



UMEÅ SCHOOL OF BUSINESS,
ECONOMICS AND STATISTICS
UMEÅ UNIVERSITY

Corporate Sustainability and Working Capital:

A panel data analysis of the relationship in Swedish-listed firms

Muhammad Shehzad Moin

Department of Business Administration
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Supervisor: Prof. Jörgen Hellström

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ABSTRACT

The theoretical and practical importance of working capital management (Sharma & Kumar, 2011) and its strong link with the firm's financial stability (Wang et al., 2020, p. 2; Kamel 2015, p. 35) make it one of the most important functional areas of corporate finance. Although literature and the corporate world recognize corporate sustainability mainly through corporate social responsibility (CSR), ESG emerged in the recent past and quickly made its strong footfall as an indicator of corporate sustainability. Literature is evident that studies have mainly focused on studying both working capital management (WCM) and corporate sustainability in relation to firm financial performance (FFP), while scant research has assessed the relationship between WCM and corporate sustainability (Barros et al., 2022, p. 1). The primary purpose of this study is to examine the relationship between corporate sustainability and WCM in the Swedish market to fill this gap in the literature and contribute to the existing body of knowledge on the subject matter through its findings, especially with reference to the use of ESG rating scores.

The relationship was examined through the quantitative approach. Sample data was comprised of 418 firm-year observations retrieved from Refinitiv Eikon on 38 firms listed on Nasdaq Stockholm between 2010-2020. ESG rating scores were used to measure corporate sustainability, while two proxy measures; cash conversion cycle (CCC) and working capital requirements (WCR) were for WCM. Stata software was used to find the results of the study by running the pertinent regression models using robust standard errors. Various statistical tests were performed to satisfy all the OLS classical assumptions. The empirical results of our study revealed mixed findings. The findings connected to CCC indicated no statistically significant relationship between ESG scores and CCC which allowed us to conclude that sustainable firms in Sweden do not operate with a shorter CCC (or cash cycle). The findings connected to WCR indicated a significant negative relationship of WCR with the environmental and social score, however no relationship with ESG and governance scores. These results allowed us to conclude that sustainable firms in Sweden are able to operate with WCR (or cash requirements), however, these effects entirely come from the environmental and social pillars, which indirectly implies more sustainable firms can operate with lower levels of debt than their counterparts. Since we found no significant effect from the ESG scores for both CCC and WCR, our findings were partially in line with the shareholder theory, the stakeholders' theory, and the legitimacy theory we used as theoretical references in our study. The overall findings of our study allow us to suggest sustainable firms in Sweden reconsider their working capital policy decisions to achieve working capital efficiency (a shorter cash cycle) while staying aligned with their sustainability goals.

Keywords:

Sustainability, Corporate Sustainability, Corporate Social Responsibility, CSR, ESG, ESG Rating, ESG Investing, Sustainable Finance, Sustainable Investment, Sweden, Working Capital, Working Capital Management, WCM, Cash Conversion Cycle, CCC, Working Capital Requirements, WCR

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List of Abbreviations

WCM	Working Capital Management
CCC	Cash Conversion Cycle
WCR	Working Capital Requirements
ESG	Environmental, Social, Governance
ENV	Environmental score
SOC	Social score
GOV	Governance score
FFP	Firm Financial Performance
CR	Current Ratio
GPM	Gross Profit Margin
EBITM	Earnings Before Interest and Tax Margin
MBV	Market-to-Book Value

Chapter 1

INTRODUCTION

This chapter will start with the problem background which will introduce the concepts of corporate sustainability and working capital management followed by the problem discussion and research gap. Then, the study purpose and study question will be followed by study contributions, choice of study, delimitations, and disposition to conclude the chapter.

1.1 Problem Background

1.1.1 Corporate Sustainability

Within the broad area of sustainability, corporate sustainability occupies a unique position and importance in the corporate world. Corporate sustainability practices (also known as ESG/CSR) may vary among countries depending upon their degree of development. Corporate sustainability has gained significant importance in the field of finance as corporations have actively opted for sustainability practices in their operations through implementing ESG strategies. This is particularly evident from the European region where 82% of the top 100 corporations by revenue (N100) report their sustainability performance by virtue of the influential pressure of the regulators, investors, ESG analysts, and consumers on corporations to be more transparent on sustainability fronts (KPMG, 2022, p. 14). Corporate sustainability measures the extent and the level of economic, environmental, social, and governance factors firms incorporate into their operations and their ultimate impact on society (Artiach et al., 2010, p. 32). Marrewijk & Werre (2003, p. 107) described corporate sustainability as “a company’s activities—voluntary by definition—demonstrating the inclusion of social and environmental concerns in business operations and in interactions with stakeholders”. The World Commission on Environment and Development (WCED¹) described corporate sustainability as “a business and investment strategy that seeks to use the best business practices to meet and balance the needs of current and future stakeholders”. Corporate sustainability has received significant attention from businesses, academicians, and policymakers since the WCED’s 1987 report addressed the impact of corporate business activities on the environment and society (Moufty et al., 2021, p. 1). Not only this but since then sustainability has emerged as the core concern of the firms, especially with reference to the ESG perspective (Barros et al., 2022; Schrettle et al., 2014), which is considered a common way of describing sustainability in finance.

Corporate sustainability demands firms stay competitive in the short run and contribute to the long run by protecting, conserving, and expanding human and natural resources (Artiach et al., 2010, p. 31). To this end, sustainable firms are obliged to make social and environmental concerns implicit part of their business strategy definition, business operations and stakeholder interactions (Lins & Wajnberg, 2007, p. 7). Padayachee (2021, p. 614) addressing the relationship between corporations and society, describes corporations as a force for more sustainable and balanced economic growth and for social and environmental good. Jan et al. (2018, p. 61) argue that firms manage their economic, social, and environmental risks besides meeting their obligations and

¹ For further details, refer to World Commission on Environment and Development (WCED) 1987 report “Our Common Future”, also known as the Brundtland Report.

embracing opportunities by involving themselves in corporate sustainability practices. According to Zainal and Zainuddin (2013, p. 21), increasing public awareness of the impact that businesses exert on society and the environment has made sustainability practices a key concern for many corporations. In brief, corporate sustainability underpins the importance of active engagement of firms in dealing with economic, environmental, social, and governance issues.

Sustainable firms are supposed to take ESG considerations into account while making investment decisions, which these firms can achieve through sustainable finance. Sustainable finance is an emerging area within the field of finance that connects corporate social responsibility (CSR) and social responsibility investment (SRI) Soppe (2009, p. 2). Sustainable finance has captured special attention in recent years in academic literature, financial markets, and the corporate world due to its particular focus on ESG (environmental, social, and governance) issues of sustainability. Sustainable Finance is described by the European Commission (2021) as “the process of taking ESG considerations into account when making investment decisions in the financial sector, leading to more long-term investments in sustainable economic activities and projects”. Sustainable finance looks at how finance (investing and lending) interacts with economic, social, and environmental issues (Schoenmaker & Schramade, 2019, p. 5). For instance, mitigation and adaptation of climate change, biodiversity preservation, pollution prevention, using natural resources efficiently in the production process, and innovation in eco-designed products essentially fall under environmental (E) considerations that measure a firm’s impact on the natural ecosystem (Liang & Renneboog, 2020, p. 2; Refinitiv 2022, p. 22). In particular, climate change is the biggest environmental risk societies and businesses face these days (Schoenmaker & Schramade, 2019, p. 6). KPMG’s Sustainability Reporting Survey indicates that among the top 250 corporations of the world (G250) 64% concede climate change and 49% concede social elements as risks to their business (KPMG 2022, p. 9). The Social (S) element addresses the relationship of the firm with its workforce, customers, and society. It predominantly includes human rights issues besides inequality, inclusiveness, labor relations, and investment in human capital and communities. The governance (G) dimension addresses the issues of protecting shareholders’ rights, a well-functioning board, management structures, employee relations, and executive remuneration (European Commission, 2021; Liang & Renneboog, 2020, p. 2).

ESG rating score² is one the most commonly used and widely accepted measures of corporate sustainability level (Barros et al., 2022, p. 1). According to Escrig-Olmedo et al. (2019, p. 2), ESG rating scores not only provide market perception but also indicate how well a firm is performing on the sustainability front. Moreover, ESG rating scores disclose the extent to which corporations contribute to improving the environment, society, and governance through their business operations and business strategies. There are many reliable rating agencies that issue ESG ratings for the ESG, ESG combined, ESG controversial, and individual pillars of E, S, and G on a regular basis based on their own research methodologies (Escrig-Olmedo et al., 2019, p. 2-3). Refinitiv Eikon produces one of the most reliable and broadly used ESG scores. Refinitiv Eikon’s ESG scores fall in the range of 0 to 100 where a higher ESG score of a firm indicates a high sustainability performance and vice versa (Refinitiv 2020, p. 7). Some scholars prefer to use ESG combined (ESGC) score over the regular ESG score for reason that the ESGC score adjusts the ESG score upward for the positive news and downward for the negative news, thus giving us a true reflection of a firm’s ESG practices and performance.

² For more details on ESG and ESG ratings refer to appendix A5 and appendix A6.2.

1.1.2 Working capital management

Working capital management (WCM) is concerned with managing the working capital of the firm. Working capital is the capital corporations and businesses need in their day-to-day trading operations and ordinary business conduct. Working capital is also known as floating capital or circulating capital because it flows/circulates in the business operations from one form to the other, for instance, from cash to inventories, inventories to sales, sale to receivables, and receivables to cash (Atseye et al., 2015, p. 3). WCM, also known as short-term financial management, is referred to the management of the current assets and current liabilities that are aimed at achieving a balance between profitability and risk in a way that contributes positively to the firm's value (Gitman & Zutter, 2015, p. 654).

WCM is broadly acknowledged as one of the core areas of corporate finance because of its importance and the impact it has on the liquidity, risk, and financial stability of the firm. Extant research has not only concluded WCM as the lifeblood of the firm but also suggested it as an essential prerequisite for success, growth, and profitability of all organizational forms (Ghosh & Maji, 2004; Enqvist et al., 2013; Orazalin, 2019, p. 525) as it impacts both firm performance and risks (Smith 1980) and ensures liquidity without making excessive investments in working capital (Nastiti et al., 2019). WCM is about planning and controlling both current assets and current liabilities in a way that not only the risk of failure to meet short-term obligations is eliminated but also high investment in these assets is prevented (Darkwah et al., 2019). WCM has its unique position and importance in corporate finance because it deals with a firm's short-term financing and investment decisions and is also considered an essential part of corporate finance theories (Sharma & Kumar, 2011, cited in Singh et al., 2017, p. 3). The importance of efficient WCM has been recognized for years, for instance, Peel et al. (1996) and Opler et al. (1999) also concluded in their studies that WCM is crucial for a firm's financial stability as it determines and affects the liquidity, profitability, and solvency of the firm (cited in Wang et al., 2020, p. 2).

WCM³ is a comprehensive concept that is further categorized into the management of its sub-parts or individual components, also known as drivers of WCM, such as cash management, inventory management, accounts receivables management, and accounts payables Management (Högerle et al., 2020, p. 28). Empirical research on WCM has proposed numerous metrics as proxy measures of WCM, however, cash conversion cycle (CCC) is the most popular and broadly used measure of WCM, which according to Högerle et al. (2020, p. 29-30) was initially introduced by Jose, Lancaster, and Stevens (1996), Shin & Soenen (1998), and Wang (2002) in their studies. CCC is a comprehensive measure of the length of time a firm takes to convert its inventory into sales, receivables into cash, and pay its payables.

1.2 Problem Discussion and Research Gap

Corporate sustainability and WCM are the two main pillars of our study. The literature is evident that the most widely explored area of WCM is examining the relationship between WCM and firm financial performance (FFP) (see, Deloof, 2003; Lazaridis & Tryfonidis 2006; Nazir & Afza, 2009; Sharma & Kumar, 2011; Baños-Caballero et al, 2012; Enqvist et al., 2013; Singhania & Mehta, 2017; Nastitti et al. 2019; Högerle et al., 2020) to name a few). Scholars claimed that the optimal

³ For more details on WCM refer to appendix A6.4.

level of working capital (Baños-Caballero et al, 2012; Atkas et al., 2015) and appropriate WCM strategies and policies (Nazir & Afza, 2009; Nguyen & Nguyen 2018) can contribute to enhance FFP. The second most researched area within WCM is the determinants of WCM (see, e.g., Nazir & Afza, 2009; Nastiti et al., 2019; Sharma et al., 2020). The determinants of WCM or the factors that affect WCM efficiency can be classified into endogenous (firm-specific characteristics) and exogenous (industry and macroeconomic) (Mousa 2019, p. 7). The most commonly used endogenous (firm-specific) factors include firm size, age, profitability/performance, value, market share (power), sales growth/growth opportunities, leverage, operating risk, capital expenditures, operating cash flow, governance structure, and compensation (Atseye et al. 2015, p. 1; Mousa, 2019, p. 7). Industry factors such as industry concentration and industry competition, and macroeconomic factors such as gross domestic product (GDP), interest rate, tax rate, country risk, inflation rate, and unemployment constitute the most commonly referred exogenous factors (Mousa, 2019, p. 8). The empirical evidence of these factors' influence on WCM has made scholars reach a consensus that these factors are crucial for achieving working capital efficiency.

Sustainability is a broad concept that has been studied in academic research in relation to a wide range of topics of finance, for instance, capital structure (Al Amosh et al., 2022), dividend policy (Benlemlih, 2019), cost of capital (El Ghouli et al., 2011), risk and return (Cornell, 2020), goodwill (Golden et al., 2018), corporate reputation (Park, 2019), firm value (Yoon et al., 2018), information asymmetry (Cui et al., 2018), international reporting (Seker & Şengür, 2021), portfolio performance (Climent et al., 2021), etc. However, examining the relationship between corporate sustainability and FFP has been the most consistently cited research area in extant literature (see e.g., Ameer & Othman, 2012, Ting et al., 2019, Alareeni & Hamdan, 2020; Ruan & Liu, 2021; Huang, 2021; Whelan et al., 2021; Hsiao et al., 2022; to name a few). Some studies have shown no relationship (see, Santis et al., 2016; Junius et al., 2020) or negative relationship (see, Ruan & Liu, 2021), but most studies concluded a positive relationship (see, Laskar, 2018; Ting et al., 2019; Dalal & Thaker, 2019). This is also evident from Huang (2021) who reviewed meta-analysis studies on the relationship between corporate ESG performance and FFP and found a statistically significant positive relationship between the two. In a similar kind of study, Friede et al., (2015) reviewed 2200 empirical studies and found a nonnegative relationship between ESG performance and FFP in roughly 90% of studies.

As noted above, empirical research has mainly focused on examining the relationship between corporate sustainability and FFP (Gatsi & Ameyibor 2016, p. 54) but scant studies exist in the extant literature on the impact of corporate sustainability on WCM of the firms (Barros et al., 2022, p. 1). Prior researchers have examined the association of WCM with corporate governance (see, Gill & Bigger, 2012; Kamau & Basweti, 2013; Kamel, 2015; Fiador, 2016; Ahmad et al., 2018; Prasad et al. 2019), CSR (Gatsi & Ameyibor, 2016), and ESG (Barros et al., 2022). A study conducted by Barros et al., (2022) is the only study that used ESG scores as a measure of corporate sustainability while using CCC and WCR (working capital requirements) as proxy measures of WCM to examine the impact of corporate sustainability on WCM of US corporations. The results of their study indicated firms with higher ESG scores are able to operate with lower WCR and a shorter CCC. Gatsi & Ameyibor (2016) investigated the relationship between corporate sustainability (CSR) and WCM (current ratio) in UK firms and found a positive but non-significant relationship.

The aforementioned brief literature provides us with evidence of a significant gap in the literature on examining the relationship between corporate sustainability and WCM. Also, this brings up an important phenomenon because we know from previous sections that corporate sustainability has captured wide attention of all stakeholders, especially since the emergence of ESG as a measure of sustainability, and that it contributes positively to the FFP and firm value. We also underpinned the importance of WCM for liquidity, solvency, survival, and growth of the firm and noted that WCM efficiency contributes positively to the FFP and firm value. Thus, making it important for the firm to achieve efficiency in managing its working capital. According to Gatsi & Ameyibor (2016, p. 55), this is prudent to examine the relationship between corporate sustainability and WCM for the broader effects of working capital on liquidity and profitability of the firm.

1.3 Research Purpose

The main purpose of this study stems from a short discussion in the previous sections, which is to identify and examine the relationship between corporate sustainability and working capital management of Swedish-listed companies. For the study purpose, corporate sustainability is measured in terms of ESG combined scores while WCM is measured in terms of CCC and WCR. The author has decided to use ESGC score rather than the regular ESG score to capture true reflection of a firm's ESG practices and performance as underpinned in an early section. The study also aims to examine the effects of ESG's individual pillar score, that is, the environmental pillar score (ENV), social pillar score (ENV), and governance pillar score (GOV) on both proxy measures (CCC and WCR) of WCM of the Swedish-listed firms. The study intends to explore whether the firms' sustainability practices are a signal to the market, and if so, this allows firms to operate with less investment in working capital and achieve working capital efficiency as compared to their counterparts. That is, whether sustainable firms in Sweden are able to operate with shorter CCC and lower WCR, what Barros et al., (2022, p. 5) called as *cash cycles* and *cash requirements* respectively.

The author believes there is an emerging need to examine how sustainability affects Swedish sustainable firms' ability to manage their working capital. This relationship is also important to evaluate because corporate strategies (financial, investment, production, marketing, etc.) can potentially affect both the ESG endeavors and WCM of the firm. The author also believes that within the scope of finance and sustainability, exploring the relationship between corporate sustainability and firm WCM carries special attention not only in developing countries but also in well-developed countries such as Sweden. Sweden is well-acknowledged well-recognized the world over for its achievements on the sustainability fronts, which is evident from the fact that Sweden was ranked second in the RobecoSAM Country Sustainability Ranking (2022), ranked first in the Global Sustainable Competitiveness Index (2021), and ranked second in UN Sustainable Development Report (2021) and Global Innovation Index (2021). Moreover, since Sweden is one of the Nordic countries, the results drawn from the study can be relatable to Nordic countries because of their similar settings.

1.4 Research Question

The following research question is intended to fulfill the purpose of the study:

Is there any significant relationship between corporate sustainability and working capital management of Swedish-listed corporations?

1.5 The Study Rationale

In terms of CBA (cost-benefit analysis), if we consider a firm's investment in ESG as its cost then there must be some benefits a firm expects to receive in return. A firm may expect these benefits in terms of risk mitigation, high goodwill and corporate reputation, better liquidity position, sustainable growth, increased customer patronage, improved sales, high profits, reduced costs (financial or non-financial), and/or high operational efficiency. Since WCM is the second pillar of our study, a firm investing in ESG would expect to achieve operational efficiency and a better liquidity position as benefits in return. As asserted by Barros et al. (2022, p. 1) based on the theory of Jensen and Meckling (1976), a firm's working capital measures and operating cycle measures (such as CCC) are correlated. Sustainable firms are expected to reap benefits from multiple sources such as reduced supply costs, decreased lost sales, lowered production interruptions, or getting more discounts from suppliers. Barros et al. (2022, p. 2) argue that firms can also use the ESG score as a tool for risk management as it allows firms to indicate lower risk to the market, which in turn, allows firms to operate under lower capital requirements without comprising their profitability.

One of the arguments on the relationship can also be drawn from Gatsi & Ameyibor (2016, p. 52-53) who based on the stewardship theory asserted that it's important for a firm to investigate the link between CSR and profitability, however, it is also equally important to examine the nature and strength of the firm's liquidity as it determines both the profitability and the ability of the firm to pay its short-term obligations when they become due. Therefore, it is crucial for the firm to engage in CSR without compromising on its liquidity position to avoid any undesired outcome such as bankruptcy or insolvency that may turn up as a result of an increase in CSR at the cost of liquidity. Another argument on the association stems from the perspective of determinants of WCM. Koralun-Bereznicka (2014) employed capital structure as one of the determinants of WCM based on the argument of Morris and Payne (2011) that the association between firm size and working capital performance is not always direct and linear, which means there are additional factors that can affect the WCM of the firm. Following this argument, in our study, we will consider ESG as one of the factors (determinants) and examine if ESG impacts (determines) the WCM of the Swedish-listed corporations, although assuming that the impact of ESG is largely dependent on the sustainability performance level (ESG scores) of the firms.

Moreover, although identifying important working capital drivers and determining the optimum level of working capital is challenging for a financial manager, this can play a pivotal role in minimizing risk, improving overall performance, and maximizing the value of the firm (Atseye et al. (2015, p. 2). Based on these arguments, the author of the study believes that if ESG is established as one of the determinants of WCM then Swedish firms may benefit from risk mitigation and improvement in overall corporate performance. Not only this but also the findings of the study (positive, negative, or no relationship) would assist corporations and all concerned stakeholders in formulating their strategies accordingly. Therefore, this would be interesting to see whether the performance of the ESG scores (and scores of its sub-parts: E, S, and G) shape the WCM of the Swedish-listed firms.

1.6 Theoretical and Practical Contributions

As discussed in the previous section, a number of studies have studied corporate sustainability and WCM in relation to FFP. However, there is a huge gap in research on exploring the relationship

between corporate sustainability and WCM not only in Sweden, the Nordic region, or Europe but also in other parts of the world, except the US which Barros et al. (2022) examined in their study. This makes this study the first of its type in Sweden. On the one end, at the theoretical level, this study is an attempt to expand on the current scientific research on this topic, which the author hopes the study would bring a notable theoretical contribution to the existing body of knowledge on this research topic and that new doors of scientific discussion on this relationship will open. Furthermore, this research is also expected to add to the existing knowledge with reference to the theories presented in the theoretical framework and how they might impact the potential relationship between the study's main variables.

The author hopes that the study signifies practical importance to the management (board of directors), policymakers, shareholders, investors, suppliers, buyers, and regulatory agencies. Though the study has been conducted on Swedish-listed companies, the importance of the practical contributions drawn from the outcomes of this study may not be restricted to Sweden only. In general, the study is of great benefit and importance to corporations whose business strategies already actively involve corporate sustainability practices (more precisely ESG/CSR practices) in their business models or who plan to consider such strategies for their businesses.

The author believes understanding the relationship between corporate sustainability and WCM is greatly beneficial to the management of the firm. Imagine this study ends up findings lower WCR and a shorter CCC, then management would like their firm to be outshined as “sustainable” and reap twofold benefits. First, a high ESG score would glitter the firm's positive image in the eyes of the regulators, the corporate world, financial markets, and the press. Second, the firm would achieve efficiency in WCM. If the study proves an insignificant relationship or no relationship then the firm would pursue different strategies on these two ends: sustainability and WCM. However, this can be assumed that management would never end up engaging in sustainability efforts at least for regulatory reasons, which are getting stricter with the passage of time and because of the reason that sustainability awareness among the masses is increasing day by day. Therefore, decreasing or eliminating sustainability efforts may end up with undesired outcomes, which firms would never desire.

Since this study is focused on all the Swedish-listed companies (excluding financial firms) which belong to different industries and each industry has its own norms and standards of business conduct and operations, therefore, different firms may perceive the relationship between corporate sustainability (ESG Scores) and WCM in a different perspective. Hence, contributions made by this study are purely general and cannot be specific to a particular industry. Some firms in a particular industry may find this study more suitable than others. For instance, this study can be of great benefit to manufacturing firms because these firms are blamed to increase environmental pollution therefore with their increased sustainability efforts to preserve the environment, for instance, these firms may gain gleam and positive image in eyes of the mass. This study is also equally and practically important for the suppliers and the buyers. If the study end up with the findings of a lower WCR and a shorter CCC of sustainable firms then the confidence and trust of suppliers in such firms would enhance and they would most likely continue doing business with these firms. Buyers would also feel more satisfied and hence support buying products from such firms. Similar arguments can also be made for other stakeholders; however, the point of discussion is that irrespective of the study outcomes, the information could be of use to all the stakeholders enabling them to make better, informed, and objective decisions.

1.7 Choice of the Topic and Preconceptions

This thesis study is an implicit and compulsory requirement of the master's degree program in Finance, which is an international business program I am currently pursuing at the Umea School of Business and Economics (USBE), Umea University, Sweden. During the program, I got an opportunity to study different finance courses at the advanced level. During my studies, what I observed was the inclination and focus on Sustainability (particularly on ESG) besides other emerging and core areas of finance, for instance, risk management. Besides studies, I keenly observed that not only in the corporate world but also in academic curriculum and academic research 'sustainability' is getting a lot of priority and attention and corporations are being forced by all segments of society to conduct business in sustainable ways. Being a master's student of finance, my interest in the field of finance was quite natural, however, interest in the field of sustainability was created during my studies, which compelled me to explore a research area that meets both ends: finance and sustainability. As mentioned earlier, after reviewing the literature, I found a gap in research with respect to corporate sustainability and WCM, therefore, I decided to work on this topic. I am not only a student of finance but also by profession, I am an academician, and for a long time, I have been teaching accounting and finance courses at undergraduate and graduate levels. This topic would help me to explore further these two distinct fields of study. However, I will take necessary precautions to make sure that none of my previous preconceptions and presumptions on the subject matter impact the research being conducted. I also ensure that no matter what the outcome turns up, I will only seek to find a relationship and analyze it without being presumptuous and biased. This is my strong belief that sustainable finance is the future of finance, and its role in the corporate and financial world is going to be pivotal. With my study, I hope to contribute to the existing body of knowledge on the subject matter of corporate sustainability and WCM no matter what outcome of the relationship I find at the end of my study.

1.8 Delimitations

Matters and occurrences arising in a study out of the control of the researcher are referred to as limitations, which limit the extensivity of the study on the one hand and sometimes exert impact on the end result and conclusion on the other hand (Simon & Goes, 2013). Delimitations are in fact the limitations consciously set by the researcher to conduct a study viably and efficiently during a specific available time limit. To this end, some of the delimitations made for this study are addressed. *First*, the focus of the study is on the Swedish stock market because the Swedish stock market is large enough to conduct this research, and data on ESG scores of the listed companies is easily available. The time and scope of the study have restricted the author to collect data only on the Swedish stock market, otherwise, data on Nordic countries would have given more space for better results of the study. Moreover, the Bonds market, mutual funds market, or commodities market of Sweden falls beyond the scope of this study, hence limiting the focus of this research only to the Swedish equity market. *Second*, ESG Scores are used to measure the sustainability practices of the Swedish-listed companies because (i) these scores capture the broad dynamics of sustainability performance and (ii) these are respected as the most concrete, consistent, and generally accepted measuring tools. Moreover, there are several rating agencies, which provide ESG rating scores of the corporations but due to time limitations, size, and the scope of the study, only ESG Scores extracted from the Refinitiv Eikon database will be used. *Third*, the literature has suggested several working capital metrics, but we use two measures: WCR and CC. *Fourth*, sample data on the ESG Scores and the working capital measures have been extracted for 11 years (2010 to 2020), which means that the study is limited to these years only. *Fifth*, financial firms

have been excluded from the sample data due to their unique characteristics. Business operations and models of the financial firms are so different in nature that they don't fit in our study settings.

1.9 Disposition

The study is comprised of a total of nine chapters. Chapter 1 (introduction) started with the study background to explore two main pillars (corporate sustainability and WCM) of the study to find a research gap and present our research purpose and research question. The author will present different paradigms, methodological assumptions, research approaches, research design, and research strategies in Chapter 2 (Scientific Methods), and the author will also present his argumentation for the suitability of each of these scientific methods for this study and wrap up the chapter with ethical and societal considerations. In Chapter 3 (Theoretical frame of reference), relevant literature on corporate sustainability and WCM will be reviewed in detail to be followed by the relevant theories and their relevance to our study.

Chapter 4 (Data and Methodology) will introduce the population and sample of data, the type of data, the data collection time-period and mechanism, and a short description of each variable to be used in regression analysis in the later part of the chapter followed by hypothesis construction to test the relationship between the variables of the study. The author will also define the relevant statistical concepts in this chapter. In Chapter 5 (Descriptive Statistics), the author will present summary statistics and correlation of the variables followed by various statistical tests on the dataset intended to satisfy the OLS assumptions. In addition to this, the author will conduct statistical tests to identify suitable regression models for the dataset. Chapter 6 (Empirical Results) will display the results of the regression models applied and the hypothesis tested followed by a summary table of the results of all the hypotheses tested. In Chapter 7 (Analysis and Discussion), the author will analyze and discuss the empirical results in light of the findings of the relevant studies, and different theories presented in Chapter 3. In the last and final part, Chapter 8 (Conclusion) of the study, the author will present concluding remarks regarding the findings of the study. The societal implications of the study findings will also be reflected followed by the possible limitation of the study. The author will close the chapter with suggestions for future research.

