(When) does PE-backing lead to a working capital optimization and profitability improvement?*

Lukas Andreas Oswald‡

ABSTRACT

I investigate the effect of Private Equity (PE) backing on working capital management and its subsequent effect on post-buyout profitability. Using a global sample of 419 unique buyouts with 2095 firm-year observations between 2011-2021, I find that PE-backed firms exhibit improvements in post-buyout working capital (manifested as a reduction in Cash Conversion Cycle length) in comparison to a carefully matched control group comprising 1,485 non-PE-backed firms. Further analysis suggests that relatively higher leverage and the presence of above-industry average (i.e., excess) working capital at entry significantly reduce Cash Conversion Cycle length. Additionally, I observe that the profitability of a PE-backed firm experiences a positive impact when adhering to a relatively aggressive working capital investment strategy but faces a negative impact when adopting a conservative working capital investment strategy. My findings are consistent with the idea that PE-backed firms can enhance their profitability by allocating more investments to fixed assets compared to current assets. I do not find a significant relationship for (non-) PE-backed firms deploying an aggressive working capital financing strategy. Overall, these results remain consistent when incorporating control variables and employing different outcome variables for profitability.

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‡ Corresponding Author: HHL Leipzig Graduate School of Management, Jahnallee 59, 04109 Leipzig, Germany, e-mail: lukas.oswald@hhl.de.

1. INTRODUCTION

During the last three years, the importance of working capital management (WCM) has increased substantially. After nearly a decade of low interest rates and a flood of "cheap money," companies had low costs to finance working capital. Since 2020/2021, times have changed drastically due to global, macro-economic shocks. Events, such as the COVID-19 pandemic, have stressed and disrupted global supply chains. Freight and transportation rates seemingly multiplied overnight, and pre-product industries reduced their production. This effect led to temporary factory shutdowns and empty production lines due to stock-outs and shortages, among other issues. Furthermore, rising inflation and subsequent changes in monetary policy by central banks around the world led to an increase in interest rates, forcing companies to closely monitor their liquidity to mitigate operational risks, such as those related to the supply chain or refinancing. Since then, companies are increasingly urged to turn towards internal sources of funding, (1) to maintain sufficient liquidity for operational needs (2) to reduce financing costs. In line with this, Deloitte's (2023) annual Working Capital Report titles: "the renaissance of working capital management" (Kinzler & Montanus, 2023). A survey involving over 1,100 corporate managers indicates that the impact of the current macroeconomic crisis on working capital is significant and is expected to increase further (Kinzler & Montanus, 2023). This aligns with PwC's 2023 working capital report, where Windhaus & Tebbett (2023) demonstrate that working capital is the top priority for financial managers.

Working capital management is a well-known topic in the financial literature, with numerous. scholars analyzing its effects on profitability over the past three decades in various contexts. Both academics and practitioners conclude that WCM involves optimizing net working capital (NWC[1])

[1] Net Working Capital (NWC) comprises inventories (i.e., stocks) plus accounts receivables (i.e., debtors) minus accounts payables (i.e., creditors). The regressions and explanations are based on NWC. NWC and working capital (WC) are used as a synonym throughout the paper.

and, consequently, the length of the Cash Conversion Cycle (CCC[2]). Thus, working capital management encompasses the optimization of the NWC components: (1) inventory reduction (e.g., faster throughput, just-in-time delivery), (2) accounts receivables reduction (e.g., shorter payment terms, factoring) and (3) accounts payables increase (e.g., longer payment terms, reverse factoring).

While substantial evidence exists regarding working capital improvement in the finance literature for listed (Aktas et al., 2015; Gill et al., 2010) and non-listed firms in various country and industry settings (Afrifa & Padachi, 2016; Baños-Caballero et al., 2010; Bhatia & Srivastava, 2016; García-Teruel & Martínez-Solano, 2007; Lyngstadaas & Berg, 2016), little is known about the impact of Private Equity (PE)-backing on working capital management and their combined influence on profitability. This paper aims to address this research gap by integrating PE research with existing working capital research.

Private Equity firms are renowned for optimizing acquired companies to enhance enterprise values (EVs) and maximize returns on investment. PE firms typically assist their portfolio companies in both operational and financial improvements. Sager (2007) highlights the importance of financial improvements related to WCM in this process. An entire M&A strategy can be built upon acquiring companies with excess working capital to enhance respective accounts (Sager, 2007). Financial institutions (e.g., J.P. Morgan), consulting firms (e.g., Deloitte, PwC), and scholars (e.g., Aktas et al., 2015 and Ek & Guerin, 2011, among others) argue that most companies have significant potential for improving their NWC. J.P. Morgan (2023) estimated for 2022 that an astonishing amount of USD 633 billion in NWC could be released across the S&P 1,500 companies. PwC (2023) estimates excess working capital of USD 1.5 trillion across a set of 17,000 global companies. Inefficient working capital management is a primary cause of restructurings. It

[2] The Cash Conversion Cycle (CCC) reflects the number of days a company needs to turn its products into cash. CCC is calculated as follows: DIO (Days Inventory Outstanding) + DSO (Days Sales Outstanding) – DPO (Days Payables Outstanding).

often results in (1) higher financing costs, (2) liquidity shortages, and (3) reduced investment capabilities, impacting long-term value creation. Therefore, PE investors, who are repeatedly confronted with improving WCM in their newly acquired portfolio companies, may be able to leverage their experience.

This raises the following questions: (1) Does PE-backing lead to stronger working capital optimization compared to a group of non-PE-backed control firms? (2) Does relatively higher leverage, and (3) excess working capital at the end of the transaction year lead to a more pronounced working capital reduction? (4) Does PE-backing result in an increase in post-buyout profitability? (5) What impact does the working capital management strategy (i.e., aggressive vs. conservative[3]) have on the profitability of PE-backed firms?

This paper aims to provide answers to those questions, using an up-to-date sample of 419 buyouts between 2011 and 2021 and a matched control group of 1,485 non-PE-backed peers.

Difference-in-difference regressions suggest that PE-backing has a positive effect on working capital improvement. I observe a decline in CCC days, indicating a quicker cash conversion. Further results suggest that the time-series reduction in CCC length is stronger if PE-backed firms have relatively higher leverage at the end of the transaction year. An above-industry average (i.e., excess) working capital in PE-backed firms leads to an even more significant reduction in CCC days.

Regarding the impact on profitability, I find that PE-backing has a negative effect as profitability declines compared to a group of non-PE-backed control firms. The results further suggest that the profitability of PE-backed firms increases through an aggressive (i.e., less conservative) working capital investment strategy (WCIS). Conversely, when executing an aggressive WCIS the

[3] The descriptions of less (more) aggressive and more (less) conservative working capital management are used interchangeably throughout the paper.

profitability of non-PE-backed firms declines. Therefore, PE-backed firms benefit more from investing relatively more in fixed assets (i.e., property, plant & equipment) compared to current assets. I do not observe any significant results indicating that a more aggressive working capital financing strategy (WCFS) leads to an increase in profitability for PE- and non-PE-backed firms, and vice versa.

Finally, I perform additional checks to address the robustness of my findings. First, I add a vector of control variables to the difference-in-difference regression to control for unobserved heterogeneity caused by time-varying omitted variables. My findings suggest that the negative effect of PE-backing on working capital improvement enlarges with the introduction of control variables. Overall, the results remain consistent with the main table.

In my second check, I change the threshold for relatively higher leverage from the 50^{th} quantile to the 75^{th} percentile to observe the sensitivity of my findings to the threshold. I document an even stronger working capital reduction (i.e., CCC length decline) with relatively higher leverage. My results rule out the possibility that the impact of the threshold influences the results.

As a final robustness check for PE-backing, working capital management strategy, and the impact on profitability, I exchange the outcome (dependent) variable return on assets (ROA) for different profitability measures, namely return on sales (ROS), return on equity (ROE), and return on capital employed (ROCE). The effect of PE-backing and the working capital management strategy on profitability remains consistent across the different dependent variables.

