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The Impact of Knowledge Capital and Organization Capital on Stock Performance during Economic Crises: The Moderating Role of a Generalist CEO

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Abstract: This study examines the relationship between intangible capital (IC) and stock performance during the two recent crisis periods, the GFC and COVID-19. By categorizing IC into Knowledge Capital (KC) and Organizational Capital (OC), we analyze the impact of each capital on the crisis return in the manufacturing sector. The results show that a greater KC and OC are significantly associated with higher crisis returns during both periods. In addition, we find evidence that generalist CEOs strengthen this relationship while specialist CEOs do not. Within firms led by a generalist CEO, the CEO's tenure positively moderates the association between each factor of intangible capital and crisis period returns. This study emphasizes the pivotal role of KC and OC as a protective buffer against external shocks, particularly when the market pays more attention to corporate sustainability.

Keywords: knowledge capital; organization capital; economic crisis; stock return; generalist CEO; specialist CEO

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1. Introduction

During economic crises, stock prices provide an opportunity to assess a company's sustainable competitiveness (Lins et al. 2017; Lome et al. 2016; Lu et al. 2022). These economic crises, characterized by factors such as credit risks, economic lockdowns, and disruptions in global demand and trade, companies face significant threats to their sustainability compared to normal periods (Bekaert et al. 2014; Ding et al. 2021; Fahlenbrach et al. 2021). Unexpected declines in overall market trust during crises make shareholders more concerned that the financial information previously relied upon for investment decisions may no longer be reliable or valid. As a result, the extent to which profitability information is reflected in stock prices is limited (Lins et al. 2017; Yoo et al. 2021). Researchers have utilized economic crisis periods as experimental settings to investigate the determinants of corporate sustainability based on investors' heightened interest in sustainable firms during these periods (Rai et al. 2021; Su et al. 2022).

Considering the complementary role of technology and a firm's inherent competitiveness alongside Physical Capital (PC), which is the primary component of capital in manufacturing, the literature on evaluating the contribution of IC to a company's competitiveness and sustainability emerges (Alvino et al. 2021; Xu and Liu 2021). Research on traditional IC has predominantly focused on research and development (R&D) expenses that form KC, limiting the importance of other intangible factors such as human capital, innovative products, brands, software, customer relationships, databases, and distribution systems. Subsequent studies have expanded the concept of IC through the OC based

on selling, general, and administrative (SG&A) expenses (Crouzet et al. 2022; Lev and Radhakrishnan 2005; Lev et al. 2009).

OC represents unique business processes and know-how that accumulate within a company and key talents, signifying the company's distinctive competitiveness attributes, including enhanced productivity, innovation capabilities, brand recognition, corporate social responsibility, and sustainability (Boubaker et al. 2022; Francis et al. 2021). On the other hand, KC signifies a company's ability to innovate products and processes, forming the foundation for long-term competitive advantage and sustainability (Chiu et al. 2021; Hegde and Mishra 2023). In alignment with Peters and Taylor (2017), our methodology for evaluating a firm's IC involves the summation of its KC and OC. Within this framework, we construe expenditures in R&D as investments in KC, employing the perpetual inventory method to determine the replacement cost of KC. Similarly, a portion of the historical SG&A is considered an investment in OC (Eisfeldt and Papanikolaou 2013). We define a firm's total capital as combining its PC and IC.

Although the previous literature identifies KC and OC as a significant contributor to stock returns as sources of a company's sustainable competitiveness (Francis et al. 2021), their impact during crisis periods remains unexplored. As a vital component of IC related to sustainability, we argue that KC and OC's influence on stock returns may be more pronounced during crises because investors prioritize companies with sustainable competitiveness in volatile periods. This study examines the relationship between IC and stock performance during two crises, specifically the Global Financial Crisis (GFC) and COVID-19.

Interest in IC in corporate sustainability is increasingly growing in finance research. Remarkable studies include the integration of Environmental, Social, and Governance (ESG) practices into business strategies (Clark et al. 2015; Wong et al. 2021), the recognition of social capital as a key driver in enhancing corporate performance and innovation (Lins et al. 2017; Liu et al. 2021), and the acknowledgment of intellectual capabilities as essential for navigating dynamic and disruptive business environments (Cohen and Kaimenakis 2007; Crupi et al. 2021). We argue that a deeper understanding of the roles of KC and OC during economic crises would provide insights into how IC supports corporate sustainability. This research provides important insights for stakeholders, including corporate managers and investors, who seek sustainability assessments beyond traditional financial metrics to evaluate a company's long-term resilience and viability amid increasing market uncertainty.

