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Academic Chair in Financial Statement Analysis

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CEO characteristics and Working Capital Management: An Analysis of Cash Conversion Cycle Efficiency Across Non-Financial Firms

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Contents

1 Introduction

This thesis aims at analyzing the relationship between the personal characteristics of Italian CEOs and the Cash Conversion Cycle of firms, applying the conceptual framework provided by the Upper Echelons Theory, whereby the personal characteristics of executives "matter" in determining corporate outcomes. While the existing literature mainly focuses on the relationship between CEO characteristics and outcome variables such as financial and market performance, leverage, and the probability of engaging in M&A activities, this study explores working capital management as an operational channel through which CEO traits may influence firm outcomes.

The work is divided into seven sections.

Section 2 reviews the conceptual framework of the Upper Echelons Theory and addresses the main alternative theories and criticisms that have emerged over time.
Section 3 reviews theories on how to effectively measure and manage working capital, highlighting the trade-offs entailed by different strategies. In addition, it provides the definition of the Cash Conversion Cycle of a firm and argues that it is a good proxy for the efficiency with which companies manage their operating cycle.
Section 4 formulates various hypotheses about the relationship between CEO characteristics and the Cash Conversion Cycle, transposing the findings of numerous papers – which often use measures of profitability as dependent variables – to the context of operational efficiency.
Section 5 describes how different sources of data were matched to create the final dataset used in the analysis, and presents several data visualizations in the exploratory data analysis. The final dataset is a firm-CEO matched panel spanning the period from 2014 to 2023, containing 226 companies listed on the Italian Stock Exchange and 335 unique CEOs.
Section 6 is devoted to regression analysis.
Finally, Section 7 concludes by summarizing the main findings.

2 Upper Echelons Theory

In this section, I will review the conceptual framework of the Upper Echelons Theory (UET), starting from the paper of Hambrick and Mason written in 1984, which for the first time formally and systematically proposed to study how the values and cognitive bases of top managers influence organizational outcomes. Then, I will review subsequent developments in the UET literature, and I will conclude by addressing the main alternative theories and criticisms that have emerged over time.

2.1 Literature Review

The starting point of Hambrick and Mason is the model of strategic choice under bounded rationality, where a choice is typically classified as "strategic" if it involves setting the competitive position of the company in the market or changing its administrative organization in a major way (e.g., changing the reward system).

The Bounded Rationality Model argues that individuals make complex, strategic decisions not simply based on the "mechanical" optimization of a utility function that perfectly maps each possible scenario to an economic benefit, but also because they are driven by behavioral factors. In other words, decision makers act on the basis of their subjective representation of the environment rather than on its objective characteristics. Given that behavioral factors are largely personal (i.e., idiosyncratic), then strategic decisions will, at least to some extent, reflect the personal characteristics of the decision makers.

Examples of behavioral factors include overconfidence, risk aversion, loss aversion, and past-experience bias.

Overconfident CEOs tend to overestimate the expected returns of investment projects. Hence, they may overinvest accumulated internal funds in capital expenditures or mergers and acquisitions, believing that their projects are "unfairly" undervalued by the market and that they can offer superior profitability (Malmendier and Tate, 2005).

Risk-averse executives tend to favor conservative policies aimed at reducing uncertainty. In particular, they evaluate decisions relative to specific performance targets, such as minimum profit or cash flow levels, and prefer options that are likely to meet such targets even if alternative choices offer higher expected returns (March and Shapira, 1987).

Prospect Theory argues that individuals evaluate outcomes relative to a subjective reference point, and that they are loss averse, meaning that they weigh potential losses more heavily than equivalent gains (Kahneman and Tversky, 1979). For example, a manager may evaluate a cash flow of 90 as a loss if their reference point is 100, while another manager may perceive the same cash flow as a gain if their reference point is 80. In addition, a manager with a reference point of zero may perceive a loss of 100 as worse than a gain of 100. Consistent with this theory, managers may avoid exiting an unprofitable project when it implies recognizing losses, even if that would allow them to free resources and use them to undertake alternative projects with higher expected returns. The S-shaped value function proposed by Prospect Theory is shown in Figure 0 below.

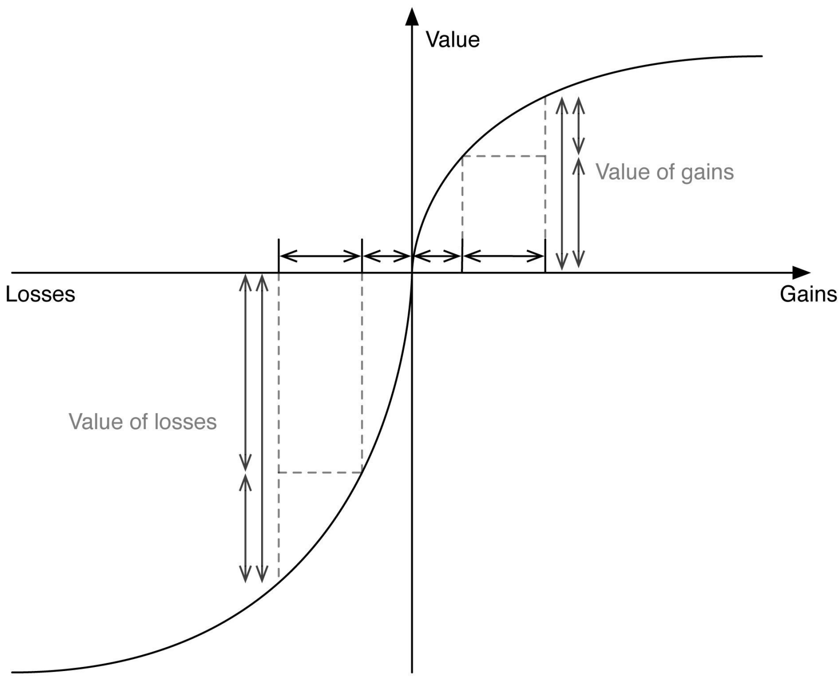

Figure 0: Prospect Theory and the value function. The figure shows the S-shaped value function proposed by Kahneman and Tversky (1979). The slope is steeper for losses than for gains, representing loss aversion: the psychological disutility of a loss is greater than the utility of an equivalent gain. Loss aversion is one of the many behavioral factors that may influence managerial behavior.

Finally, managers may replicate decision patterns that were successful in the past, even when the industry and the context are very different. For example, executives with prior experience in operations may emphasize efficiency and the optimization of internal processes, reflecting a cognitive basis shaped by their functional background (Hambrick and Mason, 1984).

Figure 1
Strategic Choice Under Conditions of Bounded Rationality

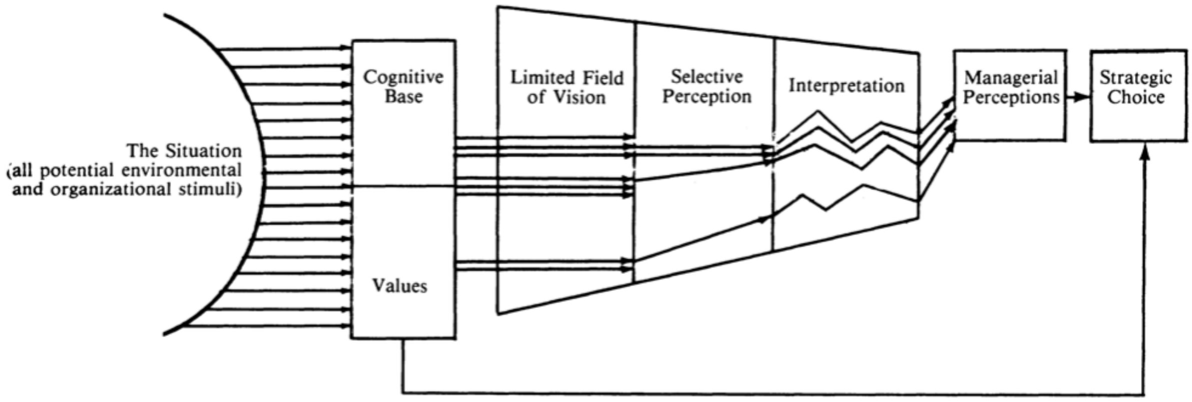

Figure 1: Strategic choice under conditions of bounded rationality. The figure shows how environmental and organizational stimuli are filtered through executives' cognitive base and values. Stimuli "pass through" managers' limited field of vision, selective perception, and interpretation. Finally, perceptions and values are the ultimate determinants of a strategic choice. Source: Hambrick and Mason (1984).

Starting from the left, the first step of Figure 1 shows that all stimuli (i.e., external inputs) are filtered through the cognitive base and values of the decision maker. The cognitive base includes (i) knowledge or assumptions about future events, (ii) knowledge of alternatives, and (iii) knowledge of consequences attached to alternatives, while values are defined as principles for ordering consequences or alternatives according to preference. The second step shows how the limited "field of vision" of decision makers restricts the stimuli they can analyze. Indeed, attention is a scarce resource (March and Simon, 1958), and managers can only see a fraction of the actual available options. In the third and fourth step, respectively, decision makers selectively perceive options they believe are pursuable and interpret them, forming their final perception of the situation. Finally, managers combine their perception of the situation with their values to form the basis for the strategic decision.

While Upper Echelons Theory "borrows" from the Bounded Rationality Model the idea that personal characteristics are a key determinant of strategic decisions, it develops its own framework applied to the corporate world.

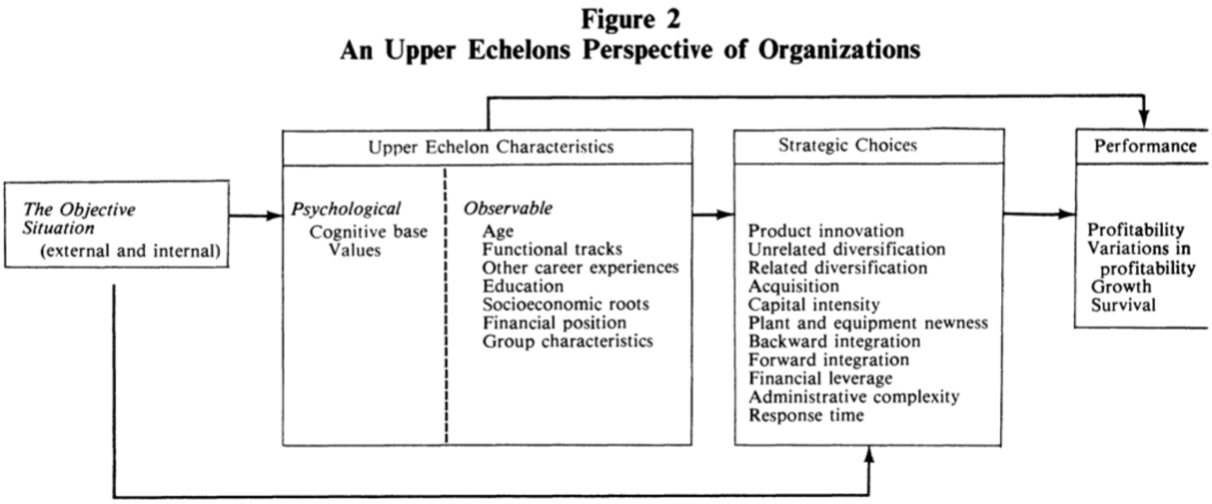

Figure 2: Upper Echelons Theory view on corporate decision making. The diagram illustrates the conceptual flow from the objective situation to organizational performance. Observable characteristics (age, functional tracks, . . .) proxy the cognitive base and values of managers, filtering strategic choices. These choices, in turn, determine firm performance and operational outcomes. Source: Hambrick and Mason (1984).

The diagram in Figure 2 is simpler than that in Figure 1 in terms of the description of the psychological process. However, it adds two key features that facilitate both the implementation and the direction of research. First, it proposes a range of observable characteristics that could proxy the cognitive base and values of managers, thus making research with observational data possible (otherwise, experimental data would be required). Second, it lists a number of corporate decisions that could be influenced by personal traits, and it maps them to relevant performance indicators.

At the same time, the second diagram proposes more elaborate contingency relationships between its components. First, it indicates that the combination of situational conditions and executives' personal characteristics will lead to strategic choices that could not be predicted as well by knowing only one of the two. Second, it offers a complete framework for interpreting organizational performance as the interaction of situational conditions, executive characteristics, and strategic choices (which are a function of the latter two).

In their paper of 1984, Hambrick and Mason also make key premises on what can and cannot be causally inferred from the application of their theory. First, there could be a reverse causality problem. Indeed, executives may be chosen because of previous organizational actions and performance. In this case, executive characteristics would be the outcome variables rather than explanatory ones. Second, one has to control for the different industry environments where executives operate, which structurally explain much of the variation both in executives' characteristics and in corporate performance (omitted-variable bias / industry-level endogeneity). For instance, the average age of executives in the tech industry may be structurally lower than in the railway industry, and corporate outcomes such as sales growth are also likely to differ in a structural way between the two industries.

In the subsequent empirical part of the thesis, I partially address these two concerns. For what concerns reverse causality, I add several financial controls that mitigate the risk that CEO characteristics are merely the reflection of the firm's prior performance or financial conditions. Regarding industry-level endogeneity, I include industry fixed effects to account for structural differences in the Cash Conversion Cycle and CEO demographics across sectors. Furthermore, I also include year fixed effects to control for temporal macroeconomic shocks, which may explain much of the performance of a given industry in a given year.

In 2007, Hambrick and Mason published a follow-up paper proposing two mediating factors between executives' characteristics and corporate performance, namely managerial discretion and executive job difficulty. Furthermore, they discussed the "black box problem" of underlying social and psychological processes, and they further addressed the issues of reverse causality and endogeneity.

Managers can exercise discretion, that is, choose between multiple alternatives, whenever they are unconstrained by both external variables – such as environmental conditions (e.g., low industry growth) and organizational factors (e.g., a strong board) – and internal variables, such as a low tolerance for ambiguity. The authors argue that personal characteristics are a good and useful predictor of corporate performance in direct proportion to managerial discretion.