My research contributes primarily to four literature streams. First, I add to prior studies in the field of working capital improvements (Baños-Caballero et al., 2010; Deloof, 2003; García-Teruel & Martínez-Solano, 2007; Martínez-Solano et al., 2017). To the best of my knowledge, no one has, to date, documented a significant negative relationship between PE-backing and working capital

management (e.g., CCC reduction) compared to a carefully matched control group in an up-to-date global buyout sample.

Second, this study contributes to the existing literature on the positive effects of PE-backing and corporate governance (Jensen, 1986; Kaplan, 1989a; Kaplan & Strömberg, 2009; Lowenstein, 1985; Renneboog et al., 2007) and on excess working capital (Aktas et al., 2015; Baños-Caballero et al. 2010; Filbeck & Krueger, 2005).

Regarding the impact of PE-backing on profitability, my findings enqueue in a broad variety of literature with mixed results of PE-backing (Ayash & Schütt, 2016; Baker & Wruck, 1989; Boucly et al., 2011; Bergstrom et al., 2007; Cohn et al., 2014; Cressy et al., 2007; Guo et al., 2011; Jensen, 1986; Kaplan, 1989b; Scellato & Ughetto, 2013; Smith, 1990; Weir et al., 2015). The effect of PE-backing on profitability seems highly affected by external circumstances, such as geographical region or the time period of the buyout, as well as accounting rules.

Fourth, concerning PE-backing, working capital management, and profitability, I extend the existing literature (Afza & Nazir 2007; Deloof, 2003; García-Teruel & Martínez-Solano, 2007; Gill et al., 2010; Jose et al., 1996; Mathuva, 2015; Pais & Gama, 2015; Sharma & Kumar, 2011; Soenen, 1993) by including the dimension of PE-backing.

The remainder of this paper is structured as follows. Section 2 introduces the theoretical background and develops hypotheses. Section 3 outlines the sample construction. Section 4 presents the empirical strategy, results, and robustness tests, and section 5 discusses and concludes.

2. THEORETICAL BACKGROUND AND HYPOTHESES

2.1 Working Capital Management

Working capital constitutes a substantial portion of a company's balance sheet. Therefore, working capital management stands out as a primary concern for financial managers. The fundamental

objective of WCM is to attain an optimal working capital level that balances efficiency and risk (Filbeck & Krueger, 2005). In this context, the Cash Conversion Cycle and its components, namely Days Inventory Outstanding (DIO), Days Sales Outstanding (DSO), and Days Payables Outstanding (DPO), are analyzed and optimized.

2.1.1 PE-backing

Private equity firms are active partnerships, acting as investment vehicles and financial intermediaries. In this structure, a general partner (GP) aggregates capital invested in the fund by one or multiple limited partners (LPs) to acquire, manage, and eventually sell companies. The GP earns a management fee throughout the fund's life cycle and a carried interest at the end, contingent upon surpassing an agreed-upon hurdle rate (Robinson & Sensoy, 2013). In return, PE firms actively support their portfolio companies by providing (access to) financing (Fenn et al., 1997; Gompers & Lerner, 2004; Ivashina & Kovner, 2011), operational expertise (Boucly et al., 2011; Matthews et al., 2009), and strategic guidance (Hammer et al., 2022a). Specialized PE firms leverage their industry or stage of investment experience to enhance operations and profitability by offering superior advice (Cressy et al., 2007). General partners can rely on a network of industry advisors, which help with post-acquisition improvements or help to acquire companies at a lower price (Graham et al., 2017). Additionally, PE-backed firms benefit from knowledge sharing within the GP's portfolio (Humphery-Jenner, 2013). Hammer et al. (2022a) find "spillover effects" from PE firms to portfolio companies, with add-on acquisitions occurring at a higher pace than those of firms without PE-backing (Hammer et al., 2022a), indicating well-established and repeatedly executed M&A, integration, and optimization processes (Matthews et al., 2009).

PE firms often operate in an environment with extensive information asymmetries (Beuselinck & Manigart, 2007), high adverse selection, and moral hazard risks (Bernile, 2007; Gompers &

Lerner, 2004; Prowse, 1998). Post-buyout, PE firms promptly introduce corporate governance systems to address principal-agent conflicts (Gompers & Lerner, 2004). Cumming et al. (2007) find that PE-backing has a positive effect on corporate governance, as monitoring, through mechanisms like board representation, increases following leveraged buyouts (LBOs). PE-backing is associated with an increase in accounting information (Beuselinck & Manigart, 2007) and higher financial reporting quality (Beuselinck et al., 2009). In summary, PE firms take an active role in managing their portfolio companies, providing financing, strategic and operational expertise, and introducing corporate governance systems to oversee management. Hence, I expect PE-backed firms to demonstrate a stronger improvement in working capital post-buyout compared to comparable non-PE-backed firms.

Hypothesis 1: *PE-backed firms outperform a group of matched non-PE-backed control firms in terms of post-buyout working capital improvement.*

2.1.2 Leverage

Leverage plays a significant role in the financing structure of PE-backed transactions, as the traditional LBO is predominantly financed with debt and a smaller proportion of equity (Brown et al., 2021; De Maeseneire & Brinkhuis, 2012; Ivashina & Kovner, 2011; Kaplan & Strömberg, 2009). The amount of debt utilized in LBOs is influenced by the conditions of the debt market (De Maeseneire & Brinkhuis, 2012). When the cost of debt is low compared to the cost of equity, PE firms can leverage their deals stronger to increase returns (Kaplan & Strömberg, 2009).

The number of LBOs has seen a substantial increase in the last few decades (Haddad et al., 2017; Jenkinson & Stucke, 2011; Kaplan & Strömberg, 2009; Singh, 2017). In the decade following the financial crisis (2007/2008), the buyout machine (PE market) has been fueled by low interest rates (Bean et al., 2015; Financial Times, 2024; Liu et al., 2022) and substantial capital

inflows from institutional investors such as insurance companies and pensions funds, who doubled their capital allocation in PE (and other alternative investment categories, e.g. real estate) (Korteweg & Westerfield, 2022) in pursuit of superior returns, which PE funds have been providing since the 1980s (e.g., Harris et al., 2014; Higson & Stucke, 2012). Consequently, larger fundraising rounds (Krantz et al., 2023) have led to bigger funds, increased deal volumes, and higher debt levels (Financial Times, 2024). Additionally, the growing availability of debt for LBO transactions, especially through the rise of private debt (e.g., non-traditional debt financing apart from banks) has accelerated this trend (Block et al., 2023).

One side effect of leverage is the contractual obligation to service the debt through interest payments and repayments. The obligation to service debt presents a "two-sided sword" (Tykova & Borell, 2012) as it entails costs and benefits for the PE-backed firm (Jensen, 1986, Kaplan, 1989a, Kaplan & Strömberg, 2009). On one hand, agency costs (Jensen 1986), that arise with financial distress, such as "operating and financial frictions" (Brown et al. 2021) and bankruptcy-associated costs increase (Brown et al. 2021; Jensen 1986; Kaplan & Stein 1993). On the other hand, leverage provides the benefit of a debt tax shield (Jensen 1986; Kaplan 1989a; Lowenstein, 1985; Renneboog et al., 2007). The "tax benefit hypothesis" argues that the tax shield provides an important source of value creation (Kaplan, 1989a). Additionally, debt might act as a governance instrument. Jensen (1986) frames this as the "control hypothesis". Jensen (1986, 1988) argues that private equity is a superior form of ownership, as the high use of debt mitigates the principal-agent conflict for the use of free cash flow. In other words, a higher debt service reduces available cash flow, as contractual interest and repayments must be made. Hence, managers have strong incentives to invest in cash flow-positive projects, reducing the temptation to deploy the money otherwise (Jensen 1986), e.g. for empire building (Jensen, 1986; Xuan, 2009). Furthermore, the fear (of the associated consequences) and costs when missing debt payments (Ang et al., 1982) force

organizations to become more efficient (Jensen, 1986). Tykova & Borell (2012) conclude that PE investors use leverage to "limit the waste of free cash-flow and (…) increase the portfolio companies' efficiency and productivity." Thus, I expect PE-backed firms with higher leverage in the transaction year to improve their working capital more strongly, and vice versa.

