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Investment in Working Capital and Shareholder Wealth - A Study on the Swedish Market

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Abstract

We examine the relationship between investments in working capital and shareholder wealth on Swedish firms. By measuring excess return on a sample consisting of 143 listed Swedish firms between 2009 – 2018, several conclusions could be made. First, for the average firm it is a disadvantage of hoarding cash when the objective is to maximize shareholder wealth. Second, for the average firm with net operating working capital higher than the median firm in the industry, firms maximize shareholder wealth through a decrease in net operating working capital. Third, the value from investments in net operating working capital is significantly positively influenced by future sales expectations and short-term debt ratio, and significantly negatively influenced by leverage. Altogether our evidence provides vital information for executives regarding working capital management.

Keywords: Working Capital Management, Investment, Shareholder Wealth

1. Introduction

Maximizing shareholder wealth is one of the biggest tasks for firm management and one key issue for executives is to manage the working capital. Kortman, Wicks and Ojeda (2017) describe working capital as cash tied up in the daily operations carried out by companies, such as inventory, account payables and account receivables. If firms can maintain low levels of working capital while fulfilling all business requirements, higher returns on invested capital and increasing sources of funds to finance growth can be achieved (Kortman, Wicks & Ojeda, 2017).

Kortman, Wicks and Ojeda (2017) present a report in which they found that Nordic firms' working capital performance are inferior to North American and European peers. In the report, the authors further state that if the efficiency of working capital in all companies improves to the next performance quartile, this would result in a €24bn cash release. Since it is proven that huge improvements can be made in the Nordic market, it becomes interesting for us to investigate what effect working capital management has on the Swedish market. Companies on the Swedish market 2016 had a net working capital (NWC) conversion cycle of 69 days compared to the average European company with 42 days (Kortman, Wicks & Ojeda, 2017). This means that Swedish firms have a significant amount of cash tied up in NWC when comparing to peers in Europe, making this an important topic of consideration for Swedish companies. There are previous studies in the area, for example, Kieschnick, LaPlante and Moussawi (2013), and Aktas, Croci and Petmezas (2014) both investigate the relationship between investment in net operating working capital and stock return on U.S. corporations. Autukaite and Molay (2011) investigate the same relationship for French firms. However, to our knowledge, there is no such study in the area considering Swedish corporations, and therefore this paper focuses specifically on Sweden. To do this, we look at investments in net operating working capital (NOWC) relative to stock performance on Swedish frims between the years 2009 – 2018.

Given the importance of working capital management, there is no surprise that several previous studies focus on this subject. For example, Knauer & Wöhrmann (2013), Yazdanfar and Öhman (2014), and Padachi (2006) conclude the important relationship between the management of working capital and firm profitability. Drobetz, Grüninger and Hirschvogl (2010), Dittmar and Mahrt-Smith (2007), and LaPorta et al (2000) provide evidence that management's decision on what to do with cash holdings (invest in working capital or not) has

a significant effect on shareholder wealth. However, the direct relationship between the management of working capital and shareholders' wealth is not discussed to the same extent.

Papers with a similar methodology to ours from which we collect a lot of inspiration from are Kieschnick, LaPlante and Moussawi (2013), Aktas, Croci and Petmezas (2014), and Faulkender and Wang (2006). These papers are frequently referred to throughout the paper, and our choice of methodology originates from these papers.

We structure the paper by starting with a brief background of prior literature and theoretical framework in section 2. Moving forward, in section 3 we provide information about the sample used in the analysis. In section 4 the methodology and models used for the analysis are presented, and section 5 presents all the results from the models. Finally, section 6 discusses the results and section 7 sums up the conclusions and implications of the paper.

The results we got are somewhat consistent with what previously has been discovered in other papers but in different countries. Firstly, for the average firm it is a disadvantage of holding cash when the objective is to maximize shareholder wealth. Secondly, for the average firm with net operating working capital higher than the median firm in the industry, firms maximize shareholder wealth through a decrease in net working capital. Third, the value from investments in NOWC is significantly positive influenced by future sales expectations, short-term debt ratio and significantly negative influenced by leverage.

2. Theoretical framework and review of prior literature

2.1 Definition

The definition of working capital is sometimes defined in the same way as net operating working capital. Some authors refer to them as equal, while others distinguish between them. In this paper, we will refer to them as equal. Arnold (2008) formulates a common definition of working capital as "*The difference between current assets and current liabilities.*" (Arnold, (2008), p. 515). However, we define net operating working capital as the sum of account receivables and inventory net of account payables. An approach that primarily focuses on cash flow established by Sartoris and Hill (1983), and used by Hill, Kelly and Highfield (2010) and Kieschnick, LaPlante and Moussawi (2013) in a similar way. By using the cash flow approach established by Sartoris and Hill (1983), it enables us to acknowledge what impact changes in

policy decisions, regarding working capital, has on cash flow. Changes in cash flow are in the next step affecting the present value and valuation of the company.

2.2 Corporate Valuation

Corporate valuation based on discounted cash flows is a commonly used approach. Massari, Gianfrate and Zanetti (2016) illustrate two different methods of discounted cash flow valuations; Free cash flow from operations (FCFO) and free cash flow from equity (FCFE). FCFO is discounted with the weighted average cost of capital (WACC) and FCFE with the cost of equity (K_e). The authors further specify the components of these cash flows, where one common component is monetary flow from current activities, which consists of EBITDA ± annual change in working capital. An increase in working capital leads to a decrease in monetary flow from current activities and vice versa. This links working capital management directly to corporate value. For example, if more cash is invested in working capital the monetary flow from current activities will decrease, as well as (depending on valuation approach) FCFO or FCFE and the valuation decreases (Massari, Gianfrate & Zanetti, 2016). To illustrate the impact on corporate valuation, we can use following hypothetical calculation example:

Hypothetical example of contribution to corporate value in one fiscal year (SEK), discounted with WACC = 10%