Chapter 2

SCIENTIFIC METHODS

This chapter will start with the concepts of research philosophy, research paradigms, and philosophical assumptions, which will be followed by discussions on research approaches, research strategies, and research designs. Literature search and source criticism will further move the chapter, which will finally be embraced by a discussion on ethical and societal considerations to close the chapter.

2.1 Research Philosophy

Philosophy is at the core of research and its role is pivotal in any field of research study whether it is natural science or social science (Bahari, 2010, p. 18). As Holden et al. (2004, p. 15) described that philosophy not only broadens the researchers' understanding of the research process and enhances their research skills but also builds their confidence in their adopted methodology. Philosophy in research is defined as “a system of beliefs and assumptions about the development of knowledge” (Saunders et al., 2019, p. 130). Bahari (2010, p. 18) claimed philosophy is central to the notion of research design whereas Holden et al. (2004, p. 2) asserted that the selection of methodology for the intended research should be based on the philosophical standpoint of the researcher. Simply put, *philosophy* should lead to methodology, *not* methodology leading the philosophy. Researchers need a solid philosophical, theoretical, instrumental, and methodological understanding of the entire research they intend to conduct. This understanding comes from clarity of vision, which comes from research paradigm (or worldview). A research paradigm is “a framework that guides how research should be conducted, based on people's philosophies and their assumptions about the world and the nature of knowledge” (Collis & Hussey, 2021, p. 10).

There are two research paradigms at the extreme ends of a pole⁴: Positivism and Interpretivism (or Anti-positivism). *Positivism* is defined by Collis and Hussey (2014, p. 40) as “a paradigm originated in the natural sciences and rested on the assumption that social reality is singular and objective and is not affected by the act of investigating it. The research involves a deductive process with a view to providing explanatory theories to understand social phenomena”. Notably, the philosophy of *Realism* is the root of positivism. *Interpretivism* is defined by Collis and Hussey, 2014, p. 44)⁵ as “a paradigm that emerged in response to criticisms of positivism. It rests on the assumption that social reality is in our minds and is subjective and multiple. Therefore, social reality is affected by the act of investigating it. The research involves an inductive process with a view to providing an interpretive understanding of social phenomena within a particular context”. inadequacies. Notably, the philosophy of *Idealism* is the root of interpretivism.

2.2 Philosophical Assumptions

Developing knowledge and the nature of that knowledge in the social world is the key to research philosophy in social science, however, how researchers perceive the social world is largely dependent on the underlying assumptions of the research philosophy they follow. Though there are several assumptions that researchers may make in their research methodology, the most

⁴ For the pictorial presentation of the two extremes of the pole, please refer to Collis & Hussey (2021, p. 41).

⁵ For more discussion refer to Collis & Hussey (2021, p. 40-48)

commonly discussed and adopted assumptions are *Ontology* and *Epistemology* (Barahi, 2010). Newman (2014, p. 43) further emphasized this and argued that the assumptions and principles that all scientific researchers follow emerge from their ontological and epistemological positions.

2.2.1 Ontological Assumption

The term ontology has been derived from two Greek terms: *ont* and *logos*, where *ont* means *being*, and *logos* means *theory* (Delanty & Strydom, 2003). This means ontology is about theorizing the *nature of reality* (Bell et al., 2021, p. 26; Saunders et al., 2019, p. 133). Al-Saadi (2014, p.1) described ontology as one's beliefs about the kind and *nature of reality* and what exists. Holden et al., (2004, p. 5) argue that ontology is a fundamental assumption as it presents the researcher's view of reality and is fundamental to all other assumptions. Ontology in social sciences is known as a social reality, or social entity. Knowing that Ontology is concerned with the nature of reality, the question raises is whether 'realities' can (or should) be considered objective or subjective. The answer lies in the two ontology positions known as Objectivism and Subjectivism. Ontologically, *Objectivism* is based on natural science's assumption that social reality is external to the social actors. That is, social realities are out of the reach or influence of the social actors (Saunders et al., 2019, p. 135). In the context of *Realism*, this means social entities (or social phenomena and their meanings) are the physical entities of the natural world and they do exist apart from whether researchers are aware of them or how they think or label them (Saunders et al., 2019, p. 135). Ontologically, *Subjectivism* is based on the arts and humanities' assumptions that social reality is a subjective phenomenon, and it is constructed from the perceptions and actions of the social actors (people). The phenomenon of subjectivism is based on the philosophy of nominalism or conventionalism (Saunders et al., 2019, p. 137).

Ontological positions also exist within the Positivism-Interpretivism paradigms. *Ontological positivists* are of the notions that social reality is singular, objective, external to the researcher, and that everyone has the same sense of reality. *Ontological interpretivists* have the opposing notion and belief that social realities are socially constructed, that is, we all have our own sense of reality; therefore, social realities are not only subjective but also multiple (Collis & Hussy, 2021, p. 43).

2.2.2 Epistemology Assumption

The term *Epistemology* has been derived from two Greek terms: *episteme* and *logos*, where *episteme* means *knowledge*, and *logos* means *theory* (Delanty & Strydom, 2003). Thus, *epistemology* can be described as the "theory of knowledge" (Bell et al., 2021, p. 29) or "the science or philosophy of knowledge" (Hay, 2002, p. 62). Collin & Hussy (2021, p. 43) argue that epistemology is related to what is called acceptable valid knowledge and what constitutes valid knowledge. Al-Saadi (2014, p. 3) argues that the methods used by social science researchers to acquire knowledge of social behavior or phenomena are significantly affected by the way researchers make epistemological assumptions. In other words, decisions on the kind of methods researchers intend to use for their research study are made based on their epistemology assumptions. Bahari (2010, p. 21) supported this argument and asserted that what is regarded as acceptable or valid knowledge in a discipline and how to acquire that knowledge is largely dependent on the research process researchers adopt. Bell et al. (2021, p. 29) believe that there is a directional link between ontology and epistemology. For instance, to understand the nature of reality (ontological position), researchers need to understand how they can acquire knowledge of that reality (epistemology position).

In light of the above short description of epistemology, a question can be raised whether ‘knowledge’ is an objective or subjective phenomenon. The answer lies in the two epistemology positions: objectivism and subjectivism. Epistemologically, *objectivists* adopt the assumptions of the natural sciences and form their belief that knowledge is an observable and measurable phenomenon that can be gathered from facts/numbers and that they contribute to the knowledge by making law-like generalizations (Saunders, et al., 2019, p. 135). Epistemologically, *subjectivists* form their belief that knowledge is not an observable and measurable phenomenon, rather valid knowledge can be gathered through opinions (written, spoken, or visual) and that data collected carries certain specific attributed meanings, therefore, their contribution to the knowledge is individual- and context-specific (Saunders, et al., 2019, p. 135).

Epistemological positions also exist within the Positivism-Interpretivism paradigms. Epistemological *positivists* are of the opinion that observable and measurable phenomenon is the only source of acceptable valid knowledge (Collin & Hussy, 2021, p. 43). Positivists believe that the social world is external to the researcher and that social facts exist with an objective reality independent of the researcher’s beliefs (Bahari, 2010, p. 23). Scholars underpin that positivists follow the natural scientist assumptions and scientific methods, and they attempt to produce causal explanations based on observable and measurable facts to present law-like generalizations, which can also be useful for prediction purposes (Saunders, et al., 2019, p. 144). In epistemological *interpretivism*, researchers intend to minimize the gap between them and the social phenomenon they study. In that pursuit, researchers might engage themselves in participative inquiries of different types (Collin & Hussy, 2021, p. 43). In interpretivism, the term *feeling* is attributed to the researchers because interpretivists believe that facts and values cannot be separated, therefore, the researcher’s views and values do impact the findings. This is where the perspective of phenomenology embraces interpretivism (Bahari, 2010, p. 23).

Since the study aims to examine the relationship between corporate sustainability and WCM of Swedish-listed companies, the author will collect secondary yearly (published) data on ESC rating scores, working capital metrics, and other control variables from reliable sources. Based on the nature of the study, the author finds *Positivism* the most appropriate paradigm while ontological-positivism/objectivism and epistemological-positivism/objectivism assumptions are most suitable for the study. There are certain reasons for these philosophical choices made by the author. First, the study is not based on humans (people/social actors) meaning that humans are not the participants of this study. Since data will not be collected from them, the researcher will not have any interaction with people. Second, this study is based on natural scientists’ assumptions, which means the study is based on scientific methods and follows objective, quantitative, and deductive approaches. Third, this study is quantitative in nature, in which secondary yearly data (facts/numbers) will be collected from a reliable data source, therefore, data will be not only observable and measurable but also unbiased and independent of the researcher’s perception, actions, and beliefs. In other words, since data are published and publicly known, data are static (singular reality) in nature, which means data cannot be changed or altered to match the researcher’s own mindset or satisfy the researcher’s own wish or will. Fourth, the study will formulate certain hypotheses, which will be tested by certain statistical methods. Moreover, statistical tests will be performed to ensure the validity and reliability of the data, and statistical methods will be applied to analyze data and formulate the findings of the study.

2.3 Research Approaches (Research Logic)

Scholars are of the opinion that researchers may opt for theory testing or theory building; however, it is largely dependent on the research approaches they adopt as reasoning for their choices. These reasonings usually come in the form of three approaches, namely, *deductive*, *inductive*, and *abductive* (Saunders, et al., 2019, p. 152). Researchers use deductive approach when they aim to test a particular theory in particular settings, and for that purpose they collect data specific to the important variables identified by the theory, formulate hypotheses, analyze data, and finally accept or reject the hypothesis based on the results drawn from the study (Collin & Hussy, 2021, p. 7). As asserted by Saunders, et al. (2019, p. 51), when a researcher adopts a research study that is driven by *theory* and tested through data collection that means the researcher has adopted a deductive approach. In short, we can say that *testing* existing theories is the main aim of the deductive approach. Collin & Hussy (2021, p. 8) describe a deductive approach as ‘*moving from general to the specific*’. Most of the researchers belonging to the positivism school of thought (paradigm) make use of the deductive approach for their research studies.

In the inductive approach the researcher develops a theory from the observation of empirical reality and induces specific instances from the general inferences (Collin & Hussy, 2021, p. 8). When a researcher adopts a research study that is *data-driven*, and theory is developed through data collection that means the researcher has adopted an inductive approach (Saunders, et al., 2019, p. 51). In short, one can say that *developing* theory is the main aim of the inductive approach. The inductive approach is concerned with ‘*moving to the particular from general*’ (Collin & Hussy, 2021, p. 8). According to Mathew et al., (2010, p. 63) and Bell et al. (2021, p. 20-23), the deductive approach can be imagined in this directional form: *from theory to data/observation* whereas the inductive approach can be circled as: *from data/observation to theory*. Bell et al. (2021, p. 20-23) are of the belief that deductive and inductive approaches establish links between theory and research therefore these approaches should be treated as tendencies instead of hard-and-fast substitutes. The process of the deduction is presented below in Figure 2.1.



Figure 2.1: Process of Deduction
(Source: Johansson & Fahlén, 2019, p. 10)

The *Abduction* approach can be defined as “an approach to theory development involving the collection of data to explore a phenomenon, identify themes and explain patterns, to generate a new – or modify an existing – theory which is subsequently tested” (Saunders, et al., 2019, p. 796). Ghauri et al., (2020, p. 21) assert that believing the abduction approach is merely a combination of inductive and deductive approaches is a misconception. In their opinion, the abduction approach is about the development of new theories based on the theoretical interpretation of the empirical problem. The results of the empirical findings under this approach cause continuous changes in the originally developed framework and theoretical assumptions made by the research.

The author believes that *deductive* research approach is quite a natural choice for this research as it also best fits the nature of the study. The author finds deductive the most pertinent approach because relevant theories will be reviewed to assess which of the theories better explain the

relationship between corporate sustainability and WCM. To this end, hypotheses will be formulated, secondary data on the study variables will be collected, some statistical models such as regression models will be applied to draw empirical results, which will be used to test the hypothesis and to analyze whether findings fall in line with the relevant theories addressed in this study, and finally conclusions will be drawn based on the findings of the study. The author further asserts that since the study is not meant to develop a new theory, the inductive approach is not an appropriate research approach for this study. Also, in the author's viewpoint, nature of the study is not such that the author will move back and forth for reformulation of the theoretical framework, research questions, or assumptions, therefore, even the abductive approach is not the appropriate one. Lastly, since the study is based on a deductive research approach, the author believes that results drawn from the study will be unbiased and unaffected by the researcher's own beliefs, actions, and perceptions. Therefore, the study contributes to the existing body of knowledge on the subject matter with its specific results.

2.4 Research Design

The research design is the broad outline of the research study aimed at meeting the research objectives (Schindler, 2019, p. 71). Bell et al. (2021, p. 48-63) suggest five research designs, namely, Experimental design, Cross-sectional design, Longitudinal design, Case-study design, and Comparative design. We will restrict our discussion to Cross-sectional design and Longitudinal designs only for their close relevance to our study. Both Cross-sectional and Longitudinal research designs are based on time dimension (Cooper & Schindler, 2014, p. 128), therefore, the selection of these designs predominantly depends on the time frame of the study data researcher intends to collect. If the study is aimed at collecting data on a particular phenomenon (or on a series of variables) at a single point in time, then a *cross-sectional* design is a better option (Bryman, 2012, p. 62). The *longitudinal research design* is more suitable for the researchers who aim to collect data on a particular social phenomenon at multiple points in time (Neuman, 2014, p. 44) or want to conduct studies over a long period of time on a repetitive basis (Cooper & Schindler, 2014, p. 128). Neuman (2014, p. 44) claims that both cross-sectional and longitudinal research designs are used for descriptive, exploratory, and explanatory types of research.

Cooper & Schindler (2014, p. 128) and Zikmund et al., (2013, p. 196) contend that the ability to capture changes over time in the phenomenon under observation is an advantage of a longitudinal study, which Neuman (2014, p. 44) believes makes it more powerful than cross-sectional. However, Bryman (2012, p. 63), Neuman (2014, p. 44), and Collis & Hussy (2021, p. 57) find longitudinal studies time-consuming and costly to conduct. According to Neuman (2014, p. 44), one type of longitudinal research design is a *Panel* study, in which data is collected on exactly the same people, groups, organizations, or any other phenomena over at least two (or often more) points in time. According to Collis & Hussy (2021, p. 57), it is possible to conduct a panel study using secondary data. A panel study that utilizes secondary data is often called a Panel Data study. Panel data has the characteristics of both cross-sectional and time-series data.

The author finds longitudinal research design more suitable for this research study as the author aims to collect yearly secondary data on listed firms in Sweden at multiple points in time. To be more specific, within the longitudinal research design, we find a panel data study design the most suitable for our study since data has the characteristics of both cross-sectional and time-series data and that data will be collected on exactly the same firms over several years.

Research studies can further be classified based on the purpose of the study, namely, exploratory, descriptive, and explanatory research. *Exploratory* research is aimed at improving the general understanding of the research phenomenon through information gathering and asking specific questions, especially when the subject is new, or the researcher knows little or nothing about it (Neuman, 2014, p.38; Collis & Hussy 2021, p. 5). *Descriptive* research provides detailed descriptions of the characteristics of phenomena for better argumentation purposes. Understanding phenomena by identifying and examining causal (cause and effect) relationships between variables is the main purpose of *Explanatory* research Collis & Hussy (2021, p. 4-5).

Since in this study, the author aims to analyze whether more sustainable firms in Sweden operate with a lower WCR and a shorter CCC through investigating the relationship between corporate sustainability (ESG rating scores) and WCM (CCC and WCR) of the Swedish-listed firms, an explanatory research design will be used. Moreover, because this study is based on deductive approach and the aim is to test the relevant theories, according to O’Gorman & MacIntosh (2015, p. 82), explanatory research design is most pertinent for this study.

2.5 Research Strategy

Bell et al. (2021, p. 35) define research strategies as broad and general orientation for conducting research, thus classifying research strategies into *quantitative* research and *qualitative research* strategies. They argue that researchers in quantitative research emphasize the quantification of data and analysis whereas in qualitative research researchers emphasize the words and images rather than the quantification of data and analysis. Moreover, quantitative research is a deductive research approach (emphasis on theory testing) that follows the assumptions of natural sciences (in particular positivism) and considers social reality as external and objective reality. In contrast, qualitative research is an inductive research approach (emphasis on theory generation), follows the assumptions of social sciences (in particular interpretivism), and considers social reality as subjective/constructed reality. Collis & Hussy (2021, p. 6) describe this classification of research based on the process of research, that is, the way research data is collected and analyzed. They argue that researchers adopt quantitative research if the purpose of their research is to collect quantitative data (numeric values or numbers and/or quantifiable qualitative data) and then apply statistical methods to analyze that data. The researchers opt for qualitative research if the purpose of their research is to collect qualitative data (non-numerical form) and then perform some non-numerical methods of data analysis. Qualitative research is also known as “Intensive” research whereas quantitative research is “Extensive” research (Bahari, 2010, p. 18). However, quantitative researchers criticize qualitative researchers for their too much emphasis on subjectivity and impressionability (Bryman 2012, p. 405).

The Mixed-methods is yet another growing field of study being widely used by researchers these days (Heigham & Croker, 2009, p. 15; Anderson et. al., 2004, p. 184). Heigham & Croker (2009, p. 16) define mixed-methods as a method of research that combines elements of both qualitative and quantitative research in a *single* study to get a full view and understanding of the research phenomena under investigation. The mixed-methods approach combines philosophical assumptions, methods of data collection, and analysis of both quantitative and qualitative research (Creswell, 2009, p. 4).

The primary purpose of the study is to assess the relationship between corporate sustainability and WCM of the firms listed in Sweden and to fulfill this aim of the study, quantitative data will be collected from secondary sources such as Refinitiv Eikon and then statistical methods of analysis will be applied to obtain results of the study. Therefore, the author believes that quantitative research is appropriate for this study. Also, based on the choices made on the philosophical stance (positivism paradigm), philosophical assumptions (ontological-positivism/objectivism and epistemological-positivism/objectivism), research approach (deductive), research design (panel data study and explanatory) all lead us to choose quantitative research strategy. Moreover, according to O’Gorman & MacIntosh (2015), if the philosophical stance of the research is aligned with ontological objectivism and epistemological positivism then the study naturally falls under the domain of quantitative research (cited in Johansson & Fahlén, 2019, p. 10).

2.6 Literature Search

A systemic literature search garners the researcher’s ability to describe and analyze published literature on the chosen topic and aid in writing the literature review and developing discussion and arguments. Moreover, an organized literature search not only ensures effective use of available resources but also produces quality work (Timmins & McCabe, 2005, p. 41). Mathew et al., (2010, p. 127) have the opinion that starting point in the literature search is usually reading about the background of the topic that is in the researcher’s mind, and for that matter, the researcher uses electronic databases or catalogs for *search* purposes and uses *keywords* to find books, articles, printed material, etc., on research topic. Bryman (2012, p. 115) asserts that researchers should rely only on reliable databases and other literature sources. Through the literature search process, the researcher becomes not only familiar with the methodologies used in the previous research but also enables the researcher to find the research gaps and deficiencies in the existing body of knowledge (Collis & Hussy, 2021, p. 67).

This thesis is aimed at examining the relationship between corporate sustainability and WCM of the Swedish-listed firms. To comprehend the broader perspective of the chosen topic, to establish research question(s) and hypotheses, to review relevant theories and literature, and to understand methodologies used in related current and previous research, the author has used authentic sources of literature search. The prime sources of literature searched included Umea University Library, which provided access to multiple databases such as DiVA, JSTOR, EBSCO, Scopus, ProQuest, and Web of Science as well as access to many peer-reviewed high-quality journals such as the journal of sustainable finance and investment, journal of sustainability and green finance, journal of banking and finance, and a lot more. Most of the research articles used in this study were accessed using these library-provided databases and journals. Renowned authors’ books on the subject matter, Umea university’s thesis manual, and the study material studied in different courses during the program proved further aid for the literature review and overall thesis writing. Google Scholar was also used for effective and easy access to the relevant articles. Some of the following keywords were used to search the relevant literature:

Sustainability, Corporate Sustainability, ESG, Environment, Social, Governance, CSR, Corporate Social Responsibility, Sustainable Finance, Sustainable Investment, Sustainable Development, Green Finance, Green Economics, Firm Performance, Working Capital, WCM, Cash Conversion Cycle, CCC, Net Working Capital, Gross Working Capital, Debt Ratio, MBV, Current Ratio, CR, EBIT, Operating Profit, Stakeholders Theory, Shareholder Theory, Legitimacy Theory.

2.7 Source Criticism

For any type of research, researchers need to access information from different sources. These sources of information are broadly divided into two types: Primary sources and Secondary sources. Primary sources emerge from *primary research*, which, in turn, becomes the basis of what is called *primary data*. Primary sources provide direct access to first-hand (and raw) information, for instance, interviews, speeches, letters, datasets, etc. Secondary sources emerge from someone else's *Primary research*, which becomes the basis of *secondary data*. Secondary sources provide secondhand information usually derived from primary sources in the form of interpretation, analysis, etc., for example, books, general articles, documentaries, etc. This study is based on secondary data (quantitative data) therefore authenticity and reliability of the data are pivotal. To this end, data was downloaded from Refinitiv Eikon available in Umea University Library with free access to its students. Refinitiv Eikon is claimed to be one of the largest financial markets data and infrastructure providers in the world with 40,000 customers and 400,000 end users in 190 countries (source: www.refinitiv.com). Moreover, Refinitiv Eikon is widely cited and used by researchers and financial industry professionals, which further proves the authenticity and reliability of the data. This study is based on secondary data, which has its own merits and demerits. For instance, one of the merits is the time and cost researchers save in the data collection process, which allows them to focus more on other important parts of the research such as statistical methods and tools for data analysis etc. The demerit stems from the researcher's lack of control over data, which at times, may result in the problem of finding the pertinent data for the study.

Although primary data may prove to be more customized, at times the nature of the study demands the use of secondary data such as our study in which we need data on ESG rating scores, which are developed by rating agencies by considering multiple factors and characteristics of the companies. Thus, under such circumstances, reliance on the secondary data source providers such as Refinitiv Eikon, MSCI, Bloomberg, Morningstar, Bankscope, etc. becomes more of a compulsion than a choice. Rating agencies assign ratings to the corporations based on internal and external documents and multiple other factors, which may result in possibilities of biasness of some sort in the ratings assigned, however, this is something beyond the author's control. To the best of the author's efforts, up-to-date, authentic, and referenced literature material in the forms of research articles/papers, books, and other printed media have been used. Nevertheless, one may find some old resources due to their relevance and necessity to use in theory development and literature review. For instance, the original reference material of the shareholder theory and stakeholders' theory is quite old (but authentic) and dates back to the times when high-statured scholars like Freeman and Friedman proposed these renowned theories.

2.8 Ethical & Societal Considerations

Generally described, *ethics* is the code of conduct that defines moral values or principles (Collis & Hussy, 2021, p. 27). In social science research, Sekran & Bougie (2016, p.13) describe ethics as a code of conduct or expected behavioral and societal norms that researcher is expected to follow while conducting the research. 'Swedish Research Council' provides valuable guidelines with respect to conducting ethical research. Moreover, Umea University has dedicated a full-fledged page on *Ethics in Research*, which contains useful information on ethics in research with particular reference to laws and guidelines. In the USBE's Thesis Manual, there are some *Ethical Guidelines* for the students regarding thesis writing. For example, the researcher should make sure that participants don't face any inconvenience while they participate; the researcher must abide by the

laws, rules, and guidelines with respect to the use of data; the researcher must not act deceptively while collecting and reporting data; the researcher must disclose information about the motive of research as well as any commercial or other benefits; and above all, the most important one *plagiarism*, which is impermissible in research whatsoever (USBE 220527, 2022, p. 10-11). Plagiarism is referred to the practice of stealing others' work, ideas, or writing and claiming that as your own (Bell et al., 2021, p. 106; Neuman, 2014, p.146). Besides the ethical concerns just described Collis & Hussy (2021, p. 28) have addressed some of the following other key principles with respect to research ethics:

- Participants should not be coerced (threatened or forced) to participate in research
- Participants should not be penalized for their non-participation in the research
- Participants are free to withdraw from the research anytime without giving any reason and without any harm.
- Participants' personal data is handled with confidentiality and anonymity
- Store that data in the password-protected files and also keep backup files
- Give respect to the dignity, privacy, and values of the participants
- Both the participants and the researcher(s) should not be harmed (directly or indirectly) physically or non-physically. Non-physical harm means harm to career, employment prospects, self-esteem, etc.
- Findings of the research should not be reported in a way that is misleading and false, creates misunderstanding, and delineates misrepresentation

The principles and the guidelines mentioned above clearly manifest research ethics a broader concept rather than merely data collection process. From start to end, ethics is part and parcel of the entire research process. The author of the study is not only aware of this but also makes sure that ethical principles and guidelines will be duly taken care of. For instance, the author ensures integrity in data handling in the sense that data accessed from the database will be used as it is without manipulating the dataset deliberately. Moreover, the author ensures that the issue of plagiarism will be handled carefully, and it will be completely avoided, and, for that matter, all the secondary sources used in the study will be appropriately referenced. Furthermore, not only the findings of the research but also the interpretations of the results will be presented in a true and fair manner.

Last but not least, as this study is an explanatory (causal) study that aims to investigate the potential relationship between corporate sustainability and WCM of the Swedish-listed companies. As mentioned above, despite there being no human participation in this research, societal and ethical aspects are of great significance for this research. For example, ESG is the main independent variable of this study (more details in chapter 4), which implies that findings of our study would have some implications in relation to the environment, society, and governance. ESG itself is a core sustainability measure of the firms engaged in sustainability practices, therefore taking care of the environment (ENV) and social (SOC) is as important as the governance (GOV) of the firm because, after all, they all constitute the "Stakeholders" of the firm. Data of the study will be collected, processed, and analyzed for a large number of those Swedish-listed firms which are primarily engaged in sustainability practices; therefore, the results of the study will be completely *general*. This means that the results of the study will not be meant or intended to favor or disfavor any particular company or industry, or stakeholder. This further means that results will strongly serve as guidance and aid to companies and stakeholders in making their informed decisions.

Chapter 3

THEORETICAL FRAME OF REFERENCE

This chapter will begin with a comprehensive literature review of working capital management studies, corporate sustainability studies, and studies related to both working capital management and corporate sustainability, followed by different theories and their connection to both research areas.

3.1 Literature Review

3.1.1 Studies Related to Working Capital Management

Working capital management has its unique position and importance in the field of corporate finance due to its theoretical and practical importance (Sharma & Kumar, 2011). Research on WCM has passed through different phases since its inception in the early 20th century. During the initial phase (1900–1940s, known as the ‘awareness’ era), there was scant research on WCM, however, during this era, one of the earliest definitions of working capital was proposed by Mann (1918)⁶ (Duran et al., 2015, p. 987-988). The second phase (1950–1980s), which is considered the era of economic development and industrialization changed not only thought regarding WCM (Kayani et al., 2018, p. 357) but also the direction of working capital studies (Duran et al., 2015, p. 989). Nguyen & Nguyen (2018, p. 196) claim that Sagan’s (1955) paper was the first work that triggered further research on WCM, and ever since quite a large number of studies have been conducted on the subject matter of WCM.

WCM is one of the most extensively explored research areas of corporate finance. Extant literature is evident that investigating the impact of various components of WCM on firm profitability/financial performance has been the most researched area of WCM (Kayani et al., 2018, p. 352), see for instance, Shin & Soenen (1998), Deloof (2003), Lazaridis & Tryfonidis (2006), Padachi (2006), Nazir & Afza (2009), Sharma & Kumar (2011), Baños-Caballero et al. (2012), Enqvist et al. (2013), Yazdanfar & Öhman (2014), Atkas et al. (2015), Singhanian & Mehta (2017), Botoc & Anton (2017), Tran et al. (2017), Nguyen & Nguyen (2018), Gonçalves et al. (2018), Nastitti et al. (2019), Orazalin (2019), Högerle et al. (2020), Wang et al. (2020), Anton & Nucu (2021), Louw et al. (2022), to name a few.