Furthermore, our study aims to expand the understanding of the crisis response capabilities of IC by considering CEO managerial ability as a moderating factor. Prior studies suggest that IC is embedded in CEOs, indicating that a company's ability to maximize the utilization of IC is associated with CEO characteristics (Crouzet et al. 2022). According to Custódio et al. (2013), CEOs can be classified as generalists or specialists by their general managerial abilities. Generalist CEOs possess a broader range of management knowledge and skills, while specialist CEOs have more focused expertise specific to an industry, firm, or domain (Chen et al. 2021). The broad expertise of generalist CEOs contributes to managerial efficiency, as they possess strategic decision-making skills, foster corporate innovation, handle complex tasks, and maintain effective communication with shareholders (Ma et al. 2021; Xu et al. 2021). This study examines whether generalist CEOs contribute to stock returns during economic crises by efficiently utilizing internal capital by analyzing moderating effects.

During the early stages of a CEO's tenure, a generalist CEO may have weakly embedded the firm's IC, potentially limiting their ability to effectively leverage the current organization's sustainable competitiveness (Li and Patel 2019; Xu 2024). The understanding and utilization experience of internal IC that increases with tenure can enhance the generalist CEO's ability to efficiently leverage the firm's KC and OC for problem-solving. Therefore, we investigate whether the CEO's tenure moderates the relationship between IC and crisis-period returns.

Our study employs a sample of US manufacturing firms covering the periods of the GFC and COVID-19 crises and their adjacent periods, from 2005 to 2013 and 2018 to 2022, respectively. We focus on manufacturing firms with Standard Industrial Classification (SIC) two-digit codes ranging from 31 to 39 to ensure homogeneous utilization strategies of IC within the sample. Manufacturing and non-manufacturing industries may adopt different R&D and operational strategies, potentially leading to differences in the accumulation of KC and OC with their impacts. The previous literature has shown, through empirical research, that the effect of R&D investment on stock performance differs between manufacturing and non-manufacturing industries, implying that the impact of IC may vary across sectors (Ehie and Olibe 2010; Rahman and Howlader 2022).

The empirical results of our study reveal that KC and OC exhibit positive correlations with crisis-period stock returns during both the GFC and COVID-19 periods, while PC shows a negative correlation. These patterns persist even after applying firm and year-fixed effects. During both the GFC and COVID-19 periods, generalist CEOs strengthen the relationship between the two components of IC and crisis returns, while specialist CEOs do not show significant relationships. As the tenure of generalist CEOs increases, during the GFC period, the relationship between both components of IC and crisis returns is enhanced, while during the COVID-19 period, only the relationship between KC and crisis returns is strengthened.

Our findings contribute to the expanding body of research concerning the influence of IC on firm stock performance. Prior empirical investigations have explored the significance of IC in enhancing a firm's operational and stock-related achievements (Belo et al. 2022; Hasan et al. 2021). By disaggregating IC into KC and OC, our study, even during crisis periods, provides a deeper understanding of the relationship between IC and stock performance. Furthermore, this study contributes to the related research area as the first analysis of stock returns during economic crises, categorizing IC into KC and OC in the manufacturing sector.

Furthermore, our findings corroborate prior research regarding the relationship between CEO general managerial ability and firm performance, such as financial results, acquisition performance, investment propensity, and credit ratings (Betzer et al. 2020; Chen et al. 2021; Ma et al. 2021). While the study by Andreou et al. (2017) explored the role of generalist CEOs during times of uncertainty, their work is limited to examining firms' investment behavior amidst crises. Our research extends this area by shedding light on how a CEO's general managerial ability influences the relationship between a firm's IC and stock return during the crisis period.

The subsequent sections of the paper are structured as follows: Section 2 delves into the foundational theoretical framework and hypothesis development. Section 3 provides an overview of the empirical methodology, encompassing data sources and our variables. Moving forward, Section 4 presents the results of our analysis, examining the influence of KC and OC on crisis returns and the moderating role of a generalist CEO. Finally, in Section 5, we draw our conclusions.

2. Literature Review and Hypothesis Development

The significance of IC in enhancing innovation, efficiency, and productivity for sustainable competitive advantage has long been acknowledged in economics and management. In the 1970s and 1980s, there were efforts in firm-level and neoclassical growth studies to research IC with a focus on R&D investment (Dziallas and Blind 2019; Griliches 1979). Subsequently, academic research shifted towards considering brands and non-R&D-based IC as strategic assets that form a company's distinctive competitiveness, particularly within management and marketing literature since the 1990s (Rojas-Lamorena et al. 2022). Interest and significance in factors within IC beyond R&D-based technological advancements became prominent after the 1990s, when information technology-driven productivity enhancements took off (Brynjolfsson and Hitt 2000; Corrado et al. 2022). During this period, significant disparities emerged between the market valuations of companies and account-

ing valuations based on physical assets, real estate, and equipment (Brynjolfsson et al. 2002; Van Criekingen et al. 2022). This phenomenon indirectly suggests an expansion in the contribution of intangible capital beyond R&D-based investment to corporate value.