Hypothesis 2: *A relatively higher (lower) leverage at the end of the transaction year increases (decreases) the effect of post-buyout working capital improvement.*

2.1.3 Excess working capital

Corporations, especially in asset-intensive industries (e.g. production and manufacturing) need positive working capital to ensure successful day-to-day operations[4] (Baños-Caballero et al., 2014; Deloof, 2003). Working capital is used to pre-finance procurement (e.g., raw materials), production (i.e., wages and general production costs such as energy), and the subsequent sales process until customer payments are collected. Accepting a higher level of working capital can help increase sales, as the company is able to grant higher trade credits (e.g., through longer payment terms) to their customers (Deloof, 2003; García-Teruel & Martínez-Solano, 2010) and thereby strengthen customer relationships (Cheng & Pike, 2003; Ng et al., 1999). Trade credit serves as an important financing source if companies have limited or no access to bank financing (Danielson & Scott, 2004; Elliehausen & Wolken, 1993; García-Teruel & Martínez-Solano, 2010; Petersen & Rajan, 1997; Schwartz, 1974). Potential benefits also arise from keeping a larger amount of inventory (e.g., safety stock). For example, companies exhibit higher crisis resilience during an economic downturn or a macro-economic shock (e.g., COVID-19 pandemic) when coping with supply

[4] Exceptions to positive working capital requirements apply for certain industries, such as supermarkets (e.g., Walmart, Aldi) and selected technology companies (e.g., Apple), as they operate on a negative working capital. Given their business model hand in hand with their market/bargaining power, their customers have short payment terms or pay them right away (i.e., relatively low trade receivables), while they pay their suppliers with very long payment terms (relatively high trade payables). Hence, a product is often sold multiple times to a customer before the company pays the supplier for the first time.

shortages (Chang, 2022; Radasanu, 2016) or in times of supply/demand uncertainty (Chopra et al., 2004). In terms of cash collections (e.g., debtor management), companies want to ensure that their trade partners (i.e., debtors) pay their invoices on time and in full (Mian & Smith Jr, 1992; Siekelova et al., 2017), especially if a company is providing large amounts of trade credit to its customers (Siekelova et al., 2017). Hence, paying supplier (i.e., creditor) invoices early, is in some cases, rewarded with a discount (Deloof, 2003; Martínez-Solano et al., 2017). Consequently, companies can reduce their cost of materials by paying early, resulting in a decline in trade payables and an increase in working capital. A relatively higher working capital requires more financial resources and vice versa. Hence, mature firms and companies with larger cash flows tend to have a longer CCC (Baños-Caballero et al., 2010).

Working capital is regularly financed through a mixture of overdraft facilities (at a cost, e.g., interest payments), internally generated cash (at an opportunity cost, e.g., the opportunity cost of capital), and customer (i.e., debit) and supplier (i.e., credit) financing (Aktas et al., 2015; Chang, 2022). The latter two are mainly driven by the respective negotiation and market power.

Previous studies have found that each firm has an optimum working capital level to which management tries to adjust (Aktas et al., 2015; Baños-Caballero et al., 2010; Pais & Gama, 2015). One can assume that in each industry, on average, companies are close to their optimal working capital level. Hence, companies that require relatively more working capital financing than the industry average have excess working capital. The lower capital efficiency translates into restrictions on undertaking investments (Aktas et al., 2015), as financing and opportunity costs increase. Consequently, managers spend a large share of their time and efforts to reduce excess working capital (Filbeck & Krueger, 2005). Thus, I expect PE-backed firms to optimize working capital by either decreasing excess working capital (e.g., to finance add-on acquisitions, to reduce costs, or to extract liquidity) or by increasing working capital (e.g., to fund growth).

Hypothesis 3: *(No) Excess working capital at the end of the transaction year increases (decreases) the effect of post-buyout working capital improvement.*

2.2 Working Capital Management and Profitability

2.2.1 PE-backing and profitability

Research on the effect of PE-backing and profitability dates back to the 1980s. Studies analyzing the first buyout wave of the 1980s and 1990s predominantly observed a positive impact of PE-backing on portfolio company profitability post-buyout (Baker & Wruck, 1989; Jensen, 1986; Kaplan, 1989b; Smith, 1990). Backer & Wruck (1989) argue that high debt service and management equity ownership have increased profitability in the divisional LBO of O.M. Scott & Sons Company. Kaplan (1989b) finds that large public-to-private buyout targets experience an increase in operating income and show statistically significant greater operating returns on assets (ROA) compared to their industry counterparts from 1980 to 1986. Jensen (1986) concludes that increases in organizational efficiency result from a reduction of agency costs.

Recent studies present mixed empirical evidence regarding post-buyout profitability. Guo et al. (2011) find that operating improvements are comparable to or slightly above (Cohn et al., 2014) those of matched control firms for individual buyout samples between 1995-2007. Scellato & Ughetto (2013) find that private-to-private buyouts underperform a matched control group regarding operating profitability in year three after the transaction for a sample from 1997-2004. Weir et al. (2015) observe a significant decline in profitability for some post-buyout years for public to private buyouts from 1998-2004 in the UK. Conversely, Bergstrom et al. (2007), Boucly et al. (2011), and Cressy et al. (2007) find significant improvements post-LBO in operating performance in Sweden, France, and the UK. Cressy et al. (2007) also find that PE industry specialization increases post-buyout profitability even further. Leslie & Oyer (2008) find no

evidence that PE-backed firms are more profitable than comparable public firms. Ayash & Schütt (2016) argue that profitability measures (e.g., ROA) have "LBO-induced accounting distortions" (e.g., goodwill and restructuring charges) and thus may lead to different results over time, based on changes in accounting principles. When replicating the studies by Kaplan (1989b) and Guo et al. (2011) using the "return on tangible assets" approach, Ayash & Schütt (2016) find no evidence for performance improvements.

The impact of PE-backing on profitability seems dependent on the geographical region, the time period of the buyout, and accounting rules. In light of mixed empirical evidence, I decide to re-test the original Jensen hypothesis (Jensen, 1986), and expect PE-backed firms to show a relatively higher increase in profitability (i.e., ROA) than the matched control firms.

Hypothesis 4: *PE-backed firms outperform a group of matched non-PE-backed control firms in terms of post-buyout profitability*.

2.2.2 Working Capital Management and Profitability

Working capital management involves a range of strategies and approaches. In simplified terms, financial managers must choose between a relatively more or less aggressive strategy for each working capital component, such as inventory, trade payables, and receivables. A more aggressive (i.e., less conservative) strategy aims for a lower working capital level. This can be achieved through higher investments in fixed assets, as opposed to current assets, and higher financing through current liabilities, as opposed to non-current liabilities. Conversely, a less aggressive (i.e., more conservative) strategy involves higher investments in current assets and relatively lower financing through current liabilities. Working capital requirements vary across industries (Baños-Caballero et al., 2010; Niskanen & Niskanen, 2006), indicating the absence of a one-size-fits-all

approach (Schwetzler, 2007). Managers need to balance the benefits and downsides of their specific WCM strategy based on industry determinants.

Various studies have explored the relationship between working capital management and profitability during the last three decades in different contexts. These studies consider a diverse range of performance and profitability measures (e.g., ROA, gross operating income), time spans (e.g., 1970s to 2010s), geographies (e.g., Belgium, Greece, India, Japan, Portugal, Spain, Sweden, US), company sizes (e.g., SMEs, large, listed companies) and industries (e.g., manufacturing, wholesale). For example, Boisjoly et al. (2020), Deloof (2003), García-Teruel & Martínez-Solano (2007), Jose et al. (1996), Mathuva (2015), Pais & Gama (2015), and Soenen (1993), among others, find a negative relationship between CCC length and profitability. Results indicate that more aggressive working capital management leads to an increase in profitability, and vice versa. Conversely, Abuzayed (2012), Afza & Nazir (2007), and Nazir & Afza (2009) find a positive relationship between CCC length and profitability, suggesting that less aggressive WCM leads to an increase in profitability. Results for studies on CCC components provide mixed evidence, with some studies showing negative relationships and others showing positive ones. For example, Gill et al. (2010) and Pais & Gama (2015) observe a negative relationship between DSO and profitability (i.e., a reduction of account receivables leads to an increase in profitability). In contrast, Sharma & Kumar (2011) report a positive relation for DSO. Sharma & Kumar (2011) find mixed evidence for accounts payable and inventories, while Gill et al. (2010) report no significant evidence. Conversely, Pais & Gama (2015) and Sharma & Kumar (2011) observe a negative relationship between DIO and DPO and profitability.