Singh et al. (2017) conducted a comprehensive study on the findings of previous studies that examined the relationship between WCM and profitability/FFP. They applied the meta-analysis technique developed by Hunter et al. (1982) to 46 research studies and also performed a subgroup study in detail to examine if the moderating effects related to different profitability proxies, economic development of a specific country, and size of the firms under study are the cause of the differences in the results of the studies. The findings of this meta-study supported the traditional view of aggressive WCM policy leading to higher profitability and revealed a negative relationship between CCC and profitability/financial performance. All the sub-group studies also showed a negative association between the CCC and profitability/financial performance. Nonetheless,

⁶ Mann (1918) defined working capital as “the money required to finance the existing operations of the business. This is also referred to as the Net Working Capital (NWC), that is, the amount of money (capital) required to keep the business operating or staying liquid (Kayani et al., 2019, p. 355; Duran et al., 2015, p. 988).

literature on the relationship between WCM and profitability/financial performance reported mixed findings (positive, negative, and non-linear/concave), some prominent scholars claimed in their studies that firms can enhance their financial performance by achieving optimal level of working capital (Baños-Caballero et al, 2012; Atkas et al., 2015) and by designing appropriate WCM strategies and policies (Nazir & Afza, 2009; Nguyen & Nguyen 2018).

Usman et al. (2017) investigated the impact of WCM on the profitability of the firm in the major Scandinavian countries (Sweden, Norway, and Denmark) during the period 2003-2015 and found negative impact of inventory days, accounts receivable days, accounts payable days, and CCC on firm profitability. Garcia et al. (2010) found results similar to Usman et al. (2017) by examining 2,974 non-financial companies listed in 11 European Stock Exchanges during 1998–2009. Tobias et al. (2020) conducted a study on Swedish-listed firms to examine the impact of WCM on firm performance during different business cycle phases between 2008-2018. Their findings indicated a shorter CCC (a measure of WCM) can enhance firm performance (measured as Tobin's Q). The study also concluded that there is no difference in the relationship between WCM and firm performance during different phases of the business cycle during the study period. Yazdanfar & Öhman (2014) examined the relationship between WCM and the profitability of 13,797 Swedish SMEs operating in four industries. Analysis of data over the period of 2008-2011 indicated that CCC significantly affects profitability, implying that firms with a shorter CCC are more profitable. The findings of these studies were in line with the previous studies by Shin & Soenen (1998), Deloof (2003), Lazaridis and Tryfonidis (2006), Enqvist et al. (2014), and Sawarni et al. (2020).

Determinants of WCM are the second most explored area of WCM (see, Nazir & Afza, 2009; Akinlo, 2012; Wasiuzzaman & Arumugam, 2013; Mongrut et. al., 2014; Koralun-Bereźnicka, 2014; Haron & Nomran, 2016; Tesfay and Batra, 2018; Nyeadi et al., 2018; Nastiti et al., 2019; Bin et al., 2019; Mousa, 2019; Sharma et al., 2020; Tjandra et al., 2022; to name a few). Despite the lack of consensus on how to measure working capital, scholars agree that WCM efficiency is affected by a different set of internal and external factors, which can be classified as endogenous (firm-specific characteristics) factors and exogenous (industry and macroeconomic) factors (Mousa, 2019, p. 7). Firm size, age, profitability/performance, value, market share (power), sales growth/growth opportunities, leverage, operating risk, capital expenditures, operating cash flow, governance structure, and compensation constitute the most commonly used endogenous (firm-specific) factors because these characteristics emerge from firm's core internal features, processes, and strategies (Atseye et al. 2015, p. 1; Mousa, 2019, p. 7). Industry practices include industry concentration and industry competition (Mousa, 2019, p. 8) whereas gross domestic product (GDP), interest rate, tax rate, country risk, inflation rate, and unemployment rate are frequently referred to as exogenous (macroeconomic) factors as these factors affect the overall economy (Atseye et al. 2015, p. 1; Mousa, 2019, p. 8). Some scholars have also studied some other factors/variables as determinants of WCM, such as the nature of business, asymmetric information, market access, asset tangibility, revenue volatility, and economic conditions (see, Wasiuzzaman & Arumugam, 2013; Sharma et al., 2020), the interest rate on loans and economic growth rate (Abbadi & Abbadi, 2013), Herfindahl-Hirschman Index (Mongrut et. al., 2014), capital structure (Koralun-Bereźnicka, 2014). Generally, the purpose of such studies is to identify those factors that not only impact WCM but are also crucial for achieving efficiency in WCM because mere identification of the optimal level of WCM is no longer adequate for firms in the present era of digitalization and globalization (Mousa, 2019, p. 1).

3.1.2 Studies Related to Corporate Sustainability

Numerous studies on sustainability indicate that academicians have also equally shown their serious concern about sustainability. From a single paper published on the topic of sustainability in the year 1970 to almost 30,000 papers published in the year 2020 alone and almost 250,000 total publications till December 2020 are the evidence of researchers' serious efforts on the subject matter of sustainability (Jose & Ramakrishna, 2021, p. 1). Sustainability has been addressed in the literature with different nomenclatures, such as corporate sustainability, corporate social responsibility, organizational sustainability, socially responsible investing, corporate governance, sustainable finance, development finance, sustainable investing, green finance/economics, etc.

As compared to WCM, corporate sustainability is a new phenomenon, however, since the emergence of ESG as a measure of corporate sustainability practices and performance, it has witnessed colossal attention and rapid growth both practically and theoretically. Corporate sustainability as an area of research in finance has been studied in connection to different aspects, however, a significantly large number of studies have examined the relationship between corporate sustainability and FFP, see, for instance, Balatbat et al. (2012), Ameer & Othman (2012), Sahut & Pasquini-Descomps (2015), Landi & Sciarelli (2018), Buallay (2019), Ting et al. (2019), Langeland & Ugland (2019), Alareeni & Hamdan (2020), Junius et al. (2020), Huang (2021), Ruan & Liu (2021), Pham et al. (2021), Saygili et al. (2021), Kim & Li (2021), Mohammad & Wasiuzzaman (2021), Bahadori et al. (2021), Turunen (2021), Hsiao et al. (2022), to name a few.

Although most of the studies reveal a positive relationship (see, e.g., Ameer & Othman, 2012; Friede et al., 2015; Laskar, 2018; Ting et al., 2019; Dalal & Thaker, 2019; Huang, 2021; Pham et al., 2021; Whelan et al., 2021), some studies show a partially positive relationship (Cho et al., 2019), weakly positive relationship (Balatbat et al., 2012), no relationship (Santis et al., 2016; Landi & Sciarelli, 2018; Junius et al. 2020) or a negative relationship (Ruan & Liu, 2021). These mixed results are further evidenced by Giese et al. (2019, p. 69-70) who reported that summarized results of most meta-studies⁷ conducted on more than 1,000 research studies found inconclusive results on the correlation between ESG characteristics and FFP, however, most studies indicated a positive correlation.

Studies attempted in the European region to examine the relationship between corporate sustainability (ESG/CSR) and FFP indicate mixed findings. A study conducted by Buallay (2019) on European banks indicated a significant positive impact of ESG on FFP whereas the results of the study conducted by Turunen (2021) on 11 Eurozone companies indicated no effect of ESG performance on the firm value or financial performance. Studies conducted in the Nordic region reveal either no significant relationship (Ahlklo & Lind, 2019) or inconclusive results (Langeland & Ugland, 2019) on the relationship. The findings of the study by Landi & Sciarelli (2018) on the Italian-listed companies also indicated no statistically significant relationship between corporate sustainability and FFP. Ahmad et al. (2021) reported positive relationship between ESG and financial performance in their study on 351 firms from FTSE350 in the United Kingdom. Studies conducted in Sweden (see e.g., Pham et al., 2021; Barbarić, 2021) also indicated a positive impact of corporate sustainability practices on FFP, which is presumably understandable because of serious endeavors undertaken and landmarks achieved by Sweden on sustainability fronts.

⁷, Carpenter & Wyman (2009), Fulton et al., (2012), Friede et al. (2015), Whelan et al. (2021), Janah & Sassi (2021), Atz et al. (2021), Huang (2021)

Exploring the relationship of corporate sustainability with FFP has not been the only area of research. The extant literature is evident from the studies that scholars have also explored the relationship of corporate sustainability with different topics, such as dividend policy (Cheung et al., 2018; Benlemlih, 2019; Matos et al., 2020), cost of capital (El Ghouli et al., 2011), risk and return (Cornell, 2020), capital structure (Al Amosh et al., 2022), goodwill (Jeffers, 2015; Golden et al., 2018; Sarker & Sarker, 2020), corporate reputation (Park, 2019), firm value (Yoon et al., 2018; Mohamad, 2020), shareholder value (Rashid, 2018), information asymmetry (Cui et al., 2016), financial reporting quality (Seker & Şengür, 2021), investment efficiency (Benlemlih & Bitar, 2018), portfolio performance (Climent et al., 2021), etc.

Generally, most of the studies conducted on corporate sustainability (CSR/ESG) in relation to different topics yielded a positive relationship. For instance, the findings of the studies conducted by Ellili (2022) in the UAE market, Matos et al. (2020) in the Eurozone, Johansson & Fahlén (2019) in the Nordic region, and Benlemlih (2019) and Cheung et al. (2018) in the US concluded a positive relationship between corporate sustainability and dividend policy. Ellili (2020) and El Ghouli et al. (2011) found a positive impact of corporate sustainability (ESG/CSR) on the cost of capital. Studies in their studies and concluded that more sustainable firms are in a better bargaining position and have more access to equity or debt financing at a lower cost than their counterparts. Mohamad (2020) conducted a study in Malaysia and Yoon et al. (2018) in Korea to test the impact of corporate sustainability (ESG/CSR) on firm value and reported positive and significant relationship, which was found to be in line with previous studies on developed countries. Seker & Şengür (2021) reported positive impact of ESG practices and performance on financial reporting quality in selected 35 countries across the world.

3.1.3 Studies Related to Corporate Sustainability & Working Capital Management

In the previous sections, we underpinned that extant literature is filled with studies on the relationship between WCM and FFP, and the factors/variables that determine WCM. We also noted that a significant number of studies examined the relationship between corporate sustainability (CSR/ESG) and FFP, and corporate sustainability (CSR/ESG) in relation to different topics. Although we could not find a notable number of studies on the relationship between WCM and corporate sustainability, we could, however, find some studies that examined the association of WCM with corporate governance (see e.g., Gill & Bigger, 2012; Kamau & Basweti, 2013; Kamel, 2015; Fiador, 2016; Ahmad et al., 2018; Prasad et al. 2019), CSR (Gatsi & Ameyibor, 2016), and ESG (Barros et al., 2022).

Considering the fact that corporate governance (CG) is one of the core components of ESG/CSR, examining its relationship with WCM derives its relevance to the study. Most empirical studies conducted on investigating the connection between CG and WCM revealed a significant impact of CG in achieving WCM efficiency. Prasad et al. (2019) examined the relationship in Indian settings and concluded that WCM can be explained by some (but not all) characteristics of corporate governance. Gill & Bigger (2012) also found some role of CG in achieving WCM efficiency in the manufacturing firms listed on the New York Stock Exchange. Contrary to the findings of Prasad et al. (2019) and Gill & Bigger (2012), the results of the study by Ahmad et al. (2018) conducted on the listed firms in Pakistan found a significant influence of CG characteristics on WCM. Fiador (2016) could also find the impact of internal governance characteristics on the WCM efficiency in the firms listed on the Ghana Stock Exchange. Kamel (2015) conducted a

study on selected listed European firms to test the impact of CG and firm maturity on WCM efficiency. The empirical findings of their study revealed that CG (except for the ownership concentration proxy) and firm maturity have a significant impact on WCM efficiency in the European region. Although study results were inconclusive with respect to the direction of impact on WC investment for some of the proxies used. Kamau & Basweti (2013) found no statistically significant association between CG and WCM efficiency in a study conducted in Nairobi.

Gatsi & Ameyibor (2016) examined the impact of CSR on working capital in UK settings. Data were collected in the period 2005-2012 on 43 firms listed on the main London Stock Exchange with a total of 344 observations. Audited annual reports of the listed companies and the relevant information extracted on the variables formed the bases of secondary data for the study. The ratio of current assets to current liabilities was used to represent working capital (WC), whereas absolute CSRED (Corporate social responsibility expenditures disclosed) was used as a measure of corporate sustainability. Other independent variables used in the study were firm risk (or equity multiplier), firm size, and firm growth. For the reasons that working capital affects both the liquidity and profitability of the firm, the management of the working capital demands due consideration. In conclusion, the findings of the panel data design and regression analysis indicated a positive, although the non-significant, relationship between CSR and working capital.

In a most recent study, Barros et al. (2022) investigated the relationship between corporate sustainability and WCM in the US setting. Using ESG rating scores as measures of corporate sustainability and CCC and WCR as measures of WCM they addressed a core question of whether more sustainable firms can operate with lower WCR and a shorter CCC. To answer this question, Barros et al. (2022) extracted data from Refinitiv Eikon for the period from 2002 to 2022 on 1,394 US publicly-listed firms with a total of 9618 observations. WCR and CCC were used as the measures of the WCM and served as dependent variables whereas Refinitiv ESG scores (ESG, ESG combined, and ESG controversial) and the scores of individual pillars of E, S, and G were used to measure corporate sustainability levels of the firms and served as the independent variables of the study. The size, leverage, current ratio, gross margin, EBIT margin, and Market/Book value were used as control variables as they potentially impact the cash level and management of the firm. The findings of the study revealed that more sustainable firms (firms with higher ESG scores) were able to operate with a shorter CCC and lower WCR. However, the results indicated that the entire effect came from only the environment and social pillars. The result from the governance pillar was inconclusive, which author believes reinforces the role of sustainability on WCM. The working capital metrics also showed some deviations in the results compared with the industry average in that the more sustainable firms are in less need of working capital than industry.

The review of the aforementioned literature not only helped the author of this study understand various research areas associated with corporate sustainability and WCM but also introduced the author to relevant theories and concepts. From the aforementioned previous studies, we observed that scholars have investigated the connection between corporate governance (CG) and WCM and CSR and WCM, however, studies investigating the relationship between WCM and ESG are scant in the literature. To the best knowledge of the author of this study, empirical research conducted by Barros et al. (2022) is the only study on the subject matter, which not only indicates a research gap in measuring the association between corporate sustainability and WCM across the globe but also indicates the position of our study. Keeping this in mind, the author believes that empirical

examination of the relationship between corporate sustainability and WCM is the second attempt in the world and the first in Europe and in Sweden.

Studying the empirical relationship between corporate sustainability and WCM in the context of Sweden would be an interesting research opportunity as Sweden stands among the top three countries in the world that have achieved landmarks on the sustainability front. Moreover, not only studies conducted in Sweden indicated a positive impact of corporate sustainability practices on FFP (Pham et al., 2021; Barbarić, 2021) but also revealed a significant impact of WCM on firm profitability/financial performance (Yazdanfar & Öhman, 2014; Tobias et al. 2020). Another study conducted in Sweden by Rimo & Panbunyuen (2010) showed a significant impact of profitability on WCM (CCC). Given these findings in Sweden, this would be even more exciting to see how corporate sustainability would impact the WCM of Swedish-listed companies. In other words, more precisely, similar to the US firms (Barros et al., 2022), would more sustainable firms in Sweden be able to operate with lower WCR and a shorter CCC.

The literature reviewed above as well as in previous sections on the studies relating to WCM, corporate sustainability, and both WCM and corporate sustainability enable us to identify the research gap existing in the extant literature. To fill this research gap and to contribute to the existing body of knowledge on the subject matter through our findings, we depict in Figure 3.1 below the pictorial presentation of the conceptual framework of our study on examining the relationship between corporate sustainability (measured in terms of ESG scores) and WCM (measured in terms of WCR/CCC) whilst using some study-specific control variables.

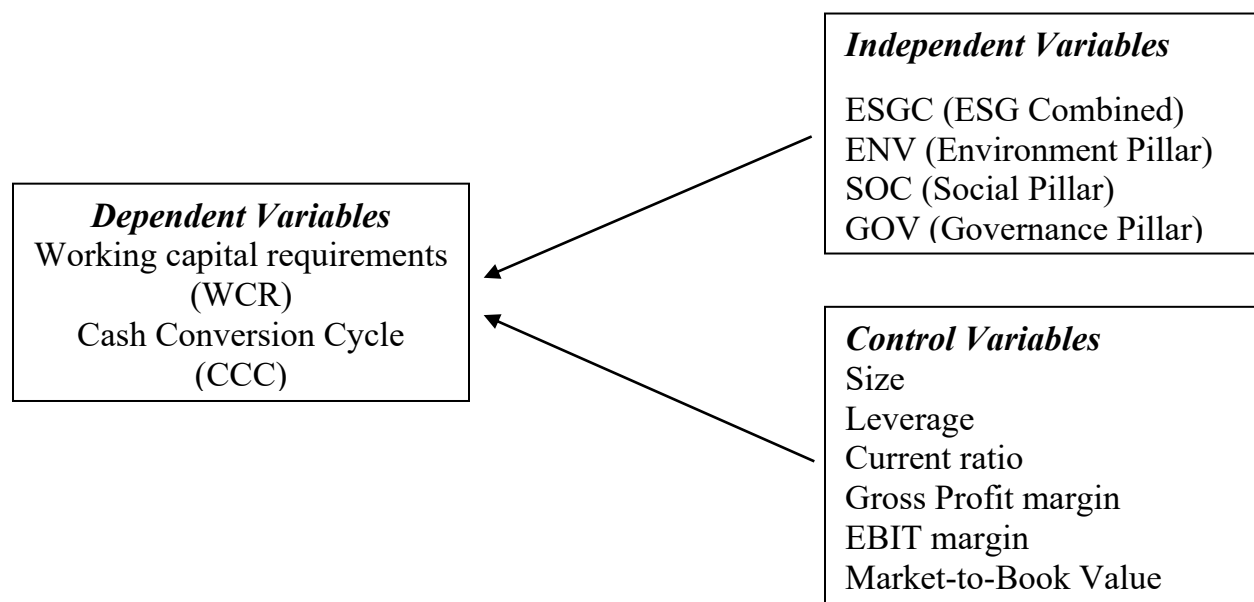


Figure 3.1: Conceptual Framework

3.2 Review of Relevant Theories

3.2.1 Shareholder Theory

Milton Friedman (1962) presented the famous shareholder theory as “maximizing wealth of the shareholders is the primary responsibility and goal of the firm”. Friedman (1970), in his famous and widely circulated article⁸ reemphasized on maximizing revenue and increasing shareholders’ returns and described this as the main responsibility of the business in society. Friedman (1970, p. 33), described that firms’ responsibilities can only belong to individuals; therefore, the assumption that firms have some form of social responsibility is unreasonable. Friedman (1970, p. 33) further described that in a free-enterprise, private-property system, a manager is an employee (agent) of owners, therefore, presumed to have direct responsibility of conducting business to generate maximum possible money while performing within the embodied legal and ethical norms of the society. Shareholder theory stands on assumptions that (i) shareholders own the firm and (ii) the objective of the firm is to maximize shareholder value (Fontrodona & Sison, 2006, p. 35).

A shareholder is a person or entity (company or institution) that owns a share of stock in a corporation. Shareholders invest money in the firm with the goal of wealth maximization, therefore, shareholder theory emphasizes that the fiduciary duty of directors of the company is to run the company in the interests of the shareholders (Moore, 1999, p. 119). O’Connell & Ward (2020, p. 2) stated that shareholder theory stands on the assumption that corporate assets are valued by shareholders with two measures: dividends and share price. That’s why the focal point of the management decision should be maximizing the value of dividends and share price (collectively called the wealth of the shareholders). Tse (2011, p. 52), emphasizing this point, asserted that only those projects should be undertaken by managers, which maximizes value for these fund suppliers (shareholders). Managers should align their interests with the interests of the owners (shareholders) and they should be evaluated for their performance. Beinhocker (2006) claimed that in its operational form, shareholders’ value maximization is the same as the maximization of present value of all future free cash flows (that is, in other words, maximization of firm value).

Shareholder theory was widely debated, negated, and criticized over the years by scholars such as Freeman (1994) for giving supremacy and primacy to shareholders over stakeholders and emphasized that corporations should also serve stakeholders, not the shareholders *alone*. O’Connell and ward (2020) argue that shareholder theory was criticized for its objective, which is purely financial in nature and that theory also fails to capture other non-financial objectives that corporations and shareholders may have, such as encouraging entrepreneurship, innovation, and building communities. The theory is also criticized for the assumption that shareholders are owners of the company, which Fontrodona & Sison (2006, p. 36) claimed to be unjustified even within the agency theory framework. They assert that no one can claim to own the firm because a firm is a “nexus of contracts”, and one cannot own a mere nexus.

Shareholder theory is closely related to this study and can help better understand and explain the relationship between corporate sustainability and WCM of the sustainable listed firms in Sweden. A firm’s performance on sustainability fronts is reflected in its ESG scores, which in turn is

⁸“A Friedman Doctrine: The Social Responsibility of Business is to Increase Its Profits”, was an essay published in 1970 in the New York Times. Essay was written by Milton Friedman, a famous Nobel Prize-winning American economist, and statistician. His doctrine is also known as theory of business ethics and shareholder theory.

reflected in a firm's high value and profitability/financial performance. As we noted in previous sections that empirical research has consistently reported a positive impact of corporate sustainability (ESG) on firm value (see, e.g., Yoon et al., 2018, p. 15) and on firm profitability (see, e.g., Friede et al., 2015; Whelan et al., 2021). We also noted that most studies reported positive impact of WCM efficiency on firm value (see, e.g., Wasiuzzaman, 2015, p. 74) and profitability and shareholder value (see, e.g., Högerle et al, 2020). These findings imply that these relationships are in line with shareholder theory. However, we need to examine whether the relationship between corporate sustainability and WCM is also in line with the shareholder theory. In other words, we need to examine whether more sustainable firms are able to increase firm value and maximize their shareholders' value through achieving working capital efficiency. If the results of the study reveal that the ESG rating scores allow sustainable firms to operate with lower WCR (cash requirements) and a shorter CCC (cash cycle) then we would be able to conclude that the sustainability (ESG) of the firms leads to working capital efficiency meaning that sustainability (ESG) allows firms to operate with less investment in working capital, which presumably would lead to an increase in shareholders' wealth and firm value. Our expectations are that our study results will be in line with shareholder theory since Sweden has achieved many landmarks on sustainability fronts and even firms and business in Sweden are also showing their serious concerns on sustainability fronts.

3.2.2 Stakeholder Theory

The Stakeholder Theory⁹ emerged in response to the criticism of the philosophy of Friedman's doctrine which, critiques believe gave an upper hand to the shareholders over other stakeholders and narrowly described corporations' role and responsibility in society (Freeman et al., 2010). Stakeholder theory has not only gained popularity in recent years because of the discerned shortfalls of shareholder theory but also because a large number of firms use this theory as a guide for their business decisions (Danielson et al., 2008). Donaldson & Preston (1995) claim that Freeman's book (1984) proved to be inspirational in the academic and corporate world as it resulted in the publication of numerous books and articles following his footprint on the concept of stakeholder. Laplume et al. (2008) mention that Freeman's book continues to be cited by innumerable authors for its continued attention from management researchers.

Understanding the concept of stakeholder is important to understand Stakeholder Theory. Stakeholders are defined as "persons or groups with legitimate interests in procedural and/or substantive aspects of corporate activity" (Donaldson & Preston, 1995, p. 67). As cited in Benn et al. (2016), (2008) claims that the most famous definition of stakeholders comes from Freeman (1984, p. 53) who defines the concept as "any group or individual who can affect or is affected by the achievement of the organization's objectives". There are two types of stakeholders: primary and secondary. Clarkson (1995, p. 106) states that primary stakeholders are those parties whose participation is important for the corporation's survival as a going concern and, according to him, shareholders, employees, customers, suppliers, and the public sector (government) agencies (for instance, regulatory agencies, taxes authorities, etc.) fall under this group of stakeholders. Clarkson (1995, p. 107) defined secondary stakeholders as "those who influence or affect or are influenced or affected by, the corporation, but they are not engaged in transactions with the corporation and

⁹ Stakeholder Theory was originally presented by R. Edward Freeman in 1984 in his classic and landmark book, *Strategic Management: A Stakeholder Approach*, which won him the title "Father of Stakeholder Theory".

are not essential for its survival”. Competition, media, trade associations, and support groups (special interests) constitute this group of stakeholders.

According to Freeman (1984), shareholders (owners) are important for the company but the satisfaction of the broader group of people (stakeholders) is as important as the satisfaction of the shareholders because they have a connection as well as a stake in the business (Johnson et al., 2017). This is argued that operating within the fundamental framework of a capitalist market economy and equally considering the shareholders’ interest, stakeholder theory is where both business’s operation and social responsibility integrate (Mansell, 2013, p. 8). Freeman (1984) stresses that all the stakeholder groups must be taken into consideration by managers (Laplume et al., 2008) while making decisions as this is advantageous to the firm because building strong relationships with stakeholders will help the firm maximize profits and create value, therefore, profit maximization should be viewed as an outcome rather than a goal (Freeman et al., 2010). To this end, Freeman’s view also matches with shareholders’ view because Freeman et al., (2010) believe that satisfying stakeholders are also the source of achieving profit maximization goal. In other words, Freeman (2008, p.166) emphasizes that shareholders’ wealth is ultimately maximized when firms pursue the goal of stakeholders’ wealth maximization. Therefore, firms’ executives must set stakeholders’ wealth maximization as their main goal because with this approach both groups (shareholders and stakeholders) are not only better served but also both shareholder and stakeholder approaches harmonize (Freeman et al., 2010, p. 12).

Stakeholder theory is quite relevant to this study because stakeholders play an important role for the survival, success, and growth of the firm. Their role becomes even more crucial when they interact with sustainable firms because they are aware of the endeavors of these firms in protecting the environment and society and improving their governance structures. A firm’s high ESG score is not only an indicator of a firm’s high performance on sustainability fronts but also indicates that the firm is making such policy decisions that collectively benefit its stakeholders and shareholders. Whether these are buyers, suppliers, or communities, all the stakeholders in Sweden show their serious concerns about sustainability which is also visible through the value they put into sustainability via their contributions individually and collectively to promote sustainability. For example, customers not only patronage sustainable products by paying prices but also prefer to buy products of sustainable firms. Similarly, suppliers and vendors maintain a strong buyer-supplier relationship with sustainable firms because they consider sustainable firms less risky. The same arguments can be drawn for other stakeholders but the point we want to draw is what Xuea (2020, p. 81) asserted that a firm’s investment in social responsibility maximizes firm value and also protects shareholders’ interests. As noted above, the wealth maximization of the stakeholder will also maximize the wealth of the shareholders. In that pursuit, this is important for a firm to achieve a high ESG rating score to showcase its performance on the sustainability fronts, and for that matter firm needs to take on board and satisfy all of its key and concerned stakeholders. On the other hand, a firm needs to make such WCM decisions that achieve efficiency in its working capital. Whether our study satisfies the stakeholders’ theory is dependent on the findings of our study. However, we assume that the findings of our study will be in line with the stakeholder theory.

3.2.3 Legitimacy Theory

The legitimacy theory (LT) was in the academic and industrial buzz during the era when theories like shareholder theory and stakeholder theory, among others, were in wide circulation and debate both in academic literature and the corporate world. Legitimacy theory was originally extracted from the concept of organizational legitimacy presented by Dowling and Pfeffer (1975, p. 122) who described it as “....a condition or status which exists when an entity’s value system is congruent with the value system of the larger social system of which the entity is a part. When a disparity, actual or potential, exists between the two value systems, there is a threat to the entity’s legitimacy” (cited in Guthrie et al. (2006, p. 4).

Since its introduction, legitimacy theory has been defined in several ways, however, a widely accepted definition of legitimacy theory was presented by Suchman (1995, p. 574) who defined it as “Legitimacy is a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions”. Burlea & Popa (2013, p. 1579) describe legitimacy theory “as a support system to the organizations in implementing and developing voluntary social and environmental disclosures in order to fulfill their social contract that enables the recognition of their objectives and the survival in a jumpy and turbulent environment”. Burlea & Popa (2013, p. 1579) further argue that social perception of an organization’s activities is pivotal for an organization’s survival. Social perception of the organization’s activities must match society’s expectations. Failure to meet these social expectations and moral values may result in severe sanctions by society, which may eventually result in the failure of the organization.