The previous research has emphasized that intangible assets, including brands, new products, and software for company operations, significantly influence the financial performance of the most innovative companies in the U.S. beyond R&D-based investment (Lev and Sougiannis 1996). Lev and Radhakrishnan (2005) suggested that corporate reports should include assets for developing new products, services, customer relationships, human resources, and organizational culture. These insights and research findings have prompted economists to explore investigating SG&A investments as a complement to traditional R&D-based measures of intangible capital (Crouzet et al. 2022). As a result, research on IC is expanded to encompass two main expense categories: R&D costs related to technological development and SG&A costs related to operational effectiveness and capabilities (Boiko 2022).

Recent studies have expanded the concept of IC by accumulating annual expenses and categorizing R&D-based capital as KC and SG&A-based capital as OC (Peters and Taylor 2017). KC and OC are estimated by capitalizing R&D and SG&A investments, respectively (Mishra 2022). OC includes strategy, market research, brand creation and management, media management, customer acquisition, sales promotion, customer intelligence and relationship, supplier and partnership management, social networks, hiring and training expenses, management consulting, business process experiment and improvement, software development, and human capital (Gao et al. 2021; Hasan et al. 2021). Therefore, OC differs from KC-based innovation of products, services, and processes, encompassing intrinsic business processes and expertise, which enable more efficient resource utilization than competitors (Crouzet et al. 2022).

Existing studies have confirmed that IC positively contributes to stock value (Crouzet et al. 2022). Specifically, KC contributes to a company's innovation capacity and long-term sustainability, impacting firm value and reducing stock volatility (Chiu et al. 2021; Hegde and Mishra 2023). OC positively correlates with sustainable competitive factors, including firm reputation, social responsibility investment, and employee satisfaction (Cui et al. 2021; Gao et al. 2021). Furthermore, OC enhances financial performance based on efficient resource utilization, distinctive operational capabilities, and firm competitiveness, consequently improving stock returns (Chiu et al. 2022; Francis et al. 2021). Therefore, KC and OC contribute to innovation capacity, productivity, and efficient resource utilization, enhancing the company's long-term sustainability (Hegde and Mishra 2023; Mishra 2022).

To fully understand the influence of KC and OC on a firm's sustainable competitiveness, it is crucial to investigate their impact on stock returns during economic crises. The literature on crisis period returns has highlighted the significance of sustainability-related factors such as social capital (Lins et al. 2017), ESG practices (Broadstock et al. 2021), and branding (Huang et al. 2021). Assuming that KC and OC are associated with sustainable competitiveness, we argue that investors would prefer companies with higher levels of KC and OC during crisis periods.

Hypothesis 1: *Firms with higher KC and OC are associated with better market performance during a crisis.*

IC within a company is inherently embedded within the company itself and its key talents, with CEOs being particularly scrutinized as prominent key talents (Gao et al. 2021; Hasan and Uddin 2022). The human capital of a CEO holds significant importance for a company's performance due to its influential role in decision-making processes (Chen et al. 2021; Garcés-Galdeano and García-Olaverri 2019). CEOs' general managerial ability is one of the major factors influencing a company's performance, especially in strategic decision-making and efficient resource utilization, because corporate leaders are required to solve a wide range of problems that require diverse career experience (Li and Patel

2019). In this context, CEOs are often classified as either generalists with broad managerial knowledge applicable across industries or specialists with focused expertise in specific sectors (Custódio et al. 2013; Xu 2024).

Existing studies present contrasting views on the impact of generalist CEOs on corporate performance. On the one hand, their broad expertise contributes to managerial efficiency. Generalist CEOs are associated with strategic decision-making, fostering corporate innovation, handling complex tasks, and delivering shareholder benefits (Betzer et al. 2020; Custódio et al. 2019). These findings suggest that generalist CEOs may adapt better to volatile economic conditions. In contrast, concerns arise that due to their broad but potentially shallow firm-specific knowledge, generalist CEOs may lead to suboptimal resource utilization and negative firm performance during routine operations (Mueller et al. 2021). Furthermore, externally hired generalist CEOs may be induced to take excessive risks, leading to significant agency problems, financial weaknesses, and increased volatility in corporate performance (Gounopoulos and Pham 2018; Ma et al. 2021).