Studies like Baños-Caballero et al. (2010), Aktas et al. (2015), and Pais & Gama (2015) observe the existence of an optimal working capital level, which leads to improved operating performance

when approaching this level. Aktas et al. (2015) attribute the performance increase to the ability to use the "free" capital otherwise and deploy it in value-enhancing measures.

Even though the relationship between working capital management and profitability has been studied in various firm size-, country-, and time-span contexts, evidence for PE-backed firms is scarce, with studies showing mixed evidence. Holthausen & Larcker (1996) find that reverse-LBO firms (i.e., public-to-private buyouts that are listed again) exhibit significantly less working capital than their industry peers. After the listing, working capital levels increase again but remain lower than the industry average (Holthausen & Larcker, 1996). Guo et al. (2011) observe an increase in sales to working capital ratio (i.e., less working capital per sales) post-buyout and increases in working capital efficiency. However, the authors find no significant relationship between working capital improvements and sales growth (Guo et al., 2011). Weir et al. (2015) analyze a proximity measure for working capital for a sample of public-to-private buyouts in the UK[5]. The authors find an increase in working capital following the transaction, suggesting a higher post-buyout working capital (Weir et al., 2015). While observing an increase in liquidity, profitability either declines or remains at pre-LBO levels (Weir et al., 2015). Wilson et al. (2012) analyze the performance of PE-backed firms and a control group during the global recession. Their findings suggest that PE-backed firms have better working capital control and show signs of better working capital management than their non-PE-backed peers (Wilson et al., 2012).

Considering the higher debt load and frequent adjustments to changing circumstances, I expect PE-backed firms that adopt a relatively more aggressive investment strategy to be more profitable, and vice versa. When adopting a more aggressive financing strategy, I expect PE-backed firms to be associated with lower profitability, and vice versa, as PE-backed firms often have substantial

[5] Weir et al. (2015) analyze the post-buyout development of the Taffler z-score and its components for a sample of 138 public-to-private buyouts in the UK. Their measure of working capital reflects a component of the Taffler z-score, namely "CATL". "CA/TL" means current assets divided by total liabilities.

long-term debt financing, leading to suppliers, on average, not accepting longer payment terms (e.g., supplier financing) due to increased financial distress risk.

Hypothesis 5: *PE-backed firms adopting a relatively more (less) aggressive working capital investment strategy exhibit higher (lower) post-buyout profitability compared to a group of non-PE-backed control firms.*

Hypothesis 6: *PE-backed firms adopting a relatively less (more) aggressive working capital financing strategy exhibit higher (lower) post-buyout profitability compared to a group of non-PE-backed control firms.*

3. SAMPLE CONSTRUCTION

3.1 The buyout sample

The sample for this empirical research paper consists of a global set of leveraged buyout transactions, obtained from Bureau van Dijk's (BvD) transaction database, Zephyr. As of January 2024, Zephyr covers 1.8 million transactions and rumors, making it a database known for its comprehensive coverage of private equity acquisitions (Erel et al., 2015). Zephyr has been frequently utilized by other scholars (e.g., Beuselinck et al., 2009; Hammer et al., 2017, Hammer et al., 2022b; Rigamonti et al., 2016; Tyková & Borell, 2012; Wang; 2012). Additionally, Zephyr and BvD Orbis share a common identifier (i.e., BvD ID), enabling a seamless match of transaction and accounting data (Hammer et al., 2022b).

I construct the sample by selecting all transactions classified in Zephyr with the deal types "institutional buy-out," "PE-backed management buyouts," "management buy-ins," and "buy-in management buyouts" between January 1, 2012, and December 31, 2020, where the deal financing is labeled as "private equity" or "leveraged buyout." I restrict the sample to completed buyouts and exclude transactions with acquisitions of minority stakes. This results in a list of 16,465 buyouts.

After excluding deals without a company identifier (i.e., BvD ID), I obtain a sample of 14,761 buyouts (89.7%) involving 13,678 individual firms. Furthermore, I add deal-related information such as target industry, region, and entry date, among others. If the buyout target has multiple industry affiliations, I determine the primary industry affiliation based on the most frequently listed SIC codes.

Next, I complement the buyout sample with accounting data (e.g., turnover, total assets, working capital) and additional information on the target companies (e.g., incorporation year) from BvD Orbis. I restrict the search query to the availability of a known value for working capital in any year., narrowing the search to 5,337 firms (32.4%), for which I retrieve accounting data for the period from January 1, 2011, to December 31, 2022[6]. The availability of a complete five-year panel of accounting data around the transaction year is crucial to the study design for constructing a balanced panel. Hence, I require the availability of working capital, turnover, cost of goods sold, stocks, debtors, creditors, EBITDA, EBIT, net income, total assets, total current assets, and total current liabilities for a five-year balanced panel from one year prior to three years post-buyout (i.e., T-1 to T+3). I exclude all deals with an incomplete 5-year dataset. Further, I exclude buyouts of financial institutions, such as banks or insurance companies (SIC 6000-6999), in line with previous research (Aktas et al., 2015; Baños-Caballero et al., 2010; Deloof, 2003). After data cleaning, exclusions, and matching, the sample comprises 419 buyouts with 2,095 firm-year observations.

3.2 Matched control group

To address my research questions, I assemble a control group of firms without PE-backing. I obtain the data from BvD Orbis. In accordance with the sample methodology, I exclude all companies without a complete 5-year panel of accounting data. Furthermore, I exclude all

[6] At the time of the sample construction, accounting data before 2012 (i.e., 2011) is mostly incomplete in BvD Orbis.

companies that are currently or have been PE-backed. Following this methodology, I obtain a population of 23,181 companies as potential matching candidates. Consistent with Boucly et al. (2011) and Bernstein et al. (2019), I construct the control group based on various matching criteria. I require the working capital-to-turnover ratio in the pre-buyout year (i.e., T-1) to (1) be within a ± 30% bracket around the buyout targets' working capital-to-turnover ratio, (2) for firms to be in the same industry cluster, (3) in the same geographic region based on registration, and (4) within the same age cluster[7]. The matching criteria align with those applied by Boucly et al. (2011), Tyková & Borell (2012), and Wilson & Wright (2013). Following Bernstein et al. (2019), I retain up to five of the closest control companies in terms of quadratic distance of the working capital-to-turnover ratio (five-to-one-nearest-neighbor matching with replacement). This results in 1,485 matched control firms for the 419 buyouts (Ø 3.5 control firms per buyout).

3.3 Descriptive statistics

Table 1 displays the sample distribution across various dimensions. In Table 1 Panel A, the sample distribution is presented by entry year. Most buyout observations are concentrated within the period from 2013-2018. The larger number of observations in the post-2012 period can be attributed to an increase in data availability in BvD Orbis after 2012.

– Insert Table 1 about here –

Table 1 Panel B reports the distribution across regions. The sample covers eight regions, and the sample distribution for (no) excess working capital and higher (lower) leverage is largely in line with the overall sample distribution. Most observations come from the United Kingdom (48.2%) and Asia (32.9%), followed by Eastern Europe (9.1%) and Europe excluding Eastern Europe (3.8%). The low share of observations from the United States (1.2%) is attributed to the

[7] I follow the approach of Davis et al. (2014) and use the following age bins: 0-5 years, 6-10, 11-15, 16-20, and >21. I match the age bin instead of the actual target age.

lack of accounting data in BvD Orbis for privately held US companies, which are not required to disclose financial data. This is a known challenge in the literature (e.g., Hammer et al., 2022b; Tyková & Borell, 2012). In comparison, European and UK companies have strict disclosure requirements. This distribution also holds true for buyouts with excess working capital (UK: 43.9%, Asia: 37.8%) and relatively higher leverage (UK: 41.4%, Asia: 33.6%).