Philosophically, society closely observes an organization’s actions. If an organization’s *actual actions* differ from what society expects the organization *should do*, it creates a gap, which is called a “legitimacy gap”, which threatens an entity’s legitimacy, and hence its survival (Sethi, 1978, p. 58; Lindblom, 1994, cited in Guthrie et al., 2007, p. 5). Dowling and Pfeffer (1975, p. 123-125) emphasize that organizations’ operations must align with the social contract, if this does not happen then, in pursuit of legitimate theory, corrective measures need to be taken by the organizations to become legitimate. Cormier and Gordon (2001) further emphasize and argue that since perceptions form the basis of legitimacy theory, corrective measures must be appended with publicized disclosure to exert effective influence on external parties. Below is a diagram to help us understand the concept of the ‘legitimacy gap’. In figure 3.2, the incongruence between a corporation’s actions and society’s perception of the corporation’s activities are represented by areas Y and Z. Area ‘X’ represents the ‘legitimacy gap’. This figure exhibits that corporations with the aim to be more legitimate should aim to increase the area of X. Legitimacy theory has appeared in many research papers (Olatijo et al., 2021) and it has achieved dominance in the research, particularly in social accounting research, due to its contribution in making the academic and corporate community understand reasons (motives and incentives) of the firms’ managers behind pursuing social and environmental disclosure activities (Husillos et al., 2009). One way or the other, all organizations are stakeholders dependent, therefore it is essential for corporate managers to understand how important is to achieve legitimacy for their firms because not only corporate repute and goodwill but also the unsystematic risk¹⁰ of the company are directly affected by

¹⁰ Unsystematic risk is the type of risk, which is unique to the firm (or industry) and exists due to certain characteristics of the firm, which are said to be controllable and avoidable. This type of risk is known by many different names, for instance, firm-specific risk, unique risk, controllable risk, avoidable risk, and diversifiable risk.

legitimacy. For example, firms with high corporate environmental legitimacy will face lower unsystematic risk, and vice versa (Bansal & Clelland, 2004, p,100).

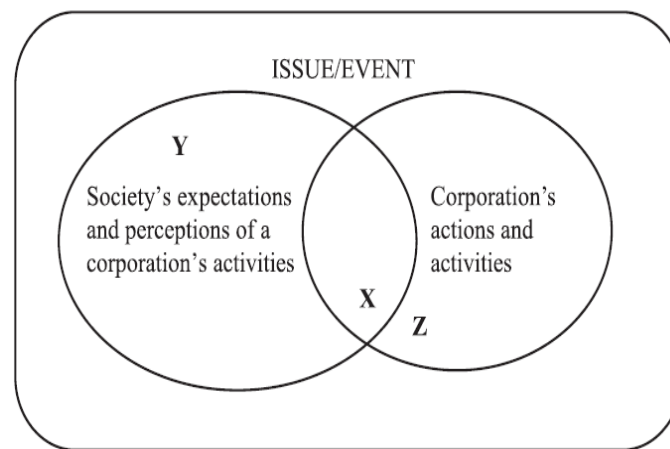


Figure 3.2: Issues/Events and Corporate Legitimacy
(Source: Garry O'Donovan, 2002, p. 347)

Legitimacy theory is as important and relevant to our study as shareholder theory and stakeholder theory are. Legitimacy theory provides an insight on the relationship between corporate sustainability and WCM that is different from the other two theories. The author noticed in other two theories that firms value maximization goals are in line with both shareholders and stakeholders value maximization but can firms achieve these value maximization goals without being 'legitimate' in the eyes of society? The answer is NO! Because legitimacy is a kind of license from society to firms allowing them to operate with due consideration of the societal norms and beliefs while at the same time duly protecting the environment. In other words, unlike stakeholder theory and stakeholder theory, legitimacy theory is more concerned with the protection of society and the environment. ESG rating scores are the indicators of the firms' endeavors on the sustainability fronts. High ESG ratings scores indicate that firms are performing more actively on the environmental, societal, and governance aspects, which further authenticates the legitimacy of sustainable listed firms in Sweden. Since the primary purpose of our study is to investigate if more sustainable firms (with high ESG score) can achieve working capital efficiency by operating with lower WCR and a shorter CCC, the legitimacy theory allows to hypothesize that more sustainable firms can achieve working capital efficiency while pursuing the societal and environmental goals. Whether findings of our study would satisfy the legitimacy theory is the question which we will address in the analysis chapter, however, the author expects study results would fall in line with the theory, implying that sustainable firms would achieve working capital efficiency while operating within societal norms and protecting the environment.

3.3 Theoretical Summary & Choice of Theory

In the previous sections, the main concepts and the theoretical arguments of the shareholder theory, stakeholders' theory, and legitimacy theory were presented in the previous sections. We noted while shareholder theory solely focuses on the shareholders, legitimacy theory goes a step ahead and includes society and the environment in its scope. The stakeholders' theory further expands its scope and includes the stakeholders of the firm in its arguments. The author also observed that

these theories expand from the micro views (shareholders) to the macro views (stakeholders) of the firm. We further noted that these theories explain why it is so important for the firm to consider all the stakeholders (including shareholders and society) in its decisions and policies and how failure to satisfy these actors may adversely affect the survival of the firm. For these particular reasons and for the reasons to help us understand our findings in light of these theories and to refine our understanding of the underpinnings and societal implications of our findings, we decided to include these theories in our study. Albeit there are numerous other theories identified in the literature such as Resource Based Theory, Agency Theory, Stewardship Theory, Life-cycle Theory, etc., that help explain the relationships between certain phenomena, we find our selected theories more relevant and pertinent to help us understand the relationship between corporate sustainability and WCM of the Swedish-listed firms. Notably, we didn't include the agency theory (principal-agent theory) or stewardship theory in our study by purpose primarily for the reason that the approaches embodied in this theory are quite similar to shareholder theory in explaining the relationship in our study.

Chapter 4

DATA AND METHODOLOGY

At the outset, this chapter of the thesis will introduce the population and sample size of the study which will be followed by introduction of data and short description of all the relevant variables. Thereafter, the regression analysis and its relevant models will be depicted. The chapter will close with the hypotheses of the study.

This study is intended to examine the relationship between corporate sustainability and WCM with special reference to Swedish-listed companies. Sweden is one of the Scandinavian and Nordic countries that fall under Northern Europe. Sweden has been selected for this study for certain reasons. First, being a student at a Swedish university (Umea University), the author finds it more pertinent and convenient to conduct a research study in Sweden because of the author's familiarization with Sweden in general, and Swedish financial markets in particular, as compared to other Nordic countries. Second, Sweden stands among the world's most advanced and developed countries, on the one hand, it is the largest country in the Nordic region in terms of population and area, on the other hand. The third reason stems from the initiatives and endeavors that Sweden has taken with respect to sustainability. So much so, Sweden's role in creating and spreading sustainability awareness as well as achieving successes and landmarks on sustainability fronts has made Sweden recognized and symbolized as a global leader in sustainability (Isaksson & Rosvall, 2020, p. 4). Sweden was declared the most sustainable country in the world and ranked first in RobecoSAM's 2019 report on Country Sustainability Ranking (RobecoSAM, 2019). The story didn't end here. As a result of its focused and continued efforts toward sustainability, Sweden was ranked first in the Global Sustainable Competitiveness Index (2021) and second in UN Sustainable Development Report (2021) and Global Innovation Index (2021). Considering the fact that through their business operations corporations can exert a direct impact on the economy, environment, and society, Sweden has made it compulsory for larger companies to publish their yearly sustainability reports since the reporting year 2017 (Isaksson & Rosvall, 2020, p. 4). The author of the study believes data on ESG scores, and other variables will be available for a wide range of NASDAQ Stockholm-listed companies of different sizes operating in different industries.

4.1 Population and Sample

According to Bell et al. (2021, p. 188) and Ghauri et al. (2020, p. 162), the term *Population* can be referred to as “the universe of units from which the sample is to be selected”, where the term “units” is not necessarily limited to the ‘people’ only. That is, it can be a universe of nations, cities, regions, firms, etc., from which the researcher may select a sample. This also means that the term population in this context has broader meanings. Collis & Hussy (2021, p. 56) contend that in the case of a large population, where it is too complicated or too expensive to collect complete information on each unit of the population, the researcher may draw a sample using the appropriate sampling method(s). The term *Sample* is generally described as a subset of a population (Collis & Hussy, 2021, p. 56) that is selected for investigation purposes using a probability or a non-probability method (Bell et al., 2021, p. 188; Ghauri et al., 2020, p. 162).

The population of our study is comprised of all the companies listed on NASDAQ Stockholm (previously known as Stockholm Stock Exchange). Albeit, NASDAQ Stockholm has also the

OMX 30 index, which constitutes the 30 most traded companies, as well as large Cap, Medium Cap, and Small Cap companies, our study is not focused on such divisions of the companies listed on NASDAQ Stockholm. Secondly, the sample of our study is comprised of all the listed companies which are registered in the primary market except for the financial firms. Financial firms have been excluded because of different firm characteristics. For certain types of studies like ours, excluding financial firms is quite common, which is evident from some of the prominent previous studies such as Shin and Soenen (1998), Deloof (2003), Lazardis & Tryfonidis (2006), Baños-Caballero et al. (2014), and Enqvist et al. (2014).

4.2 Data Collection

All types of research studies are largely dependent on data whether it is in the form of primary data or secondary data. According to Collis & Hussy (2021, p. 20) data is referred to as known facts, statistics, things, or opinions collected and used for reference or analysis purposes. *Primary data* is the first-hand data collected from an original source (surveys, interviews, etc.) whereas *secondary data* is collected from the source already existing (databases, publications, etc.). For this study, secondary data provided the basis for analysis. Secondary data was retrieved from Refinitiv Eikon from the years 2010 to 2020. Initially, the data was downloaded for all the listed companies on NASDAQ Stockholm for all the study variables. At the time of data retrieval, there were 406 companies listed on NASDAQ Stockholm. Once data was downloaded, data was carefully processed, cleaned, and filtered to ensure that the firms with no data or incomplete data on any of the study variables are excluded from the study sample. As mentioned in chapter 2, since the data retrieved possessed the characteristics of both the time-series data and cross-sectional data, data collected was panel data and the study we intend to conduct is the Panel Data study (Collis & Hussy, 2020, p. 57). Since the author intended to use balanced panel data, data was further processed and the firms failing to meet the criteria were dropped from the study sample. In other words, firms not having data on all the study variables for the entire study time period were dropped. Since our study is based on quantitative research, this was highly important for us to make sure that data is available on all the study variables, particularly on ESG ratings scores and WCM measures for the entire study period as these are the main variables of this study. Having passed through this data attrition process, the author finally ended up with a sample of 38 listed firms belonging to different industries (excluding the financial firms), thus making a sample of 418 firm-year observations.

4.3 Variables

Collis & Hussy (2021, p. 187) describe a variable as a measurable or observable characteristic of a phenomenon under study. In other words, one can refer a variable to a characteristic or attribute of a phenomenon that varies (changes) from case to case. In research, variable provides the basis of data collection, which in turn, forms the basis of empirical evidence to test the hypotheses (Collis & Hussy, 2021, p. 187). Prior to data collection relating to each variable, relevant variables have been identified based on the research question and purpose, which have been framed and guided by the theoretical framework. To address the research purpose and question, and test the hypotheses, we have used the Refinitiv Eikon database to collect data on the related dependent, independent, and control variables. Our study is quantitative and explanatory study that aims to assess the relationship between corporate sustainability and WCM of the Swedish-listed companies employing regression analysis. To be in line with Barros et al., (2022, p. 2-3), WCR and CCC (proxy measures of WCM) serve as dependent variables whereas ESGC scores and

scores of individual pillars of ESG (ENV, SOC, GOV) serve as the independent variables of regression models of our study. Some control variables such as firm size (Size), leverage (Lev), current ratio (CR), gross profit margin (GPM), EBIT margin (EBITM), and market-to-book value (MBV) were also added in the regression models to follow Barros et al., (2022, p.2-3).

4.3.1 Dependent Variables

A variable whose values are dependent on (or affected by) one or more independent variables is referred to as a dependent variable (Collis & Hussy, 2020, p. 189). In other words, it's a response variable in that it is expected to change in response to manipulations in the independent variable(s) (Saunders et al., 2019, p. 512; Schindler, 2019, p. 12). The dependent variable is also known as the predicted variable or the regressand (Wooldridge, 2020, p. 21). Both the dependent and the independent variables are of the researcher's prime interest, however, in an explanatory (causal) study, identification of the dependent and independent variables is largely dependent on the assumed relationship researcher aims to study (Schindler, 2019, p. 12). In our study, we assume a causal relationship between corporate sustainability and the WCM of the firms in a way that we determine corporate sustainability as the independent variable and WCM as the dependent variable to establish that cause-and-effect relationship. We'll use two dependent variables, namely, CCC and WCR as representative of the WCM of the listed firm in Sweden.

According to Barros et al., (2022, p. 3), numerous working capital metrics have been used in empirical research on WCM, however, CCC has been used most commonly as a measure of WCM of the firm in the extant empirical research due to its characteristics (see, e.g., Deloof, 2003; Garcia-Teruel & Martinez-Solano, 2007; Sharma & Kumar, 2011; Banos-Caballero et al., 2012; Yazdanfar & Öhman, 2014; Afrifa & Padachi, 2016; Singhania & Mehta, 2017; Altaf & Shah, 2018; Pestonji et al., 2019; Orazalin, 2019; to name a few). Barros et al., (2022) described CCC as a dynamic method in the sense that it is based on the company operations and combines the data of the two key financial statements, namely, the balance sheet and income statement, whereas other scholars (Deloof, 2003, p. 576; Singh et al., 2017, p.3; Sharma & Kumar, 2011, p. 165) examined CCC as a comprehensive efficiency measure of a firm's WCM. Richards & Laughlin (1980) mentioned CCC as a potent tool to assess a firm's performance in managing WCM (cited in Singh et al., 2017, p. 3). Empirical researchers such as Singhania & Mehta (2017) and Sharma & Kumar (2011) claim CCC to be an exhaustive and adequate liquidity measure of a company's working capital, which according to Tran et al., (2017, p. 6) is because of its ability to measure the length of the time firm needs to convert its cash outflow (outlay) to cash inflow (recovery) and provide a kind of measure of firm's working capital policy (aggressive vs. conservative). For instance, a shorter CCC is an indication of a more aggressive working capital policy (Baños-Caballero et al, 2012, p. 520; Tran et al., 2017, p. 14).

Yazdanfar & Öhman (2014, p. 445) describe CCC in terms of the net time interval (days) between cash payments a firm makes for the purchases and the cash receipts a firm finally recovers from the sale of its finished goods inventory. For the reasons that a lower CCC is an indicator of low investment in the current assets and a sign of high liquidity, Sharma & Kumar (2011, p. 165) believe that a lower value of CCC is better for the firm. However, they contend that a higher CCC, on the other hand, is not only an indicator of a firm's high investment in current assets but also signifies high financing needs for its current assets. To be in line with the previous research studies, and following the approach adopted by Lazaridis & Tryfonidis (2006, p. 4), Sharma & Kumar

(2011, p. 165), Enqvist et al., (2013, p.16), and Barros et al., (2022, p.2), we calculate firm's CCC in terms of the number of days in the following way.

$$CCC = \text{No. of Days Accounts Receivable} + \text{No. of Days of Inventory} - \text{No. of Days Accounts Payable}$$

Where each component of CCC is calculated as follows:

$$\text{No. of Days Account Receivable} = (\text{Accounts Receivables} \div \text{Sales}) \times 365$$

Indicates the average collection period of the firm from its debtors. A higher value means more investment in receivables.

$$\text{Number of Days Account Inventory} = (\text{Inventory} \div \text{Cost of Goods Sold}) \times 365$$

Indicates the time period firm takes to convert its inventory into sales. A higher number represents a higher investment in inventory.

$$\text{Number of Days Account Payable} = (\text{Accounts Payable} \div \text{Cost of Goods Sold}) \times 365$$

Indicates the average payment period of the firm to its creditors. A higher number means a longer time taken by the firm to make settlements in payments to its creditors.

To be in line with the previous research studies and following the approach adopted by Barros et al. (2022, p. 2), we calculate our second dependent variable, WCR, as follows:

$$WCR = (\text{Receivables} + \text{Inventories} - \text{Payables}) \div \text{Net Sales}$$

4.3.2 Independent Variables

An independent variable can be stated as a variable that affects the dependent variable's values (Collis & Hussy, 2021, p. 189). The Independent variable is also known as the cause variable, the predictor variable, the explanatory variable, or the regressor because of its characteristics to affect, predict, explain, or regress the dependent variable (Wooldridge, 2020, p. 21). To meet the aim of our study, to address the study question, and to test the hypothesis of the causal relationship between corporate sustainability and the WCM of the Swedish listed firms, and to be in line with previous research such as Barros et al. (2022), the ESGC score and the ESG's individual pillar scores (ENV, SOC, GOV) are determined as independent variables of our study. We have used the Refinitiv Eikon database to retrieve the rating scores of these independent variables. Data on ESG scores retrieved from Refinitiv Eikon can be considered reliable and valid because, for the past 15 years, these ESG scores have been broadly used (or referenced) in over 1,200 academic articles (Berg et al., 2021, p. 6). The extensive use of Refinitiv ESG scores in academic research can be also witnessed in the recent literature (see, Barros et al., 2022; Janicka & Sajnóg, 2022; Khaled et al., 2021; Shakil et al., 2022; Berg et al., 2021; Galletta et al., 2021; to name a few). Refinitiv ESG scores are also used by professional practitioners (Berg et al., 2021, p. 6). There is also wider use of Refinitiv ESG scores by most university students for their research endeavors for the most probable reason of easy and free access to the Refinitiv Eikon database that most universities provide to their students.

Since 2002, Refinitiv has become one of the leading ESG database providers covering more than 80% of the market cap with over 630 ESG measures. With the world's biggest ESG content collection operations and more than 700 trained staff, Refinitiv Eikon provides weekly updated ESG data of more than 12000 public and private companies across the world (Refinitiv, 2022, p. 3-5). Refinitiv Eikon constructs transparent and objective ESG scores based on the data provided by the company as well as publicly available verifiable data (Refinitiv, 2022, p. 3). Refinitiv Eikon's ESG Combined (ESGC) combines both the regular ESG and the controversial ESG scores. A controversial ESG score is constructed based on the negative stories reported by global media sources, therefore, ESGC can be thought of as a comprehensive measure because the controversial ESG score plummets (discounts) the ESGC performance score accordingly (Refinitiv, 2022, p. 6). Knowing that the ESGC score adjusts the ESG score upward for the positive news and downward for the negative news, thus giving us a true reflection of a firm's ESG practices and performance, the author has decided to use the ESG combined (ESGC) score over the regular ESG score.

The scores of ESG and of its pillars are the percentile rank scores which are scaled from 0 to 100, where 0 represents the *minimum* score and 100 represents the *maximum* score. These percentiles are converted into letter grades, which range from category A (leaders) to category D (laggards), where category 'A' represents excellent while category 'D' represents poor relative ESG performance (Refinitiv, 2022, p. 7). We'll be using ESG scores *not* the letter grades for our study. Out of more than 630 ESG measures calculated at the firm level, 180 belong to the subset. These measures are divided into 10 categories (or themes), which are further classified into Environment (E), Social (S), and Governance (G) pillars. Three measures (resource use, emission reduction, and innovation) belong to the *environment pillar*, four measures (workforce, human rights, community, and product responsibility) are calculated with respect to the *social pillar*, and the final four measures (management, shareholders, and CSR strategies) fall under the *governance pillar* (Refinitiv, 2022, p.22).

4.3.3 Control Variables

A control variable is a variable that is held constant (controlled) in a research study. Just like qualitative research, a control variable has its own significance in quantitative research, although, it is not a regressor of interest and generally does not have a causal interpretation (Stock & Watson, 2020, p. 232). According to Atinc et al., (2012, p. 59), the control variable(s) is mostly used by researchers to purify the research results and to reveal the true relationships by statistically removing the distortions related to extraneous variables (cited in Bernerth et al., p. 132). In our study, we'll be following Barros et al., (2022, p. 2-3) to use size, leverage, current ratio, gross profit margin, EBIT margin, and market-to-book value (MBV) as the control variables because of the potential impact these control variables may have on the working capital, and cash level, cash holding, and cash management (Barros et al., 2022, p. 2).

4.3.3.1 Leverage

The leverage ratio, also known as a debt ratio or solvency ratio, indicates the amount of debt financing (external financing) used by the firm to finance its total assets (Lazaridis & Tryfonidis 2006, p. 28). Hence, this ratio is a measure of the riskiness or solvency of the business. According to Nastitti et al., (2019, p. 63) the use of leverage as a control variable can be observed in several empirical studies on WCM because of its probably close relation to WCM (see, e.g., Deloof, 2003; Baños-Caballero et al., 2014; Barros et al., 2022; Janicka & Sajnog, 2022). To follow the approach

used in the previous studies, we will also use leverage as a control variable, and it will be measured as follows:

$$Lev = Debt^* \div Total Assets$$

*Refinitiv Eikon calculates debt as the combination of short-term debt, the current portion of long-term debt, and long-term debt.

4.3.3.2 Firm Size

Another control variable of our study is the 'Firm Size' because of its potential impact on the working capital of the firm. According to Hanafi et al., (2014), small firms in comparison to large firms not only carry higher working capital but also the percentages of current assets and current liabilities between large firms and small firms differ remarkably (cited in Rizki & Idawati, 2018, p. 4). The size of the firm is measured by researchers in different ways. Some researchers use the log or natural log of sales to measure the firm size (see, Baños-Caballero et al, 2014) whereas some use the log or natural log of total assets (see, Mahmood et al., 2019; Anton & Nucu, 2021; Barros et al., 2022). To be in line with previous studies and to follow Barros et al. (2022, p. 3), we will use the log of total assets to measure the firm size.

$$Size = Log\ of\ Total\ Assets$$

4.3.3.3 Current Ratio

The current ratio belongs to the liquidity measures of the firm (Bintara 2020, p. 29; Ross et al., 2018, p. 47). A strong liquidity position is essential to the firm as it indicates not only the firm's ability to meet its short-term obligations when they become due but also how quickly and easily the firm can convert its non-cash assets into cash (Keown et al., 2020, p. 105; Rizki & Idawati, 2018, p. 5). According to Bintara (2020, p. 29), a high CR may be a good indicator of collateral for short-term creditors, however, it may also spread a negative signal with respect to the management of working capital as well as the firm's ability to generate profits, which in turn, may affect the returns expected by the investors. Besides that, CR is the most known and extensively used liquidity measure (Ross et al., 2018, p. 47), it also has a close relationship between working capital and liquidity (Rizki & Idawati, 2018, p. 5). For this reason and to follow Barros et al., (2022, p. 3), we'll include CR as a control variable in our study. The most common way the CR is measured in academic literature and empirical research is as follows:

$$CR = Current\ Assets \div Current\ Liabilities$$

4.3.3.4 Gross Profit Margin and EBIT Margin

Profitability is one of the measures firms use to gauge their financial performance. This is pivotal for the firms to know how efficient they are in using their assets and managing their operations (Ross et al., 2018, p. 52) because shareholders' value is created through earning strong profits (Keown et al., 2020, p. 110). GPM and EBITM are among the most widely used profitability measures. Most empirical researchers have found a significant relationship between working capital and profitability (see, Yazdanfar& Öhman 2014; Tran et al., 2017; Anton et al., 2021), therefore, it is important to use these measures as control variables in our study. Moreover, similar to the approach followed by Barros et al., 2022, both GPM and EBITM have been added as control variables in our study. GPM and EBITM are measured as follows:

$$GPM = \text{Net Sales} - \text{Cost of Goods Sold}$$

$$EBITM = EBIT^* \div \text{Sales}$$

*Refinitiv Eikon calculates EBIT by taking the pre-tax income and adding back interest expense on debt and subtracting interest capitalized.

4.3.3.5 Market-to-Book Value

MBV is the second most frequently used investors measure to assess the firm's performance (Keown et al., 2020, p. 125). In the MBV ratio, the market is referred to as the firm's value (price) of a share of stock in the market whereas book value means the value of a share of stock of the firm as per the books of accounts. Book value can be calculated by dividing the total equity appearing on the firm's balance sheet by the total number of shares outstanding (Ross et al., 2018, p. 54). Relating the market price of a share of stock with its book value provides investors with the firm's performance indication of whether the firm has destroyed or created shareholder value (Keown et al., 2020, p. 125). Investors do this by comparing MBV with 'one'; for instance, MBV less than one would mean the firm's complete failure in creating value for its shareholder (Ross et al., 2018, p. 54). It is evident in the literature that MBV has been used as the control variable (see, Appuhami, 2008; Haddad, 2015; Barros et al., 2022). In our study, MBV is measured as follows:

$$MBV = \text{Market Value} \div \text{Book Value}$$

According to Barros et al. (2022), EBITM and MBV are essential to use as control variables because of their relation to firm performance even though these two measures cover different aspects of firm performance. That is, where EBIT examines the firm's operating performance, MBV is a forward-looking approach that indicates investors' future expectations of the firm's performance.

4.4 Regression Analysis

The primary aim of the study is to investigate the relationship between corporate sustainability and WCM of Swedish-listed companies. In light of the existing body of knowledge on the subject matter, we have already identified the dependent (WCR and CCC) and independent variables (ESG scores) of our study. However, now we need a way to estimate the relationship between the dependent and independent variables of our study. To this end, we will use *regression analysis*, which is known to be the most frequently used statistical method because of its ability to determine the existence, strength, and direction of a significant quantitative relationship between the dependent and independent variables of the study (Studenmund, 2017, p. 5-6). Moreover, regression analysis is useful not only to meet study aim but to address the research questions and test the hypothesis also. There are two types of regression models. Simple Linear Regression model and Multiple Linear Regression model. A simple linear regression model is known as a *two-variable* or *bivariate* model as it is comprised of only two variables in a way that one independent variable (x) explains variations in the dependent variable (y) (Wooldridge 2020, p. 20; Groebner et al., 2018, p. 560). Notably, however, if x and y are not perfectly correlated then variations explained by x will not be 100% (Groebner et al., 2018, p. 598), which means unexplained variations in the dependent variable exist because of some other independent variables not accounted for. This is what econometricians and statisticians grapple with by employing a multiple linear regression model.

A multiple linear regression model, also known as the multiple regression model and multivariate linear regression model, predicts or explains variations in the dependent variable by more than one independent variable (Studenmund, 2017, p. 12). For our study, we will employ a multiple regression model for certain reasons. First, we have more than one explanatory variable in the study. Second, as Studenmund (2017, p. 12) suggested, it is advantageous to use multiple regression because it has the ability to measure the impact of one independent variable on the dependent variable while keeping the impacts of other independent variables constant. Third reason is the wide and common use of multiple regression in extant empirical research (see, Velte, 2017; Altaf & Shah, 2018; Alareeni & Hamdan, 2020; Bintara, 2020; Kim & Li, 2021; Alvarez et al., 2021; Barros et al., 2022), etc. Based on the evidence from previous research as well as considering the nature of the study, the author finds multiple regression most suitable for the study.

4.4.1 Ordinary Least Squares (OLS)

OLS is one of the most widely and commonly used methods in regression models that estimate the regression line and the regression parameters in a way that minimizes the sum of the squared residuals (Studenmund, 2017, p. 36). That is, OLS plots a line on the dataset that minimizes the sum of the squared prediction errors, which can be described as the vertical distances between the actual values and the predicted values of the dependent variable (Groebner et al., 2018, p. 562; Moore et al., 2016, p. 117). Nonetheless, econometricians have developed a number of estimation techniques to achieve this, OLS is still the most-used method due to its simplicity and ease of use, theoretical appropriateness, and useful characteristics. Moreover, most of the estimation techniques used in regression models are merely extensions of the OLS (Studenmund, 2017, p. 36-37). Notably, best-fit line estimated for regression models using OLS is essentially based on the following classical assumptions (Studenmund, 2017, p. 93):

- i. *The regression model is linear, is correctly specified, and has an additive error term.*
- ii. *The error term has a zero population mean.*
- iii. *All explanatory variables are uncorrelated with the error term.*
- iv. *Observations of the error term are uncorrelated with each other (no serial correlation).*
- v. *The error term has a constant variance (no heteroskedasticity).*
- vi. *No explanatory variable is a perfect linear function of any other explanatory variable(s) (no perfect multicollinearity).*
- vii. *The error term is normally distributed (this assumption is optional but usually is invoked).*

4.4.2 Generalized Lease Squares (GLS)

In order to achieve robust and reliable results of the study using regression models, it is essential to satisfy all the OLS assumptions mentioned in the previous section. If one or more of these OLS assumptions are not satisfied, then either the model should be revised/transformed, or other methods of regression estimation should be employed. For instance, if assumption (iv) of OLS is not satisfied and the error terms are found correlated with each other, that is serial correlation is suspected, then Generalized Lease Squares (GLS) can be the best alternative method to use (Studenmund, 2017, p. 92). The Generalized Lease Squares is a method by which the pure first-order serial correlation from an equation is rid and the minimum variance property of estimation is restored. Generally, the GLS process starts with an equation that fails to hold the classical assumptions of OLS and transforms that equation into the one that meets the classical assumptions (Studenmund, 2017, p. 292).