During crises, there is an increased demand for CEOs with diverse managerial capabilities to improve organizational performance in response to the changed market environment (Jebran and Chen 2022). Generalist CEOs, capable of addressing disparate business challenges through varied professional experiences, are well-suited to navigate uncertainties and complexities (Andreou et al. 2017; Li and Patel 2019). Generalist CEOs with diverse managerial backgrounds often acquire skills in adapting firm-specific resources to market dynamics (Garicano and Rossi-Hansberg 2006), nurturing investor relations (Murphy and Zabojnik 2007), and assisting in financial distress recovery (Cheng et al. 2020; Gilson and Vetsuypens 1993). On the other hand, specialist CEOs, who possess narrower but deeper knowledge and skills closely tied to specific industries, firms, or domains, possess problem-solving capabilities related to industry- and firm-specific IC (Agnihotri and Bhattacharya 2021; Faleye et al. 2018). However, during economic crises, when new approaches to problem-solving are required(Andreou et al. 2017), their resource utilization capabilities may not be effectively leveraged. Therefore, we hypothesize that generalist CEOs can leverage a wider range of strategies during crisis periods to optimize the utilization of KC and OC.

Hypothesis 2. *A generalist CEO positively moderates the association between IC, including KC and OC, and crisis period returns.*

A specialist CEO, as compared to a generalist CEO, possesses a more precise understanding of internal resources and external relationships due to their long-term accumulated and deep understanding of organizational domain expertise (Alderman et al. 2022; Gounopoulos and Pham 2018). Therefore, during the early stages of a CEO's tenure, a generalist CEO may have weakly embedded the firm's IC, potentially limiting their ability to effectively leverage the current organization's sustainable competitiveness (Leng and Pan 2023).

As a result, the extended tenure of a generalist CEO may facilitate the accumulation of firm-specific domain expertise and operational competencies. This accumulation of knowledge and experience equips them with the tools to leverage the organization's resources for efficient problem-solving (Brochet et al. 2021). Therefore, we hypothesize that the generalist CEO's tenure is a moderator, enhancing the relationship between IC and stock returns, particularly in an economic crisis.

Hypothesis 3. *Within firms led by a generalist CEO, the CEO's tenure positively moderates the association between IC and crisis period returns.*

3. Data and Methods

3.1. Sample Definition

Our main sample consists of firms in the United States during the GFC and COVID-19. The GFC spans from 15 September 2008 to 9 March 2009, aligned with Lehman Brothers'

bankruptcy and concluding at the nadirs of the S&P 500 and MSCI World Equity Index (Frankel and Saravelos 2012). Our sample spans pre-crisis and post-crisis periods, allowing us to discern IC effects in normal and crisis periods, specifically from 2005 to 2013, including four years before and after the GFC. For the COVID-19 period, data spans from 19 February to 23 March 2020, reflecting the highest and lowest points of the S&P 500 index during the first half of 2020 (Cox et al. 2020). The COVID-19 sample covers 2018 to 2022, limited by data availability in the latest year.

We collect daily stock return data from CRSP and annual accounting data from COMPUSTAT. Accounting data are based on the last year ending before each testing year. We excluded small-cap stocks with a market capitalization below USD 250 million as of the end of the previous year for both the GFC and COVID-19 economic crises due to their limited liquidity, wider bid-ask spreads, and heightened susceptibility to the price pressure effects of trading. After consolidating companies using the COMPUSTAT and CRSP databases, we obtained the final sample of 1105 and 807 firms meeting these criteria for the GFC and COVID-19 periods.

3.2. Dependent Variables

This study utilizes two stock return variables: Raw Return and Abnormal Return. Raw Return is based on daily excess returns during the estimation period for each crisis period of GFC and COVID-19. These excess returns are calculated by subtracting the risk-free rate, represented by the 1-month daily Treasury bill rate, from the daily buy-and-hold returns. Abnormal Return measures the difference between the firm's expected return and Raw Return. The expected return is calculated using the market model with the CRSP value-weighted index as the market proxy. We estimate the expected return over a 60-month period, extending until the day immediately preceding the start of the Raw Return period for each respective year. Variable definitions are provided in Appendix A.

3.3. Main Independent Variables: KC and OC

We measure KC and OC with the perpetual inventory method by following the approach in the previous literature (Eisfeldt and Papanikolaou 2013; Peters and Taylor 2017). This measurement involves the aggregation of deflated R&D and SG&A expenses, as formulated in Equations (1) and (2):

$$KC_{i,t} = KC_{i,t-1}(1-\delta_0) + \frac{R\&D_{I,t}}{CPI_t} \tag{1}$$

$$OC_{i,t} = OC_{i,t-1}(1-\delta_0) + \frac{SG\&A_{I,t}}{CPI_t} \tag{2}$$

where i denotes the firm, and t represents the fiscal year. We adopt a depreciation rate (δ_0) of 15 percent, in line with the rate used by the U.S. Bureau of Economic Analysis for estimating R&D capital. CPI_t represents the consumer price index. In cases of missing R&D and SG&A expense data in COMPUSTAT, we estimate these values using the method proposed by Peters and Taylor (2017), which involves applying age-specific growth rates categorized by SIC two-digit industrial classifications.