	FCFO Calculation	**Divestment in NWC**	**Investment in NWC**
+	EBITDA	10 000	10 000
±	Changes in NWC	-200	200
±	Changes in pension payables and provision	20	20
-	Operating investments	-1 000	-1 000
+	Operating divestments	0	0
-	Virtual taxes on the operating income	-3 000	-3 000
=	**FCFO**	**5 820**	**6 220**
	Value contribution	5 291	5 654

Source: Authors' calculations

2.3 Working Capital Management

2.3.1 Inventory

A company´s inventory differs depending on its characteristics and sector. Lantz (2012) lists five assets an inventory may consist of; 1. Raw materials 2. Progressing materials 3. Finished goods 4. Extra material 5. Consumption materials. Lantz (2012) discuss the importance of inventory management and states that many companies are highly dependent on the inventory in their daily operation. Regarding inventory management, Lantz (2012) conclude that financial managers must choose between; minimizing inventory in order to reduce the cash conversion cycle or maintain a stable inventory to meet unexpected rises in demand. Reducing the cash conversion cycle costs will increase the amount of cash available for use. However, the risk is to not being able to meet unexpected rises in demand and thus lose potential revenue (Lantz, 2012).

2.3.2 Account Recievables

Account receivables are short-time assets that consist of claims on customers who have not yet paid for purchases of companies' products and/or services (Lantz, 2012). Management of receivables is less complex than inventory management. Lantz (2012) describes that to shortener the cash conversion cycle a company should front-load the maturity date of receivables. Managing account receivables is also about ensuring that customers pay their invoices on time, which is an effective way to strengthen the liquidity position in a company (Lantz, 2012).

2.3.3 Account Payables

Account payables, also referred to as trade credit, are short-term debt obligations companies have towards suppliers. Depending on a firm's liquidity structure, trade credits have different purposes (Danielson & Scott, 2004). The authors' states that:

> "If a firm makes timely payments, trade credit can be a complement to bank loans in its capital structure. However, when a firm cannot make timely payments, perhaps because it faces cash flow constraints and additional bank loans are not available, trade credit can be an expensive source of funds and can be a substitute for bank loans." (Danielson & Scott, (2004), p. 581).

Companies have the opportunity to use this short-term source of funds to cover some of their investments in inventory and receivables. Trade credit may therefore offer multiple advantages compared to bank loans. For example, it offers firms a degree of financial flexibility that is greater than what bank loans provide (Danielson & Scott, 2004).

2.3.4 Cash Conversion Cycle

One method of measuring working capital management is to use the cash conversion cycle. The cash conversion cycle is based on the number of days it takes for a company to convert account receivables and inventory into cash flows, net of the days it takes to convert account payables into cash flows. Investments in net working capital increase with the cash conversion cycle (Deloof, 2003). Deloof (2003) investigates the effect of working capital management on firms' profitability for Belgian firms. The author concludes that many firms have invested a large amount of cash in working capital and state that there is a negative correlation between a firm's cash conversion cycle and profitability. In other words, the longer the cash conversion, the worse the profitability. However, what Deloof (2003) and other similar studies like Shin and Soenen (1998) fail to recognize is that investments in net operating working capital may have negative cash flow today but will hopefully increase future cash flow. For example, Blinder and Maccini (1991) conclude that supply costs may increase if inventory is not available when needed, Petersen and Rajan (1997) suggest that extending credit can increase sales, and Corsten and Gruen (2004) provide evidence that up to 43% of customers, depending on the product, turn to another store if the product is out of stock.

2.4 Integrated Management

Situations such as non-existing inventory and desired increase in sales can be solved individually by investing in inventory and extending credit to customers. However, they should be managed together and depend on each other. The dependent relationship is demonstrated by a model created by Schiff and Lieber (1974) where credit and inventory policies influence each other. The conclusions drawn are that firms need more inventory when extending credit due to increased sales and vice versa. In other words, when firms reduce credit, they need less inventory. Further focus on the subject is for example made by Kim and Chung (1990) and Sartoris and Hill (1983), where they both emphasize the importance of an integrated approach.

To illustrate the importance of an integrated approach, Sartoris and Hill (1983) created an expression that shows the relationship between corporate value and policy decisions regarding working capital:

$$NPV_t = (-PP + PD + PC)S_t \quad (1)$$

Where:

$$PP = C_p e^{-rt_p}\ , PD = (1-d)qe^{-rt_d}\ , PC = (1-q)(1-b)e^{-rt_c} \quad (2)$$

In the model, C_p equals cash paid for production, d is the discount on sales, q is the proportion of sales on credit, b represents the share of bad credit sales, and S_t is the sales at time t. The discount rate is represented by r, and t_p, t_d, t_c are the times when cash is paid. Given the expression presented by Sartoris and Hill (1983), it is implied that future conditions such as sales growth and financing have an important role in working capital management and firm value.

2.5 Financing

The implied relationship between investments in net operating working capital and financing raises questions about the dependence of firms' financial health. Danielson and Scott (2004) find evidence that demand for credit is increasing for firms experiencing financial constraints. Furthermore, Longhofer and Santos (2003) provide evidence that the value of the inventory probably is worth more for trade creditors than for banks, which results in different financing costs. Both conclusions indicate that the financing of investments in NOWC affects the value of the company.

2.6 Previous Research of High Relevance

A paper written about working capital management by Aktas, Croci and Petmezas (2014), investigates whether working capital management is value-enhancing. The study is conducted on US-listed companies between 1982 – 2011. When examining their research question, evidence from stock performance and investments are used. The authors conclude that there is an existing optimal level of working capital. "*Firms that converge to that optimal level, either by increasing or decreasing their investment in working capital, improve their stock and operating performance over the subsequent period*" (Aktas, Croci & Petmezas, (2014), page 111). The suggestion of an optimal level of working capital is also concluded by Baños-Caballero, García-Teruel and Martínez-Solano (2010). Aktas, Croci and Petmezas (2014) further discuss how their results affect shareholders and state that their findings should be a more important point of consideration for corporate policy decisions. Corporate managers should, according to the authors, avoid tying up cash in working capital in order to generate

more internal funds that can be used directly and in more profitable investments, which will benefit shareholders.