Table 1 Panel C presents the sample distribution across industries. The majority of buyouts fall in the category "other" (27.7%) and "manufacturing" (20.5%), followed by "wholesale & retail" (16.2%), "business equipment" (12.2%) and "consumer non-durables" (10.0%). This distribution holds true for the buyout sub-samples. Excess working capital is more frequently present in the industry cluster "other" (35.1%), "manufacturing" (21.6%), and "consumer non-durables" (11.5%). Higher leverage occurs more frequently in "other" (27.0%) and "manufacturing" (25.7%), followed by "consumer non-durables" (13.8%) and "wholesale & retail" (11.2%).

Table 2 provides the summary statistics for the main variables used in the regression models (see Appendix A1 for a detailed variable definition) across different industries. Table 2 Panel A presents the summary statistics for the buyout sample, while Panel B presents the summary statistics for the control group.

– Insert Table 2 about here –

There are substantial differences in working capital-to-turnover ratio (and CCC length) across the depicted industry clusters. The sectors chemicals & allied products (0.24 and 0.23, respectively), healthcare & medical equipment (0.23 and 0.19, respectively), and manufacturing (0.22 for both) show the highest working capital-to-turnover ratio for both PE- and non-PE-backed firms. On average, buyout targets display a relatively higher TCA/TA ratio compared to their matched control firms, indicating a more conservative (i.e., less aggressive) working capital investment strategy (WCIS). In contrast, firms in the control group, on average, show an 11.6 pp.

lower TCA/TA ratio. Additionally, control firms exhibit a lower TCL/TA ratio, reflecting a more conservative (i.e., less aggressive) working capital financing strategy (WCFS). Profitability ratios (e.g., ROA) reveal, that buyout targets, on average, record slightly higher profitability compared to control firms (0.06 and 0.04, respectively). Differences in profitability persist across industries.

4. EMPIRICAL RESULTS

4.1 Empirical strategy

I utilize five-year panel data around the buyout entry (i.e., T-1 to T+3) to examine the general impact of PE-backing on working capital management. Following the methodology of Boucly et al. (2011) and Hammer et al. (2022a), I employ a two-way fixed effects panel regression. Formally, I estimate the following difference-in-difference model:

$$CCC_{it} = \alpha_i + \beta_t + \gamma\, Post_{it} + \delta\,(Post_{it} \cdot PE_i) + \varepsilon_{it} \quad (1)$$

where CCC_{it} represents the dependent variable (Cash Conversion Cycle as a measure of working capital management) of company *i* in year *t*; *Post* is a binary variable that equals 1 the three years after the transaction and 0 otherwise (i.e., T0 and T-1); *PE* is a time-invariant variable that equals 1 for PE buyouts (n=419) and 0 otherwise. α and β are firm and year fixed effects, respectively.

To assess the impact of higher (lower) leverage in the transaction year, I modify the regression model (1) as follows:

$$CCC_{it} = \alpha_i + \beta_t + \gamma\, Post_{it} + \delta_1\,(PE_{HLev_i} \cdot Post_{it}) + \delta_2\,(PE_{LLev_i} \cdot Post_{it}) + \varepsilon_{it} \quad (2)$$

where PE_{HLev} and PE_{LLev} are time-invariant dummy variables for PE-backed firms with a leverage ratio higher (N=152) or lower (N=267) than the 50th percentile in the transaction year (i.e., T0).

To investigate the difference in working capital management between targets with and without excess working capital in the year of the transaction, I modify the equation (1) as follows:

$$CCC_{it} = \alpha_i + \beta_t + \gamma\, Post_{it} + \delta_1\,(PE_{ExWC_i} \cdot Post_{it}) + \delta_2\,(PE_{NExWC_i} \cdot Post_{it}) + \varepsilon_{it} \quad (3)$$

where PE_{ExWC} and PE_{NExWC} represent time-invariant dummy variables for firms with an above (N=148) or below (N=271) average working capital turnover ratio among firms in the same industry and the same year. The excess working capital calculation is based on the population of all potential control firms (23,181) and is not restricted to the matched 1,485 controls. Other variables and fixed effects are similar to the regression model (1).

To address hypothesis four, the relationship between PE-backing and profitability, I estimate the difference-in-difference model from equation (1) with a different dependent variable:

$$ROA_{it} = \alpha_i + \beta_t + \gamma\, Post_{it} + \delta\,(Post_{it} \cdot PE_i) + \varepsilon_{it} \quad (4)$$

where ROA_{it} represents the dependent variable (return on assets, as a measure of profitability) for portfolio company *i* in year *t*. All variables and fixed effects are similar to the regression model (1).

To gauge the impact of PE-backing and different working capital management strategies (e.g., WCIS and WCFS) on profitability, I employ various additional difference-in-difference regressions, which and alter equation (4) as follows:

$$ROA_{it} = \alpha_i + \beta_t + \gamma\, Post_{it} + \delta_1\,(Post_{it} \cdot PE_i) + \delta_2\left(Post_{it} \cdot \frac{TCA}{TA}_i\right) + \delta_3\left(Post_{it} \cdot PE_i \cdot \frac{TCA}{TA}_i\right) + \varepsilon_{it} \quad (5)$$

$$ROA_{it} = \alpha_i + \beta_t + \gamma\, Post_{it} + \delta_1\,(Post_{it} \cdot PE_i) + \delta_2\left(Post_{it} \cdot \frac{TCL}{TA}_i\right) + \delta_3\left(Post_{it} \cdot PE_i \cdot \frac{TCL}{TA}_i\right) + \varepsilon_{it} \quad (6)$$

$$ROA_{it} = \alpha_i + \beta_t + \gamma\, Post_{it} + \delta_1\,(Post_{it} \cdot PE_i) + \delta_2\left(Post_{it} \cdot \frac{TCA}{TA}_i\right) + \delta_3\left(Post_{it} \cdot PE_i \cdot \frac{TCA}{TA}_i\right) + \delta_4\left(Post_{it} \cdot \frac{TCL}{TA}_i\right) + \delta_5\left(Post_{it} \cdot PE_i \cdot \frac{TCL}{TA}_i\right) + \varepsilon_{it} \quad (7)$$

where $\frac{TCA}{TA}_i$ and $\frac{TCL}{TA}_i$ represent total current assets (TCA) divided by total assets (TA) for company *i* and total current liabilities (TCL) divided by total assets (TA) for company *i*. All variables and

fixed effects are similar to the regression model (4). A relatively higher TCA/TA ratio reflects a relatively less aggressive working capital investment strategy, and vice versa. In contrast, a relatively higher TCL/TA ratio reflects a relatively more aggressive working capital financing strategy, and vice versa.

4.2 Main results: Working Capital Management

In Table 3, I address my first research question, namely whether PE-backing leads to post-buyout working capital improvement. I present the coefficient estimates for the difference-in-difference panel regression. Column (1) exhibits the baseline effect of PE-backing on CCC. I find that firms in the control group experience a statistically significant increase in CCC after the matched buyout entry. For PE-backed firms (*Post x PE* coefficient), I observe a negative coefficient, suggesting a 5.8-day reduction in CCC days. The PE-treatment effect is statistically significant at the 5% level.

– Insert Table 3 about here –

In column (2), I present the results of my second research question, i.e., whether relatively higher leverage in the transaction year increases working capital improvement). I split the *Post x PE* interaction term and divide the PE-treatment group into buyout targets with relatively higher or lower leverage at the end of the transaction year. I find a 38.4% more negative coefficient for PE-backed firms with relatively higher leverage compared to the *Post x PE* baseline coefficient. Furthermore, I find that PE-backed firms with relatively lower leverage also exhibit a negative coefficient, which is, however, less negative than for PE-backed firms with relatively higher leverage (-4.6 vs. -8.1-day reduction). Both coefficients are significant at the 10% level. Overall, the results suggest that relatively higher leverage leads to stronger working capital improvement and vice versa. The findings align with my second hypothesis, indicating that relatively higher

leverage leads to an optimization of the internal use of funds, reducing opportunity costs and freeing up liquidity.