Estimating the initial stock of KC and OC is often necessary due to the absence of accounting data in the founding year of firms. Our approach, as outlined in Equations (3) and (4), is consistent with methodologies established in prior studies (Eisfeldt and Papanikolaou 2013; Peters and Taylor 2017):

$$KC_{i,t0} = \frac{R\&D_{i,t1}}{g+\delta_0} \tag{3}$$

$$OC_{i,t0} = \frac{SG\&A_{i,t1}}{g+\delta_0} \tag{4}$$

where t_1 indicates the first year of a firm i appears in our sample, and g represents the estimated growth rate of R&D and SG&A expenses before its appearance in the dataset. For our analysis, we use the average growth rate of R&D and SG&A expenses in our dataset as g, which is approximately 10.08 percentage points. Furthermore, we measure the replacement cost of the PC as the book value of property, plant, and equipment (COMPUSTAT item PPEGT). Subsequently, we normalize KC, OC, and PC by the firm's total assets.

3.4. Generalist and Specialist CEO

We employ the generalist and specialist CEO categorization using the Generalist Ability Index (GAI) developed by Custódio et al. (2013). The GAI evaluates the extent of a CEO's human capital, drawing from their cumulative work experience in publicly traded companies before assuming their current CEO role. A CEO with diverse experience across various industries, multiple firms, different organizational sectors, or previous CEO roles is classified as possessing broader or more general skills. The GAI dataset covers U.S. S&P 1500 firms from 1992 to 2022, sourced from EXECUCOMP. Each CEO's profile is manually cross-referenced with the BoardEx database to obtain comprehensive attributes encompassing their professional history.

The GAI of CEO i in year t is defined as

$$GAI_{i,t} = 0.268X_{1i,t} + 0.312X_{2i,t} + 0.309X_{3i,t} + 0.218X_{4i,t} + 0.153X_{5i,t} \quad (5)$$

where X_1 represents the count of distinct executive positions held by a CEO throughout their career, X_2 signifies the number of companies where a CEO has been employed, and X_3 quantifies the diversity of industries at the four-digit SIC code level in which a CEO has gained experience. X_4 is a binary variable, taking the value of 1 if a CEO has previously held a CEO position at another company, and X_5 is another binary variable, set to 1 if a CEO has been employed by a multidivisional company, which is a firm that reports multiple business segments in its financial disclosures.

The coefficients in Equation (5) are derived by extracting common components using principal component analysis from five variables. Finally, we classify generalist CEOs as those exceeding the median of annual GAI, while specialist CEOs are those falling below the median of annual GAI.

3.5. CEO's Tenure

To estimate the CEO's tenure, we reference the EXECUCOMP database, which furnishes the year a CEO assumed their role within their current firm. CEO tenure is defined as the number of years a CEO has held their current position within the company. We utilize this variable to evaluate the moderating impact on the relationship between capital and stock returns during the crisis, specifically for generalist CEOs.

3.6. Empirical Methodology

We examine the positive relationship between a company's IC and stock returns during economic crises. Furthermore, our study explores the impact of the CEO's general management ability on the relationship between intangible and crisis return. Our baseline empirical test uses ordinary least squares estimation to evaluate the relationship between IC and crisis return. We compiled longitudinal data for sampled firms, encompassing four and two years before and after the GFC and COVID-19. Overall, our regression equation is formulated as follows:

$$Return_{i,t} = \beta_0 + \beta_1 \cdot Capital_{i,t-1} + \beta_2\ Crisis_t + \beta_3\ Capital_{i,t-1} \times Crisis_t + \beta_4\ \mathbf{X}_{i,t-1} + \text{Firm Fixed Effects} + e_{i,t} \quad (6)$$

where $Return_{i,t}$ denotes the daily stock return, $Capital_{i,t-1}$ represents the firm's annual PC, KC, and OC measured at the latest fiscal year-end before the measurement of $Return_{i,t}$[1]. $Crisis_t$ is a binary variable assigned one for the crisis period and zero otherwise. The coefficient of primary interest is β_3, as it estimates the impact of each capital on firm value during the crisis period relative to non-crisis periods, with β_1 indicating the effect of each capital

during non-crisis periods. $\boldsymbol{X}_{i,t-1}$ represents the control variables of the firm measured at the latest fiscal year-end before the measurement of $Return_{i,t}$. The control variables include market capitalization, long-term and short-term debt, cash holdings, profitability, book-to-market value, negative book-to-market value, momentum, and idiosyncratic risk, in line with prior studies (Blau and Griffith 2016; Harford et al. 2014; Lins et al. 2017). In addition, we control for firm factor loadings based on the Fama–French three-factor model and the momentum factor, and we consider industry or firm fixed effects. All variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. Detailed definitions are provided in Appendix A.

