the formulated hypotheses.

3.2 Research Approach

Before starting any study, it is essential to decide for an appropriate research approach. Literature distinguishes between two major approaches: the quantitative and the qualitative research approach.

The qualitative research approach is commonly employed when the research takes place in a "natural setting"[165]. This means that researchers collect their data by e.g. interviewing or observing the research objects in their natural environment.[166] Furthermore, the researcher is considered the key instrument because he personally collects the data and he often uses manifold forms of data, instead of relying on only one source of data.[167] Typically, qualitative research starts from an inductive approach which means that it starts with an observation and thus develops a theory out of this observation.[168] Distinctively, qualitative research is developing throughout the research process.[169] It also focuses on participants' meanings and researchers reflect upon how they influence the study e.g. by taking their personal background into consideration.[170] Finally, qualitative research is holistic which implies that the researcher tries to analyze every aspect of the issue to provide a complex and holistic picture of the research problem.[171]

In contrast to qualitative research, the quantitative research approach is deductive and aims at testing hypotheses that are based on existing theories.[172] It tries to identify relationships between

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[165] CRESWELL (2014), p. 185
[166] Cp. ibid
[167] Cp. CRESWELL (2014), pp. 185f.
[168] Cp. ibid, p. 186
[169] Cp. ibid
[170] Cp. ibid
[171] Cp. ibid
[172] Cp. ibid, p. 4

numeric variables by using statistical techniques.[173] Characteristically, quantitative research is positivistic and thus, tries to reveal the cause-effect relation and make bias-free assertions.[174]

Even though these two approaches tend to be combined in a so called mixed methods approach, the quantitative research approach is the more adequate approach to reach this thesis' research aim. Because to be able to answer the research question, it is necessary to reveal a cause-effect relation between WCM and firm profitability, as well as between WCM and the crisis. To do so, statistical techniques, i.e. correlation and regression analysis, is employed. The research aim (see section 3.1) requires hence a quantitative research approach.

3.3 Sampling

This thesis concentrates on SMEs because particularly smaller companies are more affected by economic crises[175] and because working capital management is crucial to small companies with limited access to capital.[176] The reasons why this study only includes companies operating in the wholesale sector is because firstly, positioned between the manufacturing sector and the retail sector, the wholesale sector has often been neglected in relevant research papers, even though it represents an important link between producers and consumers.[177] Secondly, wholesale can distinctively reflect the impact of the crisis because the nature of the wholesale industry is to sell products to retailers who resell those to consumers. Hence, the wholesale sector is highly dependent on demand. Because the crisis of 2008 was i.a. characterized by a sharp decline in consumer demand[178], one can assume that the wholesale industry must have been particularly affected by the crisis. Furthermore, this thesis only investigates Swedish companies because, on the one hand, to the best of the author's knowledge, there exists no study analyzing WCM and the relationship between the crisis and Swedish SMEs. On the other hand, Sweden has suffered from a sharp economic decline during the latest global financial crisis but interestingly Sweden has recovered much faster than most other countries.[179] This might be due to various reforms implemented after the deep recession of the early 1990s which reinforced the Swedish monetary policy framework alongside a strong labor market and improved social policies.[180]

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[173] Cp. ibid
[174] Cp. ibid, p. 7
[175] Cp. DASS (2000), pp. 135-145
[176] Cp. PETERSEN/RAJAN (1994), p. 3
[177] Cp. KASK/KIERNAN/FRIEDMAN, p. 3
[178] Cp. MAFOUTA (2015), p. 158
[179] Cp. OECD (2011), p. 9
[180] Cp. ibid

The data set is retrieved from the Swedish database Retriever Business which publishes financial statements of Swedish companies. The choice of using Retriever Business was mainly due to the easy accessibility and the completeness of the database. Retriever Business however only offers data for the last ten years which is why the observation period from 2008 to 2015 could not be extended further in the past to also analyze the relationship in the beginning and before the crisis.

To meet the relevant company criteria, only Swedish companies of the type 'Aktiebolag' that meet the EU criteria for SMEs, i.e. fewer than 250 employees, annual turnover less than 50 mEUR (corresponds to 500 mSEK[181]), and/or annual balance sheet total not exceeding 43 mEUR (430 mSEK[181]) (see also chapter 2.1.1), have been included in the sample.[182] A further selection criterion was the Swedish industry sector code (sni), to ensure that only companies operating in the wholesale sector are included in the sample. Thus, only snis starting with the numbers '46', i.e. "[w]holesale trade, except of motor vehicles and motorcycles"[183], have been applied in the selection. This led to an original sample size of 18,337 companies.

However, companies that were not active or for which relevant data was missing at least once during the observation period as well as those that announced bankruptcy during the period under review were removed from the sample. Furthermore, all companies with less than one employee or a turnover of zero for at least once were removed from the sample as it can be assumed that they represent dummy companies or that they were not active for the respective period. Additionally, all companies that showed a missing value or an amount of zero for any other relevant figure, especially concerning one of the components of working capital, were deleted to be able to calculate all necessary variables. Thus, the final sample contains 1,532 companies. For an in-detail description of the selection process see Appendix B.

For each of these companies the financial statement is derived from Retriever Business for the years 2008 until 2015 which leads to a total of 12,256 firm year observations.

3.4 Variables

The next step is to select appropriate variables. Commonly, research distinguishes between various kinds of variables. The three different types of variables relevant for this study are: (1) the dependent variable, (2) the independent variable, and (3) control variables. The independent

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[181] an average exchange rate of 10 SEK/EUR was applied
[182] Cp. THE COMMISSION OF THE EUROPEAN COMMUNITIES (2003), p. 39
[183] STATISTICS SWEDEN (2007), no page

variable is expected to impact the research object.[184] The dependent variable is, as the name suggests, dependent on the independent variable and reflects the impact of the independent variable.[185] Control variables are a special form of independent variables that are included in the model because they might bias the dependent variable.[186] To be able to investigate solely the influence of the independent variable on the dependent one, it is necessary in quantitative studies to control for this potential influence e.g. by using statistical methods like analysis of covariance.[187]

3.4.1 Main Independent Variable

Richard and Laughlin suggest that the CCC is an advantageous measure of WCM because it is not a static ratio but a dynamic measure that takes the expected lifetime of working capital components into account.[188] Like e.g. in Jose, Lancaster, and Stevens, Deloof, Raheman and Nasr, Gill, Biger, and Mathur, Anser and Malik, Yazdanfar and Öhman, Afrifa and Padachi, and Huy-Cuong, Manh-Dung, and Duc-Trung, and a majority of further relevant studies, the CCC is chosen as the most appropriate measure of WCM.[189] It is the main independent variable in this thesis because the research aim is to reveal the working capital-profitability relationship and thus, working capital (measured by the CCC) is expected to influence firm profitability.

CCC is calculated in line with Lazaridis and Tryfonidis by adding up the NDAR and NDI minus NDAP (see section 2.1.4)[190]:

$$CCC = NDAR + NDI - NDAP \tag{I}$$

3.4.1.1 Number of Days Accounts Receivable

NDAR is one of the key figures for the calculation of the CCC. It measures the average time it takes until a company's receivables are paid. If a company can reduce its accounts receivable, it can shorten its CCC.[191]

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[184] Cp. CRESWELL (2014), p. 52
[185] Cp. ibid
[186] Cp. ibid
[187] Cp. ibid, p. 53
[188] Cp. RICHARD/LAUGHLIN (1980), pp. 34-36
[189] Cp. JOSE/LANCASTER/STEVENS (1996), p. 35; Cp. DELOOF (2003), pp. 574f.; Cp. RAHEMAN/ NASR (2007), p. 280; Cp. GILL/BIGER/MATHUR (2010), p. 4; Cp. ANSER/MALIK (2013), p. 84; Cp. YAZDANFAR/ÖHMAN (2014), p. 445; Cp. AFRIFA/PADACHI (2016), p. 49; Cp. HUY-CUONG/MANH-DUNG/DUC-TRUNG (2016), p. 57
[190] Cp. LAZARIDIS/TRYFONIDIS (2006), p. 28
[191] Cp. ibid

NDAR is calculated by dividing accounts receivable with sales and multiply the outcome with the average number of days in a year:[192]

NDAR = Accounts Receivable / Sales * 365   (II)

3.4.1.2 Number of Days Inventories

NDI is the second key figure for the calculation of the CCC. It measures the average time the inventories stay in a company's stock before they are sold. In line with NDAR, a company can improve - and thus shorten - its CCC with a decrease in NDI.[193]

It is calculated by dividing the inventory with cost of goods sold and multiply the outcome with the average number of days in a year:[194]

NDI   = Inventory / Cost of Goods Sold * 365   (III)

3.4.1.3 Number of Days Accounts Payable

NDAP is the last key figure needed for the calculation of the CCC. It measures the average time it takes until a company pays its accounts payable. A company can hence shorten its CCC by lengthening the NDAP, i.e. paying its payables as late as possible.[195]

It is calculated by dividing a company's accounts payable with cost of goods sold and multiply the outcome with the average number of days in a year:[196]

NDAP = Accounts Payable / Cost of Goods Sold * 365   (IV)

3.4.2   Dependent Variable

For this thesis, the dependent variable must be a measure of profitability to be able to analyze the relationship between the CCC and firm profitability. In line with Jose, Lancaster and Stevens, a proxy for profitability (PROF) is used as it seems to be the most advantageous measure because it allows "to focus on operating efficiency and avoid capital structure differences"[197]. The impact of financial assets on profitability can be neglected because SMEs usually do not hold a considerable amount of financial assets.[198] Thanks to the negligible amount of financial

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[192] Cp. ibid
[193] Cp. ibid
[194] Cp. ibid
[195] Cp. LAZARIDIS/TRYFONIDIS (2006), p. 28
[196] Cp. ibid
[197] JOSE/LANCASTER/STEVENS (1996), p. 35
[198] Cp. DELOOF (2003), p. 576

assets it is not necessary to employ a second dependent variable like ROE as e.g. in Jose, Lancaster, and Stevens or in Wang.[199]

In line with Jose, Lancaster, and Stevens, profitability is calculated by dividing earnings before interests and taxes (EBIT) with total assets (TA):[200]

$$\text{PROF} = \text{EBIT} / \text{TA} \qquad (V)$$

3.4.3 Control Variables

Because of their potential influences on firm profitability, the following firm-level control variables have been selected: age, firm size, and debt ratio. Furthermore, a lagged dependent variable as well as a time dummy variable for the economic crisis are introduced to enhance its validity and to be able to point out how the crisis is related to WCM.

3.4.3.1 Age

According to Berger and Udell, older companies have higher opportunities of external financing[201] and thus Yazdanfar and Öhman argue that they might not be as dependent on inside financing as younger firms which leads to the assumption that age might influence a company's WCM[202]. Thus, in line with e.g. Baños-Caballero, García-Teruel, and Martínez-Solano, and Yazdanfar and Öhman, age is considered to impact firm profitability which is why it is included as control variable in this model.[203]

Following Yazdanfar and Öhman, age is calculated by subtracting the current year (the exact date used is 01/01/2018) minus the date of registration and dividing the outcome with 10,000:[204]

$$\text{AGE} = (20180101 - \text{Reg. Date}) / 10,000 \qquad (VI)$$

3.4.3.2 Firm Size

Jose, Lancaster, and Stevens introduced size as an important influential factor for firm profitability.[205] Hence, most subsequent studies, e.g. Wang, Deloof, Lazaridis and Tryfonidis, Anser

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[199] Cp. JOSE/LANCASTER/STEVENS (1996), p. 36; Cp. WANG (2002), p. 163
[200] Cp. JOSE/LANCASTER/STEVENS (1996), p. 36
[201] Cp. BERGER/UDELL (1998), pp. 622-627
[202] Cp. YAZDANFAR/ÖHMAN (2014), pp. 445f.
[203] Cp. BAÑOS-CABALLERO/GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2010), p. 516; Cp. YAZDANFAR/ÖHMAN (2014), pp. 445f.
[204] Cp. YAZDANFAR/ÖHMAN (2014), p. 445
[205] Cp. JOSE/LANCASTER/STEVENS (1996), pp. 39-42

and Malik, and Huy-Cuong, Manh.Dung, and Duc-Trung control for firm size and it is thus also included as control variable in this model.[206]

In line with e.g. Deloof, the natural logarithm of sales is used in this thesis as a proxy for firm size:[207]

$$SIZ(LN) = Ln\ (Sales) \hspace{4cm} (VII)$$

The logarithmic transformation is advantageous because it can diminish the effects of outliers and heteroscedasticity in the model equation.[208]

3.4.3.3 Debt Ratio

Following e.g. Shin and Soenen, Deloof, Lazaridis and Tryfonidis, Charitou, Elfani, and Lois, Enqvist, Graham, and Nikkinen, and Huy-Cuong, Manh-Dung, Duc-Trung, the debt ratio (DR) is employed as a measure of leverage because of its influence on firm profitability.[209]

As in Enqvist, Graham, and Nikkinen, DR is calculated by dividing total debt with TA whereby total debt is calculated by adding up short-term debt and long-term debt:[210]

$$DR = (short\text{-}term\ debt + long\text{-}term\ debt)\ /\ TA \hspace{2cm} (VIII)$$

3.4.3.4 Lagged Profitability

It can be assumed that it is advantageous to apply a dynamic model to analyze the working capital-profitability relationship during and after the crisis because e.g. Goddard and Wilson discover a connection between current and future profitability.[211] Empirical evidence for such a profitability persistence is further provided by e.g. Feeny, Harris, and Rogers, and Goddard, Tavakoli, and Wilson who link future profits to current profits.[212] To incorporate this linkage, a lagged dependent variable, short LDV, is introduced in this model.