4.4.3 Theoretical Regression Models

To examine the relationship between corporate sustainability and WCM of Swedish-listed companies, the author of the study has developed eight regression models. In the first four regression models, CCC is the dependent variable whereas in the remaining four regression models WCR is the dependent variable. The ESGC score, environmental score (ENV), social score (SOC), and governance score (GOV) serve as the main independent variables whereas lev, size, CR, GPM, EBITM, and MBV constitute the control variables common in all regression equations used in this study. The variables included in the regression models have been consciously identified in light of the existing body of knowledge on the subject matter of the study (e.g., Barros et al., 2022). Since our study is primarily inspired by Barros et al. (2022), all the variables included in the regression models as well as the regression model specifications (regression equations) have been adopted from Barros et al. (2022, p. 2 & 5). Regression equations used for the study are presented below:

Regression models with respect to CCC

$$CCC_{i,t} = \beta_0 + \beta_1 ESG_{i,t} + \beta_2 LEV_{i,t} + \beta_3 Size_{i,t} + \beta_4 CR_{i,t} + \beta_5 GPM_{i,t} + \beta_6 EBITM_{i,t} + \beta_7 MBV_{i,t} + \varepsilon_{i,t}$$

$$CCC_{i,t} = \beta_0 + \beta_1 ENV_{i,t} + \beta_2 LEV_{i,t} + \beta_3 Size_{i,t} + \beta_4 CR_{i,t} + \beta_5 GPM_{i,t} + \beta_6 EBITM_{i,t} + \beta_7 MBV_{i,t} + \varepsilon_{i,t}$$

$$CCC_{i,t} = \beta_0 + \beta_1 SOC_{i,t} + \beta_2 LEV_{i,t} + \beta_3 Size_{i,t} + \beta_4 CR_{i,t} + \beta_5 GPM_{i,t} + \beta_6 EBITM_{i,t} + \beta_7 MBV_{i,t} + \varepsilon_{i,t}$$

$$CCC_{i,t} = \beta_0 + \beta_1 GOV_{i,t} + \beta_2 LEV_{i,t} + \beta_3 Size_{i,t} + \beta_4 CR_{i,t} + \beta_5 GPM_{i,t} + \beta_6 EBITM_{i,t} + \beta_7 MBV_{i,t} + \varepsilon_{i,t}$$

Regression models with respect to WCR

$$WCR_{i,t} = \beta_0 + \beta_1 ESG_{i,t} + \beta_2 LEV_{i,t} + \beta_3 Size_{i,t} + \beta_4 CR_{i,t} + \beta_5 GPM_{i,t} + \beta_6 EBITM_{i,t} + \beta_7 MBV_{i,t} + \varepsilon_{i,t}$$

$$WCR_{i,t} = \beta_0 + \beta_1 ENV_{i,t} + \beta_2 LEV_{i,t} + \beta_3 Size_{i,t} + \beta_4 CR_{i,t} + \beta_5 GPM_{i,t} + \beta_6 EBITM_{i,t} + \beta_7 MBV_{i,t} + \varepsilon_{i,t}$$

$$WCR_{i,t} = \beta_0 + \beta_1 SOC_{i,t} + \beta_2 LEV_{i,t} + \beta_3 Size_{i,t} + \beta_4 CR_{i,t} + \beta_5 GPM_{i,t} + \beta_6 EBITM_{i,t} + \beta_7 MBV_{i,t} + \varepsilon_{i,t}$$

$$WCR_{i,t} = \beta_0 + \beta_1 GOV_{i,t} + \beta_2 LEV_{i,t} + \beta_3 Size_{i,t} + \beta_4 CR_{i,t} + \beta_5 GPM_{i,t} + \beta_6 EBITM_{i,t} + \beta_7 MBV_{i,t} + \varepsilon_{i,t}$$

Dependent Variables

CCC = Cash Conversion Cycle

WCR = Working Capital Requirements

Independent Variables

ESG = ESG Combined Score

ENV = Environmental Pillar Score

SOC = Social Pillar Score

GOV = Governance Pillar Score

Control Variables

LEV = Leverage

Size = Firm Size

CR = Current Ratio

GPM = Gross Profit Margin

EBITM = EBIT Margin

MBV = Market-to-Book Value ratio

ε = Epsilon represents residual

Definition and description with relevant formulas of each of the aforementioned variables used in the regression models have already been presented in the previous sections.

4.5 Statistical Hypothesis

A hypothesis can be referred to as a statement about a population parameter that is yet to be verified (Lin et al., 2019, p. 275). A hypothesis is also described as a proposition formulated to test for relationship or causality against empirical evidence (Collis & Hussy, 2021, p. 47). Researchers formulate hypotheses in light of the research questions they intend to address in their study. Once the hypothesis is set, the next step is to test the hypothesis. In this section, the author will establish the hypothesis on the basis of the research questions of the study. As discussed, both in chapter one and chapter three, there are a significant number of research studies that addressed multiple dimensions of the relationship between ESG and firm performance as well as the relationship between working capital and firm performance but there is a dearth of literature addressing the relationship between ESG and working capital.

4.5.1 Hypotheses connecting to CCC

H_{01.1}: There is no significant relationship between ESG score and CCC

H_{A1.1}: There is a significant relationship between ESG score and CCC

H_{01.2}: There is no significant relationship between ENV score and CCC

H_{A1.2}: There is a significant relationship between ENV score and CCC

H_{01.3}: There is no significant relationship between SOC score and CCC

H_{A1.3}: There is a significant relationship between SOC score and CCC

H_{01.4}: There is no significant relationship between GOV score and CCC

H_{A1.4}: There is a significant relationship between GOV score and CCC

4.5.2 Hypotheses connecting to WCR

H_{02.1}: There is no significant relationship between ESG score and WCR

H_{A2.1}: There is a significant relationship between ESG score and WCR

H_{02.2}: There is no significant relationship between ENV score and WCR

H_{A2.2}: There is a significant relationship between ENV score and WCR

H_{02.3}: There is no significant relationship between SOC score and WCR

H_{A2.3}: There is a significant relationship between SOC score and WCR

H_{02.4}: There is no significant relationship between GOV score and WCR

H_{A2.4}: There is a significant relationship between GOV score and WCR

Chapter 5

DESCRIPTIVE STATISTICS

In this chapter, the author aims to present descriptive statistics of the dataset starting with summary statistics and correlation statistics, followed by the model diagnostics which test for the OLS assumptions. The chapter concludes with the model specification to identify the final regression models to be applied in the following chapter.

5.1 Summary Statistics

Descriptive statistics are important to gain insight into the dataset besides understanding how the dataset is constructed. To start with the process of descriptive statistics, in this section, the author aims to present the summary of statistics and correlation matrix of the dependent, independent, and control variables included in the theoretical regression model presented in previous chapter.

Table 5.1: Summary Statistics of all variables included in the Regression Models

<i>Variable</i>	<i>Obs</i>	<i>Mean</i>	<i>Std. dev.</i>	<i>Min</i>	<i>Max</i>
<i>Dependent Variables</i>					
CCC	418	97	70.4276	-258	314
WCR	418	0.22496	0.12563	-0.2051	0.7393
<i>Independent Variables</i>					
ESGC	418	62.75	16.3739	17.22	93.71
ENV	418	66.25	20.6998	13.02	97.9
SOC	418	70.76	19.4832	4.42	96.73
GOV	418	61.08	21.7641	11.81	97.27
<i>Control Variables</i>					
Size	418	17.4959	1.1478	13.72893	20.05304
CR	418	1.3799	0.57873	0.17	6.77
Lev	418	0.2517	0.16170	0	1.0781
GPM	418	0.3335	0.17845	-0.3653	0.7981
EBITM	418	0.1005	0.21609	-2.3759	1.0031
MBV	418	2.810	15.3383	-86.41	225.95

Table 5.1 above presents the summary statistics of all the variables included in the theoretical regression model. These statistics are based on balanced panel data comprised of 418 firm-year observations derived from a sample of 38 non-financial firms listed on the Stockholm Stock Exchange (Nasdaq Stockholm) for the period of 11 years from 2010 to 2020. The balanced panel data was gathered to emphasize and ensure an equal number of observations for all the variables

and for that matter, all the companies with incomplete data on any of the study variables were dropped from the sample over the period of analysis.

Analysis of the dependent variables reveals that during the period of analysis, the average (mean) WCR has been 0.22496 (22.496%) of sales, whereas the average (mean) CCC has been 97 (days). The mean value of CCC indicates that Swedish-listed companies take, on average, 97 days to convert their inputs into outputs, in terms of cash. Notably, the minimum value of CCC is -258 (days). This is not surprising to find negative CCC as we noted in the previous chapter, CCC is a composite measure of inventory days, receivable days, and payable days. Many firms desire to achieve negative CCC because a negative CCC is an indicator of working capital efficiency of the firms in that such firms are able to sell their inventories and receive their receivable quickly and pay their payables slowly. This implies that such firms are able to sell their goods and recover their cash from credit customers (debtors) far before they pay to their credit suppliers (creditors), thus resulting in negative CCC. Technically, negative CCC implies that suppliers and vendors are financing firm operations. A comparison of the standard deviations of CCC and WCR indicates that volatility in CCC (70.43) is much higher than volatility in WCR. This comparatively high volatility in CCC can be largely explained by the huge difference in minimum (-258) and maximum (314) values of CCC. Moreover, this large volatility of CCC may also indicate the presence of a large variety of companies in terms of working capital policies. Moreover, the huge gap between the minimum value and maximum value of CCC signals the existence of some extreme values (or outliers) in the dataset. The issue of these extreme values will be dealt with through the method of winsorization, if deemed necessary. Winsorizing can be described as a method in which extreme values (or outliers) are replaced with the closest possible values depending on the winsorizing percent level set by the researcher (Berry et al., 2014, p. 349). However, a far better alternative approach to winsorizing is to apply robust regression because it keeps the original data intact and also makes the original data the basis of analysis.

The result of the combined ESG (ESGC) score reveals quite a large gap between the minimum (17.22, corresponding to Grade D+) and maximum (93.71, corresponding to Grade A+) scores which indicates that companies in the sample vary quite largely in their ESGC performance during the period of analysis. However, the mean ESGC score (62.75, corresponding to B+ Grade) is an indication of most of the companies' better performance on the ESG front¹¹. The same analysis also goes with other independent variables (ENV, SOC, and GOV), however, with exception of the social pillar (SOC), which presents a much better mean performance (70.76) as compared to the other two pillars of ESG as well as the means score of ESGC. The comparison of the volatility (standard deviation) of the independent variables doesn't exhibit worth mentioning differences. The results indicate the highest standard deviation for the governance pillar (21.76) whereas the lowest for the ESGC (16.37).

Descriptive statistics of all the control variables also exhibit huge intervals in their minimum and maximum values especially when we compare these figures with their average (mean) values. Although our study is in line with Barros et al. (2022), we find some differences in descriptive statistics, primarily, for the possible reasons of the difference in the market (US vs Sweden) and data time period (2002-2020 vs 2010-2020). One notable difference we could find in the descriptive statistics of our study and the study conducted by Barros et al. (2022) was in the mean

¹¹ Refer to Appendix A5 for a complete list of ESG score intervals with their corresponding grades.

scores of the ESG and individual pillars of ESG. Comparative analysis reveals much better, on average, sustainability performance of Swedish-listed companies than the US firms.

Table 5.2 below shows the results of the correlation matrix for all the variables of our study prepared using Stata. A simple correlation matrix indicates the strength of individual linear relationships between the variables of the study (Newbold et al., 2020, p. 533-534). While the magnitude of each correlation coefficient indicates the strength of the linear relationship, the sign (plus or minus) indicates the direction of the relationship between the two variables.

Table 5.2: Correlation Matrix

	<i>CCC</i>	<i>WCR</i>	<i>ESGC</i>	<i>ENV</i>	<i>SOC</i>	<i>GOV</i>	<i>Size</i>	<i>CR</i>	<i>Lev</i>	<i>GPM</i>	<i>EBITM</i>	<i>MBV</i>
<i>CCC</i>	1											
<i>WCR</i>	0.7923 ***	1										
<i>ESGC</i>	0.0394	0.0874 *	1									
<i>ENV</i>	-0.0538	-0.0683	0.0193	1								
<i>SOC</i>	-0.0781	-0.0662	-0.0216	0.6044 ***	1							
<i>GOV</i>	-0.0189	-0.0392	0.0176	0.1286 ***	0.2274 ***	1						
<i>Size</i>	0.4307 ***	0.3786 ***	0.2654 ***	0.0638	-0.0246	0.0698	1					
<i>CR</i>	0.3445 ***	0.3599 ***	0.1507 ***	-0.0414	-0.0301	-0.0562	0.1508 ***	1				
<i>Lev</i>	0.0063	-0.0081	-0.0995 **	-0.1038 **	-0.0692	-0.1146 **	-0.0553	-0.2438 ***	1			
<i>GPM</i>	0.3177 ***	0.0294	-0.1071 **	0.0319	0.034	0.0358	-0.0451	-0.0558	0.1601 ***	1		
<i>EBITM</i>	0.1045 **	-0.0582	0.0897 *	-0.0363	-0.0861 *	0.1069 **	0.1159 **	0.1153 **	-0.1289 ***	0.3499 ***	1	
<i>MBV</i>	0.0154	0.0142	0.0381	-0.0573	-0.1103 **	0.0381	-0.0004	-0.0142	-0.0902 *	0.0236	0.0256	1

Significant at * $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$

The asterisk (*) attached to each correlation coefficient shows the significance of that linear relationship at a certain level of significance presented at the bottom of the table. The correlation coefficient without the asterisk(s) indicates the linear relationship between the two variables is insignificant. The correlation matrix of our study reveals that, positive or negative, almost all the variables depict reasonably low correlations, except for a few variables. For instance, a high correlation can be observed between WCR and CCC (0.7923) in the first column. This high correlation is in line with Barros et al., (2022, p. 4) and deemed understandable as both of these figures have been derived from the same common bases (input variables). Analysis of the correlation of CCC (first column) with independent variables (ESGC, ENV, SOC, GOV) also reveals not only weak relationships (0.0394, -0.0538, -0.0781, -0.0189 respectively) but also that the relationships are insignificant. Further analysis of the relationship reveals that except for ESGC, all other independent variables are negatively correlated with CCC. Similarly, the analysis of the correlation between WCR (second column) and independent variables depicts similar kind

of results, except for the relationship between WCR and ESGC (0.0874*), which appears to be significant at the 10% level of significance, nevertheless, the relationship is quite weak. Further analysis reveals that ESGC is positively correlated with CCC and WCR, though, the relationships are not significant.

The analysis of the correlation of the independent variables with each other depicts somewhat similar kind of results that we've drawn from the relationships of CCC and WCR with independent variables. That is, relationships are quite weak. For instance, we find the relationships between ESGC and ENV (0.0193), ESGC and SOC (-0.216), and ESGC and GOV (0.0176) quite weak. One can notice that the SOC pillar of ESG is negatively correlated with ESGC while the other two pillars are positively correlated. On similar grounds, when we compare the correlations of ENV with SOC (0.6044***), ENV with GOV (0.1286***), and SOC with GOV (0.2274***) we find some interesting results. First, the correlations between the individual pillars of ESG are not only positively correlated but are also strongly significant at the 1% level of significance. Second, the correlation between SOC and GOV is almost double the correlation between ENV and GOV pillars of ESG. Third, we observe the highest correlation between the ENV and SOC pillars of ESG, which is also the highest correlation between any two variables in the correlation matrix. Whether this high correlation between ENV and SOC is really high enough to cause a problem of multicollinearity in our model is a matter of serious concern that will be further investigated in the later section. Though, this can be deduced from the correlation analysis that ESGC and its individual pillars (ENV, SOC, and GOV) are not optimal indicators of CCC and WCR of the Swedish-listed companies. However, extreme caution is required before drawing any final conclusion at this stage of analysis because this data reveals only correlations.

Correlation analysis of the control variables reveals that both Size and CR are positively and significantly correlated with CCC and WCR. The analysis also reveals that GPM and EBITM are positively and significantly correlated with CCC (0.3177*** and 0.1045** respectively) whereas their relationship with WCR is not only weak but also insignificant. Further analysis of Lev and MBV reveals a quite weak correlation of these two variables with CCC and WCR. Finally, some of the control variables are negatively correlated, albeit the correlations are quite weak. Since we followed Barros et al., (2022) to conduct our study, we find mixed results of correlations as compared to Barros et al., (2022, p. 4).

5.2 Model Diagnostics

In this section of the chapter, the author aims to address the classical assumptions of the linear regression model listed in the previous chapter. The purpose of these model diagnostics is to ascertain the validity of our regression model, which is pivotal to drawing conclusions regarding the cause-and-effect relationship between our dependent variables and independent variables.

5.2.1 Linearity Test

In the previous chapter, we stated some classical assumptions to estimate the best-fit line for regression models using OLS. The first of these assumptions requires that the regression model must be linear, and correctly specified, and the error term must be additive (Studenmund, 2017, p. 93). There are several ways to satisfy this assumption. For instance, one way is the thorough investigation of the strength of the relationship between all the study variables simultaneously (correlation matrix) and determining if the individual relationships are linear (matrix plots or

scatter plots). We have already presented and analyzed a simple correlation matrix that has already been presented above in Table 5.2. and the individual Scatter Plots (or Matrix Plots) of all the study variables of the regression can be found in Appendix A4.

The second way to satisfy the linearity assumption is to plot the residuals against the fitted values of the regression model under study. The residual can be described as the difference between the observed value and the estimated value of the response variable determined by using the estimated coefficients (Newbold et al., 2020, p. 482). To determine whether model errors are stable over the range of predicted values this is strongly suggested to use residuals against the fitted or the predicted values of the dependent variable. If any specific pattern or relationship between the residuals and the fitted values cannot be discerned, we can conclude that the model errors are stable over the range of predicted values (Newbold et al., 2020, p. 540).

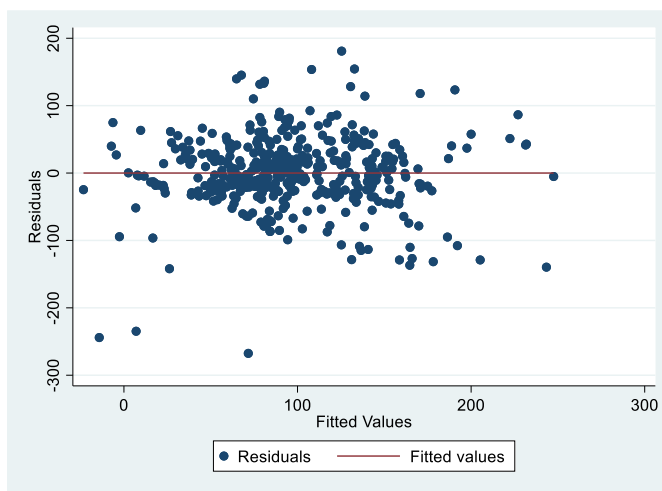


Figure 5.1

Scatterplot of Residuals vs. Fitted values (CCC-ESGC)

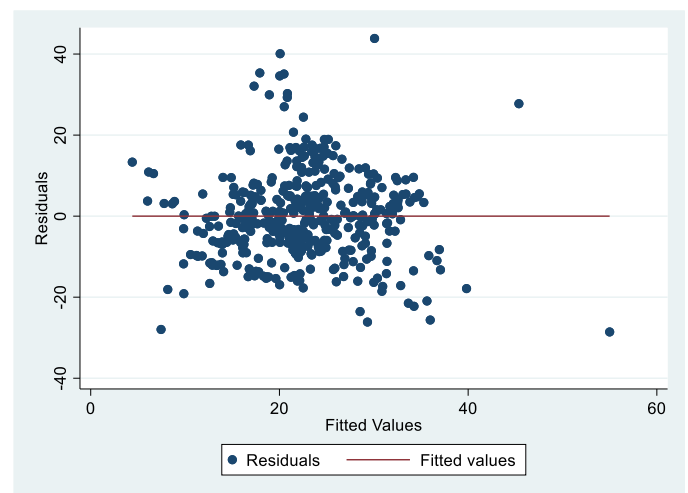


Figure 5.2

Scatterplot of Residuals vs. Fitted values (WCR-ESGC)

We plotted residuals against the fitted values of our response variables CCC and WCR in Figures 5.1 and 5.2 respectively. Figure 5.1 reveals that most of the observations fall around zero and are in the range of -200 to $+300$ except for a few extreme values that fall outside this range. Figure 5.2 further satisfies the linearity assumption. The linearity of each independent variable was also tested against the dependent variables of our regression models and the results indicated the linearity of independent variables with dependent variables. Although the models seem to meet the normality assumption, one may suspect the existence of heteroscedasticity in the dataset as the figures reveal high residual values for the higher fitted values. Whether the issue of heteroscedasticity exists in the dataset will be statistically tested and dealt with accordingly in the later section. Based on the results drawn from our scatterplots and that our models are linearly specified with the stochastic error term added to each equation, the author believes that the first assumption is satisfied¹².

¹² Studenmund (2017, p.193) suggests that one can apply a linear regression model to an equation that has nonlinear variables, however, this is true as long as the model is linear in the coefficients.

5.2.2 Normality Test

This section addresses two classical assumptions (assumptions II and VII) of OLS. Assumption II states that the error term must have a zero population mean and the closely related assumption VII states that the error term is normally distributed. The error term has a zero population mean when the entire population of the possible values for the stochastic error term is accounted for. This property is largely true for the large sample size because, for the small sample size, it is unlikely to have exactly a zero value of the mean. However, if the equation of the small sample size has a constant term, the estimate of the β_0 coefficient absorbs the nonzero mean, and also the estimates of the other coefficients remain unaffected (Studenmund, 2017, p. 94-95). Although assumption VII is considered optional for OLS estimation, it plays a significant role in hypothesis testing and confidence interval because these measures use the estimated regression coefficient. Moreover, this assumption is also important for the true application of the t -statistic and the F -statistic (Studenmund, 2017, p. 99). There are several ways to test if the study models satisfy assumptions II and VII such as the Skewness and Kurtosis test, Shapiro-Wilk test, Summary Statistics of the Residuals, and Histogram of the Residuals to determine if the errors are normally distributed around the mean value.

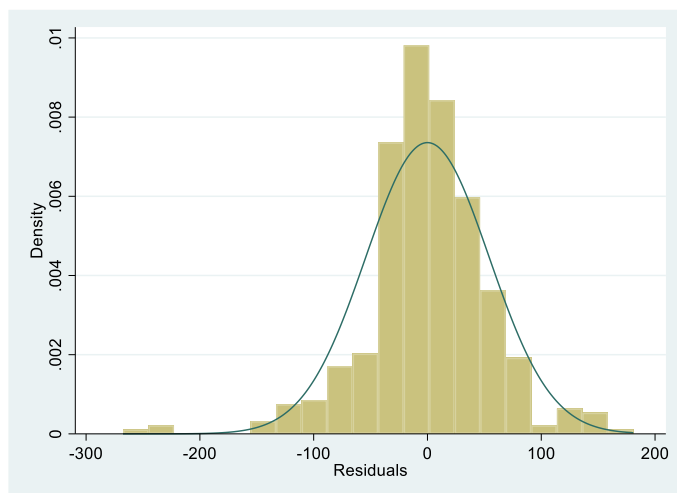


Figure 5.3
Distribution of the Error Term (CCC-ESGC)

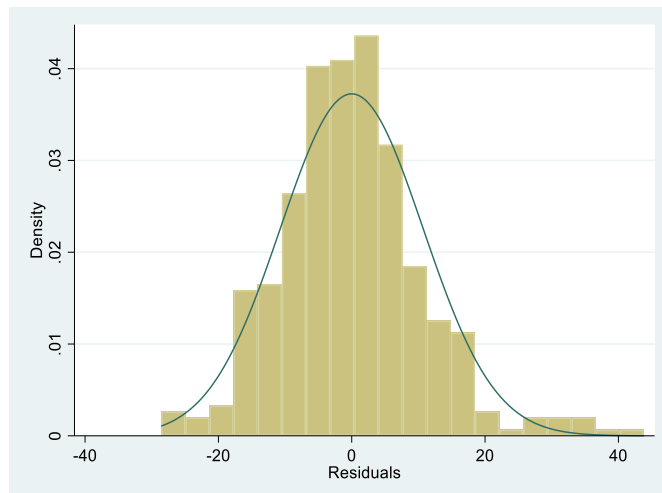


Figure 5.4
Distribution of the Error Term (WCR-ESGC)

To satisfy these assumptions, our approach is to first plot the residuals in a histogram to examine whether the residuals are normally distributed and then examine the summary statistics of the residuals to further confirm our results. Analysis of the histograms with added normal distribution reference lines reveals that the residuals are (not precisely but) approximately normally distributed around mean zero. As mentioned above, since our sample size is not very large, we don't expect the error term to follow a perfectly normal distribution. However, the inclusion of the constant term in our regression model will solve the issue if any deviation from the normality assumption exists. Now, we investigate whether the error term has a zero population mean by examining the descriptive statistics of the error term. The results presented in the tables in Appendix A1 reveal that the mean values of the error terms are very close to zero in all regression models, which is enough to satisfy our assumption II. Based on the results drawn from the histograms and

descriptive statistics of the residual, the author believes that assumptions II and VII are satisfied, therefore, there is no need for further investigations.

5.2.3 Correlation of the Error Term with Explanatory Variables

In this section, we will investigate if our regression models satisfy the third assumption of OLS, which requires all the explanatory variables to be uncorrelated with the error term. This assumption is equally important to satisfy because if the explanatory variable and the error term are found to be correlated then variation in the dependent variable that actually came from the error term would likely be attributed to the explanatory variable. Not only this but the correlation would also bias the estimation of the coefficient. This assumption is mostly violated when an important explanatory variable is omitted from the model (Studenmund, 2017, p. 95-96). Since the study variables are in line with Barros et al. (2022), the author believes that all the important variables have been included in the regression models of the study. Tables in Appendix A2 indicate the results that correlations (plus or minus) between the residuals and the explanatory variables are zero (or very close to zero in some cases), which allows the author to assume no relationship between the error term and explanatory variables and, hence, assume that assumption III is satisfied overall.

5.2.4 Autocorrelation Test

Classical assumption IV of the OLS states that observations of the error term should be uncorrelated with each other, that is, there should not be a serial correlation (Studenmund, 2017, p. 93). In other words, the error term at time t should be uncorrelated with the error term at a time $(t - 1)$ or any other error term in the past (Gujrati, 2015, p. 113). The underlying concept of serial correlation, also known as autocorrelation, implies that the value of the error term from one time period depends in some systematic way on the value of the error term in other time periods, therefore, it is mostly a concern of time series data (Studenmund, 2017, p. 93¹³). Serial correlation may exist in different forms such as pure serial correlation, impure serial correlation, first-order serial correlation, positive serial correlation, and negative serial correlation.

Though in the presence of serial correlation, the OLS coefficient estimates still remain unbiased and normally distributed (in large sample size), they don't remain efficient anymore. That is, they are no longer BLUE (best linear unbiased estimator). Moreover, serial correlation causes the OLS estimates of the standard errors of the coefficients to be biased, which makes hypothesis testing unreliable and skeptical. More precisely, it causes underestimation of standard errors of the coefficients and inflated estimated t-values, which makes coefficients appear more significant than their actual level (Gujrati, 2015, p. 113; Studenmund, 2017, p. 282). There are several ways that researchers can apply to detect serial correlation, however, the most commonly used are the graphical method, the Durbin-Watson test, Lagrange Multiplier (LM) test, and Breusch–Godfrey test (Gujrati, 2015, p. 115; Studenmund, 2017, p. 282-292). These tests are most commonly used to test for autocorrelation in the time series data. Since we have panel data, none of these tests is applicable, therefore, we have decided to run the Wooldridge test, which is mostly used to test for autocorrelation in the panel data. The null hypothesis of the test states that there is no first serial autocorrelation.

¹³ For further details, refer to Studenmund (2017, p. 275-281).

Table 5.3: Wooldridge Test for Autocorrelation in Panel Data

<i>H₀: No first-order autocorrelation</i>	
CCC – ESGC	WCR – ESGC
F (1, 37) = 30.602	F (1, 37) = 6.212
Prob > F = 0.0000	Prob > F = 0.0173

The test results presented in Table 5.3 are significant, therefore, we reject the null hypothesis and conclude serial correlation in our panel dataset. Since assumption (IV) is violated, OLS is no longer the efficient method of estimating coefficients. One of the remedial measures is to use GLS, however, based on certain statistical tests, we will find out the most suitable panel data regression model for our study later in section 6.3.