3.7. Summary Statistics and Correlations

Table 1, Panels A and B present an overview of the variables along with their respective summary statistics for the periods of the GFC and COVID-19. The key variables KC, OC, and PC are % of total assets calculated by dividing the cumulative values by the total assets. The standard deviations of KC and OC during the GFC period were 0.415 and 0.484; during the COVID-19 period, they were 0.230 and 0.439, respectively. During the GFC and COVID-19 periods, KC had median (maximum) values of 0.409 (4.699) and 0.077 (1.853), respectively. During the same periods, OC had median (maximum) values of 0.472 (2.976) and 0.374 (2.777), respectively. Compared with the previous literature, Eisfeldt and Papanikolaou (2013) reported OC/Total Assets with a median value of 0.66 and a maximum value of 2.71, while Li et al. (2018) reported a median value of 0.69 and a maximum value of 2.19, indicating that they were measured at a similar level.

"Raw Return" and "Abnormal Return" represent returns over the entire period, including both crisis and normal periods, while "Crisis Raw Return" and "Crisis Abnormal Return" are specifically analyzed for the periods of economic crisis. The "Raw Return" analyzed over the entire period, including crisis and normal periods, showed mean values of 3.7 and −9.5 percentage points during the GFC and the COVID-19 review period, respectively. To enhance comparability between the two economic crises, if we consider the normal period of the GFC to be the same as the COVID-19 testing period, which is four years, then the average stock return during the GFC is −3.1 percentage points. The "Crisis Raw Return" analyzed specifically during the economic crisis showed significant negative values during the GFC and the COVID-19 period, with mean values of −55.6 and −40.3 percentage points, respectively. The 25th percentile values were −70.6 and −48.8 percentage points, respectively. The stock returns during the GFC and COVID-19 periods confirm substantial concerns among investors and stakeholders about the viability and sustainability of the invested companies, as evidenced by the summary statistics. Therefore, these crisis periods provide an appropriate period for analyzing the contribution of KC and OC as key drivers of a company's sustainability and distinctive competitive advantage.

Table 1, Panel C presents the correlation matrix of key variables used in the regression analysis during the GFC period of this study. The core variables, KC and OC, correlate significantly positively with raw and abnormal returns during crisis periods ($p < 0.05$). This correlation suggests that KC and OC positively impact a firm's stock performance during the economic crisis. Company size (measured by market capitalization) and profitability positively correlate with raw returns during crises. In contrast, debt and the book-to-market ratio negatively affect stock returns during crises. Firm-level control variables and stock return metrics correlate with our expectations.

Table 1. Descriptive statistics and correlations.