In addition, they discuss the role of corporate nationality as a major determinant of both managerial discretion and heterogeneity. For instance, French CEOs tend to have uniform backgrounds, Japanese ones are relatively constrained in their actions, and American ones exhibit, in general, a higher degree of discretion. This discussion has implications for the sample of Italian firms I analyzed in later sections. Indeed, for reasons of proximity and culture, Italian CEOs are more likely to be similar to French rather than American ones, and low variability in personal characteristics may reduce the robustness of the analysis. Using a 10-year panel of listed firms from a variety of different sectors partially addresses the issue of low variance in the independent variables, as CEOs in different sectors are more likely to differ than in any one given sector.

The second mediating factor Hambrick and Mason propose is executive job demands, which may depend on task challenges (e.g., difficult strategic conditions), performance challenges (e.g., demanding owners or board) and executive aspirations (e.g., a strong personal desire to deliver maximum performance). The more demanding their job, the more CEOs are likely to resort to the behavioral factors discussed above, such as deciding based on past experiences or heuristics.

Concerning the "black box problem" of the unknown social and psychological mechanisms that link personal characteristics to strategic decisions, the authors argue that experimental data obtained from strategy simulation games where executives are presented with more information than they can possibly handle, could provide a solution. However, obtaining this sort of experimental data is very unlikely. Recent advances in artificial-intelligence-based techniques may partially address this limitation by allowing researchers to infer cognitive traits and decision styles from observable behavior such as the vocal acoustic features in CEOs' earnings conference call recordings, used to construct a machine-learning-based measure of CEO depression (Golshan and Cheng, 2024).

The follow-up paper of 2007 discusses ways to address the problems of reverse causality and endogeneity, already mentioned in the 1984 paper. As for a typical issue of reverse causality, the authors propose the example of executives with an abundance of technology expertise. In a cross section, they are more likely to invest a great deal in R&D not necessarily because they have a background in technology, but because they are typically drawn to R&D-intensive companies. Panel datasets could address the problem of reverse causality by establishing a clear time ordering between CEO characteristics and subsequent corporate policies. For example, they may relate R&D_t to CEO characteristics measured at $t-1$ or earlier.

Finally, the problem of endogeneity consists in CEOs taking actions that reflect their personal traits not because of their biased information processing, but because the board hires them specifically because it believes they have the necessary characteristics to execute a specific mandate. Hambrick and Mason propose the example of an outsider CEO taking major changes of course in strategy. He does so not because of a particular open-mindedness, but rather because he is executing the board's desire for change. Endogeneity can be addressed with an instrumental variable, i.e., a truly exogenous one, measuring the likelihood of the independent variable. In this case, the endogenous independent variable would be CEO open-mindedness – for example, proxied by outsider status or career diversity – and the instrument must predict the likelihood of observing such open-mindedness while being plausibly unrelated to firm performance, except through its effect on open-mindedness.

2.2 Criticisms

Criticisms of Upper Echelons Theory question whether executive characteristics can be treated as independent drivers of corporate performance. Indeed, alternative theories argue that other factors, such as pre-determined organizational paths, environmental constraints, governance mechanisms, and institutions are the primary determinants of firm behavior, and that executive characteristics may be the result of these factors, rather than being truly exogenous variables.

Organizational Ecology argues that a combination of the environment in which firms operate – defined as the set of competitive, technological, and institutional conditions – and structural inertia, i.e., the tendency of organizations to preserve existing structures and routines, determines corporate behavior. Organizations are viewed as relatively rigid entities, and executives are selected to fit organizational paths that have already been determined, rather than to shape them. This implies an endogeneity problem, as the selection of executives is not random. Given that executive characteristics are the outcome of organizational selection, rather than independent drivers of firm behavior, it is difficult to disentangle actual managerial effects from underlying organizational constraints (Hannan and Freeman, 1989).

According to Agency Theory, the discretionary power of managers is constrained by the contractual relationship they have with shareholders. Executives make decisions within a framework of governance structures and incentive schemes, which are designed to align managers' actions with owners' interests (Jensen and Meckling, 1976). If managers are effectively monitored by the board of directors, then corporate performance reflects the efficiency of these control mechanisms rather than the personal cognitive biases or background of executives.

Institutional Theory claims that firms have a need for legitimacy within the institutional environment in which they operate. To achieve legitimacy, companies that operate in the same institutional environment tend to adopt similar organizational structures and practices, driven by formal rules and regulations, informal practices, professional standards, and deeply rooted cognitive models of what is considered appropriate organizational behavior. This tendency of firms to become increasingly similar over time under institutional pressures is known as institutional isomorphism (DiMaggio and Powell, 1983). Given that greater conformity is associated with organizational stability, while lack of conformity may reduce legitimacy and support from institutional actors, managers tend to act in ways that maximize conformity to institutional expectations. This implies a limited role for discretionary decision-making driven by managers' individual cognitive base or personal experience.

3 The Operating Cycle of Companies

Closely following the approach of the book Finance for Executives (Hawawini and Viallet, 2015), in this section I will review theories about how to effectively evaluate the operating cycle of companies. Furthermore, I will discuss the trade-offs between liquidity, risk, and profitability, describing different working capital management strategies. I will conclude with the description of the Cash Conversion Cycle (CCC) metric, arguing it is a good proxy for operational efficiency, and hence a good dependent variable for the subsequent empirical part of this work.

3.1 Working Capital Requirement: Overview

Liquidity is defined as the company's ability to meet recurring cash obligations. Typically, companies implement a matching strategy to liquidity, financing long-term investments (e.g., PP&E) with long-term funds (i.e., equity capital and long-term debt), and short-term investments (e.g., cash) with short-term debt, with cash being residually funded by short-term liabilities at the end of the period. This approach minimizes the risk of not being able to finance the asset over its entire useful life. While determining the nature and type of financing for net fixed assets and cash is straightforward, applying the matching strategy to working capital is more complex. The working capital requirement (WCR) is defined as follows:

$$
\begin{aligned}
\text{WCR} &= (\text{Operating Assets} - \text{Operating Liabilities}) \\
&= (\text{Accounts Receivable} + \text{Inventories} + \text{Prepaid Expenses}) \\
&\quad - (\text{Accounts Payable} + \text{Accrued Expenses})
\end{aligned} \tag{1}
$$

In theory, in the managerial balance sheet the WCR should be classified as a short-term investment, because it includes current assets that convert into cash in one year or less, and current liabilities that are due within the same time horizon. However, while any given current asset and liability will "exit" the WCR over a short period of time, it will be replaced by new current assets and liabilities, since the operating cycle, as shown in Figure 3 below, continuously repeats itself.

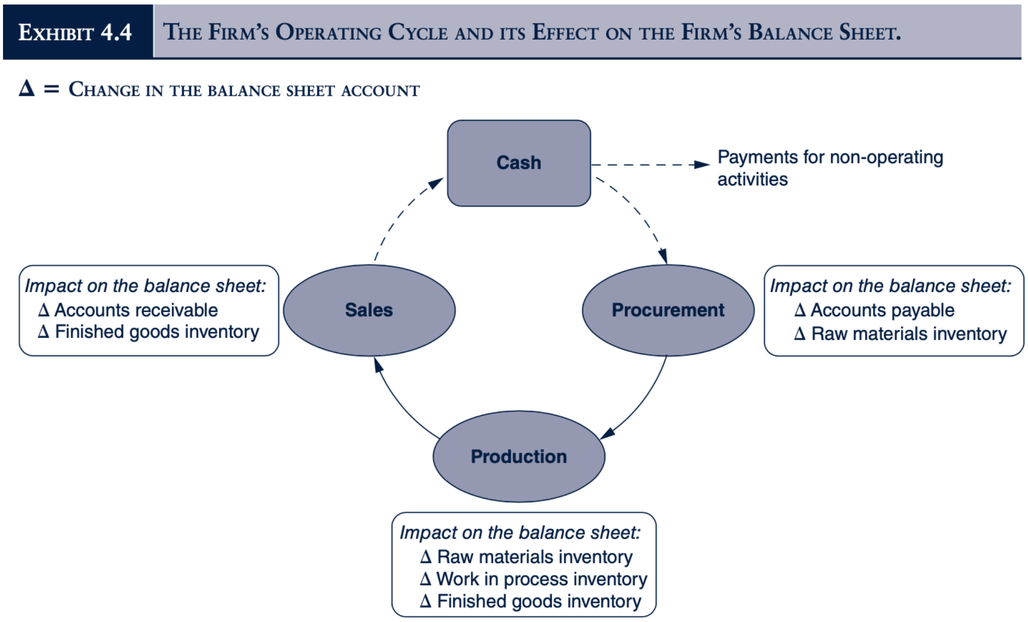

Figure 3: The firm's operating cycle and the dynamics of working capital. The operating cycle moves from cash to procurement (raw materials), through production, and finally to sales (accounts receivable) before returning to cash. Each stage of the cycle triggers a corresponding change in the balance sheet's current assets and liabilities, showing that WCR is a permanent investment rather than a temporary one. Source: Hawawini, G., and Viallet, C. (2015), Finance for Executives.

The conclusion of one stage (e.g., the collection of receivables) typically overlaps with the beginning of the next (e.g., the procurement of new raw materials). Hence, working capital remains relatively stable over time. However, inefficiencies in one of the stages, such as delays in production or slower collection of receivables from clients, would inflate the WCR. Similarly, improvements in efficiency or bargaining power (e.g., the possibility to pay suppliers over a longer time horizon) would decrease the WCR, thereby releasing capital to finance other investments.

Given the discussion so far, there is a solid theoretical argument to finance permanent working capital with long-term funds. However, in practice, a significant portion of it is financed with short-term debt. Among others, this may be due to the seasonal nature of some businesses, where sudden increases in sales require additional operating investments that cannot be efficiently financed with long-term capital.

In general, net long-term financing (NLF) is defined as long-term financing (LF) in excess of net fixed assets (NFA), and it can be used to fund WCR. In formula:

$$\text{NLF} = \text{LF} - \text{NFA} \tag{2}$$

Similarly, net short-term financing (NSF) is defined as short-term financing (SF) that is not used to finance the firm's cash position, and it can also be used to fund WCR. In formula:

$$\text{NSF} = \text{SF} - \text{Cash} \tag{3}$$

From an accounting perspective, since NLF and NSF are sources of funds and WCR is the use of those funds, the following identity holds:

$$\text{NLF} + \text{NSF} = \text{WCR} \tag{4}$$

Rearranging the equation, we get that:

$$\text{NSF} = \text{WCR} - \text{NLF} \tag{5}$$

The result shows that, all else being equal, an increase in working capital determines a rise in short-term financing, which increases refinancing risk and reduces financial stability, as a larger share of working capital becomes exposed to short-term funding constraints and rollover risk.

Finally, the liquidity ratio (LR) is the proportion of working capital that is financed with long-term funds:

$$\text{LR} = \frac{\text{NLF}}{\text{WCR}} \tag{6}$$

This metric does not capture liquidity in the traditional, static sense. For instance, the current ratio measures short-term solvency by comparing total current assets to short-term liabilities. Similarly, the quick ratio excludes inventories from current assets and focuses on the most liquid components, such as cash, cash equivalents, and accounts receivable. LR, instead, captures the extent to which the maturities of operating investments and their sources of funding are aligned. A higher LR implies lower refinancing / rollover risk and greater financial stability, as a smaller share of working capital is exposed to maturity mismatch risk.

Given the focus of this work on UET, a necessary clarification must be made about the negative relationship between WCR and liquidity. Indeed, it would be misleading to conclude that, among companies of similar size, some have lower WCR simply because they are more efficient, and that the personal characteristics of their executives is what determines the effective management of the operating cycle.

Such line of reasoning would neglect the sectoral nature of working capital, and the greater operating investments driven by sales growth. In the subsequent empirical analysis, I will use sector fixed effects to account for structural differences across sectors, and I will control for sales growth thanks to a dataset comprising a decade of firm-level data, from which it is possible to derive changes in variables. Both conditions are not sufficient to state any causal relationship between CEO characteristics and managerial efficiency in the operating cycle, but they would at least make it possible to identify meaningful associations between the two.

Exhibit 5.6 Some Benchmark Ratios of Working Capital Requirement to Sales for a Sample of US Economic Sectors in 2017.[1]

Working capital requirement as percentage of sales

Sector		Sector	
Iron & steel mills	27%	Merchant wholesalers: nondurable goods	10%
Textile mills	23%	Wood product manufacturing	10%
Aircraft manufacturing	21%	Drilling oil & gas wells	9%
Machinery manufacturing	18%	Computer systems design & related services	8%
Motor vehicle manufacturing	18%	Natural gas distribution	8%
Plastics & rubber products manufacturing	16%	Soap & cleaning compound manufacturing	6%
Leather & allied product manufacturing	16%	Electric power generation	5%
Computer & peripheral equipment manufacturing	15%	Grocery stores	0%
Beverage manufacturing	14%	Warehousing & storage	0%
Merchant wholesalers: durable goods	13%	Air transport	–2%
Food manufacturing	13%	Publishing industries (except Internet)	–6%
Department stores	11%	Accommodation	–6%
Average all sectors: 10%			

[1] Source: Calculated by the authors using Compustat data.

Figure 4: Working capital requirement as a percentage of sales by industry. This figure shows the average WCR-to-sales ratio across different sectors. There is strong variation between capital-intensive industries with high ratios, such as textile mills and primary metals, and service industries with lower or negative ratios, such as air transport and hotels.

3.2 Working Capital Management Strategies

Liquidity should not be analyzed as a standalone dimension, but rather be related to profitability and operating risk, with which it is deeply intertwined.