5.2.5 Heteroscedasticity Test

The classical assumption (V) of OLS assumes that the error term in the regression model has equal variance (homoscedasticity) across observations (Gujrati, 2015, p. 96). The violation of this assumption is known as heteroskedasticity. Although this assumption of homoskedasticity is not always realistic, it is important to satisfy because the presence of heteroskedasticity makes the least square an inefficient procedure for estimating the regression model's coefficients and also results in the biased (downward or upward) estimation of the OLS standard errors which makes the confidence intervals and hypothesis tests' procedures unreliable and invalid for these coefficients (Studenmund, 2017, p. 306, 312-313). Moreover, the presence of heteroskedasticity affects the minimum-variance property in that the OLS no longer remains the minimum variance estimator (of all the linear unbiased estimators). There are two versions of heteroskedasticity (pure and impure) and this is equally important to detect which form of heteroskedasticity exists in the model because each of these forms has certain consequences. Notably, the cause of pure heteroskedasticity is the error term of the correctly specified equation whereas the cause of impure heteroskedasticity is the specification error such as an omitted variable (Studenmund, 2017, p. 307).

One can always apply statistical tests for detecting heteroskedasticity in the model, however, before conducting any such tests, a good starting point is to perform some of the preliminary investigations. For instance, initially, the researcher can investigate the model specification errors by determining if there are no omitted variables. The researcher can then investigate any early warning signs of heteroskedasticity, for instance, by examining the range between minimum and maximum values of the dependent variable. If the range is too high then the researcher has to beware of heteroskedasticity. The researcher can also detect heteroskedasticity by plotting the residuals against a potential Z proportionality factor or against the dependent variable (Studenmund, 2017, p. 314-316). We have already plotted residuals against the fitted values (see figures 6.1–6.2) while conducting the linearity test and the graphical view indicates some signs of heteroscedasticity. Although the graphical view, as well as the too-high range between minimum and maximum values of dependent variables, indicate the signs of heteroscedasticity, the author has decided to test it statistically by performing Breusch-Pagan/Cook-Weisberg test for heteroskedasticity. The null hypothesis of the heteroscedasticity test such as the Breusch-Pagan/Cook-Weisberg test suggests that error terms are normal (constant variance,

homoscedasticity). We will reject the null hypothesis if the p-value is less than a 5% level of significance.

Table 5.4: Breusch-Pagan/Cook-Weisberg Test for Heteroscedasticity

Null Hypothesis, H_0 : Constant variance	
<i>CCC – ESGC</i>	<i>WCR – ESGC</i>
chi2(7) = 149.13	chi2(7) = 53.51
Prob > chi2 = 0.0000	Prob > chi2 = 0.0000

Since the results are significant, we reject the null hypothesis in Table 5.4. The results strongly confirm the presence of heteroskedasticity, which means assumption V is violated. There are several ways to encounter the problem of heteroscedasticity, the author has decided to include robust standard error terms in the models as this is one of the most popular remedies to deal with heteroskedasticity.

5.2.6 Multicollinearity Test

In this section, we intend to test that no independent variable of our model is in a perfect linear functional relationship with any other independent variable(s) of the model. That is there is no perfect multicollinearity (assumption VI, Studenmund, 2017, p. 221). Notably, this linear relationship between the independent variables is measured on relative terms (but not on absolute terms) and multicollinearity may exist in form of perfect multicollinearity or imperfect multicollinearity. When *perfect* multicollinearity exists in the dataset that means variation in an explanatory variable is *completely* explained by the movement in another explanatory variable(s). Also, note that *perfect collinearity* occurs when two explanatory variables measure exactly the same phenomenon (or when one is the multiple of the other) whereas *imperfect multicollinearity* occurs when more than two independent variables are involved. The presence of perfect collinearity or perfect multicollinearity makes the OLS program incapable of estimating the coefficients accurately and distinguishing the effects of one explanatory variable from the effects of the other explanatory variable(s). To deal with this problem, an easy remedy is to drop the variable from the equation that suffers from collinearity (Studenmund, 2017, p. 221-222).

Unlike perfect multicollinearity, the occurrence of imperfect multicollinearity is somewhat more common and may result in serious problems. In the presence of severe imperfect multicollinearity, the linear functional relationship between two or more explanatory variables is so strong that the estimation of the coefficients is significantly affected (Studenmund, 2017, p. 224). There are a variety of tests to detect multicollinearity but most of these are informal without critical values or levels of significance. There are two most common ways to detect multicollinearity. First, examine the simple correlation coefficients of the explanatory variables, and second run the VIF (Variance Inflation Factor) test for independent variables (Studenmund, 2017, p. 232). Since the existence of multicollinearity may cause serious estimation problems¹⁴, we'll perform both analytical tools to make sure that our models are free of the multicollinearity problem. First, we examined the correlation coefficients of the explanatory variables (given in table 6.2) and found no strong correlation between any two independent variables except for the SOC and ENV variables, which

¹⁴ To study more about major consequences of multicollinearity, refer to Studenmund (2017, p. 226).

indicated a slightly high correlation (0.6044). This seemingly high correlation between SOC and ENV doesn't seem to add any risk of multicollinearity in our models as these two variables are definitionally different. However, we consider this important to investigate this further through the VIF test.

The VIF is a technique that detects the severity of the multicollinearity by examining the extent to which an independent variable can be explained by all the other independent variables in the regression model of the study. In this technique, VIF is calculated for each independent variable, which serves as an index to indicate how much variance of an estimated coefficient has increased by multicollinearity. A higher VIF means a higher effect of multicollinearity on the estimated coefficient's estimated variance. Since there are formal critical values of VIF, a common rule of thumb of VIF (β_i) > 5 serves as an indication of severe multicollinearity (Studenmund, 2017, p. 233-234). The test results of VIF (Variance Inflation Factor) for independent variables of our regression models are presented in Appendix A3. We can see that VIFs of all the independent variables are far below 5, which means we don't have multicollinearity in our models. Thus, we believe that assumption VI is satisfied.

5.3 Model Specification

In the previous sections, we addressed the classical assumptions of OLS and now, in this section, we will examine which of the regression models (such as pooled OLS, random effect, or fixed effect) is the best fit for our data. The specification of the pertinent model(s) is pivotal for the unbiased estimation of coefficients and their significance (or insignificance), and reliable and valid hypothesis testing. To start with the process, first, we will examine whether pooled OLS or the panel effects model such as Random Effect GLS (Generalized Least Square) model is the best fit for our dataset, and for that purpose, we will conduct a Breusch-Pagan Lagrange multiplier test for the random effects. The test assumes that the variation across entities is random and uncorrelated with the model's independent variables (Torres-Reyna, 2007, p. 39). The null hypothesis suggests no random effects, that is, the variance across entities is zero (Torres-Reyna, 2007, p. 47). If we fail to reject the null hypothesis, we conclude that the random effect GLS model is more appropriate to use than the pooled OLS.

Table 5.5: Breusch-Pagan Lagrange Multiplier Test for Random Effects

Null Hypothesis, $\text{Var}(u) = 0$	
<i>CCC – ESGC</i>	<i>WCR – ESGC</i>
$\text{chibar2}(01) = 807.77$	$\text{chibar2}(01) = 914.80$
Prob > $\text{chibar2} = 0.0000$	Prob > $\text{chibar2} = 0.0000$

Based on the test results in Table 5.5, we reject the null hypothesis at 1% level of significance, which strongly suggests that the Pooled OLS model is not the best estimation method in our case. Therefore, we decided not to proceed with the Pooled OLS model in our study and find out the most pertinent panel effects model such as the fixed effects and random effects models.

As mentioned above, when it comes to finding the most suitable panel data (or panel effects) model, we come across two competing alternative models: fixed effects and random effects.

Verbeek (2017, p. 394), argues that deciding between fixed effect and random effect is not easy and that it makes a significant difference in the estimates for β , in particular when T is small. Fortunately, we can use the Hausman test to decide which of the two models best fits our regression models. The Hausman specification test is used by many researchers to test the statistical difference between the regression coefficients estimated under the fixed effects and random effects models. If the difference is found to be significant, the fixed effects model is preferred to use, otherwise, it is suggested to use either use the random effects model or provide estimates of both models (Studenmund, 2017, p. 484). The null hypothesis of the Hausman test states that the difference in coefficients is not systematic and suggests that the random effect is the most efficient estimation method.

Table 5.6: Hausman Specification Test

<i>Null Hypothesis, H_0: Difference in coefficients is not systematic</i>		
<i>Hausman Test</i>	<i>CCC – ESGC</i>	<i>WCR – ESGC</i>
chi2(7)	37.52	5.76
Prob > chi2	0.0000	0.5682
Model Selection	Fixed Effects	Random Effects

The results in Table 5.6 indicate that the fixed effects model is appropriate for both regression models of our study in which CCC is our dependent variable as the null hypothesis is rejected at the 5% level of significance. However, in our regression models in which WCR is the dependent variable, we fail to reject the null hypothesis at the 5% level of significance, which means the difference in coefficients is not systematic, therefore, the random effects model is the most efficient method of estimation in this case. Since we have already noticed in previous sections that our models suffer from autocorrelation and heteroskedasticity, which should be corrected in order for estimating unbiased standard errors. One way to fix these problems is to use *clustered robust standard errors*, which are already embedded in Stata and are reported automatically when we use *robust* commands for fixed effects and random effects estimations. The second approach to deal with autocorrelation and heteroskedasticity is to use *Driscoll-Kraay standard errors*. However, this technique is more suitable when there is cross-sectional dependence in the model (Hoechle, 2007, p. 286). We performed a CD test (not formally reported) to test for cross-sectional dependence in our models. We failed to reject the null hypothesis at a 5% level of significance, which means we didn't find cross-section dependence in our models. Therefore, the author has decided not to use *Driscoll-Kraay standard errors* and use clustered robust standard errors instead to solve both autocorrelation and heteroskedasticity problems in our models.

5.4 Final Regression Models

To identify and examine the relationship between corporate sustainability and WCM of Swedish-listed companies, eight regression models were developed in Chapter 05 (section 5.4.4). Since there are two dependent variables, CCC and WCR, in our study, the Hausman specification test was conducted in the previous section to specify the most suitable regression models for each of the dependent variables. First, for each of the independent variables, we ran the initial regression models specified above with respect to CCC and WCR by including all the control variables in each regression model. Two control variables, Lev and MBV, were found to be highly insignificant (with p-values above 0.60) in those initial regression models. Then the author decided to run

different combinations of control variables with the main independent variables in an attempt to find the best-fit models. In this trial-and-error process, the author observed when the control variable *Lev* is dropped from the regression models, not only did the p-value of MBV plummet but the p-values of other variables too. The surprising part was that dropping *Lev* did not affect the overall R-squared value in all regression models. In fact, in some cases, the R-squared value improved slightly. The results of regression models excluding *Lev* were statistical evidence that allowed the author to drop *Lev* from the list of control variables and run all the regression models without including *Lev* in the regression models. To reiterate, rest of the study variables and regression model specifications are precisely in line with Barros et al. (2022). The revised and final regression equations used for the study are presented below:

Regression models with respect to CCC

$$CCC_{i,t} = \beta_0 + \beta_1 ESGC_{i,t} + \beta_2 Size_{i,t} + \beta_3 CR_{i,t} + \beta_4 GPM_{i,t} + \beta_7 MBV_{i,t} + \beta_5 EBITM_{i,t} + \varepsilon_{i,t}$$

$$CCC_{i,t} = \beta_0 + \beta_1 ENV_{i,t} + \beta_2 Size_{i,t} + \beta_3 CR_{i,t} + \beta_4 GPM_{i,t} + \beta_7 MBV_{i,t} + \beta_5 EBITM_{i,t} + \varepsilon_{i,t}$$

$$CCC_{i,t} = \beta_0 + \beta_1 SOC_{i,t} + \beta_2 Size_{i,t} + \beta_3 CR_{i,t} + \beta_4 GPM_{i,t} + \beta_7 MBV_{i,t} + \beta_5 EBITM_{i,t} + \varepsilon_{i,t}$$

$$CCC_{i,t} = \beta_0 + \beta_1 GOV_{i,t} + \beta_2 Size_{i,t} + \beta_3 CR_{i,t} + \beta_4 GPM_{i,t} + \beta_7 MBV_{i,t} + \beta_5 EBITM_{i,t} + \varepsilon_{i,t}$$

Regression models with respect to WCR

$$WCR_{i,t} = \beta_0 + \beta_1 ESGC_{i,t} + \beta_2 Size_{i,t} + \beta_3 CR_{i,t} + \beta_4 GPM_{i,t} + \beta_7 MBV_{i,t} + \beta_5 EBITM_{i,t} + \varepsilon_{i,t}$$

$$WCR_{i,t} = \beta_0 + \beta_1 ENV_{i,t} + \beta_2 Size_{i,t} + \beta_3 CR_{i,t} + \beta_4 GPM_{i,t} + \beta_7 MBV_{i,t} + \beta_5 EBITM_{i,t} + \varepsilon_{i,t}$$

$$WCR_{i,t} = \beta_0 + \beta_1 SOC_{i,t} + \beta_2 Size_{i,t} + \beta_3 CR_{i,t} + \beta_4 GPM_{i,t} + \beta_7 MBV_{i,t} + \beta_5 EBITM_{i,t} + \varepsilon_{i,t}$$

$$WCR_{i,t} = \beta_0 + \beta_1 GOV_{i,t} + \beta_2 Size_{i,t} + \beta_3 CR_{i,t} + \beta_4 GPM_{i,t} + \beta_7 MBV_{i,t} + \beta_5 EBITM_{i,t} + \varepsilon_{i,t}$$

Dependent Variables

CCC = Cash Conversion Cycle

WCR = Working Capital Requirements

Independent Variables

ESGC = ESG Combined Score

ENV = Environmental Pillar Score

SOC = Social Pillar Score

GOV = Governance Pillar Score

Control Variables

Size = Firm Size

CR = Current Ratio

GPM = Gross Profit Margin

EBITM = EBIT Margin

MBV = Market-to-Book Value ratio

ε = Epsilon represents residual

Chapter 6

EMPIRICAL RESULTS

This part of the thesis starts with a few comments on regression models and hypothesis testing to be followed in this chapter. Thereafter, the empirical results derived from the regression models and hypothesis tests will be presented. The chapter will conclude with a summary of the results from the hypotheses tests performed in this chapter.

6.1 Regression Models & Hypotheses Testing

We know from Chapter 1; the main purpose of the study is to examine the relationship between corporate sustainability and WCM of Swedish-listed companies. To meet the purpose of the study and to find statistical evidence to answer the research question raised in Chapter 1, eight hypotheses were established in Chapter 5. In this chapter, we will test those hypotheses by running a regression model corresponding to each hypothesis and draw conclusions on the statistical significance of the relationships. In the previous chapter, we performed certain tests to specify pertinent regression models for our study. Since we have two dependent variables (CCC and WCR), it was necessary to specify the most suitable regression model for each dependent variable to establish valid and reliable statistically significant relationships. As explained in the previous chapter, we will run OLS Robust Fixed Effects models for CCC and GLS Robust Random Effects models for WCR to test their relationships with independent variables.

This is important to note that for the R-squared, which ranges from 0 to 1 and measures the explanatory power of independent variables included in the regression model, we will follow the *rule of thumb* ($R^2 < 0.1$:poor fit, $R^2 = 0.11-0.3$:modest fit, $R^2 = 0.31-0.5$: moderate fit, and $R^2 > 0.5$:strong fit) suggested by Muijs (2022, p. 132). Moreover, nevertheless, the generally accepted criterion to determine the significance of a variable or a model is 5% (or p-value< 5%), we will consider a variable or a model significant if the p-value falls below either 1%, 5%, or 10% (denoted by ***, **, and *, respectively). Furthermore, we will interpret only those coefficients which are proven significant. Finally, the results presented in this chapter are based on our final regression models, meaning that there are no further changes expected in our models.

6.2 Empirical Results: ESG and Cash Conversion Cycle

In the sub-sections of this section, we will run four *Robust Fixed Effects* regression models connecting to our first dependent variable, CCC, to test four hypotheses aimed at establishing the relationship of CCC with ESG and each of its three pillars (Environmental, Social, and Governance).

6.2.1 The CCC and the ESGC Score

In this subsection, we aim to run the first regression model to test our first null hypothesis on the significance of the relationship between CCC and ESGC score. The overall results presented in Table 6.1 reveal that except for CR, all the variables are insignificant as indicated by their p-values which are quite higher than the significance levels acceptable in this study. Our main independent variable, ESGC, is also found to be insignificant. Therefore, we cannot reject the null hypothesis and conclude that CCC has no statistically significant linear dependence on ESGC. CR is observed

Table 6.1: OLS Robust Fixed Effects Regression Model – CCC & ESGC

Robust Fixed Effects Regression Model				
CCC	Coefficients	Robust Std. Err.	t	P> t
ESGC	0.132571	0.194002	0.680	0.499
Size	5.832200	13.96530	0.420	0.679
CR	11.34679	5.490641	2.070**	0.046**
GPM	0.405625	0.298663	1.360	0.183
MBV	-0.022025	0.018661	-1.180	0.245
EBITM	-0.391385	0.347034	-1.130	0.267
_cons	-38.89577	234.83450	-0.170	0.869
R-squared (overall) = 0.2812 Prob > F = 0.0235, F (7,37) = 2.81 H _{01.1} : There is no significant relationship between CCC and ESGC score				

Significant at * $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$

to be the only variable significant at the 5% level and its coefficient reads that for each increase of 1 unit of CR, CCC will increase, on average, by 11.41 units (days), ceteris paribus (keeping other factors constant). The coefficients of MBV and EBITM indicate their negative relationship with CCC, however, insignificant as can be seen from their p-values. The constant term is also observed as negative and insignificant even at the 10% level. The R-squared indicates that this model is a modest fit and that it explains 28.12% of the variability in CCC. The model is observed to be a good fit as indicated by F-statistics.

6.2.2 The CCC and the Environmental Score

The second regression model is run in this subsection to test our second null hypothesis to examine the significance of the relationship between CCC and the environmental score (ENV). The p-value

Table 6.2: OLS Robust Fixed Effects Regression Model – CCC & ENV

Robust Fixed Effects Regression Model				
CCC	Coefficients	Robust Std. Err.	t	P> t
ENV	0.016599	0.089022	0.190	0.853
Size	7.157938	13.63034	0.530	0.603
CR	11.578150	5.570790	2.080**	0.045**
GPM	0.400832	0.29404	1.360	0.181
MBV	-0.021848	0.022007	-0.990	0.327
EBITM	-0.393356	0.347163	-1.130	0.264
_cons	-55.011500	230.0309	-0.240	0.812
R-squared (overall) = 0.3042 Prob > F = 0.0449, F (7,37) = 2.42 H _{01.2} : There is no significant relationship between CCC and ENV score				

Significant at * $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$

of ENV score in Table 6.2 indicates that we fail to reject our second null hypothesis at 10% level of significance and conclude that no statistically significant relationship between the ENV score and CCC is observed. Note that the coefficient of ENV is positive and much less in magnitude than ESGC meaning the ENV score has a far less mean effect on CCC as compared to ESGC. CR is again observed to be the only variable significant at the 5% level and its impact on CCC can be interpreted in the same way as we did in the previous section. Other than CR, none of the control variables again is observed to be significant at any acceptable significance levels. The constant term is again observed as negative and insignificant. Both MBV and EBITM are again found to have a negative and insignificant relationship with CCC. The R-squared indicates the explanatory power of the model is 30.42% and that the model is a moderate fit. The F-statistics indicate the model is a good fit.

6.2.3 The CCC and the Social Score

The coefficient of the SOC score in Table 6.3 indicates a negative relationship between the social pillar and CCC, however, the relationship is found highly insignificant. Therefore, we conclude that our second null hypothesis stating that the ENV has no significant relationship with CCC cannot be rejected. That is, we could not find evidence of statistical dependence of CCC on ENV score. CR is again significant at the 5% level. Though the p-value of Size is observed to be less than in the previous two models, it is still the highest insignificant variable in the model, second only to the SOC score. MBV and EBITM again indicate a negative and insignificant relationship with CCC. The model is a moderate fit, and it explains 30.95% of the variation in CCC as indicated by its R-squared. F-statistics reveal the model is a good fit.

Table 6.3: OLS Robust Fixed Effects Regression Model – CCC & SOC

Robust Fixed Effects Regression Model				
CCC	Coefficients	Robust Std. Err.	t	P> t
SOC	-0.009938	0.075854	-0.130	0.896
Size	7.219939	13.32075	0.540	0.591
CR	11.52695	5.530035	2.080**	0.044**
GPM	0.405958	0.294788	1.380	0.177
MBV	-0.024259	0.025330	-0.960	0.344
EBITM	-0.394712	0.345288	-1.140	0.260
_cons	-54.37341	226.5749	-0.240	0.812
R-squared (overall) = 0.3095				
Prob > F = 0.0585, F (7,37) = 2.26				
H _{01.3} : There is no significant relationship between CCC and SOC score				

*Significant at *p<10%, **p<5%, ***p<1%*

6.2.4 The CCC and the Governance Score

In this subsection, we run our last regression model connecting to CCC. The results presented in Table 6.4 indicate that the governance (GOV) score is also found highly insignificant, hence we failed to reject our fourth null hypothesis and conclude there is no significant relationship between CCC and the governance (GOV) score. Although insignificant, the GOV score (0.0794) also has

a negative association with CCC. Notably, in this model also, the only variable significant at a 5% level is CR. We find Size again the highest of all insignificant variables. Again, MBV and EBITM display a negative association with CCC. The R-squared indicates that the model is a modest fit and it explains 29.67% of the variability observed in CCC. The model is the best fit and strongly significant at the 1% level as indicated by the F-statistics.

Table 6.4: OLS Robust Fixed Effects Regression Model – CCC & GOV

Robust Fixed Effects Regression Model				
CCC	Coefficients	Robust Std. Err.	T	P> t
GOV	-0.079406	0.102907	-0.770	0.445
Size	6.672586	13.83515	0.480	0.632
CR	10.99076	5.423293	2.030**	0.050**
GPM	0.385469	0.284378	1.360	0.183
MBV	-0.019321	0.020580	-0.940	0.354
EBITM	-0.381384	0.347869	-1.100	0.280
_cons	-39.37449	243.0850	-0.160	0.872
R-squared (overall) = 0.2967				
Prob > F = 0.0063, F (7,37) = 3.62				
H _{01.4} : There is no significant relationship between CCC and GOV score				

*Significant at *p<10%, **p<5%, ***p<1%*

6.3 Empirical Results: ESG and Working Capital Requirements

In the subsection, we will run four *Robust Random Effects* regression models connecting to our second dependent variable, WCR, to test four hypotheses aimed at establishing the relationship of WCR with ESG and of each of its three pillars (Environmental, Social, and Governance).

6.3.1 The WCR and the ESGC Score

Our first regression model is aimed at testing our first null hypothesis, H_{02.1}: There is no significant relationship between WCR and the ESGC score. Table 6.5 reveals that ESGC has a negative relationship with WCR, however, the relationship is not statistically significant as evidenced by its high p-value. Thus, our first null hypothesis cannot be rejected. The results in Table 7.3.1 show MBV as the only control variable that does not appear significant based on its p-value (0.209). Moreover, except for Size which is significant at a 1% level, all the other control variables (CR, GPM, and EBITM) are significant at the 5% level. Furthermore, from the analysis of coefficients, we observe that each unit increase in Size will cause, on average, an increase of 3.31 units (%) in WCR, ceteris paribus. Similarly, each unit increase in CR will lead to, on average, an increase of 3.33 units (%) in WCR, ceteris paribus. On similar grounds, for each increase of GPM unit (%), WCR will increase, on average, by 0.1378 units (%). Since the coefficient of EBITM (-0.1378) is negative, it will have a negative effect on WCR in that for every one unit (%) increase in EBITM, the WCR will decrease, on average, by 0.1378 units (%), ceteris paribus. The R-squared value of the model is a little less as compared to the models presented in the previous sections. One of the reasons might be a difference in approach to estimating the regression models. Nevertheless, the value of R-squared indicates that the model is a modest fit and that it explains 23.38% of the total

variation in WCR. The Wald test measures the goodness of fit of the regression model in GLS, as does the F-test in OLS. The p-value of the Wald test indicates that the model is a good fit.

Table 6.5: GLS Robust Random Effects Regression Model – WCR & ESGC

Robust Fixed Effects Regression Model				
WCR	Coefficients	Robust Std. Err.	z	P> z
ESGC	-0.015729	0.039940	-0.390	0.694
Size	3.319296	1.073437	3.090***	0.002***
CR	3.333633	1.540823	2.160**	0.030**
GPM	0.098784	0.049052	2.010**	0.044**
MBV	0.012468	0.009914	1.260	0.209
EBITM	-0.137848	0.069579	-1.980**	0.048**
_cons	-41.13569	17.41424	-2.360	0.018**
R-squared (overall) = 0.2338 Prob > chi2 = 0.0001, Wald chi2 (6) = 27.05 H _{02.1} : There is no significant relationship between WCR and ESGC score				

Significant at * $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$

6.3.2 The WCR and the ENV Score

From the results of our second model presented in Table 6.6, one can see that the p-value for the ENV (0.077) score is below the 10% level of significance, thus, our second null hypothesis can be rejected and that a significant relationship between the WCR and ENV exists can be confirmed. The environmental pillar is negatively associated with WCR which indicates that for each unit (score) increase in ENV, the WCR will decrease, on average, by 0.01572 units (%), ceteris paribus. One can observe in the table that except for MBV, all the other control variables are significant at

Table 6.6: GLS Robust Random Effects Regression Model – WCR & ENV

Robust Fixed Effects Regression Model				
WCR	Coefficients	Robust Std. Err.	z	P> z
ENV	-0.024146	0.013659	-1.770	0.077*
Size	3.287309	1.047354	3.140	0.002***
CR	3.283160	1.542792	2.130	0.033**
GPM	0.104880	0.046649	2.250	0.025**
MBV	0.011014	0.010552	1.040	0.297
EBITM	-0.138585	0.069451	-2.000	0.046**
_cons	-40.08570	17.20638	-2.330	0.020**
R-squared (overall) = 0.2403 Prob > chi2 = 0.0000, Wald chi2 (6) = 33.88 H _{02.2} : There is no significant relationship between WCR and ENV score				

Significant at * $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$

The 5% level while Size is significant at the 1% level. MBV again appears to be highly insignificant. As the variables Size, CR, GPM, and EBITM were also observed as significant in the previous model, their impact on CCC can be interpreted the same way as we did in the previous section. The R-squared indicates that the model is a modest fit and that it explains 24.03% of the total variation in WCR. The model is a good fit as evidenced by the Wald test.

6.3.3 The WCR and the SOC Score

In our third regression model, we intend to test our third null hypothesis, $H_{02.3}$: There is no significant relationship between WCR and the SOC score. This is evident from Table 6.7 that the social (SOC) pillar of ESG is significant at the 10% level, thus, the null hypothesis can be rejected, and we can confirm that a statistically significant relationship exists between the WCR and the SOC score. Similar to ESGC and the ENV, the social score (SOC) is also negatively related to WCR as indicated by its coefficient value of -0.0243, which means that every one unit (score) increase in SOC will lead to a decrease, on average, of 0.0243 units (%) in WCR, ceteris paribus. Further analysis reveals that excluding MBV, all the control variables are significant at the 5% level except Size which is significant at the 1% level. MBV is again highly insignificant. All the significant variables can be interpreted in similar ways as in section 7.3.1. The R-squared is observed in the range of the previous two models, indicating the model is a modest fit and its explanatory power is 23.03%. One can see from the Wald test results, the model is a good fit.

Table 6.7: GLS Robust Random Effects Regression Model – WCR & SOC

Robust Fixed Effects Regression Model				
WCR	Coefficients	Robust Std. Err.	z	P> z
SOC	-0.024384	0.014768	-1.650	0.099*
Size	3.167975	1.025649	3.090	0.002***
CR	3.249417	1.560534	2.080	0.037**
GPM	0.100271	0.048301	2.080	0.038**
MBV	0.009221	0.009927	0.930	0.353
EBITM	-0.138906	0.069185	-2.010	0.045**
_cons	-37.663510	17.25915	-2.180	0.029**
R-squared (overall) = 0.2374				
Prob > chi2 = 0.0000, Wald chi2 (6) = 30.42				
$H_{02.3}$: There is no significant relationship between WCR and SOC score				

Significant at * $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$

6.3.4 The WCR and the GOV Score

In this subsection, we'll run our last regression model connecting to WCR to test our last null hypothesis, $H_{02.4}$: There is no significant relationship between WCR and the GOV score. The results reported in Table 6.8 show the p-value of the GOV score is 0.439, which is higher than the 10% level of significance. This means we failed to reject our null hypotheses and conclude that we do not find statistical evidence of a significant relationship between the governance (GOV) pillar and the WCR. The control variables reveal more or less the same results and significance as we detected in our previous three models connecting to WCR. MBV is again observed as negative

and insignificant. This means that control variables Size, CR, and GPM have a positive mean effect whereas EBITM has a negative mean effect in predicting the estimated mean value of WCR. In other words, these significant control variables together with the significant independent variables have the ability to influence, explain variation in, and predict the value of WCR. The value of the R-squared and the p-value of the Wald test showed results quite similar to the previous models.