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[206] Cp. WANG (2002), p. 166; Cp. DELOOF (2003), p. 576; Cp. LAZARIDIS/TRYFONIDIS (2006), p. 30; Cp. ANSER/MALIK (2013), p. 84; Cp. HUY-CUONG/MANH-DUNG/DUC-TRUNG (2016), pp. 56f.
[207] Cp. DELOOF (2003), p. 576
[208] Cp. JOSE/LANCASTER/STEVENS (1996), p. 43
[209] Cp. SHIN/SOENEN (1998), p. 43; Cp. DELOOF (2003), p. 576; Cp. LAZARIDS/TRYFONIDIS (2006), p. 28; Cp. CHARITOU/ELFANI/LOIS (2010), p. 65; Cp. ENQVIST/GRAHAM/NIKKINEN (2014), p. 42; Cp. HUY-CUONG/MANH-DUNG/DUC-TRUNG (2016), p. 57
[210] Cp. ENQVIST/GRAHAM/NIKKINEN (2014), p. 42
[211] Cp. GODDARD/WILSON (1999), pp. 664-668
[212] Cp. FEENY/HARRIS/ROGERS (2005), pp. 212-231; Cp. GODDARD/TAVAKOLI/WILSON (2005), pp. 1272-1280

Such a LDV approach was also employed in e.g. Baños-Caballero, García-Teruel, and Martínez-Solano who introduced $CCC_{i,t-1}$, and $Prof_{i,t-1}$, in their models to point out that firms adjust their CCC over time and to appreciate the profitability persistence.[213]

According to Keele and Kelly, a LDV can increase the robustness of a dynamic model but only when the dependent variable, in this case PROF, is stationary.[214]

Because profitability of the previous year probably influences the profitability of the following year, $PROF_{i,t-1}$ is employed as a control variable to control for the influence of lagged profitability on current profitability.

To obtain $PROF_{t-1}$, PROF is lagged one year ahead.

3.4.3.5 Crisis Dummy

Because this thesis strives to reveal the relationship between firm profitability and working capital management during and after global financial crisis, it is reasonable to include a time dummy variable into the regression analysis that represents the economic crisis. This is in line with e.g. Baños-Caballero, García-Teruel, and Martínez-Solano, Enqvist, Graham, and Nikkinen, and Proença, Laureano, and Laureano who also included a time dummy variable in their studies.[215] This dummy variable allows to perform a measurable comparison of crisis and post–crisis values.

This dummy variable is a non-metric variable and only has two concrete forms - '1' and '2'- which is why literature sometimes also refers to it as dichotomous variable. The crisis period from 2008 to 2009 is represented by '1', and '2' is assigned to the after-crisis period from 2010 to 2015. By introducing this crisis dummy variable (CD), the sample is divided into two groups and thus, results during the crisis (1) and results after the crisis (2) can be compared.

3.5 Hypotheses

To be able to answer the research question of this thesis, it is necessary to develop hypotheses that can be tested with a statistical method. Taking all described variables (see section 3.4) into account, the following six hypotheses can be developed.

The relevant variables concerning the research question (*Is working capital management related to the profitability of Swedish wholesale SMEs during and after the crisis?*) are CCC, firm

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[213] Cp. BAÑOS-CABALLERO/GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2010), pp. 519f.; Cp. BAÑOS-CABALLERO/GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2012), p. 520
[214] Cp. KEELE/KELLY (2006), pp. 23f.
[215] Cp. BAÑOS-CABALLERO/GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2010), p. 520; Cp. ENQVIST/ GRAHAM/NIKKINEN (2014), p. 42; Cp. PROENÇA/LAUREANO/LAUREANO (2014), p. 187

size, firm age, firm debt, lagged PROF, and the crisis dummy variable that either represents the time of financial turmoil ('1') or the time of economic recovery ('2'). These give rise to the following hypotheses:

Because a majority of previous research, e.g. Shin and Soenen, Deloof, Lazaridis and Tryfonidis, Raheman and Nasr, and Yazdanfar and Öhman, has revealed an inverse relationship between working capital and firm profitability, similar results are expected in this thesis.[216]

H1: There exists a significant negative relationship between CCC and PROF

In line with e.g. Jose, Lancaster, and Stevens, Deloof, Lazaridis and Tryfonidis, and Baños-Caballero, García-Teruel, and Martínez-Solano, firm size is expected to be a positive influencing factor of profitability:[217]

H2: There exists a significant positive relationship between firm size and PROF

Following e.g. the results of Mathuva and Afrifa and Padachi who argue that older firms are more experienced with their WCM and thus are more profitable than younger firms, a positive relationship between profitability and firm age is anticipated:[218]

H3: There exists a significant positive relationship between firm age and PROF

E.g. Shin and Soenen, Deloof, Lazaridis and Tryfonidis, Mathuva, and Huy-Cuong, Manh-Dung, and Duc-Trung reveal a negative relation between leverage and profitability which is why this thesis hypothesizes accordingly:[219]

H4: There exists a significant negative relationship between firm debt and PROF

Following Baños-Caballero, García-Teruel, and Martínez-Solano, a positive relation between the LDV and profitability is expected:[220]

H5: There exists a significant positive relationship between lagged PROF and PROF

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[216] Cp. SHIN/SOENEN (1998), pp. 40-43; Cp. DELOOF (2003), pp. 580-583; Cp. LAZARIDIS/TRYFONIDIS (2006), pp. 33-36; Cp. RAHEMAN/NASR (2007), pp. 289-293; Cp. YAZDANFAR/ÖHMAN (2014), pp. 448f.

[217] Cp. JOSE/LANCASTER/STEVENS (1996), pp. 43-45; Cp. DELOOF (2003), p. 582; Cp. LAZARIDIS/ TRYFONIDIS (2006), pp. 33-35; Cp. BAÑOS-CABALLERO/GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2012), pp. 253-526

[218] Cp. MATHUVA (2010), pp. 6f.; Cp. AFRIFA/PADACHI (2016), pp. 53f.

[219] Cp. SHIN/SOENEN (1998), pp. 41-43; Cp. DELOOF (2003), p. 582; Cp. LAZARIDIS/TRYFONIDIS (2006), pp. 33-35; Cp. MATHUVA (2010), pp. 6-8; Cp. HUY-CUONG/MANH-DUNG/DUC-TRUNG (2016), pp. 58-60

[220] Cp. BAÑOS-CABALLERO/GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2012), p. 523

Taking Sweden's fast recovery from the economic crisis into account, a new increase in profitability in the aftermaths of the crisis is expected which leads to the assumption that profitability is positively related to the crisis dummy:

H6: *There exists a significant positive relationship between the crisis dummy and PROF*

3.6 Model Specification

In order to test these hypotheses, an appropriate statistical method has to be selected. However, there exist a vast number of statistical methods which complicates the decision process. Some examples for commonly used statistical approaches, particularly in this respective research area, are FEM, REM, OLS method, factor analysis, t-test, or Chi-square test, to name only a few. Out of this tangle of statistical methods, multiple correlation analysis and multiple regression analysis are selected as the most adequate approach for this thesis because for one thing, multiple regressions are a rather simple way to test a linear relationship between one dependent and a number of independent variables.[221] Secondly, this selection can be justified by regarding related studies e.g. by Shin and Soenen, Wang, Eljelly, Lazaridis and Tryfonidis, Anser and Malik, and Enqvist, Graham, and Nikkinen, that all employ correlation and regression analysis for similar models to analyse the working capital-profitability relationship for listed companies in different countries.[222] However, when performing regression analyses, the researcher should, according to Kamer-Ainur and Marioara, mainly keep the problems of multicollinearity and autocorrelation in mind.[223] These issues will be addressed in the following to ensure that the regression results are meaningful. Having considered the applicability of regression analysis for this thesis, the following model equation is used to quantify the relationship between the employed variables:

$$PROF_{i,t} = \alpha + \beta_1 * PROF_{i,t-1} + \beta_2 * CCC_{i,t} + \beta_3 * SIZ(LN)_{i,t} + \beta_4 * AGE_{i,t} + \beta_5 * DR_{i,t} + \beta_6 * CD_{i,t} + \varepsilon_{i,t}$$

(IX)

Where α is the intercept, $PROF_{i,t}$ is the dependent variable and measures profitability (measured in %). $CCC_{i,t}$ is used as the proxy for WCM and is the main independent variable in this model (measured in number of days). $PROF_{i,t-1}$, lagged profitability, reflects the profitability of firm *i* lagged one year ahead. $SIZ(LN)_{i,t}$ is the natural logarithm of sales that indicates the size of a firm *i* at time *t*. $AGE_{i,t}$ stands for the age of firm *i* at the time *t*. $DR_{i,t}$ is used as a ratio to measure

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[221] Cp. HINTON (2004), pp. 322-337
[222] Cp. SHIN/SOENEN (1998), pp. 41-43; Cp. WANG (2002), pp. 163-168; Cp. ELJELLY (2004), pp. 53-58; Cp. LAZARIDIS/TRYFONIDIS (2006), pp. 33-35; Cp. ANSER/MALIK (2013), pp. 84-86; Cp. ENQVIST/ GRAHAM/NIKKINEN (2015), pp. 44-48
[223] Cp. KAMER-AINUR/MARIOARA, p. 711

the amount of leverage of company i at the time t, and $CD_{i,t}$ is the crisis dummy variable that either stands for the crisis or the post-crisis time. The latter are considered the control variables of the model. $\varepsilon_{i,t}$ is the error term of the model.

In addition to the multiple correlation and regression tests that are run in the SPSS software, in line with Uyar, analysis of variance (ANOVA) is used in this thesis to test the significance of the employed model.[224] Furthermore, a Comparison of Means test is used to identify differences in WCM and firm profitability between the two observation groups.

4. Presentation and Analysis of Results

In this chapter the results of the empirical research are presented. The first part explains the results of descriptive statistics with special regard to the Comparison of Means test. Thereafter, the results of the correlation analysis are presented and finally regression results are presented and discussed.

4.1 Descriptive Statistics

Table 1 displays descriptive statistics for the dependent as well as the independent and control variables except for the crisis dummy variable. The five columns provide information on the number of observations, minimum, maximum, and mean values as well as the standard deviations. In total, the table presents n = 12,256 firm year observations for every variable (except CD) of the sampled 1,532 Swedish wholesale SMEs for a period of eight years from 2008 to 2015. Because it would be redundant to explain the results of Table 1 in detail, the table is only included in Appendix C as comprehensive background information.

To analyze how the crisis is related to WCM and firm profitability, a Comparison of Means test and a One-way ANOVA test were run in SPSS; results are presented in Table 2.

The ANOVA test shows that the model is very robust. It presents p-values below the significance level of 5% (p=0.0 for PROF, PROF$_{t-1}$, CCC, AGE, and DR) indicating that all variables but SIZ(LN) have significantly changed from observation period 1 to observation period 2 and that this change is not due to chance. Solely the p-value for SIZ(LN) is not significant at the 5%-level which indicates that there is no statistically significant difference between firm size in the two observation groups. In line with the strong p-values, F-values (except again for

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[224] Cp. UYAR (2010), p. 190

SIZ(LN)) are high and support the conclusion that the model is statistically significant and can claim high validity.

The Comparison of Means test shows a significant decrease of 1.7% in PROF when comparing the mean PROF of the crisis period (9.5%) with the mean PROF of the post-crisis period (7.8%). This indicates that profitability was significantly affected by the economic crisis and that the average profitability of wholesale companies continued to decrease in the aftermaths of the crisis. A possible explanation might be that retailers had built up a stock of inventory during the crisis and did not need to purchase additional goods during the recovery period as also consumer behavior only gradually returned to normal. This would initially lead to a decrease in turnover for the wholesale industry and thus, in a decrease of profitability for the first period after the crisis. A further attempt at explanation is provided by observations of Mulyono, Djumahir, and Ratnawati who detect a general downward trend for firm profitability with the example of Indonesian state fertilizer companies (-13.87% per year).[225] The standard deviation of PROF is slightly higher during the post-crisis period, with a standard deviation of 13.4% during the crisis and of 15% during the economic recovery period. This implies that the sampled companies might have recovered from the crisis at different paces. The slightly lower standard deviation during the crisis implies that there were less deviations from the mean profitability during the crisis whereas during the recovery period, a slightly higher standard deviation indicates a marginally greater deviation from the average PROF which reflects that some companies experienced a more pronounced increase/decrease of profitability after the crisis.