Prior to analyzing how the management of the operating cycle can affect profitability, it is necessary to clarify the distinction between WCR, the metric used so far, and the net working capital (NWC). WCR, the difference between operating assets and operating liabilities, measures the investment in the operating cycle, while NWC measures the solvency of the company over a short-term horizon. In other words, NWC represents what is left after the company sells all current assets and pays all short-term liabilities both to trade partners and to financial institutions. Mathematically, the NWC equals WCR adjusted for the firm's net short-term financial position. This relationship is summarized in Table 1:

Table 1: Relationship between WCR and NWC

Metric	**Formula**	**Economic Nature**
WCR	$A_{op} - L_{op}$	Operating Investment
ST NFP*	ST Debt $-$ Cash	ST Net Financial Position
NWC	**WCR - ST NFP**	**Short-term Solvency**

**This variable was defined as net short-term financing (NSF) in Subsection 3.1.*

Profitability is measured with the Return on Capital Employed (ROCE):

$$\text{ROCE} = \frac{\text{NOPAT}}{\text{Net Capital Employed}} = \frac{\text{NOPAT}}{\text{Net Fixed Assets} + \text{NWC}} \tag{7}$$

The denominator of the ROCE includes NWC because Net Capital Employed, the basis on which the return is measured, is the sum of Net Fixed Assets (NFA) and NWC. This sum represents the total investment that the firm must fund through permanent sources of capital, that is, Equity and Long-term Debt.

While the WCR measures the capital strictly absorbed by the operating cycle, the NWC reflects the firm's net requirement for permanent funds. NWC captures the portion of current assets that is not financed by operating payables or short-term bank loans.

Therefore, this “remaining” part of current assets must be financed by permanent sources, such as Equity or Long-term Debt.

Mathematically, this logic can be observed in the managerial balance sheet identity:

$$\text{NFA} + \underbrace{\text{WCR} - \overbrace{(\text{ST Debt} - \text{Cash})}^{\text{Net ST Financial Position}}}_{\text{NWC}} = \text{Equity} + \text{LT Debt} \tag{8}$$

It is interesting to notice that using WCR instead of NWC in Equation 7 would overlook the negative effect of holding excess cash on profitability. Holding one additional euro of cash inflates the denominator (Net Capital Employed) while contributing marginally to the numerator (Net Income), as the interest earned on cash is typically lower than the operating return generated by the firm’s core assets. This results in a dilution of the ROA.

Even if the CEO manages the operating cycle primarily through WCR, the impact on profitability is mediated by the NWC. As argued by Shin and Soenen (1998), an excessive WCR inflates the NWC, creating an opportunity cost that reduces the return on total capital employed. Similarly to the case of excess cash, every additional euro trapped in the WCR reduces profitability, as it represents capital that could have been more productively deployed elsewhere or returned to investors.

Working capital management involves a trade-off between profitability, liquidity, and operating risk. As already mentioned, if a firm decides to improve its efficiency by reducing the WCR, this will boost its profitability because it employs less capital to generate roughly the same earnings. However, operating risk would also increase. Indeed, a low WCR reduces the firm’s ability to absorb unexpected shocks, for instance when an important customer delays payment. In this case, lower inventories and receivables would imply fewer buffers to keep operations going. The company would risk running out of cash, which may result in short-term borrowing from a bank or in scaling back operations.

From the accounting identity derived in the previous subsection, $\text{NLF} + \text{NSF} = \text{WCR}$, given the difficulties in attracting long-term financings in the short term, any increase in WCR must be met with an increase in short-term debt. As discussed in the previous subsection, greater reliance on short-term debt increases refinancing risk and weakens the liquidity position of the firm, since the mismatch between operating assets and their financing widens. The inverse relationship between the proportional reliance on short-term debt to finance WCR and liquidity can be seen by re-writing the equation of the liquidity ratio:

$$\begin{aligned} \text{LR} &= \frac{\text{NLF}}{\text{WCR}} \\ &= 1 - \frac{\text{NSF}}{\text{WCR}} \end{aligned} \tag{9}$$

Setting aside the role of non-justifiable inefficiencies, a firm's level of working capital seems to reflect how managers want to strategically position it in the risk-return tradeoff. Companies with lower WCR prioritize capital efficiency and profitability at the expense of greater operating and liquidity risk, while companies with higher WCR weight business continuity and low risk more, at the expense of profitability. These alternative approaches are described in the literature as respectively "aggressive" and "conservative" working capital management strategies. As discussed by Weinraub and Visscher (1998), aggressive working capital strategies are associated with lower investments in current assets and a greater exposure to liquidity risk, while conservative strategies rely on higher levels of current assets and more stable funding, prioritizing operational continuity over profitability.

Reasoning about working capital strategies in terms of associated costs, the "carrying cost" of a conservative strategy is the opportunity cost of tying up capital in inventories and receivables plus the related storage and management costs, while the cost of an aggressive strategy consists of increased risks of production delays, stock-outs, or costly reliance on short-term funding when operations are hit by shocks (Brealey, Myers, and Marcus, 2022). Finally, a moderate strategy will attempt to find an optimal level of working capital that minimizes the total cost arising from the two strategies.

The discussion so far is summarized in Table 2:

Table 2: Comparison of working capital strategies

Strategy	WCR	Liquidity	Solvency	ROA	Risk
Aggressive	Low	Low	Low	High	High
Moderate	Balanced	Balanced	Balanced	Moderate	Moderate
Conservative	High	High	High	Low	Low

3.3 The Cash Conversion Cycle

The efficiency with which executives manage the operating cycle can be measured with the Cash Conversion Cycle (CCC). The CCC measures the average time that elapses between the cash outflows required to finance operating inputs – such as payments to suppliers for raw materials or goods – and the cash inflows generated by sales to customers.

Figure 5: The CCC and its components. At the top, the diagram illustrates the temporal relationship between the investment in inventories (Days Inventory Outstanding, DIO) and receivables (Days Sales Outstanding, DSO). At the bottom, it shows the offsetting effect of supplier financing, represented by the length of the average payment period (Days Payables Outstanding, DPO). The resulting CCC represents the net duration during which cash remains committed to operations. Source: Bozzolan, S., Financial Statement Analysis lecture slides.

As illustrated in Figure 5, the CCC is constructed by combining three distinct stages of the operating cycle. First, cash is invested in inventories, and it remains tied up until goods are produced and sold. Second, once a good is sold, cash remains locked in accounts receivable until customers make the actual payment. These two stages represent periods during which the firm's financial resources are committed to operations. Third, part of this commitment is offset by trade credit, as suppliers allow the firm to delay payments for production inputs. The time during which suppliers are not yet paid effectively represents a source of short-term financing for the firm. Overall, the CCC captures how long, on net, financial resources remain committed to the operating cycle before returning to the firm as cash (Deloof, 2003).

In formula, CCC is the sum of the time cash is tied up in inventories, known as Days Inventory Outstanding (DIO), and receivables, or Days Sales Outstanding (DSO), minus the time during which suppliers finance the firm through payables, or Days Payables Outstanding (DPO). The definitions of DIO, DSO, and DPO follow:

$$\begin{aligned} \text{DIO} &= \frac{\text{Inventories}}{\text{COGS}/365} \\ \text{DSO} &= \frac{\text{Accounts Receivable}}{\text{Sales}/365} \\ \text{DPO} &= \frac{\text{Accounts Payable}}{\text{COGS}/365} \end{aligned} \tag{10}$$

Finally, CCC is defined as:

$$\text{CCC} = \text{DIO} + \text{DSO} - \text{DPO} \tag{11}$$

The Cash Conversion Cycle captures how long working capital is committed to operating activities. A longer CCC implies that financial resources are tied up for longer in the different stages of the operating cycle, such as the transformation of inventories into final products and the collection of receivables. A shorter CCC implies that capital is recovered faster relative to its initial deployment. Given its negative association with the duration of capital commitment, CCC has been taken in the literature as a proxy for operating efficiency (Wang, 2019).

However, proxying operating efficiency with CCC is not always straightforward. Indeed, in periods of fast business expansion and in some sectors, the CCC may be deliberately maintained at higher levels. In these cases, a high CCC is the outcome of a strategic choice, rather than the outcome of operating inefficiency.

Given the discussion so far, CCC should be interpreted as a measure of operating efficiency conditional on specific business conditions (such as high growth) and sector-specific characteristics.

4 Hypotheses

In this section, I will connect the general principles of UET exposed in Section 2, which form the theoretical basis for the choice of the independent variables of this work, with the discussion on the dependent variable, the CCC, made in Section 3. The resulting hypotheses will be empirically tested in Section 6.

Studies have shown that the relationship between CEO age and efficiency is driven by various and often conflicting forces, such as the desire to signal one's ability at early career stages, human capital accumulation, and risk aversion.

Prendergast & Stole (1996) argue that in the early stages of their career CEOs are very concerned with signaling their ability to the market. They do so by reacting very fast to new information, and this comes at the risk of overinvesting. Hence, younger CEOs may adopt relatively more aggressive strategies in working capital management (WCM). At the same time, CEOs typically enhance their human capital as they grow older, since they acquire greater industry experience.

Becker (1964) proposes a theory of diminishing marginal returns to human capital. This translates into a concave function, which is very steep early on, when each additional year of age significantly increases human capital, and becomes flatter over time, when the positive effect of age on human capital tends to disappear. The Human Capital Theory would point to a relatively more aggressive WCM strategy for older CEOs.

The prevailing force between signaling and human capital accumulation will shape the relationship between age and CCC, especially when holding constant the psychological condition of the CEO. Human capital is likely to prevail because accumulated experience improves decision quality and operational efficiency, reducing the need for precautionary working capital buffers.

Serfling (2014) finds that a one-standard-deviation increase in CEO age (approximately 6 and a half years) is associated with a 10% decrease in the volatility of stock returns. He also shows a negative relationship between age and cash flow volatility. The proposed mechanism goes through a change in CEOs' psychological condition, with older CEOs becoming more risk-averse, which may imply a more conservative approach to

WCM for the latter.

The relatively conservative stance of older CEOs is also studied by Orens and Reheul (2013). They show that, in a sample of Belgian small and medium-sized enterprises, firms led by older CEOs tend to hold higher levels of cash to avoid liquidity shortfalls, implying greater risk aversion. This, again, may translate into negative association between age and CCC.

Finally, Miller (1991) finds that at some point late in their career CEOs tend to become more mentally rigid, applying fixed heuristics for decision-making and slowing the adoption of new technologies.

If the positive human capital effect prevails early on, and the negative effects from increased risk aversion and cognitive rigidity eventually take the lead, then the relationship between age and CCC could be U-shaped (convex).

H1: CEO age has a U-shaped relationship with the Cash Conversion Cycle.

In financial literature, tenure is typically taken as a proxy for managerial ability, defined, among others, as the ability to transform corporate resources into revenues (Demerjian et al., 2012). If longer tenured CEOs are more managerially capable, given that they have been confirmed in their role most likely because of satisfactory corporate performances, then one would expect the company they lead to relatively efficiently transform working capital invested in inventories and receivables into sales and cash flows, thereby shortening the CCC.

Fee and Handlock (2003) study the relationship between tenure and the probability of turnover, finding that CEOs that have delivered top-quartile stock market performance have lower turnover probability, while CEOs that ranked in the bottom quartile have greater turnover probability. This suggests a "selection effect", whereby more capable CEOs stay longer in their role because shareholders are pleased with what they have accomplished.

By interacting a cumulative abnormal return (CAR) variable with CEO tenure, Luo (2005) finds that, as tenure increases, CAR becomes strongly and positively associated with the probability of following through with an announced deal. More managerially capable managers successfully complete the deal if the market reacts positively, and withdraw if the reaction is negative. This implies an ability not only to "read" the market, but also to act accordingly when the response is positive, thereby delivering on their initial announcement. Luo finds that managers' greater ability to align investments with market opportunities (a good opportunity exists if the market reacts positively) kicks in, on average, after a learning period of two to three years in their role.

Custódio et al. (2013) define generalist skills as human capital that can be transferred across different industries and firms, measuring it with a General Ability Index (GAI) based on five CEO characteristics: past number of positions, number of firms, number of industries, experience as CEO at another firm, and experience in a conglomerate company. Conversely, they define firm-specific skills as non-transferrable human capital, such as knowledge of a firm's technologies, business processes, and informal communication networks. While generalist CEOs are associated with more positive market reactions when announcing a deal, and they are typically paid more in firms with high organizational complexity (measured by product and geographic diversification), the pay gap disappears in niche sectors, where firm-specific skills are as valuable as generalist skills. Moreover, when companies perform negatively in terms of stock price, specialist CEOs have lower turnover probability, which points to the fact that their specific operational knowledge of the company would be too costly to replace.

While the literature summarized above overwhelmingly suggests a negative relationship between tenure and CCC driven by efficiency gains, alternative theories argue that longer-tenured CEOs may become "entrenched" in the company, as predicted by managerial entrenchment theory (Shleifer and Vishny, 1989), potentially prioritizing stability and personal control over operational efficiency. In such cases, longer tenure could be associated with more conservative working capital policies and a longer CCC.

H2: CEO tenure is negatively associated with the Cash Conversion Cycle.

The third area of interest of this study is the relationship between CEOs' functional background, in particular in finance, and the strategic priorities they focus on. Different professional histories, indeed, are likely to influence both the training and cognitive base of CEOs. For example, one may expect CEOs with a marketing background to focus more on sales growth, those with an operations background to strengthen production processes and improve the cost structure, and those with a financial background – say in planning and control – to optimize cash flows and maximize capital efficiency.