Another study by Kieschnick, LaPlante and Moussawi (2013), also focus on shareholder wealth in comparison to investments in NOWC on the US market. The authors add variables regarding expectations on the company, capital structure, macroeconomic and financial market conditions. By doing this they provide evidence on what additional factors that must be considered in addition to factors that are only targeting operational activities. Firstly, they conclude that factors such as expected sales growth, type of financing, and financial condition had an impact on shareholder return. Secondly, they conclude that factors concerning macroeconomic and financial market conditions had no significant impact on the relationship between investment in NOWC and stock return.

Another study with high relevance is made by Faulkender and Wang (2006). The authors develop a methodology they argue is an improvement of the methodology developed by Fama and French (1998), whose methodology focuses on variation in market-to-book ratio. Faulkender and Wang (2006) argue that their model takes time-varying risks into consideration while Fama and French (1998) do not. By using a benchmark portfolio as a comparison to individual stock performances, the model can incorporate risks that vary over time into equity return. Furthermore, the authors argue that equity returns are easier to measure and interpret. Fama and French (1998) comment in their study that they preferably would want to measure replacement cost similar to equity returns but do not have sufficient data. One reason for wanting to measure replacement cost instead of a book-to-market ratio is because the ratio could vary because of the variation in accounting policy and not replacement costs. The model provided by Faulkender and Wang (2006) is taking this into consideration.

2.7 Hypothesis

When comparing previous research made on firms in other countries, we believe that we will see results that differ from similar papers. Given the current level of working capital on the Swedish market (high cash conversion cycle) compared to Europe and North America, proven by Kortman, Wicks and Ojeda (2017), our paper will potentially examine the effect of improving working capital management for firms with an abnormal large amount of cash tied up in daily operations. The previous research we consider has only been able to capture the effect of working capital management in countries with an average amount of cash tied up in daily operations. We believe that our results will show that improving the efficiency of working

capital management in Sweden firms will have a greater effect on shareholder wealth than in other countries.

3. Sample

To investigate the relationship between investments in NOWC and stock performance, a sample of Swedish public-traded corporations on Nasdaq Stockholm between 2009 – 2018 will be used. More specifically, we use all the firms on the index OMX Stockholm PI (OMXSPI) at 2019-11-25. However, due to the different meanings of working capital in financial services, we exclude all firms with SIC codes 6000 to 6800, plus Kinnevik AB, Investment AB Latour, Catella AB, Midway Holding AB, Vostok New Ventures AB, JM AB, Intrum Justitia AB. The reason for excluding these companies is because they are included in financial services, but do not have a SIC code between 6000 – 6800. The number of financial services companies excluded was 41.

Furthermore, we exclude 94 firms that have not been traded on OMXSPI during the entire period between 2009 – 2018 and 23 firms that have a split financial year. After excluding these firms, we end up with 143 companies in total. We are aware of the survivorship bias risk that exists within our chosen sample but given that only three companies have been delisted on OMXSPI due to bankruptcy since 2013, the potential bias is negligible. Stock performance and accounting data is collected from Compustat, and if data is missing, we collect that data from the firms' annual reports. More information about the different variables created in the models is discussed in Section 4.

4. Methodology

The dependent variable, stock performance, is measured as excess return compared to a benchmark portfolio, where the portfolio is a size and book-to-market portfolio. Faulkender and Wang (2006) argue that this approach is better than using a market-to-book ratio approach, such as Fama and French (1998), as a measurement of baseline valuation. The two main reasons Faulkender and Wang (2006) gives are that the model takes time-varying risks into consideration and that the measurement and interpretation of equity returns are easier. At the beginning of each year, we sort the stocks in our sample into tertials based on size and book-to-market to construct 9 different benchmark portfolios. The return on the portfolio is weighted with regard to each firm's market value of equity at the beginning of the year, and the portfolio

that each firm belongs to at the beginning of the year serves as the benchmark portfolio for the firm.

4.1 Model 1: Benchmark Model

Four different models are used to explain the dependent variable excess return, and all models will be using fixed effects and Robust Roger Standard Errors clustered at firm level to handle heteroscedasticity. Firstly, we use the same model Faulkender and Wang (2006) use when investigating how shareholders value changes in an extra dollar held in cash by firms. Although our study focuses on equity value relative to investments in NOWC, more factors than investments in NOWC correlate with equity value. Therefore, Faulkender and Wang (2006) came up with a model taking profitability, financing policy, and investment policy into consideration. A model suitable for our purposes:

$$r_{i,t} - R_{i,t}^{B} = \theta_i + \beta_1 \Delta C_{i,t} + \beta_2 C_{i,t-1} + \beta_3 \Delta E_{i,t} + \beta_4 \Delta NA_{i,t} + \beta_5 \Delta RD_{i,t} + \beta_6 \Delta I_{i,t} + \beta_7 \Delta D_{i,t} + \beta_8 L_{i,t} + \beta_9 NF_{i,t} + \varepsilon_{i,t} \quad (3)$$

$r_{i,t} - R_{i,t}^{B}$ is the excess return in comparison to the benchmark portfolio for firm i during fiscal year t, and the other variables are as follow:

$\Delta C_{i,t}$ change of firm i cash holdings during fiscal year t.

$C_{i,t-1}$ firm i cash holdings fiscal year $t-1$.

$\Delta E_{i,t}$ change of firm i earnings before interest during fiscal year t.

$\Delta NA_{i,t}$ change of firm i total assets net of cash during fiscal year t.

$\Delta RD_{i,t}$ change of firm i R&D expenditures during fiscal year t.

$\Delta I_{i,t}$ change of firm i interest expense during fiscal year t.

$\Delta D_{i,t}$ change of firm i total dividends during fiscal year t.

$L_{i,t}$ firm i total debt over total debt plus market value of equity (market leverage) at the end of fiscal year t.

$NF_{i,t}$ firm i total equity issuance minus repurchase plus debt issuance minus amortization during fiscal year t. In other words, the firm's net financing.

By dividing each variable, except market leverage, by the market value of equity in year *t-1,* same as the beginning of the year, we scale the variables so we can interpret how investors value each extra SEK. In other words, the coefficients represent how much investors value an extra SEK in the variable.