In accordance with initial expectations but contrary to findings of Duggal and Budden[226], the CCC shows a drastic decrease from observation period 1 to observation period 2. ANOVA results state that this change is significant and not due to chance. The average CCC during the crisis is 200.3 days whereas the value dropped almost by half to 101.4 days after the crisis. This supports the findings of the PWC survey which revealed that companies generally had a long CCC during the crisis e.g. due to bad payment behavior and increase in stocks.[227] This development indicates that during the crisis, companies tried to decrease their risk of running out of cash by adapting a more conservative WCM strategy. Following the risk-return tradeoff, this should have led to a decrease in profitability. However, this assumption cannot be tested in this thesis due to the restricted time horizon of the employed sample. As the CCC decreased during

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[225] Cp. MULYONO/DJUMAHIR/RATNAWATI (2018), p. 95
[226] Cp. DUGGAL/BUDDEN (2012), p. 755
[227] Cp. PWC (2015), p. 3

the recovery period it can be concluded that, with the beginning economic recovery, the sampled wholesale companies e.g. reduced their inventories and saw less need to hold a large amount of cash. This reflects that companies were again less afraid of taking risks which might be thanks to a broad number of soothing policy measures introduced by the Swedish government, e.g. relaxing financial policy requirements and reducing the corporate income tax rate.[228] Despite the general expectation that such a more aggressive WCM strategy should lead to an increase in profitability, profitability in this sample continued to decline marginally which might be a result of the generally weak state of the majority of sampled companies. Altogether, it is remarkable that Swedish companies adjusted their working capital so quickly after the financial crisis as e.g. the PWC survey states that globally, working capital continued to increase after the crisis and the first significant improvements in WCM could be observed as late as 2014.[229] Standard deviation is still very high for CCC, especially for the crisis period (1,985 days). This indicates that the deviations concerning WCM were substantial during the crisis, hinting at how severely the crisis has deranged companies' financial management. Taking into account that the standard deviation of the CCC is remarkably lower during the economic recovery period (183 days), it can be deduced that Swedish firms more or less agreed on the most profitable WCM strategy, i.e. reducing the CCC, even though not all of them might have been able to fully employ this strategy already.

There is a statistically significant change in age between the two observation periods as logically age gradually increases over time. During the crisis, companies were averagely 25 years old and the post-crisis mean value is 29 years.

The statistically significant decrease of the debt ratio, from 51.4% during the crisis to 47.3% after the crisis, indicates that companies reduced their amount of leverage since the crisis by 4.1%. The standard deviation of 18% in the post-crisis period is 1% higher than during the crisis (17%) which indicates a slightly greater spread in the level of indebtedness in the aftermaths of the crisis.

Results suggest that there is no statistically significant difference in company size between the two observation periods. The mean value for the crisis is 9.88 and the mean value for after the crisis is 9.90. This indicates that firm size, possibly due to the impacts of the economic crisis, could not significantly increase from 2008 to 2015. Standard deviation for both observation

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[228] Cp. OECD (2008), pp. 17f.
[229] Cp. PWC (2015), pp. 3-5

periods ranges around 1.6 signifying that there is a spread in firm size of plus/minus 1.6 around the mean value.

Overall, ANOVA results indicate that there is a statistically significant difference between the two groups 'crisis' and 'post-crisis' which supports the elementary assumption that the crisis is significantly related to firm profitability and to WCM practices of Swedish wholesale SMEs.

Table 2
Comparison of Means & ANOVA
1,532 Swedish Wholesale SMEs, 2008-2015: 12, 256 Firm Year Observations

CD		PROF	$PROF_{t-1}$	AGE	CCC	DR	SIZ(LN)
1	**Mean**	0.0951636	0.1155391	25.2651321	200.3765648	0.5144047	9.8778349
	N	3,064	3,064	3,064	3,064	3,064	3,064
	Std.Dev	0.1339988	0.1326972	16.5852022	1,985.341383	0.1696921	1.5492537
2	**Mean**	0.0778374	0.0825480	29.2584920	101.3740845	0.4728895	9.9054552
	N	9,192	9,192	9,192	9,192	9,192	9,192
	Std.Dev	0.1497032	0.1322827	16.6709422	183.1900374	0.1797576	1.6332819
Total	**Mean**	0.0821689	0.0907958	28.2601520	126.1247046	0.4832683	9.8985501
	N	12,256	12,256	12,256	12,256	12,256	12,256
	Std.Dev	0.1461230	0.1331496	16.7384365	1006.061661	0.1781971	1.6126673
Main Results of ANOVA between observ. periods							
F		32.392	142.711	132.197	22.292	126.000	0.674
Sig.		0.000	0.000	0.000	0.000	0.000	0.412

p<0.05

4.2 Correlation Analysis

Table 3 presents the results of the Pearson correlation analysis for all variables included in the model equation. Almost all coefficients are statistically significant at least at the 5%-level, except of the correlation between crisis dummy and size, lagged profitability and CCC, as well as CCC and leverage. For these variables the analysis hence cannot identify a correlation different from zero. Moreover, the correlation results imply that the risk of multicollinearity is low because correlations are generally rather low, i.e. none of the correlations shows results above 0.8.[230]

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[230] Cp. HINTON et al. (2004), p. 323

The crisis dummy (CD) shows significant negative correlations with PROF, lagged PROF, CCC, and debt ratio which is an indicator for how the crisis is negatively related to profitability, working capital, and leverage of Swedish wholesale SMEs. The significantly positive correlation between CD and age indicates that older companies might have been less affected by the crisis. The absence of a significant correlation between the crisis and firm size suggests that the size of the firm did not have any influence on its degree of affectedness by the crisis.

PROF is significantly negatively correlated with CCC. This is in line with the generally taken view that reducing the CCC, which means following an aggressive working capital policy, can lead to profitability improvements. Moreover, the analysis shows a significant negative correlation between PROF and firm age and PROF and leverage. This indicates that as age and debt increase, profitability declines.

Lagged PROF shows the same signs as PROF for all correlations. Notably, lagged PROF is more strongly correlated with the crisis dummy than is PROF. This indicates that the economic crisis might have influenced profitability of Swedish wholesale SMEs with a time lag which could also help to explain the continuous decrease in PROF after the crisis that was revealed in the descriptive statistics in Table 1 (see Appendix C) and Table 2 (see section 4.1). Furthermore, lagged PROF is not significantly correlated with CCC, but the correlation shows the same direction as the correlation between PROF and CCC.

Further interesting correlation results are the significant negative correlation between CCC and firm age as well as between CCC and firm size. These findings imply that older or bigger companies tend to have a shorter CCC. Considering that shortening the CCC is generally viewed as the advantageous financial strategy, these correlation results could be explained with the higher experience level of older companies respectively with the greater availability of resources for the financial planning of bigger firms. As CCC is not significantly correlated with debt ratio, no correlation different from zero could be discovered between these two variables. This suggests that working capital practices are not significantly influenced by a company's amount of leverage.

Nevertheless, regarding Pearson correlation results, it is important to understand that they do not enable to differentiate between causes and consequences.[231] Therefore, a multiple regression analysis is run in the SPSS software in addition to the multiple correlation analysis to be able to make valid statements concerning the hypotheses.

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[231] Cp. DELOOF (2003), p. 578

Table 3
Pearson Correlation Analysis
1,532 Swedish Wholesale SMEs, 2008-2015: 12, 256 Firm Year Observations

		CD	PROF	PROF$_{t-1}$	AGE	CCC	DR	SIZ(LN)
CD	Pearson Cor.	1	-.051**	-.107**	.103**	-.043**	-.101**	0.007
	Sig. 2-tailed		0.000	0,000	0.000	0.000	0.000	0.412
	N	12256	12256	12256	12256	12256	12256	12256
PROF	Pearson Cor.	-.051**	1	.460**	-.030**	-.058**	-.167**	.166**
	Sig. 2-tailed	0.000		0.000	0.001	0.000	0.000	0.000
	N	12256	12256	12256	12256	12256	12256	12256
PROF$_{t-1}$	Pearson Cor.	-.107**	.460**	1	-.046**	-0.007	-.146**	.123**
	Sig. 2-tailed	0.000	0.000		0.000	0.438	0.000	0.000
	N	12256	12256	12256	12256	12256	12256	12256
AGE	Pearson Cor.	.103**	-.030**	-.046**	1	-.019*	-.037**	.289**
	Sig. 2-tailed	0.000	0.001	0.000		0.036	0.000	0.000
	N	12256	12256	12256	12256	12256	12256	12256
CCC	Pearson Cor.	-.043**	-.058**	-0.007	-.019*	1	-0.004	-.071**
	Sig. 2-tailed	0.000	0.000	0.438	0.036		0.622	0.000
	N	12256	12256	12256	12256	12256	12256	12256
DR	Pearson Cor.	-.101**	-.167**	-.146**	-.037**	-0.004	1	.131**
	Sig. 2-tailed	0.000	0.000	0.000	0.000	0.622		0.000
	N	12256	12256	12256	12256	12256	12256	12256
SIZ(LN)	Pearson Cor.	0.007	.166**	.123**	.289**	-.071**	.131**	1
	Sig. 2-tailed	0.412	0.000	0.000	0.000	0.000	0.000	
	N	12256	12256	12256	12256	12256	12256	12256

**. Correlation is significant at the 0.01 level (2-tailed).

 *. Correlation is significant at the 0.05 level (2-tailed).

4.3 Regression Analysis

In line with Shin and Soenen, Deloof, Anser and Malik, and Enqvist, Graham, and Nikkinen, this model equation surmises a linear relationship between the variables.[232] For this reason, a

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[232] Cp. SHIN/SOENEN (1998), pp. 41-43; Cp. DELOOF (2003), p. 573; Cp. ANSER/MALIK (2013), p. 84; Cp. ENQVIST/GRAHAM/NIKKINEN (2014), p. 44

linear multiple regression analysis is employed to further test the relationship between the independent and the dependent variable. This allows to predict to what extent the variation in scores on independent and control variables, i.e. CCC, lagged PROF, firm age, firm size, leverage, and the crisis dummy, can predict the variation in the scores on the dependent variable, i.e. profitability, and how much is due to error.[233]

Table 4 presents the model summary including ANOVA results which gives information about the quality of the regression analysis. The R-value (R) represents the multiple correlation coefficient and indicates the strength of the relationship between dependent and independent variables. In this regression, the R-value of 49.4% indicates a moderately strong relationship between profitability and the predictor variables, i.e. CCC, $PROF_{t-1}$, AGE, SIZ(LN), DR, and CD. R^2 (R-Square) reveals that 24.4% of the variance in profitability can be explained by the independent variables employed in the model equation. This implies that almost 75% of the variation cannot be explained by the chosen variables and gives incentives for future research that could include additional variables. Nevertheless, in combination with the remaining results, this can be regarded as an acceptably satisfying value. The Adjusted R^2 "adjusts for a bias in R Square"[234]. In this regression it shows almost the same result as R^2 which is due to the limited number of predictor variables employed in the model equation and hence R^2 is the more relevant output in this case.[235] The standard error of the estimate measures the variability of the multiple correlation.[236] It is very small in this model implying that the average gap between the regression line and the observed values is only 0.13 which indicates that the model is on average very accurate. Furthermore, because of the risk of autocorrelation in time-series data, a Durbin-Watson test should be included in the evaluation of the model quality. It shows a highly satisfying value of 1.99, with a value of 2 representing no autocorrelation. Thus, it can be assumed that observations are independent and that there is almost no risk of autocorrelation in these regression data. Including ANOVA results in the evaluation, the high F-value (658.2) and the p-value of 0.0 signify hat the model explains a statistically significant amount of the variance in profitability. Mean Square results from dividing sum of squares with degrees of freedom and indicates the amount of variance.[237] Considering that the mean square of the regression is greater than the mean square of the residual, regression results indicate that the regression itself can

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[233] Cp. HINTON et al. (2004), pp. 148/323
[234] Ibid, p. 329
[235] Cp. ibid
[236] Cp. ibid
[237] Cp. ibid, p. 330

explain significantly more variance than the error. Overall, the multiple linear regression model can hence, despite the relatively low R^2 value, claim high statistical significance.

Table 4

Regression Model Summary [b]

1,532 Swedish Wholesale SMEs, 2008-2015: 12, 256 Firm Year Observations

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Durbin-Watson	Mean Square	F	Sig.
1	0.494[a]	0.244	0.243	0.12709945	1.989	10.632 (Regression) 0.016 (Residual)	658.179	0.000[a]

a. Predictors: (Constant), CD, SIZ(LN), CCC, PROF$_{t-1}$, DR, AGE
b. Dependent Variable: PROF

$p<0.05$

After having outlined the overall statistical significance of the model, the specific coefficients of each variable, namely lagged PROF, CCC, AGE, SIZ(LN), DR, CD, are to be identified to determine which of the variables significantly add to the comprehension of the dependent variable, i.e. PROF.