Using a large sample of US public companies, Custodio and Ferreira (2014) build a dummy variable equal to one if a number of conditions that may entail financial expertise are met. These conditions can be broadly divided into previous functional financial roles (e.g., CFO, controller, treasurer, ...) and previous banking or investment roles (e.g., in investment banking, corporate banking, and asset management ...). The outcome variable is the cash ratio $\left(\frac{\text{Cash+ST Investments}}{\text{Total Assets}}\right)$. Given a dummy coefficient of -0.014, the authors find that financially sophisticated CEOs have, on average, a 1.4% lower cash ratio than non-financial expert CEOs. Since the sample average cash ratio is 15.5%, this translates into cash holdings being approximately 9% lower than the average $\left(\frac{0.014}{0.155} \approx 0.09\right)$. The efficient use of resources by financial expert CEOs may imply that they tie less capital up in the operating cycle, potentially resulting in a lower CCC.

Greater sophistication in financial decisions by CEOs with previous experiences in financial roles is also documented by Graham, Harvey, and Puri (2013). They administer a psychometric survey to a large sample of more than 1,000 CEOs of European and US public and private companies, dividing their backgrounds into "Finance", "Operations", "Marketing", and "Sales". They find that CEOs with a financial background are more likely to apply sophisticated financial tools in their decision-making processes. Among others, in a Probit regression analysis, a positive and statistically significant coefficient on the financial track variable indicates that financial expert CEOs are more likely to base their capital budgeting decisions on NPV and IRR techniques rather than non-financial criteria.

H3: CEO financial expertise is negatively associated with the Cash Conversion Cycle.

The fourth hypothesis investigates the role of CEO gender on the management of the operating cycle. Prevailing literature suggests that female executives tend to be more risk-averse and less prone to overconfidence than their male counterparts.

Huang and Kisgen analyze the relationship between gender and a series of outcome variables, like the probability of making an acquisition, the reaction of the market to its announcement, and the probability of issuing bonds. They use a large sample of American firms spanning the period 1993-2005, with about 16,000 managers tracked over time and 2,000 firm-level observations per year. The percentage of women CEOs in the entire sample is only 4%, similar to the sample I analyzed in Section 5. The structure of the dataset allows them to find 111 transitions from male to female CEO. The treatment group includes firms that have experienced a gender transition, while the control group includes firms that have changed between male CEOs. Using a Probit regression and a Difference-in-Differences (DiD) causal identification strategy, they find that companies in the control group have a 2 percentage points higher probability of making an acquisition, and a 20% percentage points higher probability of issuing bonds, signaling more aggressive growth and financial strategies. In addition, the authors find that the CAR after the announcement of an acquisition, the "announcement return", is 2 percentage points lower for men, consistent with higher overconfidence among male CEOs.

Faccio et al. investigate the effect of CEOs' gender on leverage. They use a huge sample of public and private firms from 17 European countries, with millions of observations covering the decade 1999-2009. They adopt a Propensity Score Matching (PSM) methodology to control for the fact that firms with given characteristics, such as size, sector, and profitability, may be more likely to hire a female CEO. With a Logit regression, they find the theoretical probability that different companies have to hire a female CEO in year $t-1$, and they match them based on the nearest propensity score. In this way, the treatment group of female-led firms and the control group of male-led ones are perfectly balanced across all financial and sectoral dimensions. The authors find that observations in the treatment group have, on average, a 2% lower leverage ratio.

Given that the literature points to a more conservative behavior of female CEOs both in external actions, such as acquisitions and debt issuances, and internal decisions, such as the choice of the target capital structure, it is reasonable to presume a more conservative behavior also with regard to working capital management, potentially leading to a longer Cash Conversion Cycle. A deviation from this result may suggest the existence of a "selection effect", whereby, given that much fewer women reach the CEO position, those that arrive there have distinctively high ability, thereby reducing the CCC.

H4: CEO's female gender is positively associated with the Cash Conversion Cycle.

As for the analysis of education, as explained more in detail in Section 5, in the empirical analysis I did not use an ordinal variable, because distinguishing between bachelor and master degree would have been misleading in Italy, given that most CEOs graduated in a period when only single-cycle degree existed. In addition, treating PhD as superior attainment to MBA would also have been misleading, since the two capture different dimensions of education, rather than hierarchical ones. MBA captures formal management education, while PhD research expertise in a specific field.

H5: Having an MBA and having a PhD have different associations with the Cash Conversion Cycle.

My hypothesis on the effect of the MBA is based on Bertrand and Schoar (2003). They use a panel dataset of the biggest 800 US public companies that spans 31 years, from 1969 to 1999. They filter the dataset, keeping only those companies where an individual who has been among the top five highest-paid executives there has also been in the top management team of another company in the same dataset. After this process, they are left with 503 companies and 598 switching managers. In this way, for each given executive, they have at least two companies. The logic is that if manager x switched from firm A to firm B and – after controlling for a series of factors – a series of performance indicators change, then the change is attributable to x rather than the intrinsic characteristics of A and B. Empirically, the authors' first step is to show that executives matter.

First, running an F-test on all 598 dummy variables that capture manager fixed effects, they obtain very high statistical significance (after accounting for firm and year fixed effects). Afterwards, the authors investigate whether manager fixed effects are correlated to having an MBA, which is an observable characteristic. They test whether the average coefficient for executives with an MBA is different from the non-MBA group. Overall, they find that executives with an MBA are associated with 3.15% more leverage, a 5.43% greater probability of distributing dividends, a 1.02% higher ROA, and a 1 percentage point lower cash-to-assets ratio. The last result may signal a lower tolerance for inactive liquidity among MBA graduates, which may result, in the context of this study, in a lower CCC.

H5.1: Having an MBA is negatively associated with the Cash Conversion Cycle.

Gottesman and Morey (2006) use a cross-sectional dataset of US public firms to analyze the impact of different types of CEO degrees (Undergraduate, MBA, Juris Doctor, and PhD) on performance, as measured by Tobin's Q $\left(\frac{\text{Total Market Value of the Firm}}{\text{Total Asset Replacement Cost}}\right)$, ROA and stock returns. After filtering for only those companies for which the CEO educational level is available, they are left with 500 firms. They find a negative association between the PhD dummy and all performance indicators, with moderate significance only observed for ROA.

CEOs with a PhD are typically specialists with a STEM technical background, and they may focus relatively more on product design and engineering compared to cash flow optimization. Given that CEOs with a PhD are typically found in sectors such as Pharma and High Tech (e.g., semiconductors), where production quality and continuity are particularly important, their product focus may entail a relatively longer DIO, since in those sectors inventory is typically seen as a strategic resource rather than a burden. A longer DIO would directly imply a longer CCC.

H5.2: Having a PhD is positively associated with a longer Cash Conversion Cycle.

The sixth and final hypothesis relates the size of the CEO's network to their efficiency in managing working capital. Using a sample of 1,949 US firms and 2,500 unique CEOs over the period 2000-2007, Engelberg, Gao, and Parsons (2013) investigate whether better-connected CEOs are paid more, and whether this greater compensation is justified by superior corporate performance. The main independent variable is the weighted sum of a CEO's connections. The weight depends on the importance of the connection (e.g., the CEO of a larger firm is weighted more than a board member of a smaller one), and a connection between two individuals in the `BoardEx` database exists if (i) they attended the same university in the same period, (ii) they worked at the same company, or (iii) they participated in other organizations such as sports and charitable associations.

Authors find that a one standard deviation increase in the weighted network measure is associated with a 9.1% increase in compensation, a 50 basis points increase in ROA, a 6.5% increase in Tobin's Q, and a 12 basis points decrease in the credit spread on bank loans. They justify their results by claiming that better-connected CEOs have greater access to private information, which in turn may result in greater investment efficiency. In addition, they argue that the lower cost of debt may derive from a stronger track record of reliability with banks, obtained thanks to the many connections accumulated over their lifetime.

The findings by Engelberg et al. may suggest a negative association between CEO connectedness and working capital efficiency, as the former could be used to obtain better conditions from customers (shorter DSO) and, even more so, suppliers (longer DPO). Alternative results could be justified by the Managerial Entrenchment Theory developed by Shleifer and Vishny (1989), which suggests that CEOs may increase their network through personal ties and reciprocal favors at the expense of market discipline and efficiency.

H6: Log-transformed CEO network size is negatively associated with the Cash Conversion Cycle.

5 Data

In this section, I will describe how I collected, cleaned, and integrated different datasets. Furthermore, I will perform an exploratory data analysis and several statistical tests. This section is structured into three parts: the first analyzes CEO-level data, the second firm-level financial data, and the third the final merged dataset used for regression analysis.

The analysis is based on four datasets for Italian listed companies. Three of them contain different sets of characteristics of the CEOs, while the fourth contains firm-level financial data. CEO-level datasets were obtained from `BoardEx`, while the financial dataset was obtained from `Compustat`. In the original databases, CEO-level datasets were named (i) `Individual Profile Employment`, (ii) `Individual Profile Education`, and (iii) `Individual Profile Details`, while (iv) `Fundamentals Annual` was the financial dataset.

Datasets (i) and (iv) dynamically track variables for 10 years, whereas (ii) and (iii) provide static data on time-invariant characteristics (e.g., gender). I chose the 10-year period from 2014 to 2023 to obtain a robust sample with many CEO transitions. Going further back in time or collecting data for more recent years would have impacted data quality and availability. Finally, this timeframe includes diverse economic conditions (e.g., the COVID-19 shock), making it possible to analyze operational efficiency across different economic cycles.

5.1 CEO-level Data

Dataset (i) contains data on the employment history of CEOs, including the start and end date of their appointment. It serves as the bridge for integrating demographic and financial data. Indeed, by mapping each CEO – uniquely identified by a `directorid` key – to their employer via the `ISIN` key (International Securities Identification Number), the dataset enables the integration of CEO-level characteristics from (ii) and (iii) with firm-level financial data in (iv).

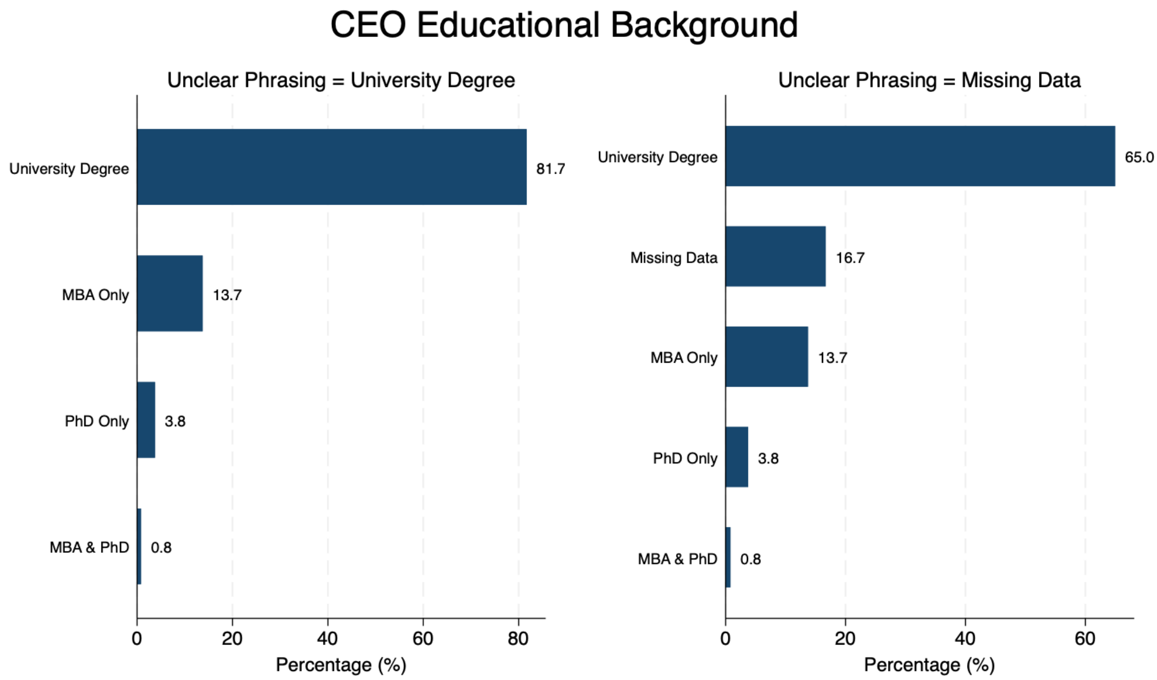

Figure 6: Distribution of CEO education level. The left panel displays the distribution of CEO education when observations with unclear educational phrasing (16.69%) are recoded as University Degrees to form a baseline qualification category (totaling 81.67%). The right panel distinguishes these unclear cases (16.69%) from clearly identified University Degrees (64.98%), MBAs (13.75%), PhDs (3.76%), and dual MBA/PhD credentials (0.82%). Observations: 611.

Dataset (ii) contains the variable `qualification`, which originally included several inconsistent academic titles and generic descriptions (e.g., many ways to denominate a master's). To ensure consistency, I constructed a new categorical variable that maps these qualifications into four distinct levels of highest educational attainment: "University Degree", "MBA", "PhD", and "MBA & PhD". I did not create specific categories for bachelor's and master's because in Italy until the early 2000s university degrees were obtained in a single cycle. The remaining categories were assigned based on the idea that an MBA captures formal management education, while a PhD the depth of knowledge in a specific field.

While in many cases the mapping was easy (e.g., MBA was denominated either as "MBA" or "Master in Business Administration") in others it was more problematic due to the ambiguity of phrasings (e.g., the category "studied"). By manually checking the educational level of some of CEOs assigned to ambiguous categories, I realized that most of them had in fact a university degree. However, for transparency, I also included in the right-hand side of Figure 6 an alternative frequency distribution that classifies categories with an ambiguous phrasing (102 observations) as missing data.