In column (3), I exhibit the results of my third research question, i.e., whether PE-backing and the presence of excess working capital increases the working capital improvement. I split the *PE dummy* into PE-backed firms with and without excess working capital at the end of the entry year (i.e., T0). I find that the *Post x* PE_{ExWC} coefficient is strongly negative (-16.4-day reduction) and statistically significant at the 1% level. The coefficient for PE-backed firms without excess working capital is slightly negative (-0.1-day reduction) and not statistically significant. The results suggest that excess working capital is a strong driver for working capital improvement for PE-backed firms. The results further indicate that PE-backed firms with below industry-average working capital levels (i.e., better utilization than their peers) at entry do not show a significant reduction in CCC days but remain approximately at a pre-buyout level. This indicates that PE firms do not "blindly" reduce the CCC length further if the portfolio company already operates at a relatively more aggressive working level.

4.3 Main Results: Profitability

Table 4 presents the main results of the regression coefficient estimates for the effect of working capital management on profitability (i.e., how PE-backing and, in combination with working capital management strategies, impact profitability). I present the results of the difference-in-difference panel regression shown in the equations (4), (5), (6), and (7).

– Insert Table 4 about here –

Column (1) exhibits the baseline effect. I find that the control group firms experience a statistically significant decline in ROA of -0.019 after the matched buyout entry. The *Post x PE* coefficient term implies an additional decline in ROA of -0.011 through PE-backing. The PE treatment effect

is statistically significant at the 5% level. The results suggest that PE-backed firms underperform their matched control firms during the three-year period post-buyout.

In column (2) I include the WCIS coefficient. I find that a relatively less (more) aggressive investment strategy leads to a statistically significant increase (decline) in ROA for the matched control firms of 0.035. The *Post x TCA/TA x PE* interaction term implies a decline in ROA (-0.065) when the investment policy is relatively more conservative (i.e., less aggressive). The effect is statistically significant at the 1% level and suggests that PE-backed firms are more (less) profitable when executing a relatively more (less) aggressive WCIS (i.e., relatively higher investments in fixed assets vs. current assets). The results suggest that the effect of an aggressive WCIS on ROA is the opposite for PE-backed firms (i.e., positive) than for non-PE-backed firms (i.e., negative).

In column (3), I find that a less (more) conservative financing strategy (i.e., higher financing through current liabilities vs. non-current liabilities) leads to a statistically significant decline in ROA for non-PE-backed firms. The *Post x TCL/TA x PE* coefficient also shows a decline in profitability, however, without displaying statistical significance. Overall, my findings suggest that profitability for both PE- and non-PE-backed firms increases when following a relatively more conservative WCFS and vice versa.

Column (4) exhibits the results for the joint WCIS and WCFS difference-in-difference regression. I observe that the coefficients are slightly larger than those presented in columns (2) and (3). Overall, signs and significance for WCIS and WCFS remain in line with my previous findings for PE- and non-PE-backed firms.

4.4. Robustness tests

In this section, I conduct multiple analyses to test the robustness of my previous estimates. First, I use an alternative model specification and add control variables to my difference-in-difference regression. Working with panel data helps reduce omitted variable bias, as time-

invariant, omitted variables are eliminated, addressing unobserved heterogeneity. However, time-varying omitted variables may still be present. Hence, I extend the regression models (1) to (3) by a vector of control variables, namely the natural logarithm of total assets (LN(TA)), return on assets (ROA), total current assets divided by total assets (TCA/TA), total current liabilities divided by total assets (TCL/TA), fixed assets divided by total assets (FXA/TA), option-adjusted high-yield spreads from BofA Merrill Lynch as proxy for economy-wide credit conditions (CSP), and GDP development (GDP) from the World Bank. Table 5 shows the results. Despite losing many observations (due to the limited 5-year panel availability of accounting data for control variables), the coefficients and statistical significance remain largely unaffected.

– Insert Table 5 about here –

The results in column (1) show that the *Post x PE* coefficient declines (-6.7 days vs. -5.8 days), implying an even stronger effect of PE-backing on CCC length reduction. The coefficient remains significant at the 5% level. Looking at the *Post x* PE_{HLev} interaction term, I observe a narrowing of the spread in comparison to the baseline PE-backing effect. In comparison with the main table (i.e. Table 3), this represents a 4.0 pp. stronger decline in CCC days. The coefficient and significance for the *Post x* PE_{ExWC} interaction term remain unchanged.

Next, I re-specify the *Post x* PE_{HLev} and *Post x* PE_{LLev} interaction terms by dividing the sample for higher (lower) leverage at or above (below) the 75th percentile, instead of above (below) the 50th percentile. The coefficient for *Post x* PE_{HLev} is more negative and remains statistically significant, indicating an even stronger optimization with higher leverage. Overall, results remain unchanged (not depicted for brevity).

To test the robustness of hypotheses four to six, I conduct additional robustness tests to analyze whether the impact of working capital management on profitability is due to the chosen dependent variable. I exchange the outcome (dependent) variable for different profitability measures, namely

return on sales (ROS), return on equity (ROE), and return on capital employed (ROCE) to explore the sensitivity of my results. Table 6 depicts the results. Confirming my previous results for PE-backed firms, I observe a negative relationship between less aggressive WCIS and profitability and vice versa. The coefficients for ROS and ROCE are significant at the 1% level. Regarding the effect of the WCFS on PE-backed firms, I do not find a statistically significant effect across all three alternative dependent variables.

– Insert Table 6 about here –

5. DISCUSSION AND CONCLUSION

This paper investigates (1) the impact of PE-backing in various settings on WCM and (2) the impact of aggressive or conservative WCM investment and financing strategies on profitability using up-to-date empirical evidence from 419 global buyouts for the period 2011-2021 and a matched control group of 1,485 non-PE-backed firms. I provide evidence that suggests that (1) PE-backing acts as a driver for working capital improvement relative to a group of non-PE-backed control firms. PE investors possess a unique skill set and industry information (i.e., gained over time by repeatedly executing buyout transactions and through a network of senior industry advisors) in line with corporate governance mechanisms that allow them to improve their portfolio companies' working capital post-buyout. Consistent with my hypothesis, findings suggest that working capital improvements are larger when leverage at entry is higher. The reduction in tied-up capital from operations can be used as a source of internal liquidity to fund debt service and growth. Working capital improvement is particularly strong if the acquired firm has an above-industry average (i.e. excess) working capital in the transaction year. However, if the target firm has no excess working capital, I do not observe a significant improvement, lending support to the idea that PE investors do not "blindly" reduce working capital levels to extract liquidity from the company if the company is already executing a rather aggressive working capital management.

Further results (2) regarding PE-backing, in combination with WCM strategy and profitability, provide evidence consistent with the idea that a more aggressive (i.e., less conservative) working capital investment strategy leads to an increase in profitability for PE-backed firms. In contrast, I find that the profitability of non-PE-backed firms declines when following a more aggressive (i.e., less conservative) WCIS. This finding is important, as it highlights differences in the potential investment styles of PE- and non-PE-backed firms, as the first have an incentive to maximize investment in fixed assets to improve profitability. Additional findings suggest that a more aggressive WCFS has a negative effect on profitability for PE- and non-PE-backed firms, respectively.

I note that my study has limitations and indicates avenues for future research. Data limitations, especially the availability of additional accounting data, have prevented an analysis of the actual use of the additional liquidity, generated from working capital improvements. Future research could further explore whether the liquidity is predominantly extracted (e.g., dividend payouts and debt service) or reinvested in the company (e.g., new machinery and product lines to foster sales growth) and thus used for additional value creation. Another opportunity for future research is to look beyond the traditional company profitability measures (i.e., ROA, ROE, etc.) and analyze the impact of WCM on the deal's internal rate of return (IRR) and EV development. Another interesting avenue for future research would be to study if PE firms act homogenously regarding WCM or if there are differences based on the degree of specialization (specialist vs. generalist). Finally, more research is warranted in the different industry- and country clusters, as well as in times of crisis (e.g., COVID-19).

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Table 1

Sample distribution

This table presents the sample distribution across entry years (Panel A), target regions (Panel B), and target industries (Panel C).