> The Unstandardized Coefficients B column, gives us the coefficients of the independent variables in the regression equation including all the predictor variables. […] The Standardized Beta Coefficient column shows the contribution that an individual variable makes to the model.[238]

Moreover, t-tests and p-values point out which predictors are significant. To examine for multicollinearity, collinearity statistics, comprising tolerance and Variance Inflation Factor (VIF), are included in Table 5.

Observing t-tests and p-values, it becomes clear that all variables entered in the regression are statistically significant due to p-values smaller than the applied significance level of 5%, except for the intercept which is not significant with a p-value of 0.129 (>0.05). To test for multicollinearity problems, tolerance and VIF are studied more closely. While tolerance shows how strongly the independent and control variables are linearly related to each other, VIF measures the degree of collinearity[239]. Hence, both measures can indicate if the inclusion of all the variables in this model was justified. Tolerance can accept values from 0 to 1 while 0 indicates that the variable cannot provide added value to the model.[240] All independent and control variables

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[238] HINTON et al. (2004), p. 331
[239] Cp. MANSFIELD/HELMS, p. 160
[240] Cp. ELJELLY (2004), p. 56

in this model show tolerance values close to 1 which implies that all variables included in the model are independent and their inclusion is justified. The VIF is also studied to appreciate the risk of multicollinearity in this model. Orthogonal data will show VIFs equaling 1.[241] Commonly, a VIF substantially higher than 1 is considered to indicate high collinearity, hence the lower the VIF, the lower the risk of multicollinearity.[242] As the VIF for all variables is very low, it equals approximately 1, it becomes clear that the variables are independent and so the danger of multicollinearity is low in this model. The overall diagnostics tests, i.e. F-statistics, Durbin-Watson test, tolerance and VIF, confirm the statistical significance and validity. Hence, the overall explanatory power of this model is very strong.

Considering the statistical significance, one can start taking a closer look at the coefficients. These show a statistically highly significant, positive relationship between PROF and $PROF_{t-1}$. This is e.g. in line with Baños-Caballero, García-Teruel, and Martínez-Solano.[243] More specifically, the coefficient indicates that for every unit increase in $PROF_{i,t-1}$, PROF increases by 0.46 holding that all other variables are zero. H5 can hence be accepted. The unstandardized coefficients standard error indicates that variability of lagged PROF is low with only 0.009. These results support the assumption that a company's profitability depends on their level of previous year profitability and can help to explain the downward trend in profitability in the aftermaths of the global financial crisis.

The relationship between PROF and CCC is statistically highly significant and negative, implying that a decrease in CCC by one unit leads to an increase in profitability by 6.856E-06 with a standard error of 0.0. These results are in line with e.g. Shin and Soenen, Deloof, Lazaridis and Tryfonidis, and Anser and Malik who also find a negative relationship between those two variables.[244] This supports the initially held expectations of an inverse relationship between CCC and profitability and hence H1 will be accepted. A short CCC can accordingly function as an indicator for efficient WCM.[245] Thus, SMEs should abridge their CCC to employ effective WCM seeing that it makes their cash flows more easily available and thus, efficient WCM can generate more profit.[246]

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[241] Cp. MANSFIELD/HELMS, p. 160
[242] Cp. ibid
[243] Cp. BAÑOS-CABALLERO/GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2012), p. 523
[244] Cp. SHIN/SOENEN (1998), pp. 42f.; Cp. DELOOF (2003), pp. 580-583; Cp. LAZARIDIS/TRYFONIDIS (2006), pp. 30-34, Cp. ANSER/MALIK (2013), p. 86
[245] Cp. NASER/NUSEIBEH/AL-HADEYA (2013), p. 12
[246] Cp. ibid

Also, firm age is statistically significantly related to profitability. However, because the coefficient of AGE is 0.0, a change in age by one year leads to no change in firm profitability which is why H3 must be rejected. This is in contrast to e.g. Yazdanfar and Öhman who find a significant negative relationship between age and profitability[247] and also to e.g. Mathuva and Afrifa and Padachi who find a significant positive relationship between profitability and firm age[248].

The regression exhibits furthermore a statistically significant, positive relationship between firm size and profitability, indicating that for every unit firm size increases, profitability rises by 0.013 on condition that all other variables are zero. This relationship shows a variability of 0.001. In line with e.g. Jose, Lancaster, and Stevens, Deloof, and Lazaridis and Tryfonidis, this result suggests that profitability increases when firm size increases.[249] This leads to the acceptance of H2.

Moreover, the regression results suggest that there is a negative relationship between the debt ratio and PROF. Apparently, with a variability of 0.007, for every unit the debt ratio decreases, profitability increases by 0.106. This result is highly significant and supports results of e.g. Shin and Soenen and Lazaridis and Tryfonidis. [250] Thus, H4 is accepted.

The crisis dummy exhibits a statistically significant, negative relation with firm profitability. Regression results suggest therefore that during the global financial crisis, profitability was 0.6% higher than during the post-crisis period. As outlined earlier in section 4.1, this surprising result might possibly be explained by a tardily growing demand after the crisis and thus the recovery period is still characterized by continuously low profitability. This leads to the rejection of H6.

The relationships of the independent and control variables with the dependent variable can be summarized in the following equation:

$$PROF_{i,t} = -0.014 + 0.46*PROF_{i,t-1} - 6,856\text{E-}06*CCC_{i,t} + 0.0*AGE_{i,t} + 0.013*SIZ(LN)_{i,t} -$$

$$0.106*DR_{i,t} - 0.006*CD_{i,t} + \varepsilon_{i,t} \tag{X}$$

[247] Cp. YAZDANFAR/ÖHMAN (2014), pp. 448f.
[248] Cp. MATHUVA (2010), pp.6f.; Cp. AFRIFA/PADACHI (2016), pp. 53f.
[249] Cp. JOSE/LANCASTER/STEVENS (1996), pp. 39-43; Cp. DELOOF (2003), p. 582; Cp. LAZARIDIS/ TRYFONIDIS (2006) p. 31
[250] Cp. SHIN/SOENEN (1998), pp. 41-43; Cp. LAZARIDIS/TRYFONIDIS (2006), p. 31

Table 5
Regression Analysis
1,532 Swedish Wholesale SMEs, 2008-2015: 12, 256 Firm Year Observations

Model	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1 (Constant)	-0.014	0.009		-1.520	0.129		
PROF$_{t-1}$	0.460	0.009	0.419	51.566	0.000	0.935	1.070
CCC	-6.856E-06	0.000	-0.047	-5.987	0.000	0.993	1.007
AGE	0.000	0.000	-0.056	-6.758	0.000	0.895	1.117
SIZ(LN)	0.013	0.001	0.145	17.152	0.000	0.867	1.153
DR	-0.106	0.007	-0.129	-15.880	0.000	0.935	1.070
CD	-0.006	0.003	-0.017	-2.086	0.037	0.964	1.037

Dependent Variable: PROF
$p < 0.05$

5. Discussion and Conclusions

Shin and Soenen found that efficient WCM can increase firm profitability and, following the risk-return tradeoff, can reduce the financial risk.[251] This leads to the conclusion that WCM is an essential part of a company's financial management that can help to improve firm performance. Therefore, this thesis aimed at empirically analyzing how WCM is related to profitability and their relation to the global financial crisis of 2008/09.

For this purpose, financial information of a final sample of 1,532 SMEs operating in the Swedish wholesale industry was collected. This data was further analyzed by applying a multiple correlation and multiple regression analysis. More detailed information about the relationship between the global financial crisis and WCM was gained by performing a Comparison of Means analysis that allowed to compare, with the help of a crisis dummy variable, the results between the crisis period from 2008 to 2009 and the post-crisis / economic recovery period from 2010 to 2015.

By studying ANOVA results, it was found that the information gained by running all these tests are highly significant. Thus, empirical evidence for a statistically significant negative relationship between the CCC, as comprehensive measure of working capital, and profitability was found which indicates that firm profitability can be increased by reducing the CCC. This finding

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[251] Cp. SHIN/SOENEN (1998), pp. 41-43

supports conclusions reached in previous studies, e.g. in Shin and Soenen, Wang, Deloof, Lazaridis and Tryfonidis, García-Teruel and Martínez-Solano, Anser and Malik, and Yazdanfar and Öhman.[252] Recollecting the theoretical foundations of WCM presented in section 2.1.5 can help to find possible explanations for this inverse relationship; e.g. high inventory levels that contribute to a high amount of working capital are accompanied by costs, e.g. storage costs, and thus, in a greatly simplified approach, decrease profitability; same applies to accounts receivable whereas a low amount of accounts payable, that leads to high working capital, implies that if companies do not make use of cheap financing opportunities, firm profitability will decrease. This reflects that maintaining high working capital corresponds to an unprofitable capital tie-up that in turn might lead to a profitability decrease. Regression results imply that managing the CCC efficiently, i.e. reduce the CCC, can contribute to a profitability increase for Swedish wholesale SMEs. This leads to an affirmation of this thesis' research question as the results indicate that there is a significant relationship between WCM and the profitability of Swedish wholesale SMEs and it should therefore play an important role in their financial strategies.

The control variables firm size and debt ratio are also significantly related to firm profitability and thus should be included in performance considerations of Swedish wholesale SMEs. This holds also true for lagged profitability which is included to appreciate the dynamism of the model and indicates that a firm's profitability level is positively related to its previous year profitability. This finding is e.g. supported by Baños-Caballero, García-Teruel, and Martínez-Solano.[253] In contrast to e.g. Mathuva, Yazdanfar and Öhman, and Afrifa and Padachi, the results indicate that firm age does not influence firm profitability[254] whereas the positive relationship between firm size and profitability indicates that larger companies are more profitable. The latter finding is in agreement with findings in e.g. Jose, Lancaster, and Stevens, Wang, Deloof, and Lazaridis and Tryfonidis.[255] The negative coefficient of debt ratio implies that more indebted companies will be less profitable which is e.g. supported by findings of Shin and Soenen,

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[252] Cp. SHIN/SOENEN (1998), pp. 42f.; Cp. WANG (2002), pp. 164-168; Cp. DELOOF (2003), pp. 580-583; Cp. LAZARIDIS/TRYFONIDIS (2006), pp. 30-34; Cp. GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2007), pp. 175-177; Cp. ANSER/MALIK (2013), p. 86; Cp. YAZDANFAR/ÖHMAN (2014), pp. 448f.
[253] Cp. BAÑOS-CABALLERO/GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2012), p. 523
[254] Cp. MATHUVA (2010), pp. 6f.; Cp. YAZDANFAR/ÖHMAN (2014), pp. 448f.; AFRIFA/PADACHI (2016), pp. 53f.
[255] Cp. JOSE/LANCASTER/STEVENS (1996), pp. 39-43; Cp. WANG (2002), pp. 166f.; Cp. DELOOF (2003), pp. 580f.; Cp. LAZARIDIS/TRYFONIDIS (2006), pp. 31-34

Deloof, Lazaridis and Tryfonidis, and García-Teruel and Martínez.Solano.[256] Thus, large companies with a short CCC that were profitable in the previous year and have a high level of equity financing will most probably be more profitable.

The crisis dummy variable, that was included to be able to test the relationship between the global financial crisis and WCM, is also significantly related to profitability indicating that economic conditions also play a role for firm profitability. The regression results for the dummy variable indicate that profitability, in contrast to expectations, was lower during the recovery period than in times of the crisis. This may surprise at first but may possibly be explained by the continuous lack of consumer demand immediately after the economic downturn since this observation period only includes the economic recovery period and omits the time of full economic recovery. Adding this finding to the results of the Comparison of Means analysis (Table 2), it becomes clear that the global financial crisis is substantially related not only to firm profitability but also to the WCM of Swedish wholesale SMEs who drastically reduced their working capital levels as soon as the crisis was over. One of the reasons for the increased working capital level during the crisis might be the increase in inventory levels that was due to a cut in consumer demand. Probably the fear of insolvency also led to a general increase in cash levels and most noticeably, the overall payment behavior deteriorated with the crisis which led to increasing accounts receivable which increased working capital levels. With the economic recovery, companies apparently refocused on financially advantageous strategies because as soon as the economic crisis subsided, Swedish SMEs operating in the wholesale sector managed to cut their working capital almost in half. Thus, these results reinforce the affirmation of the research question and allow to suggest that the global financial crisis of 2008/09 is significantly related to firm profitability and WCM.

Overall, the research results serve this thesis' research purpose, i.e. finding a significant positive relationship between firm profitability and WCM in Swedish wholesale SMEs and showing that results during the crisis differ significantly from results after the crisis. By doing so, this thesis provides valuable information about optimal WCM strategies with a special regard to the economic crisis that cannot only support the financial management and owners of Swedish wholesale SMEs, but also gives valuable insights for fellow researchers, and policymakers. It was found that companies can increase profitability by employing efficient WCM, i.e. shorten-

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[256] Cp. SHIN/SOENEN (1998), pp. 42f.; Cp. DELOOF (2003), pp. 580f.; Cp. LAZARIDIS/TRYFONIDIS (2006), pp. 31-34; Cp. GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2007), p. 174

ing the CCC. Owners and managers should therefore further evaluate challenges and opportunities associated with economic turmoil as efficient WCM could enable them to maintain a higher level of profitability not only in good economic states but also during a financial crisis.