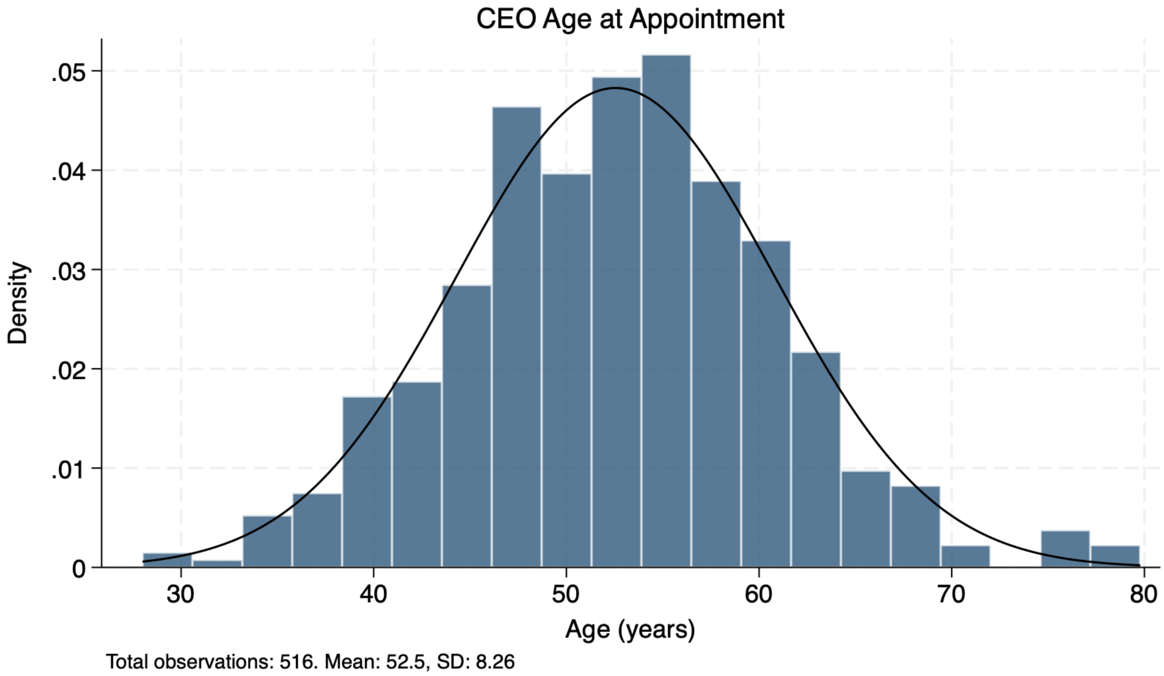

Figure 7: Distribution of CEO age at appointment. The distribution of CEO age at appointment exhibits high symmetry, with both mean and median centered at 52.5 years (standard deviation: 8.26). The sample ranges from 28 to 79.8 years. The low skewness (0.13) and kurtosis of 3.34 indicate that the distribution closely approximates normality. Observations: 516.

Dataset (iii) contains demographic characteristics, such as date of birth, age, and gender. The date of birth, together with information about the start date of CEOs' tenure contained in the dataset (i), allows us to obtain CEOs' age at the appointment date. However, in the regression analysis I rely on current age (measured for each CEO-year observation), rather than age at appointment, in order to capture life-cycle effects and the potential evolution of CEOs' psychological traits over time. Since working capital decisions are recurrent and dynamic, current age better reflects the CEO's cognitive and behavioral stage decisions are made.

Although in regression analysis I will use current age to better capture CEOs psychological evolution over time, it is interesting to notice from Figure 7 that the empirical distribution of CEOs' age is remarkably similar to a normal and it is centered about 52 years and a half.

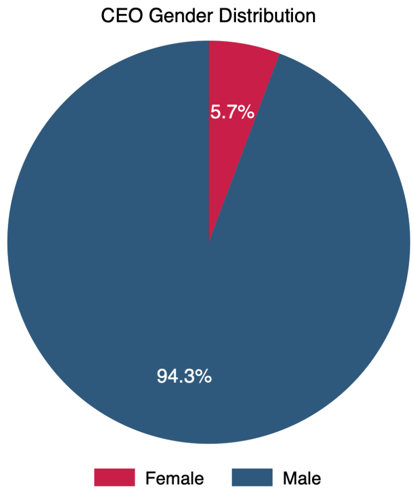

Figure 8: Gender distribution within a 10-year sample from 2014 to 2023. The data reveals a significant gender gap in top executive positions, with female CEOs accounting for only 5.73% (35 individuals) of the total, while male CEOs represent 94.27% (576 individuals). Observations: 611.

The distribution of gender shown in Figure 8 is extremely unbalanced toward men. Women account for only the 5.7% of the CEOs of Italian listed companies. This percentage is broadly consistent with other studies. A report by SDA Bocconi based on a representative sample of 320 large Italian firms, including 169 listed companies, shows that only 7% of the companies have a female CEO (SDA Bocconi, *Donne executive: l'Italia non brilla in Europa*, 2025). Similarly, at the European level, a study of the OECD shows that women hold roughly 8% of CEO positions among the largest publicly listed companies in the EU (OECD, *Women still lag behind men in reaching leadership roles*, 2025).

The gender distribution I obtained – besides because of the sampling methodology – may differ from the one in the SDA Bocconi study because my sample includes all CEOs of Italian listed firms over a 10 year period. Given the discussion so far, it is interesting to investigate whether the gender gap has closed over the period 2014-2023.

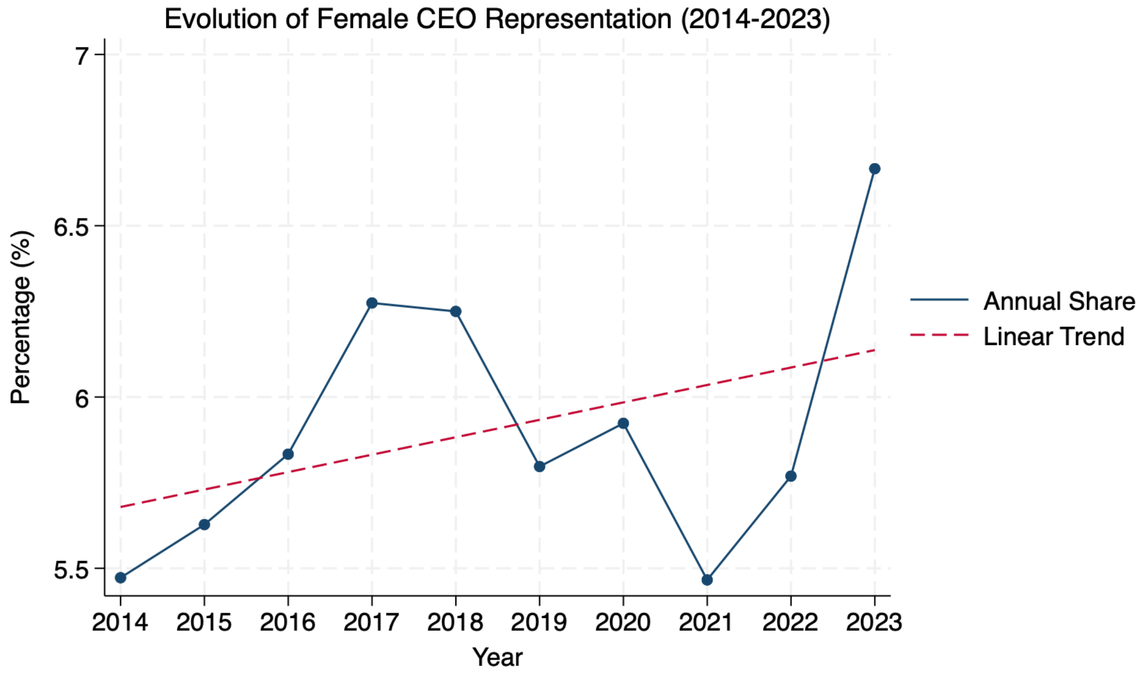

Figure 9: Evolution of female CEO representation (2014–2023). The blue line tracks the annual percentage of female CEOs in Italian listed companies. The dashed red line illustrates a positive linear trend, indicating a gradual increase from approximately 5.48% in 2014 to 6.67% in 2023. Despite some annual fluctuations, the upward slope suggests a reduction of the gender gap at the executive level. Note that by shifting the unit of observation from the unique individual to CEO-years, the sample size increases from 611 to 2,700 observations. Observations: 2,700.

As illustrated in Figure 9, the share of female CEOs rose from 5.48% in 2014 to 6.67% in 2023. Overall, the time-series shows a positive trend, despite annual fluctuations. While the gender gap is narrowing, the pace of change is quite slow, with a relative increase of approximately 21.7% over the decade.

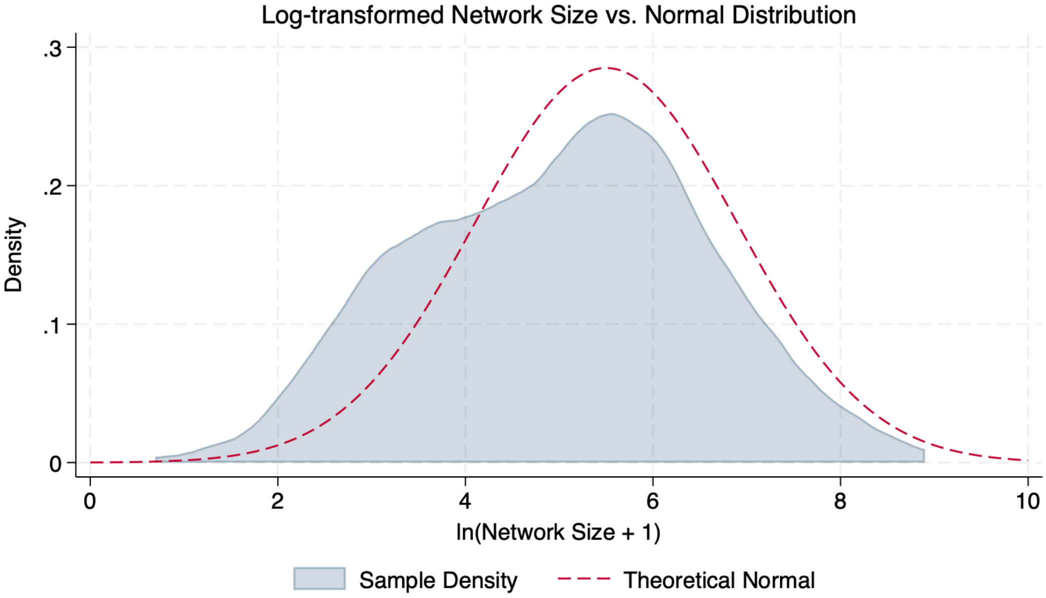

Figure 10: Distribution of the log-transformed CEO network size compared against a theoretical normal distribution (dashed line). Following the natural log transformation, the sample exhibits a distribution very close to normality. This visual confirmation is consistent with the use of OLS estimation in the subsequent empirical analysis, as it effectively addresses the initial skewness of raw data. Observations: 603.

Alongside demographic characteristics, dataset (iii) includes the variable `networksize`, which measures the number of direct connections CEOs have accumulated throughout their career by working in the same company, serving in the same board, or attending the same university as other individuals in the `BoardEx` database in an overlapping period. Since this variable is highly dispersed and skewed, I will use its natural logarithm to avoid biased results driven by a handful of "super-connected" CEOs. The distribution is plotted in Figure 10.

Log-transforming network size reflects diminishing returns to professional networking. Indeed, the impact of expanding a network is greatest at lower levels; for instance, moving from 0 to 100 connections represents a more important change than moving from 5,000 to 5,100. Moreover, by "compressing" the scale of extreme values, the log transformation reduces the influence of outliers, mitigates potential heteroscedasticity, and improves the normality of the residuals.

Finally, in the empirical analysis the log-transformed network size was winsorized at the 1^{st} and 99^{th} percentiles to mitigate the effect of outliers.

Table 3: Pairwise Correlation Matrix of CEO Characteristics

Variables	(1)	(2)	(3)	(4)	(5)
(1) Age at Appointment	1.000				
(2) Gender (Female=1)	−0.059	1.000			
(3) Log(Network Size)	−0.058	0.056	1.000		
(4) MBA Dummy	−0.075	−0.031	0.291***	1.000	
(5) PhD Dummy	0.076	−0.025	0.086	0.002	1.000

Notes: $N = 440$. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 4: Multicollinearity Test: Variance Inflation Factors (VIF)

Variable	VIF	1/VIF
Age at Appointment	1.02	0.982
MBA Dummy	1.01	0.989
PhD Dummy	1.01	0.994
Gender (Female=1)	1.01	0.995
Mean VIF	**1.01**	

Table 3 and Table 4 analyze multicollinearity within the dataset. The correlation matrix reveals a highly significant association between the MBA dummy and the log-transformed network size ($r = 0.291$, $p < 0.01$). This points to the fact that managerial education is a highly significant correlate of connectivity. However, it is not a particularly strong predictor: most of the variance in network size is not captured by having an MBA.

The Variance Inflation Factor (VIF) serves as a diagnostic tool to quantify how much the variance of an estimated coefficient is "inflated" due to linear associations with other regressors. Mathematically, a VIF of 1.0 represents total orthogonality. The observed mean VIF of 1.01 indicates that the independent variables are almost completely independent. Hence, both education and network size can be included in regression analysis to avoid an omitted variable bias.

We can interpret education as a proxy for formal human capital, defined as managerial expertise and cognitive frameworks (Becker, 1964), and network size as a proxy for social capital, defined as the access to information and external resources (Burt, 1992). Hence, by controlling for both human and social capital, the model accounts for the possibility that CEOs with an MBA typically develop larger professional networks, thereby reducing confounding and allowing for a "cleaner" interpretation of the estimated network effect in regression analysis.