Panel A: Distribution by entry year

	Total sample		Higher Leverage		Lower Leverage		Excess WC		No Excess WC		Control Group	
Entry year	N	%	N	%	N	%	N	%	N	%	N	%
2012	9	2.1%	1	0.7%	8	3.0%	2	1.4%	7	2.6%	18	1.2%
2013	41	9.8%	10	6.6%	31	11.6%	14	9.5%	27	10.0%	143	9.6%
2014	65	15.5%	28	18.4%	37	13.9%	18	12.2%	47	17.3%	210	14.1%
2015	62	14.8%	24	15.8%	38	14.2%	20	13.5%	42	15.5%	231	15.6%
2016	83	19.8%	31	20.4%	52	19.5%	33	22.3%	50	18.5%	309	20.8%
2017	95	22.7%	33	21.7%	62	23.2%	37	25.0%	58	21.4%	355	23.9%
2018	64	15.3%	25	16.4%	39	14.6%	24	16.2%	40	14.8%	219	14.7%
Total	**419**	**100.0%**	**152**	**100.0%**	**267**	**100.0%**	**148**	**100.0%**	**271**	**100.0%**	**1,485**	**100.0%**

Panel B: Distribution by region

	Total sample		Higher Leverage		Lower Leverage		Excess WC		No Excess WC		Control Group	
Region	N	%	N	%	N	%	N	%	N	%	N	%
Asia	138	32.9%	51	33.6%	87	32.6%	56	37.8%	82	30.3%	624	42.0%
Africa & Middle East	2	0.5%	1	0.7%	1	0.4%	2	1.4%	0	0.0%	10	0.7%
Oceania	7	1.7%	3	2.0%	4	1.5%	1	0.7%	6	2.2%	12	0.8%
Europe excl. East. Europe	16	3.8%	9	5.9%	7	2.6%	8	5.4%	8	3.0%	62	4.2%
Eastern Europe	38	9.1%	16	10.5%	22	8.2%	11	7.4%	27	10.0%	104	7.0%
LATAM	10	2.4%	4	2.6%	6	2.2%	4	2.7%	6	2.2%	37	2.5%
North America excl. US	1	0.2%	1	0.7%	0	0.0%	0	0.0%	1	0.4%	1	0.1%
United Kingdom	202	48.2%	63	41.4%	139	52.1%	65	43.9%	137	50.6%	617	41.5%
United States	5	1.2%	4	2.6%	1	0.4%	1	0.7%	4	1.5%	18	1.2%
Total	**419**	**100.0%**	**152**	**100.0%**	**267**	**100.0%**	**148**	**100.0%**	**271**	**100.0%**	**1,485**	**100.0%**

Table 1

Sample distribution – *continued*

Panel C: Distribution by industry												
	Total sample		Higher Leverage		Lower Leverage		Excess WC		No Excess WC		Control Group	
Industry	N	%	N	%	N	%	N	%	N	%	N	%
Consumer non-Durables	42	10.0%	21	13.8%	21	7.9%	17	11.5%	25	9.2%	167	11.2%
Consumer Durables	10	2.4%	5	3.3%	5	1.9%	1	0.7%	9	3.3%	32	2.2%
Manufacturing	86	20.5%	39	25.7%	47	17.6%	32	21.6%	54	19.9%	353	23.8%
Oil & Gas	2	0.5%	1	0.7%	1	0.4%	0	0.0%	2	0.7%	2	0.1%
Chemicals & Allied Products	11	2.6%	2	1.3%	9	3.4%	7	4.7%	4	1.5%	40	2.7%
Business Equipment	51	12.2%	11	7.2%	40	15.0%	11	7.4%	40	14.8%	199	13.4%
TMT	6	1.4%	3	2.0%	3	1.1%	2	1.4%	4	1.5%	15	1.0%
Utilities	8	1.9%	4	2.6%	4	1.5%	3	2.0%	5	1.8%	19	1.3%
Wholesale & Retail	68	16.2%	17	11.2%	51	19.1%	17	11.5%	51	18.8%	219	14.7%
Healthcare & Medical Equipment	19	4.5%	8	5.3%	11	4.1%	6	4.1%	13	4.8%	57	3.8%
Other	116	27.7%	41	27.0%	75	28.1%	52	35.1%	64	23.6%	382	25.7%
Total	**419**	**100.0%**	**152**	**100.0%**	**267**	**100.0%**	**148**	**100.0%**	**271**	**100.0%**	**1,485**	**100.0%**

Table 2

Summary statistics

This table depicts the summary statistics (mean values) for the buyout sample (Panel A) and the control group (Panel B) used in this paper in the year prior to the transaction (i.e., T-1). All variables are defined in Appendix A1.

Panel A: Buyout Sample

Industry	N	WC-TO-ratio	CCC	TCA/TA	TCL/TA	ROA	ROS	ROE	ROCE
Consumer non-Durables	42	0.17	72.94	0.64	0.41	0.04	0.10	0.07	0.17
Consumer Durables	10	0.19	83.21	0.66	0.46	0.07	0.12	0.16	0.22
Manufacturing	86	0.22	91.12	0.64	0.41	0.06	0.11	0.15	0.15
Oil & Gas	2	0.14	42.60	0.72	0.19	0.14	0.21	0.19	0.32
Chemicals & Allied Prod.	11	0.24	96.87	0.62	0.33	0.09	0.14	0.25	0.18
Business Equipment	51	0.20	43.24	0.72	0.36	0.08	0.19	0.20	0.21
TMT	6	0.08	40.31	0.41	0.33	-0.04	0.08	0.10	0.03
Utilities	8	0.05	37.20	0.23	0.19	0.02	0.25	0.16	0.06
Wholesale & Retail	68	0.11	35.27	0.68	0.45	0.09	0.09	0.21	0.25
Healthcare & Med. Equip.	19	0.23	102.49	0.50	0.35	0.00	0.09	0.15	0.16
Other	116	0.12	28.18	0.61	0.43	0.08	0.14	0.23	0.25

Panel B: Control Group

Variable	N	WC-TO-ratio	CCC	TCA/TA	TCL/TA	ROA	ROS	ROE	ROCE
Consumer non-Durables	167	0.18	78.58	0.47	0.28	0.03	0.10	0.06	0.08
Consumer Durables	32	0.18	68.04	0.52	0.35	0.03	0.09	0.06	0.10
Manufacturing	353	0.22	105.40	0.54	0.33	0.03	0.11	0.06	0.09
Oil & Gas	2	0.09	85.40	0.32	0.17	0.07	0.29	0.14	0.13
Chemicals & Allied Products	40	0.23	103.29	0.53	0.37	0.05	0.10	0.06	0.11
Business Equipment	199	0.19	77.99	0.59	0.31	0.04	0.11	0.07	0.09
TMT	15	0.06	14.97	0.29	0.22	0.04	0.23	0.06	0.09
Utilities	19	0.05	22.22	0.26	0.21	0.04	0.24	0.07	0.09
Wholesale & Retail	219	0.18	45.54	0.57	0.37	0.05	0.09	0.10	0.12
Healthcare & Medical Equip.	57	0.19	175.21	0.55	0.26	0.00	0.06	0.02	0.02
Other	382	0.13	43.34	0.50	0.32	0.05	0.14	0.09	0.11

Table 3

Main results: PE-backing and the impact on working capital management.

This table presents the results of the difference-in-difference regression for PE-backing (and different interaction terms) on CCC (dependent variable). Column 1 presents the baseline result for the *Post x PE* interaction term. Column 2 presents the results when splitting the *Post x PE* coefficient into the PE-backed firms with higher and lower leverage. Column 3 presents the divides the Post x PE interaction term into PE-backed firms with (out) excess working capital. Robust standard errors are in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent variable: Cash Conversion Cycle (CCC)		
	(1)	(2)	(3)
Post	6.291 ***	6.291 ***	6.291 ***
	(2.04)	(2.04)	(2.04)
Post x PE	-5.843 **		
	(2.65)		
Post x PE_{HLev}		-8.085 *	
		(4.75)	
Post x PE_{LLev}		-4.567 *	
		(2.70)	
Post x PE_{ExWC}			-16.435 ***
			(4.92)
Post x PE_{NExWC}			-0.058
			(2.58)
Firm FE	YES	YES	YES
Year FE	YES	YES	YES
N (observations)	9,520	9,520	9,520
N (groups)	1,904	1,904	1,904

Table 4

Main results: PE-backing, working capital management strategy and profitability.