Finally, the limitations of this study have to be pointed out and kept in mind when evaluating the findings of this study. As already mentioned, the study's sample consists of rather underperforming companies, mainly reflected in the descriptive statistics in Table 1 and Table 2, which might reduce the generalizability of results. Additionally, the time horizon is limited to 2008 to 2015 due to unavailability of data before 2008. This impedes the investigation of the full crisis time (from 2007 to 2009) and it is also not possible within this thesis to take the pre-crisis time into account which prevents this study from comparing results during and after the crisis to the situation before the crisis.

These limitations give incentives for future research. Future studies could e.g. test the generalizability of results and test how the economic crisis affected a bigger sample of Swedish SMEs, possibly including more than one industry. Doing so would serve as an interesting complement to this thesis which is limited to a rather small and apparently underperforming sample of Swedish SMEs operating in the wholesale sector. In a couple of years, it could also be interesting to include the period of full economic recovery in the analysis to test if profitability has again increased or whether there is a general downward trend in the profitability like suggested in Mulyono, Djumahir, and Ratnawati.[257] Furthermore, considering that the PWC study suggests that globally post-crisis WCM did not increase as rapidly as shown for this sample[258], it might be interesting to compare the characteristics of the Swedish economic recovery period to characteristics of other countries recovery periods. Moreover, it might also be of interest to analyze the working capital-profitability relationship and WCM practices not only during and after the crisis but also before the global financial crisis.

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[257] Cp. MULYONO/DJUMAHIR/RATNAWATI (2018), p. 95
[258] Cp. PWC (2015), pp. 3-5

Appendix A - Literature Overview

Issue 1.1: Determinants of Working Capital Management

Study	Country	Sample	Observation Period	Methodology	Dependent Variables	Independent/ Control Variables	Proxy for WCM	Findings			Main Conclusions	Further Information of Interest	Citation
								Negative Relation	Positive Relation	No Significant Relation			
HAWAWINI/VIALLET/VORA (1986)	USA	1181 firms	1960-1979	-	WCR	industry	NWC	-	-	-	- results indicate that there exists a significant industry effect on firm's investment in working capital and that this effect is persisted over the nineteen years covered by the study.	-	HAWAWINI, Gabriel/VIALLET, Claude/VORA, Ashok (1986): Industry Influence on Corporate Working Capital Decision, in: Sloan Management Review,
MOSS/STINE (1993)	USA	1,717 observations of only retail firms	1971-1990	regression analysis	CCC	size (measured by net sales & total assets), current ratio, quick ratio, cash flow	CCC	cash flow	current ratio, quick ratio		-largest firms are better managers of their cash conversion cycles. The analysis shows that the smallest firms could improve their cash conversion cycles by concentrating on the inventory and receivable conversion periods	-	MOSS, Jimmy/STINE, Bert (1993): Cash Conversion Cycle and Firm Size: a Study of Retail Firms, in: Managerial Finance, Vol. 19 No. 8 (1993), pp. 25-34
KIESCHNICK/LAPLANTE/MO USSAWI (2006)	USA	-	1990-2004	regression analysis	CCC	industry (CCCM), firm size, proportion of a firm's assets (PTA), future sales growth (FSG), Herfindahl-Hirschman index (HHI)	CCC	PTA	future sales growth, CCCM, firms size, HHI		-firms tend to over-invest in working capital on average		KIESCHNICK, Robert/LAPLANTE, Mark/MOUSSAWI, Rabih (2006): Corporate Working Capital Management: Determinants and Consequences, in: International Journal of Managerial Finance, Vol. 3 No. 2 (2006), pp. 164-177
BAÑOS-CABALLERO/GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2010)	Spain	4,076 SMEs	2001-2005	partial adjustment model, panel data methodology: ordinary least squares (OLS) estimation and fixed effects model	CCC	cash flow, leverage, growth, size, age, investment in fixed assets, ROA, variable for the unobservable heterogeneity.	CCC	Cash Flow, Leverage, ROA, fixed assets	lagged CCC, growth, size, age	interest rates GDP growth		-	BAÑOS-CABALLERO, Sonia/ GARCÍA-TERUEL, Juan/MARTÍNEZ-SOLANO, Pedro (2010): Working Capital Management in SMEs, in: Accounting and Finance, Vol. 50 No. 3 (2010), pp. 511-527
HILL/KELLY/HIGHFIELD (2010)	USA	3,343 companies	1991-2006	fixed effects regression	WCR	Growth, gross profit margin (GPM), SaleVAR, OCF, market-to-book ratio (M/B), Size, MktShare, Distress, control for time-specific macroeconomic factors	WCR-to-sales ratio	sales growth, uncertain demand, cost of external financing, financial distress	operating cash flow, capital market access	lagged GPM, lagged market share	-managers react to greater sales volatility by managing working capital more aggressively -firms with greater operating cash flows manage working capital more conservatively -firms with greater costs of external finance seek to reduce the WCR, probably to avoid costly external financing. -distressed firms manage operating working capital more aggressively than nondistressed firms. A more restrictive working capital policy is a rational response to financial distress due to the limited financial slack and cash generating ability of	-	HILL, Matthew/KELLY, G. Wayne/HIGHFIELD Michael (2010): Net Operating Working Capital Behavior: a First Look, in: Financial Management, Vol. 39 No. 2 (2010), pp. 783-805
RIMO/PANBUNYUEN (2010)	Sweden	40 listed firms	2007-2008	regression analysis	CCC	profitability, operating cash flow, company size, sales growth	CCC	operating cash flow, company size, sales growth	profitability, four industry classifications(material s, industrials, health care and information technology)	-	- profitability, operating cash flow, company size and sale growth affect the working capital management in Swedish listed companies. - We have found a significant positive relation between profitability and the cash conversion cycle. The positive relationship demonstrates that an increase in profitability, measured by return on assets, have an impact on a rise in the length of the cash conversion cycle which indicate less effective working capital management. - we have found that the length of the cash conversion cycle have inverse relations with operating cash flow, company size and sale growth. Increases in these three factors, operating cash flow, company size and sale growth, reduce the length of the cash conversion cycle which indicate effective working capital management	- Accordingly, companies with these four characteristics, low profit, surplus operating cash flow, large company size, high growth rate, tend to have more efficient working capital management for the case of Swedish listed companies	RIMO, Alexandra/PANBUNYUEN, Podjaman (2010): The Effect of Company Characteristics on Working Capital Management: a Quantitative Study of Swedish Listed Companies, master's thesis, Umeå, Umeå University, Sweden, 2010, pp. 1-63
UYAR (2010)	Turkey	166 listed corporations from seven industries (i.e. food, paper, metal, metalware, cement, chemicals and textile)	2007	ANOVA and Pearson correlation analyses	WCR	size profitability	CCC	size, profitability	-	-	-the lowest CCC is found in the retail/wholesale industry, with an average of 34.58 days. The main reason for this is that retail/wholesale industry do not manufacture goods, rather it keeps ready-for-sale goods in its warehouse. Hence, it has shorter days in inventory. Secondly, the retail/wholesale industry makes cash sales or credit sales with short maturity. Moreover, the retail/ wholesale industry is slower in paying its accounts payable to its suppliers. -smaller firms have longer CCC -the longer CCC, the less profitable you are. The probable reasons are keeping inventory for a long time, being slow in collecting	-	UYAR, Ali (2010): The Relationship of Cash Conversion Cycle with Firm Size and Profitability: an Empirical Investigation in Turkey, in: International Research Journal of Finance and Economics, Vol. 24 (2010), pp. 186-193
GILL (2011)	Canada	188 listed firms	2008-2010	Ordinary Least Square (OLS) regression model	WCR	Operating cycle, operating cash flows, Firm's growth, Return on assets, Tobin's q, Leverage, Firm Size, Internationalization, Industry	WCR_TA	growth, firm size	operating cycle, ROA, internationalization, industry	OCF, Tobin's q, leverage	-	-	GILL, Amarjit (2011): Factors that Influence Working Capital Requirements in Canada, in: Economics and Finance Review, Vol. 1 No. 3 (2011), pp. 30-40
ABBADI/ABBADI (2012)	Palestine	11 listed, industrial firms	2004-2011	multiple regression analysis, using time-series and cross-sectional observations, Ordinary Least Square Method	CCC	Operating Cash Flow (OCF), Firm Size, Profitability (ROA), Leverage (Lev), GDPR, Interest Rate on Loans and Advances(R)	CCC	Lev, Firm Size	ROA, OCF	GDP R	- firms with higher profits are less concerned with the efficient working capital -the higher the leverage the more attention has to be paid by the firms to reduce capital that is tied to current assets -The larger the firm the less working capital to total assets is required	-	ABBADI, Suleiman/ABBADIA, Rasha (2012): The Determinants of Working Capital Requirements in Palestinian Industrial Corporations, in: International Journal of Economics and Finance, Vol. 5 No. 1 (2012), pp. 65-75