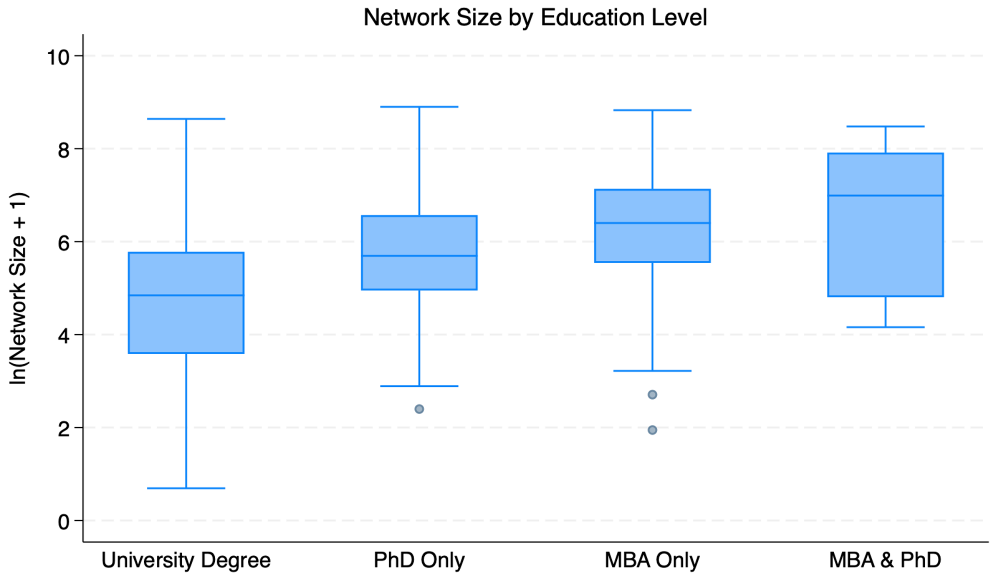

Figure 11: Distribution of CEO Network Size by Educational Attainment. The boxplot is ordered in ascending order by the median of `log(Network Size)`, illustrating the incremental relationship between academic credentials and social capital. This hierarchy demonstrates that advanced degrees, particularly the MBA, are associated with an increase in connectivity. Observations: 603.

Given the highly significant coefficient in the correlation matrix between MBA degree and network size, I further explored the relationship of the latter with the maximum educational level attained by CEOs. As seen in Figure 11, median network size rises as degrees become more specialized. A university degree represents the baseline. Then connectivity increases for CEOs with a PhD and MBA, reaching its peak for those with both. This points to the fact that advanced education, and especially managerial one, is associated with access to "elite" professional networks.

5.2 Firm-level Data

Dataset (iv) contains Cash Conversion Cycle, the dependent variable of this study, and a series of controls, such as size, leverage, liquidity, tangibility, growth, and profitability.

Figure 12 displays the distribution of the main financial variables after I applied the appropriate transformation / winsorization. Overall, the variables appear well behaved.

Firm size (log assets) displays an approximately symmetric and unimodal distribution very similar to a normal shape, as commonly observed after logarithmic transformations. Leverage $\left(\frac{\text{Total Debt}}{\text{Total Assets}}\right)$ exhibits moderate right skewness, but it remains smooth and unimodal. In contrast, cash holdings $\left(\frac{\text{Cash + s.t. Investments}}{\text{Total Assets}}\right)$, asset tangibility $\left(\frac{\text{Net PPE}}{\text{Total Assets}}\right)$, and sales growth show a pronounced right skewness, with a high concentration of observations at lower values and a long right tail. Finally, ROA is highly concentrated just to the right of zero and has asymmetric tails, reflecting the coexistence of some low-performing firms and a few highly profitable ones.

CCC is centered around 90 days. Tails are longer than in the normal distribution. This captures strong differences in working capital management, likely at sectoral level. Indeed, even though I excluded from the sample financial institutions – for whom measuring CCC would not make sense –, sector still plays an important role, as, for instance, the working capital of a heavy manufacturing company structurally differs from that of a software house.

Table 5: Summary Statistics of Financial Variables

Variables	N	Mean	St.Dev.	Min	Median	Max
CCC	3,364	91.586	284.754	-1329.653	83.019	1579.476
ROA	2,759	0.006	0.107	-0.574	0.023	0.203
Firm Size	3,367	5.059	2.199	-2.526	4.866	12.300
Leverage	3,364	0.283	0.169	0.000	0.274	0.784
Cash Holdings	3,367	0.136	0.112	0.002	0.108	0.550
Sales Growth	2,842	0.185	0.559	-0.764	0.086	3.994
Asset Tangibility	3,367	0.191	0.174	0.001	0.146	0.715

Variables (except size) are winsorized at 1% and 99% levels.

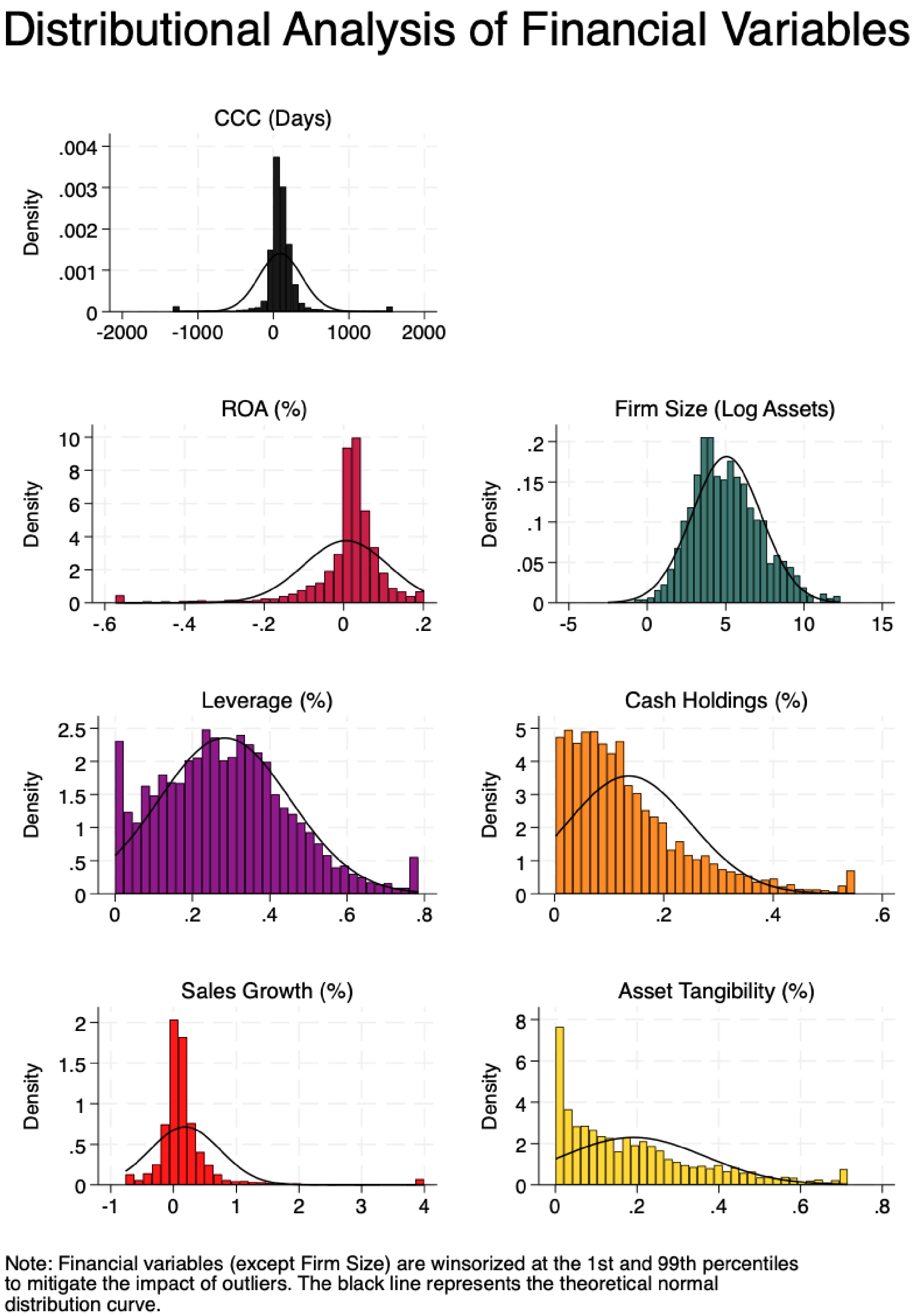

Figure 12: Distribution of financial variables.

Table 6: Pearson Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) CCC	1.000						
(2) ROA	-0.025	1.000					
(3) Firm Size	-0.164***	0.232***	1.000				
(4) Leverage	-0.093***	-0.244***	0.189***	1.000			
(5) Cash Holdings	0.076***	0.138***	-0.126***	-0.243***	1.000		
(6) Sales Growth	-0.051***	0.130***	-0.115***	-0.109***	0.054***	1.000	
(7) Tangibility	-0.185***	0.044**	0.279***	0.272***	-0.196***	-0.100***	1.000

*Note: * p < 0.10, ** p < 0.05, *** p < 0.01. This table reports Pearson pairwise correlation coefficients. Variables (except Size) are winsorized at 1% and 99% levels.*

Table 7: Multicollinearity Diagnostic: Variance Inflation Factors (VIF)

Variable	**VIF**	**1/VIF**
Financial Leverage	1.24	0.810
ROA	1.21	0.828
Firm Size (Log)	1.20	0.831
Asset Tangibility	1.17	0.852
Cash Holdings	1.13	0.885
Sales Growth	1.04	0.964
Mean VIF	**1.16**	

Note: All VIF values are significantly below the conservative threshold of 5, indicating that multicollinearity does not threaten the stability of the OLS estimates.

Table 6 shows that most correlation coefficients are highly significant, with the exception of the one between ROA and CCC. The relatively large sample size and the use of total assets as a common denominator for several of the financial ratios may contribute to correlation across variables. The negative correlation between asset tangibility and the Cash Conversion Cycle (0.185) is quite surprising. Perhaps, firms with a higher share of tangible assets tend to exhibit shorter cash conversion cycles because they have a stronger bargaining power along the supply chain.

Despite the observed correlations, Table 7 shows that multicollinearity is not concerning, as all variance inflation factors are well below five. This suggests that each control variable contributes distinct information to the regression models.

5.3 Merged Dataset

After merging the CEO-level dataset with financial data through the `ISIN` key, I obtained an initial sample of 272 unique companies with CEO coverage in Italy for the period 2014-2023. This initial sample represents approximately 56% of the 489 Italian listed firms included in the original financial dataset, reflecting the limited availability of CEO-level information in `BoardEx` for smaller / less liquid firms.

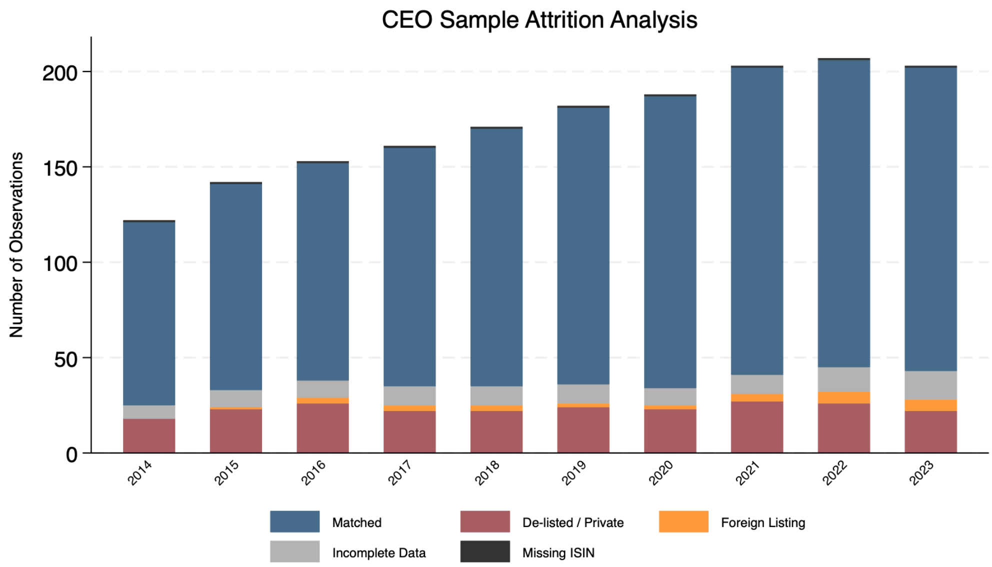

Figure 13: CEO Sample Attrition Analysis (2014–2023). The stacked bar chart illustrates the initial composition of the merged dataset. 83.09% of unique companies were successfully matched (226 firms). Main reasons for the exclusion of firms are de-listing ("De-listed/Private"), change in the stock exchange ("Foreign Listings"), and unavailability of data ("Missing ISIN"/"Incomplete Data"). Observations: 1,732.

Figure 13 illustrates that the majority of firms were successfully matched with CEOs (226 companies, representing 83.09% of the total). However, there are several unmatched cases, mainly due to de-listings, changes in stock exchange listings, and missing data. In total, 46 firms exit the sample after the initial match.

While the company-level match rate is high, the observation-level attrition provides a clearer view on the effective estimation sample used in the regressions. From an initial pool of 1,732 CEO-year observations, 375 were excluded (21.65%), resulting in a final sample of 1,357 matched observations. Most excluded observations are associated with firm exits rather than isolated missing years. Indeed, the loss of observations occurs primarily at the extremes of the sample period. For instance, companies that were delisted in 2020 immediately stop contributing to the sample, causing a drop in the final years. Similarly, we would have the first observation only in 2020 if an IPO occurred in that year.

Table 8 summarizes this process:

Table 8: Summary of Sample Attrition (CEO-Year Observations)

Category	Observations	Percentage
Initial BoardEx Sample	**1,732**	**100.00%**
Less:		
De-listed / Private Companies	(233)	(13.45%)
Foreign Listings (Non-IT ISIN)	(81)	(4.68%)
Incomplete Financial Data	(51)	(2.94%)
Missing ISIN Identifiers	(10)	(0.58%)
Final Matched Sample	**1,357**	**78.35%**

The observed attrition is most likely not a "random" phenomenon. Instead, it reflects a structural trend of corporate delisting and the migration to foreign stock exchanges (EY, *Global IPO Trend*, 2023). As a result, the final sample may over-represent firms that remained continuously listed during the period.