4.2 Model 2: Investment in NOWC

In the second model, we use the first model as a benchmark model, similar to how Kieschnick, LaPlante and Moussawi (2013) did, to see how investors value investment in working capital. We do this by adding three new variables to the equation:

$$r_{i,t} - R^{B}_{i,t} = \theta_i + \beta_1 \Delta C_{i,t} + \beta_2 C_{i,t-1} + \beta_3 \Delta E_{i,t} + \beta_4 \Delta NNA_{i,t} + \beta_5 \Delta RD_{i,t} + \beta_6 \Delta I_{i,t} + \beta_7 \Delta D_{i,t} + \beta_8 L_{i,t} + \beta_9 NF_{i,t} + \beta_{10} NOWC_{i,t-1} + \beta_{11} \Delta NOWC_{i,t} + \varepsilon_{i,t} \quad (4)$$

The three variables are as follow:

$NOWC_{i,t-1}$ represents net operating working capital for firm i fiscal year $t-1$, which is calculated as inventories plus accounts receivables minus accounts payables.

$\Delta NOWC_{i,t}$ represents the change in net operating working capital for firm i during fiscal year t.

$\Delta NNA_{i,t}$ replace the variable $\Delta NA_{i,t}$ and represents the change of total assets minus the sum of cash and marketable securities, inventories, and accounts receivables for firm i during fiscal year t.

Considering our hypothesis, we believe that changes in cash holdings and cash holdings at time $t-1$ will have a value between 0.0 and 1.0. This is because cash holdings do not generate any return until it is invested in some value-creating project, and if cash is not invested, it could rather be distributed to shareholders. In addition, we believe that both changes in NOWC and the level of NOWC will have a value between 0.0 and 1.0. Although investments in NOWC can generate future cash flows, we believe investors do not reward an increasing amount of working capital given the already high level, proven by Kortman, Wicks and Ojeda (2017).

4.3 Model 3: Excess NOWC

Kieschnick, LaPlante and Moussawi (2013) found that the response from investment in net operating working capital varied depending on the current level of NOWC. In the third model,

we therefore replace the former NOWC variable with excess NOWC, a method used by Aktas, Croci and Petmezas (2014). This is done to measure the level of NOWC in comparison with similar peers. Excess NOWC will be the difference between firms' NOWC and the industry adjusted median NOWC. To divide firms into industries, we use the Industry Classification Benchmark (ICB) code and to standardize firms NOWC we use a sales ratio. In other words, we compare firms' NOWC in relation to their sales. In the model, excess NOWC will be divided into two different independent variables:

$$\beta_{10}\left[Excess\ NOWC_{i,t-1} * D\right] + \beta_{11}\left[Excess\ NOWC_{i,t-1} * (1 - D)\right] \tag{5}$$

Where D is a dummy variable that takes the value one when excess NOWC is positive, and zero otherwise. This will allow us to measure the effect on shareholders' wealth both when excess NOWC of firms' is positive and negative. The model looks as follow:

$$\begin{aligned} r_{i,t} - R^{B}_{i,t} = \theta_i &+ \beta_1 \Delta C_{i,t} + \beta_2 C_{i,t-1} + \beta_3 \Delta E_{i,t} + \beta_4 \Delta NNA_{i,t} + \beta_5 \Delta RD_{i,t} + \beta_6 \Delta I_{i,t} \\ &+ \beta_7 \Delta D_{i,t} + \beta_8 L_{i,t} + \beta_9 NF_{i,t} + \beta_{10}\left[Excess\ NOWC_{i,t-1} * D\right] \\ &+ \beta_{11}\left[Excess\ NOWC_{i,t-1} * (1 - D)\right] + \beta_{12} \Delta NOWC_{i,t} + \varepsilon_{i,t} \end{aligned} \tag{6}$$

Having a higher level of NOWC in comparison to the median in the industry is something that investors probably punish and will therefore have a negative impact on shareholder wealth. This is because the abnormally high amount of cash tied up in working capital could otherwise be distributed to, for example, shareholders. What impact a lower level of NOWC than the industry median will have is harder to predict. It could have a positive impact if investors believe the company has a more efficient working capital management. On the other hand, Sweden already has a high level of working capital compared to similar peers (Kortman, Wicks & Ojeda, 2017), so from a global perspective, investors may not value a lower amount of working capital than the industry median.

4.4 Model 4: Extra factors influencing shareholders

Aktas, Croci and Petmezas (2014) and Kieschnick, LaPlante and Moussawi (2013) state that it is reasonable to believe that not only the level of NOWC influences the response from investment in net operating working capital, but also other factors. Therefore, the last model will add additional factors to the model. Factors discussed by Kieschnick, LaPlante and Moussawi (2013) are Expected sales growth, Debt load, Financial constraints, and

Macroeconomic & Financial market conditions. However, the authors found that Macroeconomic & Financial market conditions, measured by Libor-rate, Term spread, Credit spread, Real GDP growth rate, and Stock market volatility, had no effect on excess return in the context of investment in NOWC. One plausible explanation the authors give is that these factors are already incorporated into firms' stock prices. Therefore, the third model only takes the other four factors into consideration.

Expected Sales growth

Given that one of the reasons for investing in net operating working capital is to have products in store to customers in the future, firms should be rewarded differently depending on expected sales growth. For example, Sartoris and Hill (1983) suggest that firms get more rewarded for investment in NOWC if the expected sales growth is higher.

Unfortunately, there is no common way to calculate expected sales growth, as it is a subjective issue. However, one possible way of predicting the future is to look at past growth. Therefore, we will use the arithmetic mean of the last three years to predict expected sales growth. Since Sartoris and Hill (1983) suggest that firms with higher expected sales growth will be more rewarded from investments in NOWC, our prediction is that the variable in our model will have a positive impact.