Study	Country	Sample	Period	Methodology	Measure	Independent variables	Measure				Results		Reference
AKINOLO (2012)	Nigeria	66 listed firms	1997-2007	pooled OLS, fixed effects, and random effect model	WCR	sales growth, operating cycle, firm size, leverage	CCC	leverage	sales growth, operating cycle, size	-	- increased sales growth leads to increased working capital requirements - the higher the days of operating cycle, the higher the working capital that would be required by firm as operative necessity	-	AKINOLO, Olayinka (2012), Determinants of Working Capital Requirements in Selected Quoted Companies in Nigeria, in: Journal of African Business, Vol. 13 No. 1, pp. 40
MANSOORI/MUHAMMAD (2012)	Singapore	94 listed firms	2003-2010	Panel Data Analysis; Pooled OLS; fixed effect and random effect estimations	WCR	SIZE, Leverage (DR), GROWTH, Cash Flow (CFLOW), Profitability (ROA), Capital Expenditures (CEX), GDP	CCC	CEX, CFLOW, SIZE, GDP	DR, ROA, GROWTH	-	-firms with more operation cash flow, less capital expenditures, and biger size have shorter CCC	-	MANSOORI, Ebrahim/MUHAMMAD, Datin (2012): Determinants of Working Capital Management: Case of Singapore Firms, in: Research Journal of Finance and Accounting, Vol. 3 No. 11 (2012), pp. 15-23
VALIPOUR/MORADI FARSI (2012)	Iran	83 listed firms	1999-2000	correlation approach and multiple regressions and Pearson's correlation	WCR	profitability (ROA), operating cash flow, size, sales growth, Current ratio, quick ratio, debt ratio	CCC	PROFIT, CFO, SIZE	DEBT, GRO	-	-	-	VALIPOUR, Hashem/MORADI, Javad/FARSI, Fatemeh (2012): The Impact of Company Characteristics on Working Capital Management, in: Journal of Applied Finance and Banking, Vol. 2 No. 1 (2012), pp. 105-125
BAÑOS-CABALLERO/ GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2013)	Spain	60 listed firms	1997-2004	panel data methodology	NTC	Cashflow (CFLOW), Costs of external finance (FCOST), GROWTH, SIZE, investment in fixed assets (FA), probability of financial distress (ZSCORE), Profitability (PRO), GDP	NTC	FCOST, GROWTH, SIZE, FA, PRO, ZSCORE	lagged NTC, Cashflow, GDP	-	-the speed with which firms adjust toward their target WCR is relatively quick, which is consistent with the idea that current balance sheet items could be changed quite easily, even in the short run, because they are to a large extent under the firm's control and are easier to manipulate -the speed of adjustment is not equal across all firms. We find that both a firm's access to external capital markets and bargaining power affect how quickly it moves toward its target WCR -companies that are capable of generating more internal funds have greater WCR -cost of external financing, growth opportunities, investment in fixed assets, probability of financial distress, and profitability negatively affect WCR	-	BAÑOS-CABALLERO, Sonia/ GARCÍA-TERUEL, Juan/MARTÍNEZ-SOLANO, Pedro (2013): The Speed of Adjustment in Working Capital Requirement, in: The European Journal of Finance, Vol. 19 No. 10 (2013), pp. 978-992
IFTIKHAR (2013)	Pakistan	9 engineering and automotive firms	2006-2010	Panel Data Analysis, Pooled Least Square Model (Fixed Effect)	WCR	DER: Debt equity Ratio; FATA: Fixed assets to total assets ratio; FMITA: Herfindahl-Hirschman Index; firm sales to industry total sales ratio; GROWTH; OPBTSR: Operating profit before taxation to sales ratio; CATA: Current assets to total assets ratio; SLINS: Natural log of sales to measure the size of the firm; AGE: No of days of firms from the	CCC	DER, FATA, GROWTH, CATA, SLINS	firm sales to industry total sales ratio; (FMITA)	profitability ratio age	- Cash conversion cycle of the firms will shorter due to following reasons: •Aggressive and tight policy of receivables. •Sales and investments in current assets of the firms are the determinants of the working capital management efficiency. •Due to liberal credit policy and it has positive relationship with the firm's profitability. •Efficient management of inventory that also has significant positive effect on the profitability of firm. •Fixed effect regression analysis showed that firms specific factors matters.	-	IFTIKHAR Muhammad (2013): Determinants of Working Capital Management Efficiency: Case Study of Pakistani Automotive and Engineering Firms Listed in Karachi Stock Exchange, in: Research Journal of Finance and Accounting, Vol. 4 No. 7 (2013), pp. 216-236
NASER/NUSIBEH/AL-HADEYA (2013)	UAE	30 listed firms	2010-2011	correlation analysis & regression analysis (backward regression)	WCR	industry type, sales growth, operating cash flows, return on equity, leverage, size	CCC	sales growth, size	leverage	industry type, operating cash flows, return on equity	-	-	NASER, Kamal/NUSEIBEH, Rana/AL-HADEYA, Ahmed (2013): Factors Influencing Corporate Working Capital Management: Evidence from an Emerging Economy, in: Journal of Contemporary Issues in Business Research, Vol. 2 No. 1 (2013), pp. 11-
KORALUN-BEREZNICKA (2014)	9 EU countries: Austria, Belgium, Germany, Spain, France, Italy, the Netherlands, Poland, Portugal	10,071 observations	2000-2009	multivariate analysis	WCR	country, industry, size, year	4 financial ratios		-	-	- they suggest that the country factors play a major role in affecting the corporate WC policy, followed by the industry factors and the factors related to firm size.	-	KORALUN-BEREZNICKA, Julia (2014): On the Relative Importance of Corporate Working Capital Determinants: Findings from the EU Countries, in: Contemporary Economics, Vol. 8 No. 4 (2014), pp. 415-433
MONGRUT et al. (2014)	Argentina, Mexico, Peru, Brazil, Chile	61-80 firms in Arg. 51-81 firms in Braz. 33-39 firms in Chile 70-85 firms in Mex. 45-60 firms in	1996-2008	regression per quantile	CCC	Average Industry CCC (ACCC), proportion of tangible assets (PTA), Future sales (FGS), Herfindahl- Hirschman Index (HHI), Country Risk (EMBI)	CCC	PTA, Size	ACCC, FGS	EMBI (Except for Brazil)	-to the extent that a big company has greater market power, it will have a lower CCC	-	MONGRUT, Samuel et al. (2014): Determinants of Working Capital Management in Latin American Companies, in: Innovar, Vol. 24 No. 51 (2014), pp. 5-18
AZAMI/TABAR (2016)	Iran	143 listed companies	2004-2014	Generalized Method of Moments (GMM)	CCC	Leverage, Tangible assets, Firm life, Profitability, Firm size, GDP, non-executive directors	CCC	Leverage, profitability, GDP	CCC (-1), ratio of fixed assets, Tobin's Q ratio	firm size, firm age, ratio of non-executive directors	- periods with lower GDP or lower corporate profitability, lower leverage, pre-period working capital and greater information asymmetry tended to make higher investment in working capital	-	AZAMI, Zeinab/TABAR, Fozieh (2016): Investigating the Factors Affecting Working Capital of Companies Using the Generalized Method of Moments, in: Bulletin de la Société Royale des Sciences de Liège, Vol. 85 (2016), pp. 1402-1415
REHMAN/WANG/KABIRAJ (2017)	China	760 listed firms	2001-2012	OLS, fixed effects and fixed effects with an added AR term	NWC	Leverage (LEV), immediate growth opportunities (IMGROWTH), asymmetric information (ASIMINFO), SIZE, Tangibility (TANG), Profitability (PROF), operating cash flow (OCF), GDP, Board size (BSIZE), BIND	NWC	Leverage, Size, Tangibility, BSIZE	lagged NWC, ASIMINFO, IMGROWTH, PROF, OCF	GDP	-bigger sized, highly levered and tangible firms invest less in their working capital. Firms with immediate sales growth and asymmetric information invest more in working capital. Board size and board independence are found to have a monitoring role in curtailing working capital investment. Finally, the study highlights an active working capital management policy by chinese non-state-owned enterprises	-	REHMAN Ajid/WANG, Man/ KABIRAJ, Sajal (2017): Working Capital Management in Chinese Firms: an Empirical Investigation of Determinants and Adjustment Towards a Target Level Using Dynamic Panel Data Model, in: Afro-Asian Journal of Finance and Accounting, Vol. 7 No. 1 (2017), pp. 84-105

A.2

Study	Country	Sample	Period	Methodology	Dependent variable	Independent variables					Findings		Reference
CHAUHAN/BANERJEE (2018)	India	17,161 manufacturing firms	1993-2015	partial-adjustment dynamic panel models	CCC	Size, Leverage, Cash Flow, Profitability, Asset tangibility, Growth opportunity, Median industry cash cycle	CCC	Cash Flow, Growth, Leverage, Asset tangibility, Size, Median industry cash cycle	lagged CCC, Growth, Asset tangibility,	Profitability,	-	-	CHAUHAN, Gaurav/BANERJEE, Pradip (2018): Financial Constraints and Optimal Working Capital – Evidence from an Emerging Market, in: International Journal of Managerial Finance, Vol. 14 No. 1 (2018), pp. 37-

Issue 1.2: Determinants of WCM including Effects of Economic Crisis

Study	Country	Sample	Period	Methodology	Dependent variable	Independent variables					Findings		Reference
HARON/NOMRAN (2016)	Malaysia	57 listed firms	2002-2012	panel regression, Random Effect model	WCR	profitability, debt, sales growth, free cash flow, firm size, liquidity	CCC	profitability, firm size, sales growth, debt (after crisis)	debt (before crisis), free cash flow (during crisis)	liquidity	-firms should take note that when dealing with WCM during non-crisis periods, they should give particular attention to profitability, debt, sales growth and firm size	-Financial crisis that hit the economic standing in 2008 has put the blame on the mismanagement of the working capital of firms	HARON, Razali/NOMRAN, Naji (2016): Determinants of Working Capital Management Before, During, and After the Global Financial Crisis of 2008: Evidence from Malaysia, in: The Journal of Developing Areas, Vol. 50 No. 5 (2016), pp. 461-468

Issue 2.21: Working Capital - Firm Profitability Relationship

Study	Country	Sample	Period	Methodology	Dependent variable	Independent variables					Findings		Reference
JOSE/LANCASTER/STEVENS (1996)	USA	2,718 firms	1974-1993	correlation analysis, non-parametric data analysis, multiple regression analysis	ROA & ROE	industry, size	CCC	CCC (for wholesale/retail)	size	-	- overall a more aggressive liquidity management (lower CCC) is associated with higher profitability for several industries (including wholesale/retail) - for these industries significant negative relationship between CCC and ROA/ROA is found and it is not driven by size	-	JOSE, Manuel/LANCASTER, Carol/STEVENS, Jerry (1996): Corporate Returns and Cash Conversion Cycles, in: Journal of Economics and Finance, Vol. 20 No. 1 (1996), pp. 33-
SHIN/SOENEN (1998)	USA	59,985 firm years	1975-1994	correlation and regression analysis	IA (operating income+depreciation)/total assets, IS (operating income+depreciation)/net sales	CR is current ratio. DR = total debt/total assets; ALPHA = Jensen's Alpha; TI = Treynor Index; SG = change in sales; IV = inventory.; AR = accounts receivables; AP = accounts payables; S = net sales; A = total assets; CA = current assets; CL = current liabilities; D = total debt;	Net Trade Cycle (NTC)	NTC, CR, DR,	SG	-	-liquidity and profitability are clearly inversely related. - negative association between the net trade cycle and corporate profitability -The negative regression coefficient for NTC (significant at the 0.01 level) implies that a firm with a relatively short net trade cycle is more profitable and has a higher risk-adjusted stock return per unit of total risk. The negative relation between profits on sales and NTC could be explained by market power or market share, i.e. a shorter NTC because of bargaining power with suppliers and/or customers as well as higher profitability due to market dominance	-	SHIN, Hyun-Han/SOENEN, Luc (1998): Efficiency of Working Capital Management and Corporate Profitability, in: Financial Practice and Education, Vol. 8 No. 2 (1998), pp. 37-45
LYROUDI/LAZARIDIS (2000)	Greece	82 listed food industry firms	1997	regression and correlation analysis, t-tests	ROI, ROE, net profit margin (NPM)	CCC	-	CCC	-	- The results indicated that there is a significant positive relationship between the cash conversion cycle and the traditional liquidity measures of current and quick ratios. The cash conversion cycle was positively related to the return on assets and the net profit margin but had no linear relationship with the leverage ratios.On the other hand, the current and quick ratios had negative relationship with the debt to equity ratio, and a positive one with the times interest earned ratio. Finally, there is no difference between the liquidity ratios of large and small firms.	-	LYROUDI, Katerina/LAZARIDIS, Yiannis (2000): The Cash Conversion Cycle and Liquidity Analysis of the Food Industry in Greece, paper presented at: EFMA2000, Athens, 2000, pp. 1-31, last access on: 16.04.2018, Web: https://poseidon01.ssrn.com/delivery.php?ID=950072066000029007022002004098076000017082029021062808612412507809607612610400610508400506809212510202606001912121005006101068600000409108110409709700401909308509908706909
WANG (2002)	Taiwan, Japan	1555 firms for Japan and 379 firms for Taiwan	1985-1996	correlation and regression analysis	ROA, ROE, Tobin's q ratio	industry dummy, size	CCC	CCC	size	-	- negative CCC–ROA and CCC–ROE relationships which is sensitive to industry factors -aggressive liquidity management is associated with higher corporate value for both countries in spite of differences in structural characteristics or in financial system of a firm.	-	WANG, Yung-Jang (2002): Liquidity Management, Operating Performance and Corporate Value: Evidence from Japan and Taiwan, in: Journal of Multinational Financial Management, Vol. 12 No. 2(2002), pp. 159-169
DELOOF (2003)	Belgium	1009 listed firms	1992-1996	Fixed-Effect Model (FEM) and Plain Ordinary Least Square Method (OLS).	gross operating income	Size, Sales Growth, Financial Debt Ratio, Ratio of Fixed Financial Assts to Total Assets, variability of net operating income	CCC	financial debt, No. Of Days Acc. Rec., number of days inventories, number of days accounts payable,	Size, Sales Growth, Fixed Financial Assets, Variability	ccc	-implies that an increase in the number of days accounts receivable by 1 day is associated with a decline in gross operating income -results suggest that managers can increase corporate profitability by reducing the number of days accounts receivable and inventories. -ass profitable firms wait longer to pay their bills	-	DELOOF, Marc (2003): Does Working Capital Management Affect Profitability of Belgian Firms?, in: Journal of Business Finance & Accounting, Vol. 30 No. 3-4 (2003), pp. 573-388
ELJELLY (2004)	Saudi Arabia	29 joint stock companies	1996-2000	correlation and regression analysis	Net Operating Income (NOI)	size, industry	cash gap, current ratio (CR)	Cash Gap, CR,	LOGS (Logarithm of net sales), LOGTA (Logarithm of total assets)	CGS, size	- significant negative relation between the firm's profitability and its liquidity level	-	ELJELLY, Abuzar (2004): Liquidity - Profitability Tradeoff: An Empirical Investigation in an Emerging Market, in: International Journal of Commerce and Management, Vol. 14 No. 2 (2004), pp. 48-61
LAZARIDIS/TRYFONIDIS (2006)	Greece	131 listed firms	2001-2004	regression analysis	Gross Operating Profit	Size, Fixed Financial Assets Ratio, Financial Debt Ratio,	CCC	CCC, financial debt, accounts payable, accounts receivable,	Size, fixed financial assets	number of days for inventory	- a decrease in the cash conversion cycle will generate more profits for a company - the longer a firm delays its payments the higher level of working capital levels it reserves and uses in order to increase profitability - managers can improve profitability by reducing the credit period granted to their customers.	-	LAZARIDIS, Ioannis/TRYFONIDIS, Dimitrios (2006): Relationship Between Working Capital Management and Profitability of Listed Companies in the Athens Stock Exchange, in: Journal of Financial Management and Analysis, Vol. 19 No. 1 (2006), pp. 26-
PADACHI (2006)	Mauritia	58 manufacturing SMEs	1998-2003	Fixed Effects and Pooled OLS model	ROTA	firm's size (LnSales), gearing ratio, gross working capital turnover ratio (CA_TURN), ratio of current assets to total assets (CA/TA), ratio of current Siabilities to total assets (CL/TA)	CCC	gearing ratio, CL/TA, CCC	LnSales, CA/TA, CA_TURN,	-	- The firms' profitability as measured by ROTA increases with firms' size, gross working capital efficiency, and with a lesser aggressiveness of asset management. This is contrary to the traditional theory of asset management, where a conservative policy is expected to sacrifice profitability at the expense of liquidity. This could be explained by the fact that small firms tend to have a lower fixed assets base and thus rely mostly on the turnover of current	-	PADACHI, Kesseven (2006): Trends in Working Capital Management and its Impact on Firms' Performance: An Analysis of Mauritian Small Manufacturing Firms, in: International Review of Business Research Papers, Vol. 2 No. 2 (2006), pp. 45-58
GARCÍA-TERUEL/MARTÍNEZ SOLANO (2007)	Spain	8,872 small to medium-sized enterprises (SMEs)	1996-2002	panel data methodology	ROA	size, growth, leverage, GDPGR	CCC	CCC, debt,	Size, GROWTH, GDPGR	-	- The results, which are robust to the presence of endogeneity, demonstrate that managers can create value by reducing their inventories and the number of days for which their accounts are outstanding. Moreover, shortening the cash conversion cycle also improves the firm's profitability.	-	GARCÍA-TERUEL, Juan/MARTÍNEZ-SOLANO, Pedro (2007): Effects of Working Capital Management on SME Profitability, in: International Journal of Managerial Finance, Vol. 3 No. 2 (2007), pp. 164-177
NASR/RAHMAN (2007)	Pakistan	94 listed firms	1999-2004	Pooled least square and general least square with cross section weight models	Net Operating Profitability (NOP)	Average Collection Period (ACP), Inventory turnover in days (ITID), Average Payment Period (APP), Debt ratio (DR), size, financial assets to total assets ratio	CCC	ACP, ITID, APP, CCC, DR, liquidity	size	-	- The negative relationship between the average payment period and profitability indicates that the less profitable firms wait longer to pay their bills -that if the inventory takes more time to sell, it will adversely affect profitability - results suggest that managers can create value for their shareholders by reducing the number of days accounts receivable and inventories to a reasonable minimum. The negative relationship between accounts payable and profitability is consistent with the view that less profitable firms wait	-	NASR, M. /RAHMAN, A. (2007): Working Capital Management and Profitability – Case of Pakistani Firms, in: International Review of Business Research Papers, Vol. 3 No. 1 (2007), pp. 279 - 300
AFZA/NAZIR (2009)	Pakistan	204 listed, non-financial firms from 17 industrial sectors	1998-2005	panel data regression analysis	ROA, Tobin's q	SIZE, GROWTH, financial leverage (LVRG), GDPGR, TCA/TA, TCL/TA	Aggressive Investment Policy (AIP), Aggressive Financing Policy (AFP)	TCL/TA	Size, GROWTH, LVRG, TCA/TA	GDPGR	- Firms' size causes the returns of the firms to be increased	-	AFZA, Talat/NAZIR, Mian (2009): Impact of Aggressive Working Capital Management Policy on Firms' Profitability, in: IUP Journal of Applied Finance, Vol. 15 No. 8 (2009), pp.-19-30
CHBARITOU/ELFANI/LOIS (2010)	Cyprus	43 listed industrial firms	1998-2007	multivariate regression analysis	ROA	natural logarithm of sales, sales growth, debt ratio	CCC	ccc, debt ratio	-	lnsales, sales growth	-	-	CHARITOU, Melita /ELFANI, Maria /LOIS, Petros (2010): The Effect Of Working Capital Management On Firm's Profitability: Empirical Evidence from An Emerging Market, in: Journal of Business & Economics Research, Vol. 8 No. 12 (2010), pp.63-68