Panel A: Statistical Overview—GFC								
Variables	**Observation**	**Mean**	**Std. Dev**	**Min**	**25%**	**Median**	**75%**	**Max**
PC (% of Total Asset)	6204	0.413	0.294	0.039	0.200	0.337	0.549	1.444
KC (% of Total Asset)	5679	0.501	0.415	0.014	0.230	0.409	0.643	4.699
OC (% of Total Asset)	6338	0.593	0.484	0.018	0.265	0.472	0.756	2.976
Raw Return (%)	4771	0.037	0.363	−0.821	−0.158	0.050	0.231	1.303
Abnormal Return (%)	3945	−0.019	0.280	−0.702	−0.177	−0.038	0.111	1.082
Crisis Raw Return (%)	533	−0.556	0.202	−0.951	−0.706	−0.567	−0.429	0.106
Crisis Abn. Ret. (%)	429	−0.109	0.393	−0.898	−0.362	−0.136	0.094	1.353
Market Cap. (USD Bln)	5581	7.087	1.802	1.337	5.964	6.971	8.232	11.617
Long-term debt (USD Bln)	6199	0.155	0.186	0.000	0.000	0.103	0.242	1.159
Short-term debt (USD Bln)	6223	0.039	0.077	0.000	0.000	0.006	0.041	0.486
Cash holdings (USD Bln)	6207	0.062	0.081	0.000	0.012	0.034	0.079	0.475
Profitability (USD Bln)	6213	0.109	0.115	−0.396	0.070	0.116	0.166	0.451
Book-to-market (%)	5579	0.585	0.583	−2.046	0.302	0.481	0.747	3.901
Negative B/M (Binary)	6338	0.027	0.162	0.000	0.000	0.000	0.000	1.000
Momentum (%)	4568	0.059	0.442	−0.746	−0.207	−0.003	0.229	2.349
Idiosyncratic risk (%)	3977	0.030	0.019	0.011	0.020	0.026	0.034	0.154
Panel B: Statistical Overview—COVID-19								
Variables	**Observation**	**Mean**	**Std. Dev**	**Min**	**25%**	**Median**	**75%**	**Max**
PC (% of Total Asset)	4035	0.393	0.334	0.002	0.180	0.295	0.498	2.230
KC (% of Total Asset)	3199	0.145	0.230	0.002	0.034	0.075	0.168	1.380
OC (% of Total Asset)	4065	0.494	0.439	0.013	0.221	0.374	0.600	2.777
Raw Return (%)	2128	−0.095	0.188	−0.712	−0.152	−0.045	0.021	0.301
Abnormal Return (%)	2128	−0.007	0.131	−0.491	−0.069	−0.012	0.049	0.414
Crisis Raw Return (%)	423	−0.402	0.130	−0.650	−0.489	−0.394	−0.312	−0.027
Crisis Abn. Ret. (%)	426	−0.001	0.216	−0.491	−0.144	−0.005	0.150	0.414
Market Cap. (USD Bln)	3764	7.981	1.807	2.506	6.786	7.934	9.212	12.332
Long-term debt (USD Bln)	4026	0.222	0.191	0.000	0.055	0.203	0.326	1.084
Short-term debt (USD Bln)	4052	0.036	0.065	0.000	0.004	0.011	0.036	0.417
Cash holdings (USD Bln)	4047	0.080	0.133	0.000	0.012	0.032	0.079	0.780
Profitability (USD Bln)	4040	0.076	0.157	−0.647	0.055	0.105	0.149	0.406
Book-to-market (%)	3764	0.440	0.477	−1.192	0.180	0.338	0.578	3.472
Negative B/M (Binary)	4065	0.037	0.188	0.000	0.000	0.000	0.000	1.000
Momentum (%)	2128	0.128	0.368	−0.608	−0.110	0.085	0.300	1.516
Idiosyncratic risk (%)	2128	0.020	0.008	0.008	0.014	0.018	0.024	0.045

Table 1. *Cont.*

Panel C: Correlation Matrix													
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**
KC (1)													
OC (2)	0.911 ***												
PC (3)	−0.010	−0.068 ***											
Raw Return (4)	0.030 **	0.021	0.047 *										
Abnormal Ret. (5)	0.014	0.017	0.062 ***	0.657 ***									
Crisis Raw Ret. (6)	0.076 ***	0.049 **	−0.101 **	1.000 ***	0.142 ***								
Crisis Abn. Ret. (7)	0.218 **	0.217 ***	−0.021 *	0.236 ***	1.000 ***	0.843 ***							
Market Cap. (8)	−0.292 ***	−0.306 ***	0.046 ***	0.047 ***	0.031 *	0.247 ***	0.180 ***						
Long-Term Debt (9)	−0.098 ***	−0.095 ***	0.083 ***	0.017	−0.001	−0.204 ***	−0.210 ***	0.078 ***					
Short-Term D. (10)	−0.029 **	−0.011	0.101 ***	−0.034 **	−0.024	−0.061 *	0.014	−0.132 ***	0.001				
Cash Holdings (9)	0.153 ***	0.168 ***	−0.192 ***	−0.036 **	−0.015	−0.072	−0.03	−0.164 ***	−0.199 ***	−0.068 ***			
Profitability (10)	−0.281 ***	−0.298 ***	0.086 ***	0.036 **	0.001	0.112 **	0.07 *	0.369 ***	0.038 ***	−0.101 ***	−0.192 ***		
Book-to-market (11)	−0.122 ***	−0.141 ***	0.080 ***	−0.189 ***	−0.065 ***	−0.116 ***	0.014	−0.215 ***	−0.151 ***	0.081 ***	−0.053 ***	−0.169 ***	
Negative B/M (12)	0.125 ***	0.123 ***	0.086 ***	−0.013	−0.032 **	−0.075 *	−0.098 **	−0.192 ***	0.262 ***	0.158 ***	−0.020 *	−0.096 ***	−0.407 ***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4. Results and Analyses

4.1. KC and OC on Crisis Returns in the GFC

We examine multiple regression analyses to explore the influence of a company's PC and IC on stock returns during periods of crisis. Table 2 represents our basic regression models, analyzing Raw and Abnormal Return as the dependent variables across columns (1) to (6). Columns (1) through (3) analyze the relationship between PC, OC, KC, and raw returns during crisis periods, applying control variables and firm fixed effects. Columns (4) through (6) analyze the relationship between abnormal returns and the same variables. The Hausman test's results for PC (χ^2 (13) = 73.35, KC (χ^2 (13) = 87.49, p-value < 0.01) and OC (χ^2 (13) = 57.08 p-value < 0.01) indicate the validity of adopting of a firm fixed effects model (Hausman 1978).