Debt load

The debt load of a company consists of long-term debt and short-term debt, we want to consider both when controlling for its effects on shareholder wealth. Preve and Sarria-Allende (2010) discuss short-term financing alternatives for companies and the importance of lowering these short-term financing costs, which might be a problem for firms with low liquidity. The authors also discuss how debt maturity policy affects these short-term financing alternatives and the importance of high liquidity for firms that are facing financial constraints. Long-term debt use is captured in the leverage for each firm and short-term debt use is captured by the ratio of current liabilities to total liabilities. Our regression model will then capture the effect of these variables on how the level of investments in NOWC influences shareholder wealth.

We expect the values to be the same as Kieschnick, LaPlante and Moussawi (2013), in other words that the variables will have a negative impact. The reason is that investments in high liquidity assets, as inventory and account receivables, could be positive for debt holders at the expense of shareholders, the higher the leverage is. Our view that the short-term debt ratio is

likely to have a negative impact is because Preve and Sarria-Allende (2010) suggest that companies should lower short-term financing costs.

Bankruptcy risk

The reason for considering bankruptcy risk is our belief that it may affect the value of an incremental dollar invested in NOWC on shareholder wealth. An asset with high liquidity can contribute with a higher value to debt holders in times when a firm is facing higher bankruptcy risk. However, shareholder wealth is likely to experience a lower valuation, as we might conclude when performing the regression. As an independent variable, we use Altman's revised Z score (Altman, (1968) and Altman, (2000)) at time $t-1$.

Financial constraints

The level of financial constraint is an interesting factor when evaluating the effect of investment in NOWC. Firms with high financial constraints are often facing higher lending rates, have relatively low credit value and therefore these firms are in higher need of self-made financial sources. Evidence of this has been provided on the American market by Kieschnick, LaPlante and Moussawi (2013), the authors found a significant relationship between access to external capital on shareholder value of additional investments in NOWC. There are several ways of measuring a firm's financial constraints. The methods often concern a firm's cash flow, leverage, and profitability. However, Schauer, Elsas and Breitkopf (2019) provide evidence for an index superior to others named FCP. The FCP takes the following variables into consideration:

$$FCP_t = -0.123 * Size_{i,t-1} - 0.024 * Interest\ Coverage_{i,t-1} - 4.404 * ROA_{i,t-1} - 1.716 * Cash\ holdings_{i,t-1} \quad (7)$$

Where *size* is measured as the natural logarithm of total assets, *Interest coverage* is EBIT relative to interest expenses, *ROA* is the ratio between net income and total assets, and *Cash holdings* is cash at the beginning of the year relative to total assets. Given that firms with higher financial constraints often face higher lending rates, have relatively low credit value, we believe that the variable will have a negative impact.

To take all these influences into consideration we use the following model:

$$\begin{aligned} r_{i,t} - R_{i,t}^{B} = {} & \theta_i + \beta_1 \Delta C_{i,t} + \beta_2 C_{i,t-1} + \beta_3 \Delta E_{i,t} + \beta_4 \Delta NNA_{i,t} + \beta_5 \Delta RD_{i,t} + \beta_6 \Delta I_{i,t} \\ & + \beta_7 \Delta D_{i,t} + \beta_8 L_{i,t} + \beta_9 NF_{i,t} + \beta_{10} \left[Excess\ NOWC_{i,t-1} * D \right] \\ & + \beta_{11} \left[Excess\ NOWC_{i,t-1} * (1 - D) \right] + \beta_{12} \Delta NOWC_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (8)$$

Where:

$$\beta_{12} = \alpha_1 F_1 + \cdots + \alpha_i F_i \quad (9)$$

4.5 Econometric specifications and methods

When handling the data, we make several assumptions about the data. Firstly, are all variables winsorized at the 1.0% and 99.0% level. This to reduce the potential effect of spurious outliers in the data set. Secondly, as previously mentioned, are all variables except $L_{i,t}$, Expected sales growth, Short-term debt ratio, Altman Z, and FCP-index, adjusted for Market Value of Equity. By doing this we can interpret how investors value one extra SEK invested in the variable.

Lastly, we are using fixed effects and Robust Roger Standard Errors clustered at firm level to handle heteroscedasticity for each regression model, and we used Levin-Lin-Chu to check unit-root and Hausman test to check fixed or random effect.

5. Results

All results can be presented in four different tables: Table I presents a summary of basic statistics of the variables, Table II shows the raw correlation between the variables, Table III presents results from the first three regression models, and Table IV shows values from model 3 with the additional factors**.** For assumptions and other conditions when handling the data, see description above the tables.

Table I – Basis Statistics

Mean, Median and Standard Deviation for all variables used in the three different models, see section 4 Methodology for definitions of the variables. The variables are all winsorized at the 1.0% and 99.0% level. Except for $L_{i,t}$, Expected sales growth, short-term debt ratio, Altman Z, and FCP-index, the variables are divided by Market Value of Equity.

	Mean	Median	Std. Deviation
$r_{i,t} - R_{i,t}^{B}$	0.033	-0.038	0.609
$\Delta C_{i,t}$	0.009	0.003	0.102
$C_{i,t-1}$	0.122	0.075	0.151
$\Delta E_{i,t}$	0.012	0.009	0.120
$\Delta NA_{i,t}$	0.026	0.022	0.356
$\Delta NNA_{i,t}$	0.019	0.008	0.259
$\Delta RD_{i,t}$	0.000	0.000	0.019
$\Delta I_{i,t}$	-0.002	0.000	0.014
$\Delta D_{i,t}$	0.004	0.000	0.019
$L_{i,t}$	0.175	0.134	0.179
$NF_{i,t}$	-0.002	-0.029	0.206
$NOWC_{i,t-1}$	0.351	0.234	0.400
$\Delta NOWC_{i,t}$	0.004	0.008	0.130
$Excess\ NOWC_{i,t-1}$	0.033	0.000	0.277
Expected sales growth	0.156	0.064	0.520
Short-term debt ratio	0.055	0.035	0.064
Altman Z	4.955	2.971	8.099
FCP-index	-0.654	-1.738	20.811

Table I illustrates descriptive statistics of all variables. We identify a relatively high standard deviation of excess return that is due to the fact that the company of the same size and book-to-market ratio have had major differences in returns over the years. Noteworthy is also the low proportion of short-term liabilities in companies.