This table presents the result of the difference-in-difference regressions panel regression. The dependent variable is ROA. Column (1) presents the baseline regression. Column (2) and Column (3) presents the results for the *Post x PE x* (2) *working capital investment* and (3) *financing strategy*. Column (4) combines the both working capital strategies in one difference-in-difference regression. Standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level respectively.

	Dependent variable: ROA			
	(1)	(2)	(3)	(4)
Post	-0.019 ***	-0.037 ***	-0.009 **	-0.028 ***
	(0.00)	(0.01)	(0.00)	(0.01)
Post x PE	-0.011 **	0.026 **	-0.003	0.025 **
	(0.01)	(0.01)	(0.01)	(0.01)
Post x TCA/TA		0.035 ***		0.048 ***
		(0.01)		(0.01)
Post x TCA/TA x PE		-0.065 ***		-0.069 ***
		(0.02)		(0.02)
Post x TCL/TA			-0.030 **	-0.049 ***
			(0.01)	(0.01)
Post x TCL/TA x PE			-0.015	0.012
			(0.03)	(0.03)
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
N (firm-years)	9,518	9,518	9,518	9,518
N (firms)	1,904	1,904	1,904	1,904

Table 5

Robustness test: alternative model specification

This table presents the result of the difference-in-difference regressions where the dependent variable is CCC. In columns (1) to (3), there are control variables included, compared to the regressions shown in Table 3. Control variables include the natural logarithm of total assets (LN(TA)), return on assets (ROA), total current assets divided by total assets (TCA/TA), total current liabilities divided by total assets (TCL/TA), fixed assets divided by total assets (FXA/TA), option-adjusted high yield spreads from BofA Merrill Lynch, as proxy for economy-wide credit conditions (CSP), and GDP development (GDP). Robust standard errors are in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent variable: Cash Conversion Cycle		
	(1)	(2)	(3)
Post	4.515 **	4.523 **	4.470 **
	(2.19)	(2.19)	(2.19)
Post x PE	-6.708 **		
	(2.68)		
Post x PE_{HLev}		-8.408 *	
		(4.73)	
Post x PE_{LLev}		-5.739 **	
		(2.83)	
Post x PE_{ExWC}			-16.760 ***
			(4.97)
Post x PE_{NExWC}			-1.209
			(2.65)
Controls	YES	YES	YES
Firm FE	YES	YES	YES
Year FE	YES	YES	YES
N (observations)	9,518	9,518	9,518
N (groups)	1,904	1,904	1,904

Table 6

Robustness test: different outcome variable

This table presents the result of the difference-in-difference regressions panel regression. The dependent variables are ROS, ROE, and ROCE. Standard errors are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level respectively.

	ROS				ROE				ROCE			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Post	-0.01 ***	-0.03 ***	-0.01	-0.02 ***	-0.05 ***	-0.08 ***	-0.03	-0.06 ***	-0.04	-0.06 ***	-0.04 ***	-0.06 ***
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.00)	(0.01)	(0.01)	(0.01)
Post x PE	-0.01	0.03 *	0.00	0.03 **	-0.04 ***	-0.02	-0.04	-0.02	-0.04	0.02	-0.05 ***	0.00
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.04)	(0.03)	(0.04)	(0.01)	(0.02)	(0.02)	(0.02)
Post x TCA/TA		0.03 ***		0.04 ***		0.07 ***		0.09 ***		0.04 ***		0.05 ***
		(0.01)		(0.01)		(0.02)		(0.03)		(0.02)		(0.02)
Post x TCA/TA x PE		-0.06 ***		-0.06 ***		-0.06		-0.07		-0.10 ***		-0.12 ***
		(0.02)		(0.02)		(0.06)		(0.06)		(0.04)		(0.04)
Post x TCL/TA			-0.03 *	-0.05 ***			-0.05	-0.09 *			0.00	-0.01
			(0.02)	(0.02)			(0.04)	(0.05)			(0.03)	(0.03)
Post x TCL/TA x PE			-0.03	0.00			0.00	0.03			0.03	0.07
			(0.03)	(0.03)			(0.09)	(0.10)			(0.06)	(0.07)
Firm FE	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES
Number of obs.	9,312	9,312	9,312	9,312	9,507	9,507	9,507	9,507	9,500	9,500	9,500	9,500
Number of groups	1,886	1,886	1,886	1,886	1,904	1,904	1,904	1,904	1,900	1,900	1,900	1,900

Appendix

Table A1 Variable description and sources

This table describes the construction and sources of dependent and independent variables used in this paper.

Panel A: Dependent variables	
Variable	Description
CCC	Cash Conversion Cycle ("CCC"), calculated as Days Inventory Outstanding (DIO) plus Days Sales Outstanding (DSO) minus Days Payables Outstanding (DPO); winsorized at the 2.5% level. Source: BvD Orbis
ROA	Return on Assets ("ROA") calculated as net income (P/L for period) divided by total assets; winsorized at the 2.5% level. Source: BvD Orbis
ROS	Return on Sales ("ROS") calculated as net income (P/L for period) divided by sales (turnover), winsorized at the 2.5% level. Source: BvD Orbis
ROE	Return on Equity ("ROE") calculated as net income (P/L for period) divided by the result of total assets minus current and non-current liabilities; winsorized at the 2.5%. Source: BvD Orbis
ROCE	Return on Capital Employed ("ROCE") calculated as EBIT (Operating P/L, earnings before interest and taxes) divided by the result of total assets minus current liabilities; winsorized at the 2.5% level. Source: BvD Orbis
Panel B: Independent variables	
Variable	Description
PE	Dummy variable that takes a value of 1 for a buyout firm and 0 for non-buyout firms. Source: Zephyr
Post	Dummy variable that takes a value of 1 for buyout firms three years after the buyout (T+1, T+2, and T+3), and 0 otherwise (T0, T-1). For control firms Post takes a value of 1 corresponding to the matched buyout target, and 0 otherwise. Source: Zephyr
PE_{HLev}	Dummy variable that takes a value of 1 for firms with a leverage ratio (debt divided by total assets), above of equal to the 50th quantile of buyouts, in the year of the transaction (T0), and 0 otherwise. Source: BvD Orbis
PE_{LLev}	Dummy variable that takes a value of 0 for firms with a leverage ratio (debt divided by total assets) below the 50th quantile of buyouts, in the year of the transaction (T0), and 1 otherwise. Source: BvD Orbis
PE_{ExWC}	Dummy variable that takes a value of 1 for firms with an above average working capital-turnover-ratio (working capital divided by turnover) among firms in the same industry and the same year from a up to 23,000-firm comparison population, and 0 otherwise. Source: BvD Orbis
PE_{NExWC}	Dummy variable that takes a value of 0 for firms with a below average working capital-turnover-ratio (working capital divided by turnover) among firms in the same industry and the same year from a up to 23,000-firm comparison population, and 1 otherwise. Source: BvD Orbis
TCA/TA	TCA/TA ("TCA/TA") calculated as total current assets (TCA) divided by total assets (TA); winsorized at the 2.5% level. A higher (lower) ratio reflects a relatively more (less) conservative working capital investing strategy (WCIS). Source: BvD Orbis
TCL/TA	TCL/TA ("TCL/TA") calculated as total current liabilities (TCL) divided by total assets (TA); winsorized at the 2.5% level. A higher (lower) ratio reflects a relatively less (more) conservative working capital financing strategy (WCFS). Source: BvD Orbis
Panel C: Control variables	
Variable	Description
LN(TA)	Natural logarithm of total assets. Source: BvD Orbis
FXA/TA	FXA/TA ("FXA/TA") calculated as fixed assets (FXA) divided by total assets (TA). A higher ratio reflects a relatively higher share of fixed vs. current assets. Source: BvD Orbis
CSP	BofA Merrill Lynch option-adjusted high-yield spread at buyout entry. Serves as a proxy for the economy-wide credit conditions. Source: BofA Merrill Lynch Global Research
GDP	Annual GDP development. Source: World Bank