Table 6.8: GLS Robust Random Effects Regression Model – WCR & GOV

Robust Fixed Effects Regression Model				
WCR	Coefficients	Robust Std. Err.	z	P> z
GOV	-0.014530	0.018764	-0.770	0.439
Size	3.143348	1.070560	2.940	0.003***
CR	3.218061	1.569864	2.050	0.040**
GPM	0.096524	0.047151	2.050	0.041**
MBV	0.013250	0.010413	1.270	0.203
EBITM	-0.135349	0.069468	-1.950	0.051*
_cons	-37.949260	18.72068	-2.030	0.043**
R-squared (overall) = 0.2340				
Prob > chi2 = 0.0000, Wald chi2 (6) = 39.36				
H _{02.4} : There is no significant relationship between WCR and GOV score				

Significant at * $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$

6.4 Summary Results of Hypotheses Testing

Table 7.1 presents the summary of the hypotheses and their respective results drawn from statistical hypotheses testing. The summary results also indicate the decisions related to the rejection or failure to rejection of each of the *null hypotheses* based on their respective level of significance. The table reveals that we failed to reject six out of eight null hypotheses.

Table 6.9: The Summary Results of Hypotheses Testing

The Summary Results of Hypotheses Testing			
<i>The hypothesis related to CCC</i>	<i>Result</i>	<i>t-value</i>	<i>p-value</i>
H _{01.1} : There is no significant relationship between CCC and ESGC score	Failed to Reject	0.680	0.499
H _{01.2} : There is no significant relationship between CCC and the Environmental Score	Failed to Reject	0.190	0.853
H _{01.3} : There is no significant relationship between CCC and the Social Score	Failed to Reject	-0.130	0.896
H _{01.4} : There is no significant relationship between CCC and the Governance Score	Failed to Reject	-0.770	0.445

<i>The hypothesis related to WCR</i>	<i>Result</i>	<i>z-value</i>	<i>p-value</i>
H _{02.1} : There is no significant relationship between WCR and ESGC score	Failed to Reject	-0.390	0.694
H _{02.2} : There is no significant relationship between WCR and the Environmental Score	<i>Rejected*</i>	<i>-1.770*</i>	<i>0.077*</i>
H _{02.3} : There is no significant relationship between WCR and the Social Score	<i>Rejected*</i>	<i>-1.650*</i>	<i>0.099*</i>
H _{02.4} : There is no significant relationship between WCR and the Governance Score	Failed to Reject	-0.770	0.439

*Significant at *p<10%, **p<5%, ***p<1%*

Chapter 7

ANALYSIS AND DISCUSSION

In this chapter, the author will analyze the empirical results derived from the regression models in the preceding chapter in connection with previous studies to be followed by the discussion on analysis in light of the theories selected for the study.

7.1 Preliminary Notes

The primary purpose of this study is to assess the significance of the relationship between corporate sustainability and the WCM of Swedish-listed firms. To meet the purpose of the study, a research question was raised in Chapter 01, which the author intends to answer in this chapter through analysis of the empirical results extracted from regression analysis and hypothesis testing in the preceding chapter. These findings will form the basis of our analysis and determine the most relevant theoretical arguments to explain the relationship between corporate sustainability and WCM in the context of Sweden.

The empirical findings of this study will be reviewed and analyzed in light of the relevant literature and theories discussed in detail in Chapter 03, therefore, the author considers it necessary to recall a brief snapshot of the relevant literature. A review of notable studies in the literature on the relationship between WCM and FFP indicate that WCM significantly affects FFP (see, Shin & Soenen, 1998; Deloof, 2003; Enqvist et al., 2014; Singh et al., 2017). Second, we reviewed a stream of notable studies on corporate sustainability (CSR/ESG) in relation to FFP and observed mixed findings, however, mostly concluded a positive and significant effect on FFP (see, Friede et al., 2015; Laskar, 2018; Ting et al., 2019; Dalal & Thaker, 2019; Huang, 2021). We also noted both corporate sustainability and WCM were studied in relation to a wide range of research areas, but we could find scant research on the interface between corporate sustainability (ESG/CSR) and WCM. However, we could find only a few scholars studying the relationship between corporate governance and WCM (see, Gill & Bigger, 2012; Kamau & Basweti, 2013; Kamel, 2015; Fiador, 2016; Ahmad et al., 2018; Prasad et al. 2019), CSR and WCM (Gatsi & Ameyibor, 2016), and ESG and WCM (Barros et al., 2022). We found a study by Barros et al. (2022) the only study closely related to our topic. Since there is no other study directly relating to our topic, we'll be comparing our findings primarily with this study, nevertheless, we will not restrict ourselves to this study only; wherever deemed necessary we will analyze our findings concerning other related studies. First we will analyze the results of ESG and its elements (E, S, G) with respect to CCC, and then with reference to WCR.

7.2 Results Analysis

7.2.1 ESG and Cash Conversion Cycle

In the previous chapter, section 6.2 revealed the empirical results of our regression models and hypothesis testing of CCC in relation to ESG and individual pillars of ESG. The results of the first regression displayed in subsection 6.2.1 revealed that a significant relationship between CCC and ESGC does not exist. We find our result in line with Barros et al. (2022, p. 5), however, with a difference in direction of the relationship. In our study, the relationship is positive (and insignificant) whereas their study revealed a negative (and insignificant) relationship. Jadiyappa

(2022) conducting his study in the Indian setting found a significant impact of CSR on CCC implying that firms engaged in CSR face an increase in CCC. We find our results in line with Jadiyappa (2022) to the extent of the direction of the relationship, however, our results differ from the standpoint of the significance of the relationship. Uyar et al. (2022) conducted their study on ten business sectors from 60 countries and found a significant relationship between CSR and CCC implying that CSR promotes higher liquidity in that firms engaged in CSR activities operate with a shorter CCC. We find the results of our study completely deviate from those of Uyar et al. (2022). These studies reveal mixed findings on the relationship between ESG/CRS and CCC, implying that more empirical evidence is needed to establish a conclusive relationship. Since an insignificant relationship between the ESGC score and CCC was detected in our study, we can conclude that the ESGC rating scores do not determine CCC. In other words, sustainable firms in Sweden with higher ESGC rating scores are not able to operate with a shorter CCC than their counterparts.

In subsections 6.2.2–6.2.4 in the previous chapter, we examined the significance of the relationship between CCC and the individual pillar of ESG. In section 6.2.2, we tested the relationship between the environmental (ENV) score and CCC and observed that the environmental (ENV) score is not significantly associated with CCC. We again find our results in line with Barros et al., (2022, p. 5) and also find the same difference in the direction of the relationship as we found between CCC and ESGC. The insignificance of the relationship implies that statistically, the environmental (ENV) pillar has no effect on CCC. Hence proved that sustainable firms in Sweden with higher environmental (ENV) rating scores do not operate with a shorter CCC than their counterparts.

The relationships between the social (SOC) score and CCC and the governance (GOV) score and CCC were tested in subsections 6.2.3 and 6.2.4 respectively. The results revealed that we failed to find a significant relationship between the SOC score and CCC, which was found in line with Barros et al., (2022, p. 5). However, we find a negative (and nonsignificant) relationship between the social (SOC) score and CCC whereas Barros et al. (2022, p. 5) found a positive (and nonsignificant) relationship. The empirical results further revealed that the GOV score is negatively associated with CCC, however, the relationship is not statistically significant. We find our result completely in line with Barros et al., (2022, p. 5). The analysis of the relationship between SOC and GOV scores with CCC implies that CCC is not statistically linearly dependent on both the social (SOC) and governance (GOV) factors. In other words, neither the social nor governance pillars of ESG allow sustainable firms in Sweden to operate with a shorter CCC.

Analysis of the control variables and their relationship with CCC presented in subsections 6.2.1 to 6.2.4 reveals that except for the CR, none of the control variables show a significant relationship with CCC. This implies that these control variables of our study sample have no impact on our dependent variable CCC. However, notably, the relationship between CR and CCC is significant and positive, implying that an increase in CR would cause an increase in CCC. This makes sense because both liquidity measures of the firm go hand in hand and are closely interrelated since both are derived from a firm's current assets and current liabilities. Thus, making the relationship strong and significant. We find no deviation in our result of the CR from that of Barros et al. (2022, p. 5), however, the results of the control variables Size, GPM, EBITM, and MBV largely deviate from Barros et al. (2022, p. 5).

An overall analysis of this section in the light of the previous studies, in particular, with reference to a study by Barros et al. (2022) indicates that either ESG or any of its dimensions (E, S, or G) has no effect on the CCC of sustainable firms in Sweden. This is a bit surprising to find our results similar to what Barros et al. (2022) found in their study since both studies were conducted in two completely different settings, particularly with reference to sustainability. From Sweden's standpoint, we find our findings completely opposite to the expectations. Our expectations were that sustainable firms can better bargain with suppliers resulting in more favorable trade discounts and payment terms allowing such firms to delay their payments (more payable days). Moreover, sustainable firms have more customer patronage than non-sustainable firms, such firms are able to quickly sell their inventories (fewer inventory days) and are in a better bargaining power allowing these firms to receive their receivables rather quickly (fewer receivable days). Because CCC is the wholesome product of receivable days, inventory days, and payable days and it also serves as an indicator of a firm's relationship with its buyers and suppliers, we expected sustainable firms to operate with a shorter CCC. Moreover, since our study results were opposite to our expectations, further investigation on the relationship between ESG rating scores and each component of CCC is necessitated to help understand and dig out a potential reason for the insignificant relationship between ESG rating scores and CCC.

Yazdanfar & Öhman (2014) and Tobias et al. (2020) conducted their studies on Swedish firms and revealed a significant impact of CCC on FFP and profitability and inferred that firms with a shorter (longer) CCC are more (less) profitable. In the wake of these findings and findings of our related studies, we observe that in the context of Sweden, CCC determines profitability but ESG (or any of its pillars: E, S, or G) does not determine CCC. This implies that with a shorter CCC, Swedish sustainable firms would have been more profitable than their counterparts if the relationship between ESG (or any of its pillars) had been found significantly negative. However, since the significance of the relationship could not be established in our study, we cannot infer that investing in ESG leads to a shorter CCC for sustainable firms in Sweden, thus, the opportunity for increased profitability through the channel of ESG investing is deemed lost.

Based on our empirical results we can infer that sustainable firms in Sweden are able to operate with a shorter CCC (cash cycle) than their counterparts as no significant relationship between ESG (and its dimensions) and CCC was established. Thus, we conclude that ESG does not seem to determine, or affect our dependent variable CCC, or in other words, variations in CCC are not explained by ESG score in our study sample.

7.2.2 ESG and Working Capital Requirements

The relationship of WCR with ESG and the individual pillars of ESG was examined by regression analysis and hypothesis testing in four subsections of Section 6.3 in the previous chapter. From the results displayed in Table 6.3.1, we find a negative relationship between ESGC score and WCR, which is in line with Barros et al. (2022, p. 5) but in our case, the relationship is not significant whereas they detected a highly significant relationship. In a comparison of our findings with another study conducted by Gatsi & Ameyibor (2016, p. 59) in UK settings, we find our results deviating from the results of their study in that they found a positive relationship between CSR and working capital, though the relationship they found was also non-significant and they used a different proxy measure for WCM. Since we could not find any other prominent study investigating the relationship between ESG/CSR and WCM, this makes it hard for us to make a

generalized conclusion on the relationship. Therefore, we believe that more studies are needed to define a decisive relationship between CSR/ESG and WCM of the firms.

Gatsi & Ameyibor (2016, p. 55) argue that the relationship between WCM and firm sustainability is pivotal to examine for the larger effects of WCM on the liquidity and profitability of the firm. WCM is generally deemed as both a liquidity and operational efficiency measure of a firm and based on the results of our study and of Gatsi & Ameyibor (2016), it seems that the firm's investment in CSR/ESG does not contribute to enhancing liquidity and achieving working capital efficiency, in particular, in European settings since both studies pertain to Europe. However, Gatsi & Ameyibor (2016, p. 59) believe that firms can enhance their short-term liquidity positions by investing in CSR (corporate sustainability) practices, and for that matter, they urge firms to frame proper policies to implement CSR practices. In view of the results of our study, we can infer that ESGC does not explain any variation in WCR or, in other words, ESGC does not affect WCR and is not proven to be one of the determinants of WCR. From the WCR perspective, we can conclude that sustainable firms in Sweden with high ESGC scores are not able to operate with lower WCR than their counterparts.

The relationships of WCR with the environmental (ENV), social (SOC), and governance (GOV) dimensions of ESG were examined in subsections 6.3.2, 6.2.3, and 6.3.4 respectively in the previous chapter. The results showed a negative and significant relationship between the environmental (ENV) score, the social (SOC) score, and WCR. We find our results quite similar to Barros et al. (2022, p.5), which is the only main reference study in our case. Though Barros et al. (2022, p.5) also indicated a negative and significant relationship, we find a huge difference in the coefficients of the ENV score and the SOC score in both studies, which implies that the impact of both scores on WCR is much stronger in our case than that of Barros et al. (2022, p.5). Since there is no other study to compare our results with, we can infer that both these elements of ESG allow the Swedish-listed firms to operate with lower working capital requirements (cash requirements). However, as mentioned above, to make a generalized conclusion, more studies are required to explore the effects of firms investing in environmental and social activities on WCR.

Subsection 6.3.4 presented the results of our last regression on the relationship between the governance (GOV) score and WCR. Our findings showed a negative relationship between governance (GOV) score and WCR, which we find exactly in line with Barros et al. (2022, p. 5). We also find our results in line with Kamau & Basweti (2013) who also found no statistically significant relationship between corporate governance (CG) and WCM in a study conducted in Nairobi. However, we find our results contradictory to the previous research studying this relationship. For instance, Prasad et al (2019) found that WCM can be explained by some (but not all) characteristics of corporate governance. Ahmad et al. (2018) reported a significant impact of CG characteristics on WCM in Pakistan. Kamel (2015) concluded CG (except for the ownership concentration proxy) and firm maturity have a significant impact on WCM efficiency in the European region. Gill & Bigger (2012) also confirmed some role of CG in achieving WCM efficiency in the US market. While these findings indicated a significant impact of corporate governance on WCM across different study settings, we find this relationship insignificant in our study sample. This may imply that the governance structure of our sample Swedish firms is such that does not support sustainable firms to operate with lower working capital requirements (cash requirements). This conclusion cannot be generalized unless we find more evidence from Sweden

or Nordic region studies particularly examining the corporate governance structure and its impact on the WCR of the firms.

The analysis of control variables indicates results mostly similar to existing literature. The results of the control variables Size and CR indicate a positive and significant relationship with WCR, which is in line with previous studies such as Barros et al. (2022), Gatsi & Ameyibor (2016), and Fiador (2016). This indicates that large firms with high growth potential usually need more investment in working capital. The result of MBV largely deviates from Barros et al. (2022, p. 5). Further analysis indicates that GPM has a positive effect whereas the effect of EBITM is negative on WCR. The significance of these two variables is found in line with Barros et al. (2022), however, a difference is observed in the direction of their relationship with WCR.

The statistical evidence presented in the empirical results concerning the WCR allows us to conclude that a higher ESG rating score allows Swedish sustainable firms to operate with lower WCR (cash requirements) than their counterparts. However, the effects came entirely only from the environmental and social pillars of ESG. Surprisingly, we didn't find any evidence of the impact on WCR from the composite ESGC score and governance pillar score in our estimations. Barros et al. (2022, p. 6) argue that governance issues have been an implicit part of the firm's risk assessment for a longer period of time even beyond the CSR issues, which makes us assume a significant impact on CCC and WCR from the governance factor. Since we found an unexpectedly insignificant impact, which opens new doors of investigation to find the reasons for the lack of significant impact from the governance pillar of ESG. To this end, this is also suggested to explore the governance structure of Swedish firms.

7.3 Theoretical Analysis

In this section, the author intends to analyze the empirical results of the study in relation to the chosen theories and the arguments inherent in these theories. We presented three theories in Chapter 03, namely, the shareholder theory, stakeholder theory, and legitimacy theory.

7.3.1 Shareholder Theory

The famous shareholder theory presented by Milton Friedman (1970) is based on the premise that maximizing shareholders' wealth should be the primary responsibility and goal of the firm. The theory's principal ideology is that corporations should make such business decisions and adopt such business strategies that maximize shareholders' wealth. The theory suggests that to achieve shareholders' wealth maximization goal, the overall valuation of the firm should be enhanced, which implies that a firm's value maximization goal is in line with the shareholders' wealth maximization goal. ESG scores of the firm are the reflection of a firm's performance on sustainability fronts whereas a firm's efficiency in managing its short-term assets and liabilities is reflected in its WCM. The shareholder theory hypothesizes a negative relationship between corporate sustainability and WCM implying that sustainability should allow firms to operate with less investment in working capital and thus achieve working capital efficiency. Empirical research is evident that a high ESG rating score increases firm value (Yoon et al., 2018, p. 15) and efficiency in working capital also increases firm value (Wasiuzzaman, 2015, p. 74), which means a high ESG rating score and efficiency in working capital both lead to maximization of the firm's value, hence shareholders wealth. This implies that not only a firm's investment in ESG is in line with shareholder theory but also the efficiency in WCM, however, we will examine in this section in

light of our results whether an investment in ESG allows sustainable firms to achieve working capital efficiency by investing less in working capital, and thus increase firm value and shareholders' wealth. In other words, we analyze whether the relationship between corporate sustainability and WCM is also in line with the shareholder theory. However, for this purpose, we need to understand the relationship between working capital and firm valuation. While firm valuation is inversely related to the levels of working capital, it is positively related to the present value of free cash flows (FCFs), implying that a firm with less investment in working capital would have more FCFs and hence, high firm valuation (and vice versa).

As mentioned above, the shareholder theory hypothesizes a negative relationship between WCM and corporate sustainability. Since we are measuring WCM in two dimensions, CCC and WCR, our findings are mixed regarding the relationship between CCC, WCR, and ESG rating scores. If we examine shareholder theory from the CCC perspective, we can infer that our findings do not support the shareholder theory whereas findings on WCR do. The results of the study reveal that firms' practices and performance on sustainability fronts (reflected in ESG scores) allow sustainable firms to operate with lower WCR (cash requirements) but not with a shorter CCC (cash cycles) implying that ESG *partially* allows firms to operate with less investment in working capital. This means shareholder theory is partially satisfied, which implies that shareholders' value and firm value can be maximized by achieving efficiency in working capital only through a reduction in WCR but not through a shorter CCC. Finally, analysis of relationship through the lens of shareholder theory suggests that sustainable firms should make such WCM decisions that allow firms to achieve working capital efficiency on CCC end too to further increase firm value, and hence to maximize shareholders' wealth.

7.3.2 Stakeholder Theory

The theory highlighted that a firm's value and shareholders' wealth cannot be maximized without maximizing the value of its stakeholders. This implies that shareholders' wealth is ultimately maximized when firms pursue the goal of stakeholders' wealth maximization (Freeman, 2008, p. 166). According to Xuea (2020, p. 81), the stakeholders demand firms fulfill their social responsibility in return for their investment of capital in various forms, and this is what significantly affects the firm's WCM efficiency. A firm's high ESG rating score is an indicator of a firm's high performance on sustainability fronts, which further reflects that the firm is making decisions that are largely beneficial to all of its stakeholders including shareholders. Perhaps for these reasons, the stakeholders in Sweden value sustainability and are ready to contribute at their individual levels to promote sustainability. For instance, buyers willingly buy sustainable products, and despite having to pay high prices they patronage sustainable products. Customers also support sustainable firms by buying these firms' products instead of non-sustainable firms. Suppliers also support sustainable firms by maintaining a strong buyer-supplier relationship with sustainable firms as they consider sustainable firms less risky than their counterparts. We can argue the same for other stakeholders and conclude based on what Xuea (2020, p. 81) asserted that a firm's investment in social responsibility maximizes firm value and also protects shareholders' interests.

The stakeholders' theory dictates a negative relationship between sustainability and working capital efficiency. Knowing this and that a firm's high ESG rating score and working capital efficiency both increase firm value, the stakeholders' theory implies that a firm must make such WCM policy decisions that allow a firm to achieve working capital efficiency without comprising

the interests of its stakeholders. In fact, taking stakeholders into account will ultimately help a firm achieve working capital efficiency. For instance, creating a strong bond with the customers and suppliers and taking care of the environment and communities they operate in would help sustainable firms achieve their goals. Since our findings are mixed in the relationship, we observed from the CCC perspective, our findings do not support the stakeholders' theory whereas WCR does. This leads us to infer that a firm's investment in ESG *partially* allows a firm to operate with less investment in working capital, thus partially satisfying stakeholders' wealth maximization goal. We can infer that achieving efficiency in working capital through a reduction in WCR would enhance firm value, thereby maximizing stakeholders' wealth without compromising shareholders' interests. This implies that stakeholders favor firms' WCM policies relating to WCR but not to the cash conversion cycle (cash cycle), which means stakeholders partially support the WCM policies of the Swedish corporations. Further, we argue that CCC has no impact on stakeholders' wealth maximization goals, and as already discussed in the previous sections, further investigation is needed to dig out the possible reasons (or hidden factors) for the lack of a relationship between ESG rating scores and CCC.

7.3.3 Legitimacy Theory

The fundamental premise of the theory is that for the survival of the firm, social perception of the firm's activities must match society's expectations and moral values, otherwise, a firm may face severe sanctions by society, which may eventually result in the failure of the firm (Burlea & Popa, 2013, p. 1579). A firm to be accepted as legitimate must portray itself as valuable through its economic and social actions that largely benefit both society and the environment. Failure to do so will create a legitimacy gap between the firm and the society. Firms in Sweden have the legitimate right to conduct business in Sweden is evident from their sustainability efforts and their performance on sustainability fronts. ESG rating scores are the indicators of such endeavors of the firms. High ESG ratings scores indicate that firms are taking serious actions on the environmental, societal, and governance aspects. Sweden ranks one of the top three countries on the list of sustainable countries in the world. This indicates that sustainable firms in Sweden are accepted as legitimate. While stakeholders' theory talks about the value maximization of a firm's all stakeholders, legitimacy theory is more concerned with the protection of society and the environment. A firm may get a legitimate right of existence from society by getting engaged in CSR activities since CSR activities largely contribute to greater societal and environmental benefits. Since the legitimacy theory is more concerned about social and environmental aspects, we will also relate our findings only to the findings on the environmental and social pillars so as to be more precise and focused. Since the main aim of our study is to examine if more sustainable firms can operate with lower WCR and a shorter CCC, from the legitimacy theory perspective, we hypothesize whether a more sustainable firm can achieve its goal of achieving working capital efficiency (lower WCR and a shorter CCC) while pursuing the societal and environmental goals. We have to refer to our findings to examine this.

Since our findings are mixed in the relationship, we observed that our findings connecting to CCC do not support the legitimacy theory, whereas WCR does. This leads us to infer that a firm's investment in ESG *partially* allows a firm to achieve working capital efficiency, thus partially satisfying the legitimacy theory. From the legitimacy theory's angle, we infer that in the case of CCC, sustainable firms completely failed to contribute to both the social and environmental goals and the goal of achieving working capital efficiency through a shorter CCC. We find our findings

on the WCR completely comply with the legitimacy theory since the relationship of the WCR with both ENV and SOC scores is significant. We can infer that a firm is successful in achieving its both goals, which also implies that society favors firms' WCM policies relating to WCR (cash requirements) but not to the CCC (cash cycle), which means society partially support the WCM policies of the Swedish sustainable firms.

Chapter 8

CONCLUSION

In this last chapter of the thesis, the author will sum up the empirical findings of this study in the concluding remarks to be followed by a discussion on the societal implications of the findings of this study. The limitations and suggestions for future research will finally wrap up the chapter.

8.1 Concluding Remarks

The theoretical and practical importance of WCM (Sharma & Kumar, 2011) and its strong link with the firm's financial stability (Wang et al., 2020, p. 2; Kamel 2015, p. 35) make it one of the most important functional areas of corporate finance. Although literature and the corporate world recognize corporate sustainability (CS) mainly through CSR, ESG emerged in the recent past and quickly made its strong footfall as an indicator of CS¹⁵. Literature is evident that studies have mainly focused on studying both WCM and CS in relation to FFP, while scant research has assessed the relationship between WCM and CS (Barros et al., 2022, p. 1). The primary purpose of this study was to examine this relationship to fill this gap in the literature and contribute to the existing body of knowledge on the subject matter through its findings. In fact, this gap sparked the author's interest in discovering this relationship, with particular reference to Sweden. The relationship was examined by collecting relevant data for the listed firms in Sweden for the years 2010–2020. To fulfill the purpose of the study and to answer the research question, eight hypotheses were tested by panel data regression models.

The empirical results of our study revealed mixed findings. The findings with reference to our dependent variable, CCC, indicated no statistically significant relationship between ESG combined (ESGC) rating scores and CCC. The finding also indicated no significant relationship between individual pillars (environment, social, governance) and CCC. The non-significant relationship between ESGC and its pillars with CCC allowed us to conclude that sustainable firms in Sweden do not operate with a shorter CCC (or a shorter cash cycle). In other words, Swedish firms' performance on sustainability fronts does not allow firms to achieve working capital efficiency at least in terms of operating with a shorter CCC (cash cycle). Barros et al. (2022) conducted their study in the US setting and also found no significant relationship between ESG and CCC.

The findings of our study are completely opposite to the expectations. Our expectations were that sustainable firms can better bargain with suppliers resulting in more favorable trade discounts and payment terms allowing such firms to delay their payments (more payable days). Moreover, since sustainable firms have more customer patronage than non-sustainable firms, such firms are able to quickly sell their inventories (fewer inventory days) and are in a better bargaining power allowing these firms to receive their receivables rather quickly (fewer receivable days). Since, the CCC is the wholesome product of receivable days, inventory days, and payable days and it is also an indicator of a firm's relationship with its buyers and suppliers, we expected sustainable firms to operate with a shorter CCC. Because we found our study results opposite to our expectations, further investigation on the relationship between ESG rating scores and each component of CCC

¹⁵ While CSR has a rich history, ESG emerged only recently in the early 2000s.

is necessitated to help understand and dig out a potential reason for the insignificant relationship between ESG rating scores and CCC.

Finding insignificant results of CCC in our study in line with Barros et al. (2022), and knowing there is no other study to compare our results with, we can cautiously infer that there seem to be some other factors (either unobservable or observable but not included in the model) that cause disturbance in establishing the significance of the relationship or for some unknown reasons ESG rating scores do not impact and determine the CCC of sustainable firms in both Sweden and the US. However, as mentioned earlier, this conclusion cannot be generalized unless we get some more evidence from studies studying this relationship in different parts of the world.

The empirical results of our study with reference to our second dependent variable, WCR, indicated no statistically significant relationship between ESG combined (ESGC) rating score and WCR. We also find no statistically significant relationship between the governance pillar score and WCR. However, a negative and significant relationship between the environmental pillar, the social pillar, and WCR was evident from the empirical results. This means that firms' sustainability practices on the environmental and social fronts send a positive signal to the Swedish market, which is welcomed by the market participants, thus allowing firms to operate with lower WCR than their counterparts. In other words, Swedish firms' sustainability efforts on environmental and social fronts are considered one of the factors (or determinants) that allow sustainable firms to achieve working capital efficiency by investing less in the working capital. However, no effect from the ESG score and, in particular, the governance pillar is also a surprising element in particular when the firms have a long hold of governance issues embedded in their risk assessments. Further investigations are called for to dig out the potential reasons for the lack of impact of both the ESG score and governance score on WCR.

Overall, the study revealed mixed results. CCC indicated no significant relationship between CCC and ESG scores, while WCR did, though the effect came entirely from the environmental and social pillars of ESG. These overall findings allow us to suggest sustainable firms in Sweden reconsider their working capital policy decisions and governance structure vis-a-viz and establish a strong bond with their stakeholders to capitalize on their sustainability status so as to achieve working capital efficiency (especially with reference to cash cycle) while staying aligned with their sustainability goals.

8.2 Quality Criteria

According to Bell et al. (2021, p. 176), it is important for quantitative research that measures are valid and reliable. They further argue that reliability and validity are technically two different notions, but they are closely connected in that if the measure is not reliable it cannot be valid, just as a measure or observation cannot be valid if it is not reliable (Martelli & Greener, 2018, p. 49). Thus, in quantitative research validity and reliability are two main quality criteria that researchers must satisfy. However, generalizability is yet another quality criterion that is important for the research. To this end, the author will evaluate the study results in light of these quality criteria to assess the trustworthiness of our research findings.