Table II – Correlation amongst variables

Raw correlation, $r_{xy} = \frac{s_{xy}}{s_x s_y}$, between the variables. The variables are all winsorized at the 1.0% and 99.0% level, for definition of the variables see section 4 Methodology.

	$r_{i,t} - R^B_{i,t}$	$\Delta C_{i,t}$	$C_{i,t-1}$	$\Delta E_{i,t}$	$\Delta NA_{i,t}$	$\Delta NNA_{i,t}$
$r_{i,t} - R^B_{i,t}$	1.000					
$\Delta C_{i,t}$	0.243	1.000				
$C_{i,t-1}$	-0.266	-0.350	1.000			
$\Delta E_{i,t}$	0.318	0.286	-0.185	1.000		
$\Delta NA_{i,t}$	0.173	0.073	-0.254	0.209	1.000	
$\Delta NNA_{i,t}$	0.174	0.087	-0.259	0.151	0.857	1.000
$\Delta RD_{i,t}$	0.021	0.079	-0.117	-0.104	0.107	0.069
$\Delta I_{i,t}$	-0.083	0.009	-0.133	-0.010	0.396	0.326
$\Delta D_{i,t}$	0.246	0.158	-0.129	0.293	0.078	0.041
$L_{i,t}$	-0.128	-0.023	0.331	-0.052	-0.142	-0.120
$NF_{i,t}$	0.118	0.261	-0.043	0.131	0.428	0.379
$NOWC_{i,t-1}$	0.060	0.052	0.212	0.009	-0.315	-0.177
$\Delta NOWC_{i,t}$	0.136	0.034	-0.154	0.217	0.600	0.299
$Excess\ NOWC_{i,t-1}$	0.000	0.006	-0.084	0.011	0.022	0.048
Expected sales growth	0.089	0.081	-0.080	0.047	0.149	0.123
Short-term debt ratio	0.003	0.024	-0.029	0.055	-0.037	-0.034
Altman Z	0.080	0.045	-0.156	-0.037	0.011	0.034
FCP-index	0.088	0.026	0.037	0.083	0.008	0.009

Table II continued

	$\Delta RD_{i,t}$	$\Delta I_{i,t}$	$\Delta D_{i,t}$	$L_{i,t}$	$NF_{i,t}$	$NOWC_{i,t-1}$
$\Delta RD_{i,t}$	1.000					
$\Delta I_{i,t}$	0.053	1.000				
$\Delta D_{i,t}$	-0.011	-0.094	1.000			
$L_{i,t}$	-0.035	-0.165	-0.128	1.000		
$NF_{i,t}$	-0.020	0.301	-0.107	0.103	1.000	
$NOWC_{i,t-1}$	-0.020	-0.369	0.016	0.393	-0.128	1.000
$\Delta NOWC_{i,t}$	0.033	0.302	0.108	-0.100	0.317	-0.381
$Excess\ NOWC_{i,t-1}$	0.000	0.004	-0.010	-0.125	0.038	0.163
Expected sales growth	0.060	0.099	0.008	-0.105	0.146	-0.161
Short-term debt ratio	-0.040	-0.092	-0.025	0.441	0.095	0.215
Altman Z	0.075	0.060	0.012	-0.332	-0.058	-0.203
FCP-index	-0.040	-0.002	-0.022	-0.005	0.165	0.002

	$\Delta NOWC_{i,t}$	$Excess\ NOWC_{i,t-1}$	Expected sales growth	Short-term debt ratio	Altman Z	FCP-index
$\Delta NOWC_{i,t}$	1.000					
$Excess\ NOWC_{i,t-1}$	0.074	1.000				
Expected sales growth	0.097	-0.008	1.000			
Short-term debt ratio	0.013	-0.022	-0.036	1.000		
Altman Z	-0.006	0.041	0.138	-0.252	1.000	
FCP-index	-0.014	0.028	0.080	0.002	-0.082	1.000

Table II does not indicate any values of correlation that could cause a problem regarding multicollinearity. The two variables with the highest correlation, $\Delta NNA_{i,t}$ and $\Delta NA_{i,t}$, are not in the same model, so it does not cause any problems. The second highest correlation is between $\Delta NA_{i,t}$ and $\Delta NOWC_{i,t}$, which is reasonable given that they share a few components. However, the degree of correlation is not high enough to be a concern.

Table III – Result from regressions

Results from all the three different models, see section 4 Methodology for definitions of the variables. All variables are winsorized at the 1.0% and 99.0% level, and each regression model is estimated using fixed effects and Robust Roger Standard Errors clustered at firm level to handle heteroskedasticity. Levin-Lin-Chu was performed for checking unit-root and Hausman test for checking fixed or random effect. P-values for the null hypothesis that the coefficient is equal to 0 are presented in the parenthesis.

	Model 1	Model 2	Model 3
Constant	0.238 (0.00)	0.059 (0.22)	0.215 (0.00)
$\Delta C_{i,t}$	0.205 (0.57)	0.056 (0.87)	0.393 (0.23)
$C_{i,t-1}$	-0.928 (0.00)	-0.957 (0.00)	-0.795 (0.00)
$\Delta E_{i,t}$	0.848 (0.00)	0.648 (0.00)	0.917 (0.00)
$\Delta NA_{i,t}$	0.214 (0.02)		
$\Delta NNA_{i,t}$		0.321 (0.00)	0.270 (0.03)
$\Delta RD_{i,t}$	0.110 (0.92)	-0.165 (0.83)	0.142 (0.90)
$\Delta I_{i,t}$	-7.061 (0.00)	-2.910 (0.05)	-6.648 (0.00)
$\Delta D_{i,t}$	3.976 (0.00)	3.151 (0.00)	3.842 (0.00)
$L_{i,t}$	-0.780 (0.00)	-1.375 (0.00)	-0.708 (0.00)
$NF_{i,t}$	0.296 (0.16)	0.242 (0.23)	0.190 (0.31)
$NOWC_{i,t-1}$		0.844 (0.00)	
$\Delta NOWC_{i,t}$		0.951 (0.00)	0.251 (0.12)
$Excess\ NOWC_{i,t-1} * D$			-0.152 (0.07)
$Excess\ NOWC_{i,t-1} * (1 - D)$			0.027 (0.94)
Observations	1 430	1 430	1 430
R-squared	0.174	0.154	0.189

From our benchmark model, model 1 in column 2 in Table III, we estimate that investors value an extra SEK of cash at SEK 0.21. However, the p-value presented in the parenthesis does not show a desirable level of significance. In column 3 the second model is presented; the evidence suggests that investors on average value an extra SEK invested in NOWC at SEK 0.95. Although the p-value does not show significance for changes in cash, the model suggests that investors value investments in NOWC higher than investments in cash.