Study	Country	Sample	Period	Method	Dependent Variable	Independent Variables	CCC	Control/Other			Results		Source
GILL/BIGER/MATHUR (2010)	USA	88 listed manufacturing firms	2005-2007	correlation and regression analysis	gross operating profit	firm size, financial debt ratio, fixed financial asset ratio	CCC	financial debt ratio	CCC	ratio of fixed financial assets to total assets, firm size	-		GILL, Amarjit/BIGER, Nahum/MATHUR, Neil (2010): The Relationship Between Working Capital Management and Profitability: Evidence from the United States, in: Business and Economics Journal, Vol. 10 (2010), pp. 1-9
MATHUVA (2010)	Kenya	30 listed firms	1993-2008	pooled OLS and fixed effects regression models	NOP	ACP, ICP, APP, Firms Size (CS), Leverage ratio (Lev), fixed financial assets ratio (FFAR), variability, GDPGrowth, age	CCC	ACP, CCC, Lev,	ICP, APP, CS, FFAR, Variability, Age	GDPGrowth	-	-	MATHUVA, David (2010): The Influence of Working Capital Management Components on Corporate Profitability: A Survey on Kenyan Listed Firms, in: Research Journal of Business Management, Vol. 4 No. 1 (2010), pp. 1-11
ABUZAYED (2012)	Jordan	52 listed, non-financial firms	2000-2008	OLS, fixed or random effects model dynamic panel, generalized method of moment (GMM)	Tobins'Q (TQ) GOP	SIZE, Sales Growth (GR) Leverage (LEV) Fixed Financial Assets to total assets (FFA) Variability of net operating income (VNOI)	CCC DAR, DI, DAP	LEV, VNOI, DAP	CCC, DAR, DI, GDP, SIZE, GR, FFA		- profitability is affected positively with the cash conversion cycle. This indicates that more profitable firms are less motivated to manage their working capital. In addition, financial markets failed to penalize managers for inefficient working capital management in emerging markets.		ABUZAYED, Bana (2012): Working Capital Management and Firms' Performance in Emerging Markets: the Case of Jordan, in: International Journal of Managerial Finance, Vol. 8 No. 2 (2012), pp. 155-
BAÑOS-CABALLERO/GARCÍA-TERUEL/MARTÍNEZ-SOLANO (2012)	Spain	1008 SMEs	2002-2007	regression analysis	Profitability (Gross operating income / Net operating income)	SIZE, GROWTH, PRO_t-1, LEV, CCC_t-1, Square CCC	CCC	CCC_t-1, Square CCC,	PRO_t-1, Size, Growth, Leverage	-	- concave relationship between working capital level and profitability; that is, firms have an optimal working capital level that balances costs and benefits and maximizes their profitability. confirm not only the greater profitability effect, but also the greater risk effect for firms with low levels of working capital.	-	BAÑOS-CABALLERO, Sonia/GARCÍA-TERUEL, Juan/MARTÍNEZ-SOLANO, Pedro (2012): How Does Working Capital Management Affect the Profitability of Spanish SMEs?, in: Small Business Economics, Vol. 39 No. 2, pp. 517-529
KADDUMI/RAMADAN (2012)	Jordan	49 Jordanian Industrial corporations listed at Amman Stock Exchange	2005-2009	Fixed-Effect Model (FEM) and Ordinary Least Square Method (OLS).	Return on Total Assets (ROTA), Net Operating Profitability (NOP)	Gross Working Capital Turnover (GWC_T), ratio of the current assets to total assets (INVP), ratio of the current liabilities to total assets (FINP), Size of the firm (lnS), Investment Growth Opportunities (INGO), Liquidity (LIQU)	average collection period (ACP), average age of inventory (AAI), average payment period (APP), cash conversion cycle(CCC), net trade cycle(NTC)	ACP, CCC, NTC	GWC_T, INVP, FINP, LIQU	AAI, APP	- shortening the CCC can maximize the shareholders wealth by generating more profit for the firm. - conservative policy appears to reduce profitability in order to maintain high liquidity		KADDUMI, Thair/RAMADAN, Imad (2012): Profitability and Working Capital Management: The Jordanian Case, in: International Journal of Economics and Finance, Vol. 4 No. 4 (2012), pp. 217-226
ANSER/MALIK (2013)	Pakistan	155 listed, manufacturing firms	2007-2011	regression analysis	ROA & ROE	Size, Debt	CCC	CCC	-	size, debt	-lesser the cash conversion cycle greater would be the profitability - cash conversion cycle is having significantly inverse association with both return on assets and equity indicating that lesser the cash conversion cycle greater would be the profitability measured through return on assets (and equity). Hence the receivable collection period and inventory selling period must be reduced along with the extension of payment period to increase the profitability of manufacturing sector organizations	-	ANSER, Raheem/MALIK, Qaisar (2013): Cash Conversion Cycle and Firms' Profitability – A Study of Listed Manufacturing Companies of Pakistan, in: IOSR Journal of Business and Management, Vol. 8 No. 2 (2013), pp. 83-87
YAZDANFAR/ÖHMAN (2014)	Sweden	23,000 SMEs	2008-2011	seemingly unrelated regression (SUR)	ROA	Size, Age	CCC	CCC, Age	Size		- it can be concluded that industry affiliation has a certain impact on the relationship between CCC and firm profitability.	-	YAZDANFAR, Darush/ÖHMAN, Peter (2014): The Impact of Cash Conversion Cycle on Firm Profitability: An Empirical Study Based on Swedish Data, in: International Journal Of Managerial Finance, Vol. 10 No. 4 (2014), pp. 442-452
AFRIFA/PADACHI (2016)	UK	160 Alternative Investment Market (AIM)-listed SMEs	2005-2010	panel data regression analysis	ROA ROCE, ROE	firm age (COAGE), firm size (COSIZE), asset tangibility (ATAN), financial leverage (LEV), short-term financing (SFIN), industry classification (INDUST)	CCC CCC Square	CCC Square, LIQ, SFIN, ATAN	CCC, COAGE	COSIZE, LEV	- This (neg. CCC Square, positive CCC) means that working capital increases the profitability of AIM-listed SMEs up to the breakpoint, after which, increases in the working capital reduce profitability. - older companies are more experienced because they have enjoyed the benefit of learning and therefore can enhance ROA	-	AFRIFA, Godfred/PADACHI, Kesseven (2016): Working Capital Level Influence on SME Profitability, in: Journal of Small Business and Enterprise Development, Vol. 23, No. 1 (2016), pp. 44-63
HUY-CUONG/MANH-DUNG/DUC-TRUNG (2016)	Vietnam	127 listed companies	2006-2014	regression analysis	ROA, ROE	Leverage (DR), Growth, Tangibility (FATA), Size, Industrial Factors (Industry), Macroeconomic Effects (ME)	CCC	DR, FATA	Growth, Size		-Growth opportunities have positive relation with firms' profitability since the high growth rate is the indicator of the increase in efficiency and the lower cost of capital - leverage shows a negative impact on firms' profitability. The result could be explain by the agency conflict, that firms had over leveraged themselves -Tangibility show the negative relation with firms' profitability. The negative impact could be explained by the fact that the companies in the sample have invested too much into their fixed assets and they could not make use of them in the most efficient way. - Size indicates a positive impact on firms' profitability. The results are consistent with the previous studies since larger firms can have higher return than smaller firms due to better management, and more diversification in investing, with a larger economic scales - the year of 2006, 2007, and 2009 are significant related to firms profitability. This could be explained by the global financial crisis, due to the policies to encourage the development of the economy before the crisis, and the policies to keep the economy stable and overcome the consequences.		HUY-CUONG, Nguyen/MANH-DUNG, Tran/DUC-TRUNG, Nguyen (2016): Working Capital Management and Firms' Profitability: Evidence from Vietnam's Stock Exchange, in: International Journal of Economics and Finance, Vol. 8 No. 5 (2016), pp. 55-62
HABIB/HUANG (2018)	Pakistan	152 listed textile firms	2003-2016	panel data regression statistics, panel ordinary least squares (OLS) regression method, panel fixed effect (FE) and panel generalized method of movement (GMM)	ROA	size, leverage, growth, and gross domestic product	Working capital rate, Square of WCR, Inventory rate, Account receivables rate, Account payables rate, Cash holding rate, Cash conversion	WCR2, Leverage, Size	WCR, Growth, GDP		- The research has revealed that a significant nonlinear relationship exists between working capital and operating profit (Hypothesis 1). The study has also found that a positive working capital has negatively influenced the operating profit (Hypothesis 2). However, the negative working capital has influenced positively (Hypothesis 3). -Hence the cash holding level is an important factor for designing the efficient working capital management	-WCR2 term is used to find the nonlinear relationship between working capital and profitability	HABIB, Ashraq/HUANG, Xiaoxia (2018) Investigating the Nonlinear Relationship between Working Capital and Profitability: a Case of Pakistan Textile Firms, in: Teknillæ, Vol. 81 No. 1 (2018), pp. 42-53

Issue 2.1: Working Capital - Profitability Relation Including Effects of Economic Crisis