Indeed, during the 2014-2023 period, many prominent firms were de-listed following large-scale take-private transactions led by global private equity firms or controlling shareholders. Major de-listings include Atlantia (now Mundys), delisted by the Benetton family and Blackstone, as well as Autogrill following its integration with Dufry. Many of these transactions may have been motivated by the desire to undergo long-term restructuring away from market pressures.

Furthermore, the sample reflects the migration of historical Italian "champions" toward international hubs, mainly Euronext Amsterdam. The transition of companies such as Exor, Ferrari, Campari, and MediaForEurope (Mediaset) to the Netherlands seems to reflect a preference for the Dutch legal system, which allows founding families to create loyalty voting structures, thus maintaining disproportionate voting control. In addition, the Dutch tax system is often regarded as favorable for holding companies, particularly with respect to dividend participation exemptions, the treatment of capital gains, and the availability of advance tax rulings (EY, *Global IPO Trends*, 2023).

Finally, previous discussions about the sectoral nature of CCC pushed me to analyze it further. Indeed, if CCC structurally differs among sectors, then I will have to control for this variation in the regressions. In the original databases, sectors were extremely detailed (there were 34 of them). I re-organized them in 8 simpler categories: (i) Finance & Real Estate, (ii) Health & Pharma, (iii) Consumer & Retail, (iv) Industrial & Materials, (v) Tech & Telecom, (vi) Food & Beverages, (vii) Services & Media, and (viii) Energy & Utilities.

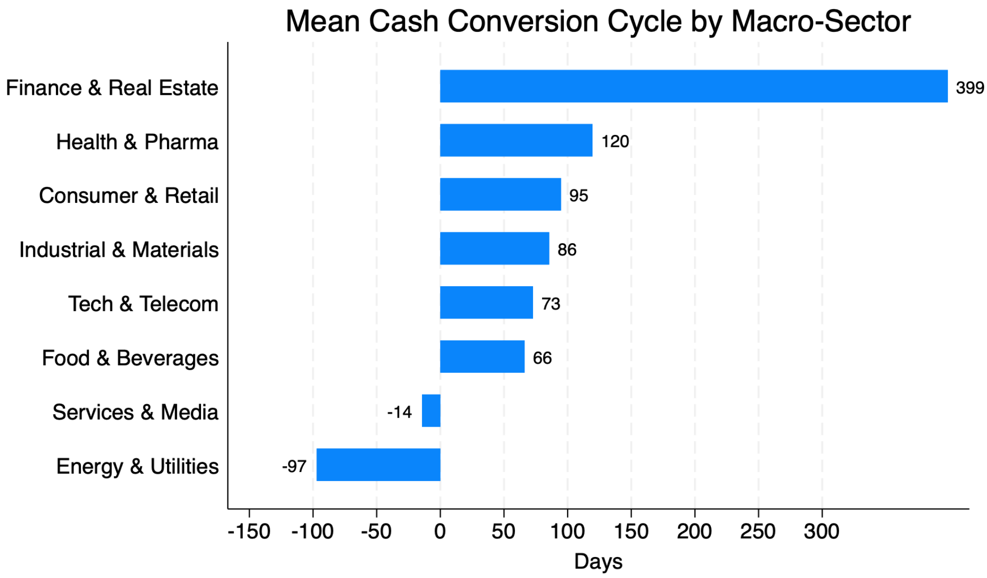

Figure 14: Mean Cash Conversion Cycle (Days) by Macro-Sector over the period 2014–2023. Note that the term "Finance" in the first category only indicates private equities / investment companies. It excludes financial institutions. Observations: 1357.

Figure 14 highlights heterogeneity in the Cash Conversion Cycle across macro-sectors.

Sectors such as industrials, consumer goods, healthcare, tech / telecom, and food & beverage exhibit positive and relatively similar CCC values. In these sectors, CCC captures the length of the production and sales cycle, as firms typically invest in inventories, transform inputs into final goods, and recover cash only after sales and collection. Hence, CCC is a standard proxy for operational efficiency.

Utilities and, to a lesser extent, services display negative values of CCC. This is consistent with the fact that they usually require advance payments: utilities receive payments through monthly billings, and similarly software providers often operate with subscription-based models.

The observed CCC for finance & real estate distances itself from the other sectors. Indeed, Real estate companies typically incur construction and financing costs long before receiving cash from property sales or rental contracts, causing receivables to remain outstanding for extended periods. In this context, traditional measures of operating income and working capital are less informative, and performance is better evaluated using other measures based on operating cash flows (Damodaran, 2012).

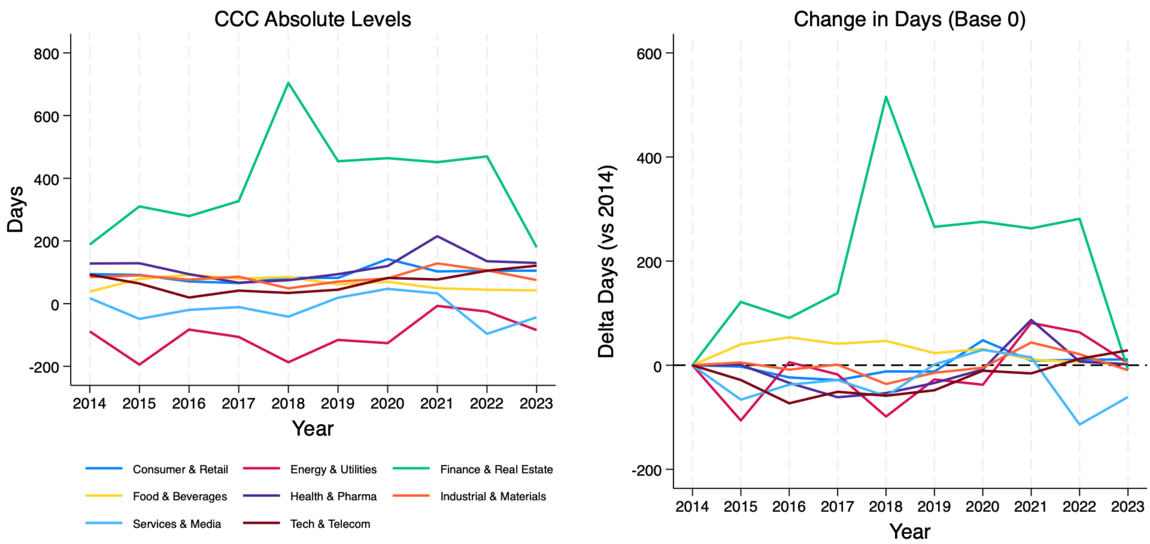

Figure 15: CCC Absolute Levels and Normalized Change by Macro-Sector (10-year Time Series). Observations: 1,357.

The time series of CCC and the variation relative to the starting year (2014 = 0) plotted in Figure 15 show that cross-sectoral differences are quite stable over time, which confirms their structural nature. High variability is observed for Finance & Real Estate, and as expected, the services sector shows a steep fall during the Covid pandemic.

In the final merged dataset I also included the variable "Financial Expert" by interrogating the `BoardEx` database on whether the CEOs of the period 2014-2023 had ever held, in the period 1990-2023, a position that required a particular financial expertise. I filtered role names by keywords such as "CFO", "Investment Banker", "Controller", "Auditor", and "Treasurer". Broadly speaking, I classified as financial experts those individuals with backgrounds in any CFO corporate area (planning and control, treasury, ...), in investment banking, or in auditing.

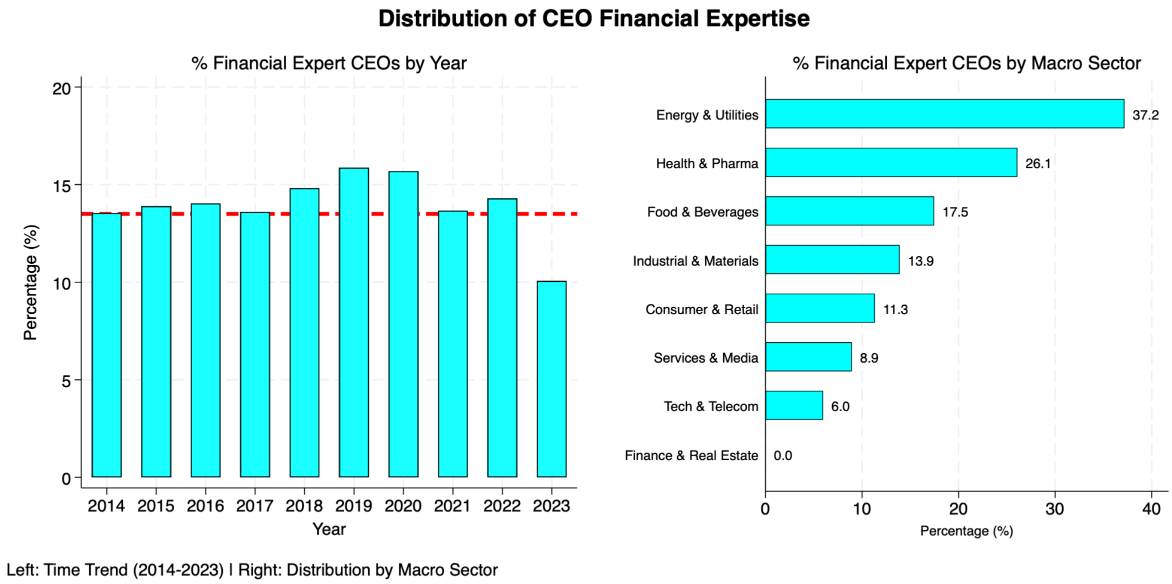

Figure 16: Distribution of CEO Financial Expertise: Year-on-Year Trend (2014-2023) and Breakdown by Macro-Sector. The graph shows very little temporal variance and high concentration of Financial Expert CEOs in specific sectors. Observations: 1,357.

In Figure 16 I plotted the distribution of CEOs with a financial background by year and by sector. The graph shows very little temporal variation, with a stable average around 13.5%. In the subsequent regression analysis, this may suggest a limited influence of year fixed effects on the coefficient of the Financial Expert dummy. Conversely, Financial Expert CEOs seem concentrated in specific sectors, rather than randomly distributed. If firms in specific sectors typically hire CEOs with a financial background, then sector fixed effects will “absorb” much of the between-sector variability of the Financial Expert dummy, potentially reducing its statistical significance.

6 Regression Analysis

In this section, I will test the hypotheses developed in Section 4 using the firm-CEO matched panel dataset described in Section 5. I will use an OLS regression that has the Cash Conversion Cycle as dependent variable and 7 CEO-level personal characteristics as independent variables. I will also add a vector of 6 firm-level controls, time fixed effects, and, importantly, industry fixed effect, given the industry-specific nature of working capital discussed in Section 3 and visualized in Section 5.

The primary goal of this study is to investigate the CEO-level determinants of working capital efficiency within the Upper Echelons Theory Framework. Hence, the main specification is the following:

$$
\begin{aligned}
\text{CCC}_{it} = \beta_0 &+ \beta_1 \text{Age}_{it} + \beta_2 \text{Age}^2_{it} + \beta_3 \text{Financial Expert}_{it} + \beta_4 \text{MBA Dummy}_{it} \\
&+ \beta_5 \text{PhD Dummy}_{it} + \beta_6 \text{log(Network Size)}_{it} + \beta_7 \text{Tenure}_{it} \\
&+ \beta_8 \text{Female Dummy}_{it} \\
&+ \sum_{j=1}^{J} \delta_j \text{Firm Controls}_{jit} + \text{Industry}_s + \text{Year}_t + \epsilon_{it}
\end{aligned} \tag{12}
$$

Age may capture different risk preferences and decision-making styles, as well as overall corporate experience. I included the square of age to allow for a non-linear relationship between CEO age and the Cash Conversion Cycle. Specifically, CEOs may become more effective with age up to a certain point in time, after which they may become less efficient due to lower adaptability or increased risk aversion. Consistent with this interpretation, discussed in H1, the coefficient on age is negative and statistically significant across all specifications (-43.524, $p < 0.01$), and the coefficient on age squared is positive and statistically significant (0.350, $p < 0.01$). Including both age and age squared allows the marginal effect of age on CCC to vary across different stages of a CEO's career.

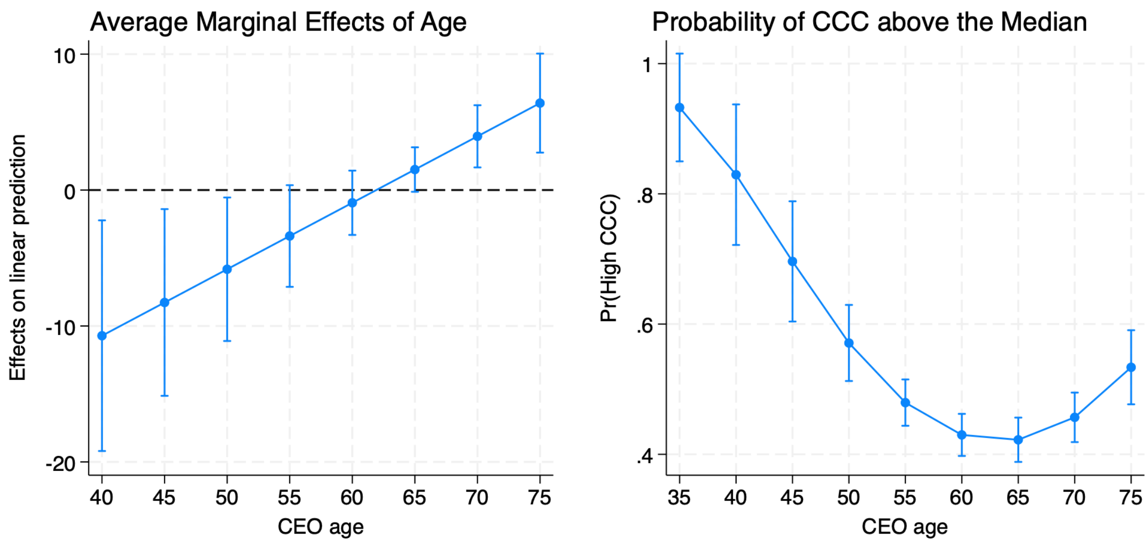

Figure 17: Left: marginal effects. Right: estimated probabilities (Probit). Obs: 1089.