In column 4 we can see that excess NOWC has a negative coefficient (-0.152) when companies have a positive excess NOWC (higher level of NOWC). This result is significant at a 10% level. On the other hand, companies with negative excess NOWC show a positive coefficient (0.027), however, that result cannot be stated as significant.

All three models show a significant result for the lagged cash holdings variable $C_{i,t-1}$. Model 1 (-0.928) shows the value for shareholders in one year, when a company invests one extra SEK in cash holdings today, given the firm's cash holding in the previous period. The interpretation is then, the more cash a firm held previous period, the greater the decrease of shareholder wealth.

Table IV – Extra factors influencing shareholders value from investment in NOWC

Results from model 3 when adding additional influences. For simplicity, we only present the variables of interest. In other words, the interaction variables. All variables are winsorized at the 1.0% and 99.0% level, and each regression model is estimated using fixed effects and Robust Roger Standard Errors clustered at firm level. Performed Levin-Lin-Chu test for checking unit-root and Hausman test for checking fixed or random effect. P-values for the null hypothesis that the coefficient is equal to 0 are presented in the parenthesis.

Model 3	Coefficient
$\Delta NOWC_{i,t} * Expected\ sales\ growth$	2.795 (0.00)
$\Delta NOWC_{i,t} * Leverage$	-3.353 (0.00)
$\Delta NOWC_{i,t} * Short\ term\ debt\ ratio$	8.542 (0.00)
$\Delta NOWC_{i,t} * Altman\ Z$	-0.029 (0.73)
$\Delta NOWC_{i,t} * FCP\ index$	0.023 (0.47)
R-squared	0.215

The results from Table IV implies that several factors influence shareholder wealth given investment in NOWC. Looking at the p-values we find that the factors with a high level of significance are expected sales growth, leverage, and short-term debt ratio. Altman Z score and FCP-index which represent the companies' financial conditions and financial constraints respectively are on the other hand not showing a level of significance.

By interpreting the values with a high level of significance the evidence suggests that high expected sales growth and high short-term debt ratio results in higher shareholder wealth when investing in net operating working capital. High leverage, however, is on the other hand leading to lower shareholder wealth when investing in net operating working capital.

6. Discussion

The results from the benchmark model, Model 1, are similar to the results obtained by Faulkender and Wang (2006) in their model. Variables that have a positive effect in our model also have a positive effect on their model. However, the biggest difference is the variable $C_{i,t-1}$, which has a significant negative effect in our model and a positive effect in the model provided by Faulkender and Wang (2006). A proposed explanation given by Dittmar and Mahrt-Smith (2007) is that the value of cash holdings may vary between firms depending on corporate governance. They provide evidence that investors value cash holdings substantially lower for firms with poor management. These results match the conclusions made by Drobetz, Grüninger and Hirschvogl (2010) that it is not in shareholders' best interest for firms to hoard cash due to information asymmetry. In addition to that, the reasoning made by Dittmar and Mahrt-Smith (2007), that greater cash holdings get punished under poor management could correspond with Kortman, Wicks and Ojeda (2017) conclusion that Nordic firms working capital management is inferior to American firms.

An interesting point to consider is when comparing investments in cash and investments in NOWC during a year. For Model 3 we identify that an incremental Swedish Krona invested in NOWC is valued less than an incremental SEK invested in Cash, these results are not significant but are consistent with what Kieschnick, LaPlante and Moussawi (2013) found for firms in the USA and what Autukaite and Molay (2011) found in France. In comparison with these articles, we were limited to the Swedish stock market which affects the likelihood of receiving significant results, in terms of the number of available firms for our sample.

For Model 3 we added the variable Excess NOWC to be able to capture the different characteristics of sectors that use and value working capital management differently. Our results show that companies with positive excess NOWC, which invests an additional incremental SEK into net operating working capital will decrease shareholder value by -0.152 SEK. This may come from potential over-investment in working capital. We also identify a reverse relationship with negative excess NOWC, which is not significant, that gives us the intention of a conversion towards an optimal level of NOWC for companies in each sector. This result is consistent with what Aktas, Croci and Petmezas (2014) found for the US market, what Deloof (2003) discovered in his sample with Belgian firms, and what Baños-Caballero, García-Teruel and Martínez-Solano (2010) provided evidence for regarding Spanish firms.

However, as the result for negative excess NOWC is not significant we can not draw the same conclusion with certainty.

Regarding the results on excess NOWC, this must be weighed against any potential risk differences that exist in keeping a positive or negative excess NOWC. For example, it is possible that using an aggressive NOWC policy is increasing the risk for the company, which makes risk a potential explanatory variable for the change in excess return. This can be derived into the components of net operating working capital. A company that chooses to apply an aggressive working capital management approach is facing risks such as fluctuations in supply costs and potential losses when they are short of materials or products when an unexpected increase in demand occurs in the market. Evidence of this is provided by Kim and Chung (1990), Blinder and Maccini (1991), and Corsten and Gruen (2004).

Consistent through all models are that $C_{i,t-1}$ has a significant negative value. In other words, firms get punished by investors for holding too much cash. One explanation provided by Drobetz, Grüninger and Hirschvogl (2010) is that firms get punished for hoarding cash when there is significant information asymmetry between the firm and the market. If firms can not communicate the reason for saving cash, the market does not see why the firm does not distribute the cash as dividends. The reasoning is reasonable since the variable $\Delta D_{i,t}$ has a significant positive impact on stock return. Investors may think that if firms don not spend their cash, they rather should distribute it to shareholders. This idea is for example discussed by LaPorta et al (2000), that shareholders prefer dividends over retained earnings.