8.2.1 Validity

Validity is the most important criterion of research as it measures the strength of research conclusions, inferences, or propositions (Adams et al., 2014, p. 247), the integrity of the conclusions drawn from the research (Bell et al., 2021, p. 47) and the accuracy of a measurement or observation (Martelli & Greener, 2018, p. 49). Moreover, it indicates the extent to which research measures what the researcher intends it to measure and ensures data collected truly represents the concept researcher intends to study (Collis & Hussy, 2021, p. 48 & 203). There are many different ways to characterize validity in research, the most common are face validity (content validity), construct (measurement/concept) validity, and internal validity (Martelli & Greener, 2018, p. 49; Bell et al., 2021, p. 47). *Face validity* is the most common of all validity tests and it is simply referred to the ability of the instruments, tests, or measures to actually measure what they were supposed to measure by the researcher (Collis & Hussy, 2021, p. 48; Hair et al., 2020, p. 264). *Construct validity*, also known as measurement & concept validity, is referred to as whether a measure captures the phenomenon that it is intended to capture, while *internal validity* is usually related to the issues of causality (Bell et al., 2021, p. 47-48) that help researchers test the technical soundness of the research study (Martelli & Greener, 2018, p. 50).

Considering the limitations of the study, the author has taken all possible steps to ensure the validity of this research study. For instance, data validity was ensured by gathering the data sample of the study large enough to increase the precision of estimates and the robustness of the results, and by downloading data from Refinitiv Eikon which is a reputable data provider widely used in research. Moreover, the fixed effects and random effects models were used to account for time-invariant firm-specific characteristics (fixed effects) in the case of CCC, and for both time-invariant and time-varying firm-specific characteristics (random effects) in the case of WCR. We examined the relationship between corporate sustainability (measured in terms of ESG score) and WCM (measured in terms of CCC/WCR) in the Swedish-listed firms, which appear to be a reasonable measure of the relationship between these variables, thus ensuring face validity of our research. We used the ESG rating scores and the control variables which are all relevant measures of the factors that could potentially impact the CCC and WCR of the listed companies in Sweden, thus ensuring construct validity. The use of fixed effects and random effects models for a rigorous examination of the relationship between ESG rating scores and CCC/WCR while controlling for the effects of other relevant variables ensures the internal validity of the research. However, the author is fully aware that there may be other factors that influence the relationship not captured in the model.

8.2.2 Reliability

As mentioned at the outset of this section, in quantitative research validity and reliability are two main quality criteria that researchers must satisfy. Reliability is referred to “the degree to which measurement produces consonant results” (Ghauri et al., 2020, p. 85-86) and “the accuracy and precision of the measurement and absence of differences in the results if the research were repeated” (Collis & Hussy, 2021, p. 47). In simple words, to pass a degree of reliability, research should produce the same results if it is repeated (Collis & Hussy, 2021, p. 47). There are several aspects of our research that contribute to its reliability. For instance, the data was not only downloaded from Refinitiv Eikon, which is a well-known and reputable financial data provider, the data was also accurately measured, collected, and cleaned properly to increase the reliability of our research. However, this is important to note that Refinitiv Eikon measures ESG rating scores

using its own methodology which may differ from other ESG rating agencies, therefore, there might exist some risk of difference in results if the data is retrieved from other ESG rating agency other than Refinitiv Eikon. To further increase the reliability of our results by reducing the impact of outliers and controlling unobserved heterogeneity, we used completely balanced panel data, which also ensured that we analyzed a consistent set of firms over time. Moreover, to ensure reliability of our research we used robust fixed effects and robust random effects multiple regression models to examine the relationship between ESG scores and CCC/WCR, with several control variables, which also indicates that we have accounted for potential biases and errors that may arise from the model assumptions. Moreover, we employed a rigorous and standard statistical approach to analyze the data. The inclusion of control variables in our models to isolate the effect of our independent variable on the dependent variables also increases and ensures the reliability of our results. In our study, each and every step relating to data and methodology was clearly spelled out to increase the transparency and reliability of our data and procedure. Overall, the author believes the use of panel data, robust models, control variables, and balanced data are all factors that contribute to the reliability of our research.

8.2.3 Generalizability

Generalizability, also known as external validity, is yet another important criterion that research must satisfy to achieve the degree of generalization of the research findings. Generalizability can be defined as the extent to which the study's results can be generalized or extended to other cases or to other settings (Ghauri et al., 2020, p. 146; Collis & Hussy, 2021, p. 48). As suggested by Collis & Hussy (2021, p. 48), since we have followed a positivist paradigm and selected a sample, we need to determine how confident we are in stating that the characteristics found in our sample will be present in the population from which we have drawn our sample. In our study, we had sample data from 38 listed companies for a total of 418 firm-year observations from different industries and sectors. The data seems to be large enough to generalize the results of the study in the Swedish market, however, it doesn't seem to be large enough to generalize the results of the study in other countries or regions. The author believes that study findings can also be generalized in the Nordic region due to the somewhat similar settings. The author believes that the generalizability of the study findings could have been enhanced and improved if more countries had been added to the study sample and also if the unbalanced panel data had been used in the study. Moreover, the time period from 2010 to 2020 may also be considered one of the reasons for the lack of enhanced generalization of our study findings. However, this last one was one of the limitations of our study because data before 2010 was not available for most of the listed companies in Sweden. Last but not least, our study findings were partially in line with Barros et al. (2022), who conducted their study in the US market. This means in order to draw a general conclusion and achieve a complete generalization of the relationship between corporate sustainability (ESG rating scores) and working capital management (CCC/WCR), more studies need to be conducted in different parts of the world.

8.3 Societal and Ethical Implications

The purpose of this study was to explore whether sustainable firms in Sweden achieve operational efficiency by investing less in working capital while fulfilling their social responsibilities. The answer is yes; though partially, more sustainable firms in Sweden are able to achieve working capital efficiency. These findings have certain social implications, particularly in Sweden's context which is one of the top three countries in the world on the RobecoSam's 2023 Country

Sustainability Ranking. Moreover, present-day most corporations and organizations in Sweden are also actively engaged in sustainability practices and it has been made compulsory for listed firms in Sweden to publish their Sustainability (ESG) Reporting. Keeping these facts in mind, the author believes the implications of the study findings are important for Swedish sustainable firms. For instance, in our study, the effects of WCR came entirely from the environmental and social scores which imply that sustainable firms' efforts on social and environmental fronts are being well appreciated by society, stakeholders, and the market. These findings can also be interpreted as a positive development for sustainability and corporate social responsibility in Sweden. Lower WCR may indicate that more sustainable firms are managing their operations more efficiently and reducing waste, which could have positive environmental impacts. Moreover, this can also be seen as an indication that more sustainable firms are prioritizing social and environmental considerations in their business practices. On the other hand, the results indicating no significant relationship between ESG scores and CCC indicate that companies are not yet prioritizing sustainable practices in their CCC. This can be seen as a potential area for improvement, where sustainable firms need to work to reduce their environmental impact and promote social responsibility by optimizing their cash conversion processes.

Despite the mixed effects of ESG and its pillars on CCC/WCR, the author would encourage sustainable firms in Sweden to continue their endeavors and practices on ESG fronts since working capital efficiency was not their only main goal to achieve through ESG practices. Definitely, this would have been an added advantage for the sustainable firms to have some success in this end too, but this cannot be considered a failure either. ESG firms' goals are much bigger and wider in scope as these firms' endeavor is centered around societal well-being. Previous research (in Sweden also) is evident that sustainability has also played a major role in achieving the firms' much bigger goals such as profit maximization and value maximization, which we discussed before, implicitly maximizes stakeholders' value (including shareholders and society). Albeit our research was conducted in Sweden, the societal implication of our findings can be generalized at least in Nordic countries for similar market settings. As far as ethical implications are concerned, the research was conducted as per the guidelines of the Swedish Research Council (Vetenskapsrådet). Since there was no human interaction, the author used officially licensed software (Stata) and databases (Refinitiv Eikon) to retrieve relevant data and information. The author ensured to mention the reference(s) and give due credit to the concerned authors/parties/organizations for the data, information, results, images, or any other thing used in this research study.

8.4 Limitations and Future Research

The study examined the relationship between corporate sustainability and WCM of Swedish-listed companies. The findings of the study revealed mixed results. Like with any research, this research is not free from limitations such as access to data on ESG rating scores before 2010, the possibility of omitted variable bias, measurement error, and endogeneity, which the author suggests overcoming in future research. There are some other certain limitations too that the author faced while conducting this research study, which the author intends to underpin below in conjunction with suggestions for future research.

- *Use large sample size.* This is possible by collecting unbalanced data and/or by reducing the study time frame (e.g., collecting data after 2015). The second way is to collect data on all the Nordic and/or European listed firms. By so doing, this would be possible to establish

generalization at least in the European region. However, for a broader generalization purposes, more studies are required to be conducted in different regions (e.g., Asia, Middle East) and markets (e.g., developed, developing, emerging markets, etc.) of the world. These studies will also help establish regional effects and market effects on the relationship.

- *A comparative study* of this relationship in different markets and geographical settings is also suggested as this would give more insight into whether ESG rating scores behave similarly or have a different impact on WCM. Moreover, since we were unable to include industry averages, we were unable to compare our results with the industry average. Our suggestion is to incorporate the industry average to gain better insight into the relationship.
- *More control variables* can be used in future research such as age, industry characteristics, and macroeconomic factors. This would be interesting to see if the addition of these control variables significantly improves this relationship. Moreover, this will also help reduce the omitted variables bias in the research.
- *A control variable Leverage* was dropped from the model due to its highly insignificant impact on both CCC and WCR. The impact of leverage was also found to be highly insignificant in a similar study by Barros et al. (2022). This is a bit surprising because empirical research indicated a highly significant impact of leverage on the WCM of the firm (see, Nazir & Afza, 2009. P. 34). Further investigation is required to figure out the reasons why the presence of ESG rating scores diminish the impact of leverage on WCM of the firm.
- *Governance pillar.* An insignificant impact of the governance factor on WCM was detected in our study and that of Barros et al. (2022). These findings open new doors of investigation in that to explore reasons for the lack of impact from the governance pillar of ESG. One suggestion can be studying the governance structure of Swedish firms.
- *Theoretical Approaches.* In the study the results were analyzed in light of the shareholder, stakeholder, and legitimacy theory. The author suggests to analyze the results from the canvas of other relevant theories. For instance, governance theories such as institutional theory, stewardship theory, and sociological theory. This may also help partially reveal the reason for the lack of governance pillar impact on CCC and WCR.
- *CCC is the composite measure* of receivable days, inventory days, and payable days. This is suggested to use these components of CCC besides CCC to examine the relationship. Moreover, some other measures of WCM (other than CCC and WCR) are also suggested to use to reassess the relationship.
- *Study the relationship the other way around.* We have examined the relationship between ESG rating scores and WCM. Our suggestion is to examine the impact of WCM on ESG rating scores. There might be a possibility of reverse impact since firms managing their working management optimally and efficiently increase firm value and firm profitability as evidenced by empirical research.

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APPENDICES

Appendix A1: Descriptive Statistics of Residuals

Variable	Obs	Mean	Std. dev.	Min	Max
Residuals (CCC-ESGC)	418	0.000000000522	54.2301	-267.56	180.9024
Residuals (WCR-ESGC)	418	-0.000000000182	0.10709	-0.28575	0.43844
Residuals (CCC-E, S, G)	418	-0.000000000040	54.07888	-267.0585	176.0784
Residuals (WCR- E, S, G)	418	-0.000000000065	10.66404	-0.28299	0.440462

Appendix A2: Correlation: Residuals & Independent Variables

Table A2 (i)

Variables	Residual
Residual	1
ESGC	-0.0000
Size	-0.0000
CR	-0.0000
Lev	0.0000
GPM	-0.0000
EBIT	-0.0000
MBV	-0.0000

Table A2(ii)

Variables	Residual
Residual	1
ESGC	0.0000
Size	0.0000
CR	-0.0000
Lev	0.0000
GPM	-0.0000
EBIT	-0.0000
MBV	-0.0000

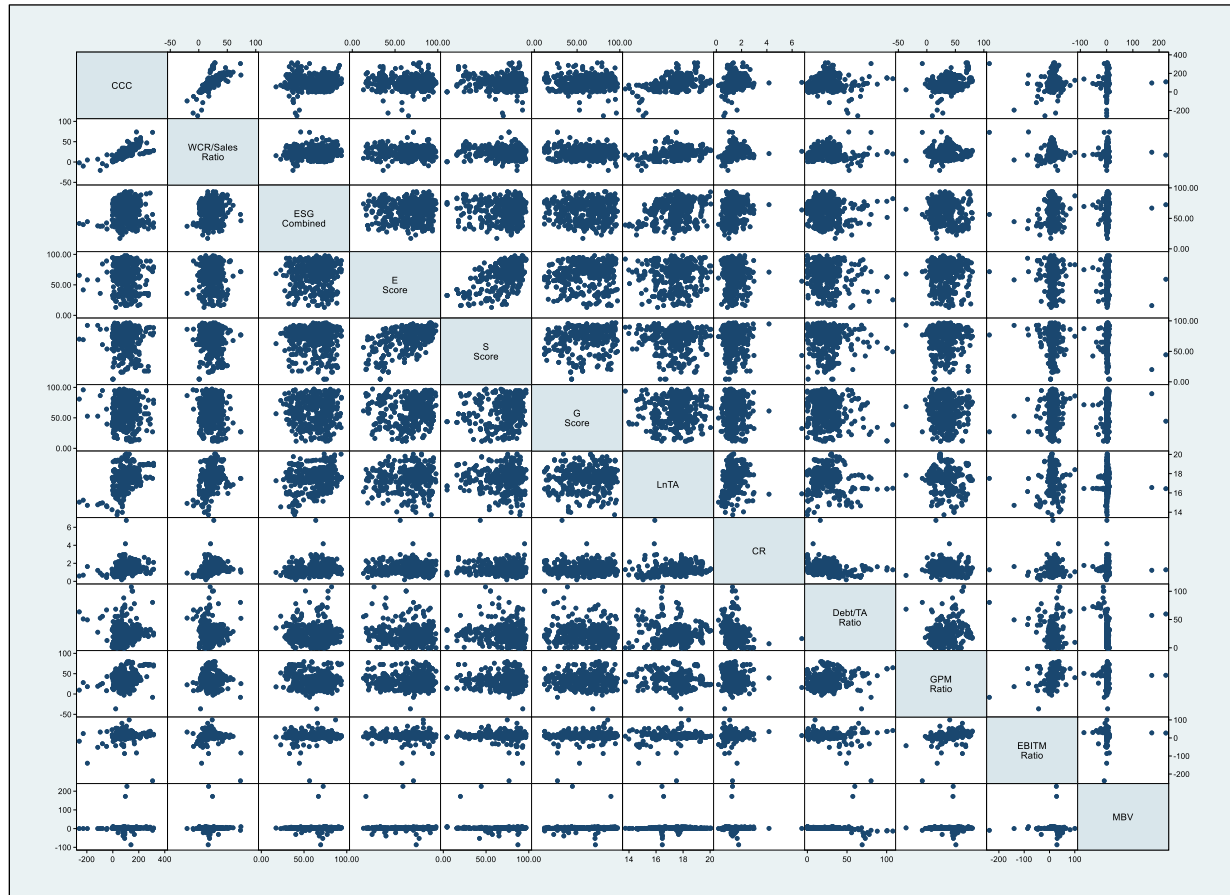
Table A2(i) & A2(ii): Correlation: Residuals & Independent Variables connected to CCC-ESG & WCR-ESG

Appendix A3: VIF (CCC & WCR – ESG)

Table A3: VIF

Variable	VIF	1/VIF
ESGC	1.11	0.898603
ENV	1.61	0.621251
SOC	1.69	0.592338
GOV	1.1	0.909531
Size	1.06	0.945349
CR	1.11	0.899964
Lev	1.17	0.85562
GPM	1.22	0.818442
EBITM	1.25	0.800544
MBV	1.03	0.971664
Mean VIF	1.25	

Appendix A4: Scatterplots (Matrix Plots)



Appendix A5: ESG Rating (Scores & Grades)

Score range	Grade	Description	<div>ESG laggards</div> <div>↑</div> <div>↓</div> <div>ESG leaders</div>
0.0 <= score <= 0.083333	D -	'D' score indicates poor relative ESG performance and insufficient degree of transparency in reporting material ESG data publicly.	
0.083333 < score <= 0.166666	D		
0.166666 < score <= 0.250000	D +		
0.250000 < score <= 0.333333	C -	'C' score indicates satisfactory relative ESG performance and moderate degree of transparency in reporting material ESG data publicly.	
0.333333 < score <= 0.416666	C		
0.416666 < score <= 0.500000	C +		
0.500000 < score <= 0.583333	B -	'B' score indicates good relative ESG performance and above-average degree of transparency in reporting material ESG data publicly.	
0.583333 < score <= 0.666666	B		
0.666666 < score <= 0.750000	B +		
0.750000 < score <= 0.833333	A -	'A' score indicates excellent relative ESG performance and high degree of transparency in reporting material ESG data publicly.	
0.833333 < score <= 0.916666	A		
0.916666 < score <= 1	A +		

Source: Refinitiv (2022, p. 7)

Appendix A6: Theoretical Concepts Related to Study

A6.1 Sustainability

Sustainability stands among the most commonly used buzzwords over the past few decades, albeit the concept of sustainability has its own three hundred years old history¹⁶. The term sustainability can now be paired apparently with everything; for instance, sustainable cities, sustainable ecosystems, sustainable energy, sustainable economies, sustainable business, sustainable investment, sustainable finance, and sustainable development (Portney, 2015, p. 8; Scoons, 2007, p. 589-590). Just like the concepts of *Justice* and *Freedom*, the concept of Sustainability is quite broad and numerous definitions of the concept exist in the extant literature addressing more or less the same concerns, however, the most widely quoted definition is one presented by WCED (Arowoshegbe & Emmanuel 2016, p. 91). WCED¹⁷ (1987) defined sustainability as an economic development activity that “meets the needs of the present without compromising the ability of future generations to meet their own needs” (Widok, 2009, p. 43; Portney, 2015, p. 2-3; Missimer, 2015, p. 1-2; Ameer & Othman, 2012, p. 61; Lins & Wajnberg, 2007, p. 7). Sustainability is a comprehensive phenomenon that incorporates programs, initiatives, and actions meant to preserve a particular resource; however, human, social, economic, and environmental aspects are considered core concerns and issues of sustainability. According to Isaksson and Rosvall (2020, p. 2), the terms sustainability and sustainable development are mostly used synonymously.

Sustainability was described by WCED (1987) in terms of three co-equal parts or elements: environment, economy, and equity (Portney, 2015, p. 6), which are also referred to as the three *pillars* of sustainability: environment, economic, and social (Lins & Wajnberg, 2007, p. 7). These pillars of sustainability captured wider attention when Elkington (1994) first coined the term Triple Bottom Line (TBL¹⁸) to refer to these pillars as the social, environmental, and financial in the *accounting* framework and UNEP-FI¹⁹ (2004) referred to these pillars as ESG (Environment, Social, and Governance) with reference to *finance* framework. In nutshell, these three elements of sustainability emphasize that sustainability cannot be achieved without protecting the environment, addressing social issues and needs, preserving economic growth, promoting equity, and improving governance (Portney, 2015; Wilkinson et al., 2001).

A6.2 ESG: A Measure of Corporate Sustainability Practices & Performance

Corporate sustainability practices are known by many different terminologies²⁰, however, the most commonly known are CSR (Corporate Social Responsibility) and ESG (Environment, Social, and Governance), which have been used interchangeably in the literature (see e.g., Seker & Şengür, 2021, p. 191; Liang & Renneboog, 2020, p. 2; Gillan et al., 2021, p. 1; Gerard 2019, p. 1). CSR is a historically rich and diverse concept the roots of which can be traced back to the era of the

¹⁶ The term sustainability was first coined by a German forester, Hans Carl von Carlowitz, in 1712 in his text “*Sylvicultura Oeconomica*” with reference to forests (Scoons, 2007).

¹⁷ For further details, refer to World Commission on Environment and Development (WCED) report “Our Common Future”, also known as the Brundtland Report.

¹⁸ The term TBL or 3BL is also commonly known as 3Ps: People, Planet, and Profits (Jan et al., 2018, p. 61).

¹⁹ UNEP-FI (The United Nations Environment Program-Finance Initiative) is a collaborative initiative of UNEP and the global financial services sector to promote the integration of environmental, social, and corporate governance (ESG) criteria into operations and services of the financial sector (UN 2004 Report, Who Cares Wins, p. xii).

²⁰ Other names addressed in the literature are socially responsible investing, impact investing, sustainable investing, corporate responsibility, corporate social relationship, corporate citizenship, etc.

industrial revolution when corporate forms of business organization emerged with the emergence of capitalism (Carroll & Brown, 2018, p. 40). The concept of CSR has been presented in multiple dimensions and defined in numerous ways in the extant literature, however, the earliest formal definition of CSR was presented by Bowen (1953²¹). However, the European Commission²² (2001, p. 6) described CSR as “a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis”.

As compared to CSR, the concept of ESG was developed only in the recent past in a UN’s Global Compact 2004 report “Who Cares Wins” (Gillan et al., 2021, p. 2). Though the terms ESG and CSR are closely related, these terms differ at least in the way *governance* concerns are dealt with (Gerard 2019, p. 1; Gillan et al., 2021, p. 2). While ESG underpins how corporations and investors consider environmental, social, and governance aspects while making decisions and designing business models, it explicitly includes *governance* as one of its main pillars. On the other hand, while CSR underpins how corporations are involved in activities that are more socially responsible to glitter their image as better corporate citizens, it deals with governance issues indirectly (Gillan et al., 2021, p. 1). ESG is considered equal to CSR plus governance (Gerard, 2019, p. 1) thus making ESG a broader and more extensive term than CSR (Gillan et al., 2021, p. 2).

Just as ESG is one of the metrics of corporate sustainability practices, the *ESG Rating Score* is one the most commonly used and widely accepted measures of corporate sustainability level (Garcia et al. 2019, cited in Barros et al., 2022, p. 1). According to Escrig-Olmedo et al. (2019, p. 2), ESG rating scores not only provide market perception but also indicate how well a firm is performing on the sustainability front. Moreover, ESG rating scores disclose the extent to which corporations contribute to improving the environment, society, and governance through their business operations and business strategies. Lopez et al., (2020, p. 14) report three major ESG rating agencies that measure the ESG performance of the firm based on the financial materiality: RobecoSAM, Sustainalytics, and Thomson Reuters’ Refinitiv Eikon. However, there are many other rating agencies that have emerged over the last two decades that provide ESG ratings of a firm (Christensen et al., 2021, p. 8), such as Morningstar, Bloomberg, MSCI, ISS ESG, FTSE Russell, etc. These rating agencies usually issue ESG ratings for the ESG, ESG combined, ESG controversial, and individual pillars of E, S, and G on regular basis based on their own research methodologies (Escrig-Olmedo et al., 2019, p. 2-3). Although ESG scores measure corporate sustainability performance on ESG fronts, there exist multiple issues and differences with reference to ESG definition, standardization of data, methodologies used in calculating ESG, etc., across rating agencies (Lopez et al., 2020, p. 1-7), which not only question the trustworthiness of these ESG ratings but also make it debatable (Nabil & Mattson, 2022, p. 10). However, despite all the differences, one way or the other, the ultimate common purpose of the ESG rating agencies is to measure the sustainability performance of the firm on the ESG front (Christensen et al. 2022, p. 8). Refinitiv Eikon calculates ESG rating scores in the range of 0 to 100 where a higher ESG score of a firm is an indicator of a firm’s high sustainability performance and vice versa (Refinitiv 2020, p. 7). For this study purpose, ESG rating scores will be used as a measure of corporate

²¹ Howard R. Bowen is known as the founding father of CSR. Bowen defined CSR as the “obligations of businessmen to pursue those policies, to make those decisions, or to follow those lines of action which are desirable in terms of the objectives and values of our society” (Khan et al., 2012, p. 43).

²² GREEN PAPER: Promoting a European Framework for Corporate Social Responsibility (2001). (www.ec.europa.eu/commission/presscorner/detail/en/DOC_01_9)

sustainability, and data on these rating scores of ESG combined and the individual components of E, S, and G will be downloaded from Refinitiv Eikon.

A6.3 Sustainability in Sweden

‘Sustainability Initiatives’ taken by Sweden over the years make Sweden outshine in the Nordic region, Europe, and the world over. Sweden is prominent in the world for creating Environmental Protection Agency and for passing the Environmental Protection Act in 1967 and hence becoming the first country in the world who took these kinds of initiatives. Moreover, continuing its efforts to promote environmental protection Sweden hosted the first UN conference on the Global Environment in 1972, which resulted in the creation of the United Nations Environment Program (UNEP). Since then, Sweden never looked back and while managing its economic substantial growth, it took many other significant initiatives including reducing pollution and carbon emissions, generating more than half of the national energy through renewable resources, enacting thorough legislation on reducing greenhouse gas emissions, etc. Low emissions, remarkably clean air, and clean water lead Sweden to stand among the top ten countries for more than a decade in the Environmental Performance Index, produced by Columbia University and Yale University. This is the outcome of the continued and focused efforts that Sweden is ranked second in the UN Sustainable Development Report (2021) and Global Innovation Index (2021), ranked first in 2021’s Global Sustainable Competitiveness Index (www.sweden.se). According to RobecoSAM²³ Country Sustainability Ranking 2022, out of 150 countries, Sweden stands second in the rank, only one rank behind Finland.

Continuing with its sustained efforts on the sustainability front, Sweden has taken another landmark step when recently the Sustainable Investment Forum (Swesif) of Sweden joined 7 other leading sustainable investment fora from across Europe as members of Eurosif (www.eurosif.org). The impact of Sweden’s sustainability-related policies, regulations, actions, and concerns was so huge and magnanimous that, today, most of the corporations and organizations in Sweden are actively engaged in sustainability practices. According to the Annual Accounts Act, sustainability reporting is compulsory for companies that meet certain conditions (www.fi.se). Since most of the listed companies in Sweden meet the criterion, therefore, Sustainability Reporting can be easily found for the listed companies in Sweden. Sustainability Reporting is about ESG factors. This is what stems from the second reason for choosing Sweden for the study purpose, that is, availability and easy access to data on ESG scores, working capital, and other control variables.

A6.4 Working Capital Management

Working capital is referred to as capital that is used by the business in its day-to-day trading operations. Gitman & Zutter (2015, p. 655) define working capital in their words as “*current assets, which represent the portion of the investment that circulates from one form to another in the ordinary conduct of business*”. Working capital is comprised of two main concepts: Gross working capital and net working capital. Gross Working Capital (GWC) is defined as the firm’s investment in current assets like cash, marketable securities, receivables, and inventory (Chandra 2019). Generally, gross working capital is also referred to as working capital. That is, mostly, these two terms are used synonymously in literature as well as in practice. Nonetheless, the concept of

²³ The RobecoSAM Country Sustainability Ranking is a comprehensive framework for analyzing countries’ performance on a wide range of ESG metrics. For more details visit: www.robeco.com.

Net Working Capital (NWC), also known as ‘net current assets’, essentially differs from the gross working capital and *mostly* defined as “*the difference between current assets and current liabilities*” (Zutter & Smart, 2022) or, *classically* defined as “*excess of current assets over current liabilities*” (Sagan, 1955, p.121). Whether traditional or classical, these definitions of net working capital indicate how much cash (or liquid assets) is available to satisfy the short-term cash requirements imposed by current liabilities (Preve & Allende, 2010, p.15).

Working capital is also known as “circulating capital” because of its very nature of continuous circulation in the business operation. Because of this nature (and strong potential to have impact on business operations, success, and survival), working capital demands proper and careful planning, organization, and control. This finance function falls under the domain of WCM, which is defined as “*the management of the current assets and current liabilities*” Gitman & Zutter (2015, p. 654). Because traditionally and conceptually, the life of current assets and current liabilities is defined as *less than one year* (that is, these resources have short life), therefore, management of these resources is also broadly termed as ‘short-term financial management’. Enqvist et al. (2013) assert that merely managing current assets and current liabilities is not enough, what is most important for all types of organizational forms is to achieve efficiency in managing these financial resources through, what they call, ‘efficient WCM’.



UMEÅ SCHOOL OF BUSINESS,
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Business Administration SE-901 87 Umeå www.usbe.umu.se