The non-linear impact of CEO age on CCC can be visualized in Figure 17. To obtain these results, I performed two distinct estimations, based on the full model specification (column 3 of Table 9).

The left panel shows the average marginal effects of age on the Cash Conversion Cycle, calculated at 5-year intervals. The marginal effect on CCC from increasing age by one year is negative and statistically significant for younger CEOs (less days to transform WC), it becomes zero around age 60, and it turns positive and significant for older CEOs (more days to transform WC).

The right panel presents the predictive margins from a Probit regression, where the dependent variable is a dummy equal to one if the firm's CCC is above the sample median and zero otherwise. In formula:

$$\begin{aligned}\Pr(\text{HighCCC}_{it} = 1) = \Phi\Big(&\beta_0 + \beta_1 \text{Age}_i + \beta_2 \text{Age}_i^2 + \beta_3 \text{Financial Expert}_{it} + \beta_4 \text{MBA Dummy}_{it} \\ &+ \beta_5 \text{PhD Dummy}_{it} + \beta_6 \log(\text{Network Size})_{it} + \beta_7 \text{Tenure}_{it} \\ &+ \beta_8 \text{Female Dummy}_{it} \\ &+ \sum_{j=1}^{J} \delta_j \text{Firm Controls}_{jit} + \text{Industry}_s + \text{Year}_t\Big) \end{aligned} \tag{13}$$

where $\Phi(\cdot)$ is the cumulative distribution function of the standard normal distribution.

This second graph confirms the U-shaped relationship between age and CCC: the probability of operating with a CCC above the median decreases as the CEO approaches the age of 60-65 (the experience effect), and begins to rise again thereafter, when lower adaptability and increased risk aversion kick in.

The variable capturing financial expertise is negative across all specifications, weakly significant in the first specification (-47.482, $p < 0.10$), and not significant in the others, although it is not far from the weakest significance level. The persistent negative direction of the effect is consistent with H3, whereby more financially sophisticated CEOs are expected to be more operationally efficient. The loss of significance may be explained by the concentration of financially expert CEOs in certain sectors and, to a lesser extent, in specific economic cycles. Sector and time variation seem to absorb the variation in financial expertise.

I captured education through separate dummy variables for MBA and PhD degrees rather than with an ordinal education variable. The rationale is that different advanced degrees may affect CCC through different channels, and therefore there is no "monotonic" order. An MBA is often associated with managerial skills, whereas a PhD may proxy analytical and research skills. Results show that the MBA dummy is not statistically significant in any specification, suggesting there is no systematic relationship between holding an MBA and the Cash Conversion Cycle. In contrast, the PhD dummy is positive and statistically significant across all models (90.145, $p < 0.01$), indicating that firms led by CEOs with a PhD tend to have longer Cash Conversion Cycles, consistent with their prioritization of production quality and continuity supposed in H5.1.

Network size is positively and statistically significantly associated with the Cash Conversion Cycle once fixed effects are included (17.623, $p < 0.05$). In the sample, CEOs with larger professional networks typically operate with longer cash conversion cycles. Given that network size had been logarithmically transformed, this result must be interpreted in percentage terms: on average, for every 10% increase in the network of a CEO, their company's Cash Conversion Cycle by $17.623 \times \ln(1.10) \approx 1.68$ days. This effect may indicate that highly connected CEOs focus relatively more on corporate dimensions other than operating efficiency. It cannot be excluded that the network effect is non-linear, and hence it may kick in in an economically more relevant way only at certain levels of connectedness. Alternatively, it could interact with other variables and show up more evidently only for specific categories / values.

CEO tenure is positive and significant only in the first specification (3.420, $p < 0.05$), and this effect vanishes once industry fixed effects are included. Indeed, tenure appears to be strongly collinear with industry fixed effects. Nonetheless, the positive coefficient in the baseline specification may suggest a greater managerial emphasis on dimensions other than operating efficiency. Longer-tenured CEOs may lead firms during prolonged expansionary periods, in which strategic focus shifts toward sales growth rather than cost efficiency. Alternatively, managerial entrenchment may account for this result.

The female CEO dummy is negative and weakly significant in the models with fixed effects (-75.034, $p < 0.05$), suggesting that firms led by female CEOs may exhibit shorter Cash Conversion Cycles. However, this result should be interpreted with caution given the limited number of female CEOs in the sample. Moreover, when estimating the model at the sector level, the coefficient becomes more sensitive to outliers, as the small number of observations may disproportionately affect the results.

Firm-level controls allow us to isolate the effect of CEO characteristics on the Cash Conversion Cycle by accounting for differences in firms' financial conditions.

Leverage is perhaps the most important financial control. Indeed, Baños-Caballero et al. (2014) show a systematic negative relationship between leverage and working-capital policies, driven by the "disciplining" role of debt and tighter financing constraints faced by more highly leveraged firms. Higher leverage increases pressure from creditors and reduces discretion, pushing firms to manage inventories and receivables more efficiently in order to limit the amount of capital tied up in operations. Consistent with this argument, leverage is negatively and statistically significantly associated with CCC once industry and year fixed effects are included (-194.673, $p < 0.01$). As a result, more leveraged firms tend to operate with lower levels of working capital and shorter Cash Conversion Cycles.

Also asset tangibility has a strong negative relationship with the Cash Conversion Cycle. The coefficient on tangibility is large, negative, and statistically significant at the 1% level in all specifications (-278.537 in column 3). This indicates that, in a given sector, firms with more tangible assets tend to operate with shorter Cash Conversion Cycles. This result is not entirely straightforward, as one might expect tangible assets to increase complexity, and therefore imply longer working capital cycles. A possible explanation is that tangible assets make it easier for firms to access external financing, which may reduce the need to rely on working capital as a liquidity buffer.

Industry fixed effects allow to control for unobserved, time-invariant differences across industries, such as production cycles and bargaining power with suppliers and customers. Comparing firms within the same industry, rather than across structurally different sectors, helps reduce omitted-variable bias in the estimation. Consistent with this role, the inclusion of industry fixed effects increases the explanatory power of the model, with the R^2 rising from 0.111 in the baseline specification to 0.228 once industry fixed effects are included.

Year fixed effects allow to control for macroeconomic conditions and common shocks that affect all firms in a given year. The period of interest (2014-2023) includes the COVID-19 pandemic starting in 2020, making these controls particularly necessary, as, for instance, the travel industry was affected in a completely different way compared to the healthcare industry.

Finally, some of the CEO characteristics may be correlated with unobserved firm factors that also affect the Cash Conversion Cycle. For example, firms with a given corporate culture may be more likely to hire CEOs with specific profiles, biasing the estimated coefficients. While the inclusion of firm-level controls and industry and year fixed effects helps reduce this endogeneity concern, it does not eliminate it. Therefore, the results should be interpreted as associations rather than causal relationships.

Table 9: CEO Age and Cash Conversion Cycle: Regression Results

Dependent Variable: CCC	(1) Baseline	(2) Industry FE	(3) Industry & Year FE
CEO Characteristics:			
Age	-35.087***	-43.125***	-43.524***
	(9.672)	(10.012)	(10.068)
Age^2	0.278***	0.345***	0.350***
	(0.073)	(0.074)	(0.075)
Financial Expert	-47.482*	-38.124	-36.567
	(27.379)	(26.115)	(25.826)
MBA Dummy	-18.099	1.854	2.439
	(18.698)	(18.725)	(18.853)
PhD Dummy	87.973***	92.451***	90.145***
	(29.889)	(27.552)	(27.062)
log(Network Size)	15.716*	16.985**	17.623**
	(8.576)	(7.912)	(7.808)
Tenure	3.420**	2.551	2.319
	(1.578)	(1.562)	(1.544)
Female Dummy	-16.658	-71.224**	-75.034**
	(38.375)	(36.885)	(36.287)
Financial Controls:			
Leverage	-108.776	-175.442**	-194.673***
	(71.303)	(70.115)	(70.230)
Tangibility	-318.230***	-285.663***	-278.537***
	(64.866)	(63.551)	(63.235)
Liquidity	81.487	-95.228	-127.223
	(74.547)	(76.114)	(77.924)
ROA	229.059	132.441	118.116
	(221.561)	(215.882)	(214.562)
Log(Size)	-0.777	5.114	6.592
	(5.931)	(6.025)	(6.145)
Growth	-31.410	-41.228	-45.507
	(32.306)	(33.885)	(34.120)
Industry FE	No	Yes	Yes
Year FE	No	No	Yes
Observations	949	949	949
R-squared	0.111	0.228	0.242
F-test	4.91	6.45	6.11
Prob > F	0.000	0.000	0.000

*Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

7 Conclusion

This thesis studied whether the personal characteristics of Italian CEOs – such as age, financial expertise, having an MBA and a PhD, size of the network, tenure, and gender – influence the efficiency with which firms manage their operating cycle, proxied by the Cash Conversion Cycle. While most literature has profitability and market-based outcomes as dependent variables, "what firms achieve", the focus of this study is on operating cycle efficiency, "how they achieve it". The operating channel is, indeed, a key precursor to overall financial performance, as it reflects the managerial ability to balance short-term liquidity needs with risk and profitability.

The empirical analysis was based on a matched firm-CEO dataset of 226 firms listed on the Italian stock exchange and 335 unique CEOs, and it spanned the period from 2014 to 2023. This final dataset was obtained through a matching process, starting from a dataset covering all Italian public companies and a dataset of all CEOs registered in `BoardEx` in the period of interest.

The final specification is based on a panel, and it includes a vector of firm-specific controls, year fixed effects, and industry fixed effects. Each of the above carries some benefit in isolating the relationship between CEO characteristics and working capital management.

The panel allows one to exploit variability over time, and not only across firms. Furthermore, it allows one to capture the lagged effect of some variables, which would not have been taken into account otherwise. For instance, age is measured at the beginning of the tenure, which allows one to establish a meaningful temporal order with CCC and avoids a mechanical overlapping with tenure.

Firm-level controls reduce omitted variable bias, and allow one to interpret results as "For any given financial conditions, . . . ".

Year fixed effects absorb CCC variation due to macroeconomic conditions, while industry fixed effects allow one to absorb variability due to structural differences across different sectors. This is particularly important given the industry-specific nature of working capital discussed in Section 3. Fixed effects, jointly, allow one to interpret results as "In any given year, for any given industry, ...".

Despite their benefits in isolating the relationship between personal characteristics and CCC, adding controls and fixed effects does not allow one to interpret results in a causal sense. Results should rather be interpreted as meaningful associations.

From an econometric standpoint, two main issues remain. The first concerns mainly two proxies, MBA for financial expertise and size of the network for connectivity, which are likely to display measurement errors. More data on specific previous financial roles of CEOs, and a more sophisticated approach to network measurement, with diverse weights attached to different connections based on their importance, would address this problem. The second issue concerns endogeneity. To what extent are the observed CEO characteristics exogenous? Do companies select CEOs because of a specific and rooted culture in, amongst others, working capital management, and therefore any observed performance outcome is the result of this selection, or do CEOs shape corporate outcomes? A quasi-experimental research design such as a Difference-in-Differences model could contribute to solving the problem of endogeneity.

A statistically significant U-shaped relationship was found between age and CCC, with operational efficiency improving at intermediate career stages and deteriorating when CEOs get older, suggesting benefits from human capital accumulation, and increased risk aversion and cognitive rigidities later on.

CEOs' financial background is negatively associated with CCC, consistent with the efficient use of capital and the optimization of cash flows by financially sophisticated CEOs hypothesized in H3. However, the statistical significance of this relationship does not "survive" the inclusion of sector fixed effects to the model.

Having an MBA has a negative although not statistically significant association with the CCC, while the coefficient on the PhD dummy is large, positive, and statistically significant across all specifications. The latter result may reflect the fact that CEOs with deep technical backgrounds focus on design and engineering relatively more than on operating efficiency. However, one must also be wary that CEOs with such a background may be typically selected by firms operating in high-precision sectors where production quality and continuity may be relatively more important than fast management of the operating cycle. This would create an endogeneity problem.

The size of the network is positively and highly significantly associated with the CCC, however the coefficient is very small, weakening any economic interpretation.

The effect of tenure, which typically proxies for managerial ability, is positive and weakly significant in the baseline specification, a somewhat puzzling result that may be explained by the coincidence of longer-tenured CEOs with periods of firm expansion, as well as by Managerial Entrenchment Theory. However, the statistical significance vanishes when sector fixed effects are included.

In the most complete specification, the coefficient on gender is negative at the 5% level. This result is inconsistent with the greater female risk aversion shown in several studies, and it could point to deeper selection processes of female CEOs, which are only a small fraction of the entire sample.

To conclude, the main contribution of this thesis lies in the specific focus on the Italian case and in the choice of the outcome variable of interest, the Cash Conversion Cycle. Indeed, both have received relatively limited coverage in the existing literature. The highly significant associations between some of the CEO characteristics and the Cash Conversion Cycle suggest that the latter is not only shaped by industry and growth dynamics, but may also be, to some extent, CEO-specific. By adopting a longer time horizon and more advanced quasi-experimental research designs, the framework of this study could be further extended to provide not only meaningful associations, but also causal evidence. Finally, this thesis may have implications for CEO selection by boards: depending on their preferred balance between risk, liquidity, and profitability, they could appoint CEOs whose characteristics are more strongly associated with the desired operational and financial profiles.

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