In the fourth model, presented in Table IV, the results show significant values for the variables Expected sales growth, Leverage, and Short-term debt ratio. On the other hand, the results for Altman Z and FCP-index are not significant. A positive effect from Expected sales growth is consistent with the results from Sartoris and Hill (1983) profiled in section 4. The interpretation is that the higher the expected sales growth, the higher the shareholder wealth when investing in NOWC. The result is also consistent with the model provided by Schiff and Lieber (1974) which states that companies need to increase inventory as sales increase, and vice versa.

Although both Leverage and Short term debt ratio are significant, they do not have the same impact on investments in NOWC. According to the results, Leverage has a negative impact while the Short-term debt ratio has a positive impact on excess return. That Leverage has a negative impact is something that is consistent with evidence provided by Kieschnick, LaPlante and Moussawi (2013). A reasonable cause could be that investments in high liquidity assets

such as inventory and account receivables may increase value for debt holders when experiencing financial distress, for which high Leverage could be an indication of. However, on the other hand, the shareholder wealth will then probably experience a decrease in value.

Contrary to evidence provided by Kieschnick, LaPlante and Moussawi (2013) that the Short-term debt ratio has a negative impact and suggestions from Preve and Sarria-Allende (2010) that firms should lower their short-term financing costs, the results from our regression indicate that firms get rewarded for higher Short-term debt ratio. One reason may be that Swedish firms in our sample, relative to Americans firms in Kieschnick, LaPlante and Moussawi (2013) study, have a significantly lower median Short-term ratio. In other words, Swedish firms use less short-term debt and more long-term debt. Investors may then encourage an increase of short-term debt, such as trade credit, to increase financial flexibility. That short-term debt, as trade credit, offers firms more financial flexibility, is something discussed by Danielson and Scott (2004). An increase in for example trade credit could be something positive for the cash conversion cycle, a measure where Swedish firms were substantially inferior to European peers (Kortman, Wicks & Ojeda, 2017).

Considering our hypothesis, the predictions were to receive higher coefficients to show a higher increase in returns for Swedish firms that improve the effectiveness of working capital management. This hypothesis turned out to be false. When comparing the results to the previous research by Kieschnick, LaPlante and Moussawi (2013) and Aktas, Croci and Petmezas (2014) we are not able to see a pattern that can conclude that statement. Swedish firms, even though they have an abnormally high average cash conversion cycle compared to Europe and North America, do not benefit more from improving working capital management.

What effect does this abnormally high average cash conversion cycle have for Swedish firms? The first and most obvious one is that they bind more cash in working capital, as discussed above, this tends to make firms highly reliable on loans and other sources of financing in daily operating activities. As proven by Aktas, Croci and Petmezas (2014), a decline in excess NWC, for firms with high excess NWC, will lead to an increase in corporate investment. One of the factors for this can be the available internal sources of funds that increase with declining NWC. The opportunities for Swedish companies to release cash through working capital are as Kortman, Wicks and Ojeda (2017) stated, more than enough to make a tremendous impact on future corporate investments. The authors also state that capital investments in Sweden have been lower compared to the world average, and Swedish firms did not increase capital

investments between the years 2012-2016. In a long term perspective, this under-investment is not beneficial for the shareholder wealth as long term growth is highly dependent on increasing capital investments.

Returning to the rejection of our early hypothesis that it cannot be concluded that Swedish firms benefit more from improving the effectiveness of working capital management. Another possible outcome considering the high cash conversion cycle is that for Swedish companies, the level of excess NOWC should not be a variable showing evidence of a conversion towards an optimal level of NOWC. When considering the amount of cash Swedish firms can release (by a decrease in working capital) as financial funds for future investments, it is reasonable to think that both these variables should be negative. Even more investments in NOWC should not benefit shareholders no matter if the company has a level of net operating working capital above or below the industry median. However, this is not what we discovered when comparing results with what Aktas, Croci and Petmezas, (2014) found for the US market, what Deloof (2003) discovered in his sample with Belgian firms, and what Baños-Caballero, García-Teruel and Martínez-Solano (2010) provided evidence for regarding Spanish firms. Every paper discovered a tendency towards a conversion to an optimal level of net operating working capital in each country. This shows us a tendency that an optimal level of net working capital exists in every single country. The fact that these optimal points do not seem to convert towards each other, especially when the EU is so integrated, is a surprise for us and a potential subject for further research.

7. Summary and conclusion

As early established the management of working capital is an important task for firm management. The importance is implied by the great number of previous studies in the field. However, of our knowledge, there is no study published in the field focusing explicitly on the relationship between investment in working capital and shareholder wealth on Swedish firms, despite the fact that Sweden and Nordic countries have a recognized worse cash conversion cycle (Kortman, Wicks & Ojeda, 2017) than rest of Europe and North America. Therefore, we provide the first examination in the area for Swedish firms.

In this study, a few conclusions can be made. On average when firms hold more cash today, it will result in a decrease in shareholder wealth in one year. When making working capital management policies about decreasing net working capital companies should spend the release

of cash in value-creating projects rather than holding the cash. Another conclusion that can be made is that companies with positive excess NOWC on average will maximize shareholder wealth by a decrease in net working capital.

Furthermore, our fourth model shows that extra SEK invested in working capital is significantly influenced by the expectations on future sales growth, something consistent with previous studies. Moreover, is the model showing significant influences from firms' Leverage and the proportion of Short-term debt. The type of influence, however, is not consistent with previous research and is somewhat contradictory. Lastly, no significant conclusions could be drawn that a firm's financial health had an impact on the relationship, something we would have thought was the case.

Although our study provides greater insight into the relationship between investment in working capital and shareholder wealth, it is our belief that there are additional areas to be discovered. For example, it may be interesting to further examine the results regarding negative influence from Leverage but positive influence from Short-term debt and given that Sweden has a worse cash conversion cycle compared to similar peers, a more integrated method with peers would be rewarding.

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