Study	Country	Sample	Period	Method	Dependent Variable	Independent Variables	CCC	Control/Other			Results		Source
ENQVIST/GRAHAM/NIKKINEN (2014)	Finnland	1,136 (listed) firm year observations	1190-2008	correlation and regression analysis	ROA, gross operating income (GOI)	size, current ratio, debt ratio, business cycle dummy	CCC	CCC, size, debt, recession dummy	current ratio, boom dummy	-	-companies can boost their profitability by increasing working capital efficiency, i.e., minimizing CCC - firm's can increase profitability by improving their margin of liquidity. - companies strive to achieve optimize levels of working capital by paying bills as late as possible, turning over inventories quickly, and collecting on account receivables quickly	- the overall significance of the CCC on profitability is greater in poor economic states. However there is no statistically significant evidence to suggest that the CCC–profitability relationship departs from the norm during more prosperous economic states. The policy implication of this result is	ENQVIST, Julius/GRAHAM, Michael,/NIKKINEN, Jussi (2014): The Impact of Working Capital Management on Firm Profitability in Different Business Cycles: Evidence from Finland, in: Research in International Business and Finance, Vol. 32,

Further Research Connecting WCM to Economic Conditions/Crises

Study	Country	Sample	Period	Method	Dependent Variable	Independent Variables					Results		Source
LAMBERSON (1995)	USA	50 small firms out of the 200 best small companies list published by Forbes	1980-1990	correlation analysis, t-test,	average annual financial ratio	annual coincident economic indicators	current ratio, quick ratio, inventory to total assets, current assets to total assets	-	-	-	- liquidity increased slightly during economic expansion with no noticeable change in liquidity during economic slowdowns. - findings suggest that won practices of small firms in response to changes in economic activity do not follow commonly held expectations.	-	LAMBERSON, Morris (1995): Changes in Working Capital of Small Firms in Relation to Changes in Economic Activity, in: American Journal of Business, Vol. 10 No. 2 (1995), pp. 45-50
KESIMLI/GUNAY (2011)	Turkey	45 listed companies	23 quarters between 2004-2009	Kolmogorov-Smirnov Test, paired samples t-test and Mann Whitney u-test,	1.Current Ratio (CR) 2.Liquidity Ratio (LR) 3.Cash Ratio (CAR) 4.Inventory-to-Current Assets Ratio (ICAR) 5.Short Term Receivables-to-Current Assets Ratio (STR CAR) 6.Current Assets-to-Total Assets Ratio (CATAR) 7.Short Term Liabilities-to-Total Assets Ratio (STLTAR) 8.Short Term Liabilities-to-Total Liabilities Ratio (STLTLR) 9.Short Term Bank Loans-to- Short Term Liabilities R atio (STBLSTLR) 10.Stock Turnover Rate		-	-	-	-the crisis has no significant effect on current ratio - liquidity ratio,cash ratio,Short term receivables-to current assets ratio, Current assets-to-total assets ratio, short term liabilities-to-total liabilities ratio, Net working capital turnover ratio have not been affected by the crisis. -that inventory to current asse ts ratio has been affected positively. Sectors' average for this ratio is 32.40% before the crisis and 29.46% during the crisis. One explanation would be improved inventory management; another would be procurement/production following orders -short term liabilities-to-total assets ratio has been affected for a short period of time at the time the last crisis trod the stage and the effect faded in the course of time. - significant effect of the crisis on Receivables Turnover Rate. During the crisis receivables turnover ratio becomes 5.04, whereas it was 15.8 before the crisis. This means that trade receivables are collected at a slower pace.	- significant but limited impact is identified in five ratios out of thirteen. - receivables turnover ratio is one of the most affected ratios -If firms do not want to encounter cash flow problems in the future, they need to be careful in managing their short-term assets and liabilities. Companies which manage their working capital optimally during times of recessions come out stronger after the recession period. Working capital management is one of the cornerstones of business continuity and acts as a hedge against tightening credit and access to additional capital.	KESIMLI, Hhet /GUNAY, Suleyman (2011): The Impact of the Global Economic Crisis on Working Capital of Real Sector in Turkey, in: Business and Economics Horizons, Vol. 4 No. 1 (2011), pp. 52-69
DUGGAL/BUDDEN (2012)	US	422 firms out of S&P 500 firms	2007; 2010	Paired t-tests	WCR	Days Inventory Held (INVENT_DAYS), Days Sale Outstanding (ACCT_RCV_TURN), Days Payable Outstanding (ACCOUNTS_PAYABLE_TURNOVER), Current Assets (BS_CUR_ASSET_REPORT), Current Liabilities (BS_CUR_LIAB), Net Working Capital/Sales, Cash and Short-Term Investments (BS_CASH_NEAR_CASH_ITEM)	CCC	-	-	-the CCC value in 2010 is about 62 days, slightly higher than the pre-recession value, indicating that on average U.S. firms have to self-finance their operating cycle by another 1.5 days as compared to 2007 -firms have more funds tied up in inventories and accounts receivables and are using more vendor financing -the study finds firms retained more cash and short-term investments in 2010 than in 2007, indicating the recession has shifted the efficient frontier. It is possible the shift was parallel, not vertical, because the cost of funds has declined since 2008 so ostensibly firms perhaps can hold more cash at the same overall cost - it appears firms in general hold more net working capital in order to face new economic challenges.	- The recent recession, which began in December 2007 and officially ended in June 2009 -the great recession was a black swan kind of event, however it likely forced corporations to rethink their working capital management practices -During that period, U.S. corporations, operating on what they believed was an efficient frontier of working capital management, suddenly found they were struggling to survive as	DUGGAL, Rakesh/BUDDEN Michael (2012): The Effects of the Great Recession on Corporate Working Capital Management Practice, in: International Business & Economics Research Journal, Vol.11 No. 7 (2012), pp. 753–756.
SCHOLLEOVA (2012)	Czech Republic	different response rates, e.g. 252 well filled questionnaires (before crisis),	several questionnaires from 2007 to 2010	questionnaire investigation	-	-	-	-	-	-	-The biggest problem hit the long inefficient firms (that survived only thanks to temporary access demand) and growth-oriented businesses, which focused only on short-term time horizon. -The optimization of the financial assets and inventory has already occurred in the early phase of the crisis, short-term liabilities of the banking sector are still difficult to access, there is no other choice but to rely on supplier credits. However, because each firm wants to follow this process, the significant effect occurs only in terms of the constant increase in short-term liabilities and receivables due to distrust and pessimistic expectations. -Firms whose management was based on the use of their own resources, were previously described as conservative with inefficient financing, the crisis proved this attitude to be a significant competitive advantage because the	- the crisis: Reduced availability of capital has reduced demand from vendors. It also worsened the possibility of rational adaptation, because the company had to deal with only short-term problems and there was not the opportunity and time for strategic management. -At present there is uncertainty and companies are afraid of further development, which, as shown in the article, leads to further problems with working capital.	SCHOLLEOVA, Hana (2012): The Economic Crisis and Working Capital Management of Companies, in: Theoretical and Applied Economics, Vol. 19 No. 4 (2012), pp. 79-92
RAMIAH/ZHAO/MOOSA (2014)	Australia	net number of participants was 120	2009	qualitative techniques like interviews and a survey questionnaire	-	-	-	-	-	-	-The results show that more than half of the participants in the survey altered their working capital management practices during the crisis. Capital expenditure was curtailed, as they aimed at preserving their cash levels while reducing inventory levels. Credit worthiness of institutions became more important, and there was a general decline in credit availability. The results also show that Australian working capital managers exhibit behavioural biases.	-	RAMIAH, Vikash/ZHAO, Yilang/MOOSA, Imad (2014): Working Capital Management during the Global Financial Crisis: the Australian Experience, in: Qualitative Research in Financial Markets, Vol.6 No. 3 (2014), pp. 332-351

A.4

Capital Structure and the Financial Crisis

Author	Country	Sample	Period	Method	Dependent Variables	Independent Variables					Results		Source
PROENÇA/LAUREANO/ LAUREANO (2014)	Portugal	12,857 SMEs	2007-2010	OLS regression model	total debt to assets (TD) short-term debt (STD) long-term debt (LTD)	ASST (ratio of tangible fixed assets to total assets), NDTS(ratio of depreciations to total assets), SIZ (natural logarithm of total assets), ROA (ratio of net income to total assets), GROW (ratio of the change in sales to sales of the previous period), LIQ (ratio of current assets to current liabilities), CF (standardized cash flow), LGFM (dummy variable equal to 1 if Corporation or 0 if Limited Liability Partnerships), size EU dummy,	STD: ASST, SIZ, ROA, CF, LIQ, LGFM LTD: NDTS, ROA, CF, SIZE EU, LGFM TD: ASST, NDTS, ROA, LIQ, CF, LGFM	STD: NDTS, GROW, SIZE EU, CRISIS LTD: ASST, SIZ, GRO, LIQ, CRISIS TD: SIZ, GROW, SIZE EU, CRISIS	-	- liquidity, asset structure and profitability are the most important determinants explaining the capital structure of Portuguese SMEs. We report a downward tendency on companies' debt ratios levels during the financial crisis. - large companies have lower transactions costs of financing externally than a small company, making it easier for the large companies to access debt externally - difficulties faced by smaller firms when accessing long-term debt which results in a preference for short-term debt -small companies prefer to finance their investments internally rather than externally due to higher risk of financing externally as argued by Fama and French (1988).	- We observe different signs for the relation between asset structure and short-term debt (negative) and long-term debt (positive). These findings are consistent with the trade-off theory which suggests that companies with higher levels of tangible assets are expected to issue more debt, as those tangible assets can be used as collateral in case of failure	PROENÇA, Pedro/LAUREANO, Raul/LAUREANO, Luis (2014): Determinants of Capital Structure and the 2008 Financial Crisis: Evidence from Portuguese SMEs, in: Procedia - Social and Behavioral Science, Vol. 150 (2014), pp.182-191
CARBÓ-VALVERDE/RODRÍGUEZ-FERNANDEZ/UDELL (2016)	Spain	38,329 SMEs	1994-2010 precrisis period: 1994 to 2006 crisis period: 2007 to 2010.	Disequilibrium Model	...	...	...	...	...	...	- credit constrained SMEs depend on trade credit, but not bank loans, and that the intensity of this dependence increased during the financial crisis. Unconstrained firms, in contrast, are dependent on bank loans but not on trade credit. - the dependence on trade credit for investment is even more important for constrained firms during crisis year	- SMEs faced a credit crunch during the current financial crisis (e.g., Jimenez et al. 2011, Popov and Udell 2011, Puri, Rocholl, and Steffen 2011). -suggests that trade credit was an important mechanism that helped some SMEs cope with the credit crisis induced by this crisis.	CARBÓ-VALVERDE, Santiago/RODRÍGUEZ-FERNANDEZ, Francisco/UDELL, Gregory (2016): Trade Credit, the Financial Crisis, and SME Access to Finance, in: Journal of Money, Credit and Banking, Vol. 48 No. 1 (2016), pp. 113-143.

Appendix B - Sampling Process

The search criteria employed in Retriever Business were:

- Bolagsform (i.e. Company type): Aktiebolag (i.e. limited company)
- Status & Inställningar (i.e. status & settings): Historiskt sök (i.e. historic search)
- NACE: 46.110 - 46.900
- <u>SME criteria:</u>

  - Omsättning (i.e. turnover): <500,000 SEK
  - Totala tillgångar (i.e. total assets): <430,000 SEK
  - Antal anställda, (i.e. number of employees): <250

This search totaled in a number of 24,385 companies. However, this still included companies of other primary snis than 46XXX. So, after deleting all companies not primarily belonging to the wholesale industry (sni 46XXX), the original sample size was 18,337.

Because this still included companies that could not be used due to missing values/ a value of zero for relevant figures, companies that met the following criteria at least once during the observation period were also deleted from the sample:

- 0 employees
- Missing values for employees
- Turnover of 0
- Missing values for turnover
- Total assets of 0
- Missing values for total assets
- EBIT of 0
- Missing values for EBIT
- Accounts receivable of 0
- Missing values for accounts receivable
- Inventories of 0
- Missing values for inventories
- Accounts payable of 0
- Missing values for accounts payable
- Costs of goods sold of 0
- Missing values for costs of goods sold

This finally resulted in an ultimate sample size of 1,532 Swedish wholesale SMEs.

Appendix C – Descriptive Statistics Table

Table 1
Descriptive Statistics
1,532 Swedish Wholesale SMEs, 2008-2015: 12, 256 Firm Year Observations

	N	Minimum	Maximum	Mean	Std. Deviation
PROF$_{i,t}$	12,256	-3.4124294	1.0072289	0.0821689	0.1461230
PROF$_{i,t-1}$	12,256	-2.2108396	1.0072289	0.0907958	0.1331496
CCC$_{i,t}$	12,256	-332.6519302	96,536.158301	126.1247046	1006.0616614
AGE$_{i,t}$	12,256	2.9874000	119.9880000	28.2601520	16.7384365
SIZ(LN)$_{i,t}$	12,256	0.6931472	15.1259239	9.89855011	1.6126673
DR$_{i,t}$	12,256	0.0029377	3.2603774	0.4832683	0.1781971
Valid N (listwise)	12,256				

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[259] The formatting of all references is in accordance with requirements of the author's home university

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I hereby declare that I composed this thesis without any help from a third party. I did not use any literature except for the indicated references. All literal or intellectual adoptions have been cited.

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Anita Geiss