Table 2. Intangible capital and stock returns in GFC.

Variables	(1) Raw Ret.	(2) Raw Ret.	(3) Raw Ret.	(4) Abn Ret.	(5) Abn Ret.	(6) Abn Ret.
PC	0.025			0.057		
	(0.060)			(0.059)		
KC		0.007			0.020	
		(0.036)			(0.035)	
OC			−0.016			0.004
			(0.034)			(0.034)
Crisis	0.024	−0.101 ***	−0.128 ***	0.033	−0.091 ***	−0.116 ***
	(0.026)	(0.025)	(0.025)	(0.026)	(0.025)	(0.025)
PC*Crisis	−0.154 ***			−0.149 ***		
	(0.047)			(0.046)		
KC*Crisis		0.110 ***			0.113 ***	
		(0.037)			(0.037)	
OC*Crisis			0.135 ***			0.138 ***
			(0.034)			(0.034)
Market Cap.	−0.070 ***	−0.064 ***	−0.071 ***	−0.056 ***	−0.056 ***	−0.061 ***
	(0.016)	(0.018)	(0.017)	(0.016)	(0.018)	(0.017)
Long-term debt	−0.110 *	−0.091	−0.113 *	−0.131 **	−0.123 **	−0.140 **
	(0.059)	(0.062)	(0.060)	(0.059)	(0.062)	(0.060)
Short-term debt	−0.039	0.016	−0.055	−0.112	−0.081	−0.136
	(0.132)	(0.137)	(0.132)	(0.132)	(0.137)	(0.132)
Cash holdings	−0.038	−0.029	−0.033	0.003	0.016	0.003
	(0.086)	(0.087)	(0.086)	(0.085)	(0.087)	(0.085)
Profitability	−0.223 **	−0.212 **	−0.191 **	−0.231 **	−0.212 **	−0.196 **
	(0.096)	(0.101)	(0.095)	(0.095)	(0.101)	(0.095)
Book-to-Market	−0.095 ***	−0.088 ***	−0.094 ***	−0.115 ***	−0.111 ***	−0.116 ***
	(0.011)	(0.012)	(0.012)	(0.011)	(0.012)	(0.012)
Negative B/M	0.444 ***	0.293 *	0.450 ***	0.460 ***	0.318 *	0.469 ***
	(0.158)	(0.175)	(0.158)	(0.156)	(0.172)	(0.156)
Momentum	−0.052 ***	−0.051 ***	−0.054 ***	−0.052 ***	−0.052 ***	−0.055 ***
	(0.010)	(0.011)	(0.010)	(0.010)	(0.011)	(0.010)
Idiosyncratic risk	−3.992 ***	−4.054 ***	−3.958 ***	−2.451 ***	−2.542 ***	−2.432 ***
	(0.442)	(0.443)	(0.441)	(0.438)	(0.442)	(0.437)
Factor Loadings	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	3865	3606	3865	3865	3606	3865
Adj. R-Square	0.42	0.42	0.42	0.07	0.07	0.08

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The models showed consistent patterns in their results for both raw returns and abnormal returns. The effect of PC, as presented in columns (1) and (4), demonstrated a negative impact on both raw and abnormal returns during the economic crisis. KC and OC did not significantly impact raw or abnormal returns during normal periods; however, they showed a positive and significant relationship during the crisis period. These results suggest that KC and OC influence a company's sustainability.

The size of coefficients in Table 2 indicates that a one-standard-deviation increase in each key variable (PC 0.294, KC 0.415, OC 0.484) is associated with changes in raw returns during the GFC period: −4.53 percentage point for PC, 4.57 percentage point for KC, and 6.53 percentage point for OC. Ceteris paribus, Abnormal Returns show changes associated with a one-standard-deviation increase in each key variable as follows: PC exhibits a −4.38 percentage point change, KC shows a 4.69 percentage point change, and OC indicates a 6.68 percentage point change. Overall, the results in Table 2 support our claim that a company's investment in intangibles, KC and OC, instills shareholders with a robust perception of its business sustainability during the crisis, ultimately contributing to its relative stock price outperformance.

4.2. KC and OC on Crisis Returns in the COVID-19

We employ another recent external shock, COVID-19, to validate our results in the GFC period. Table 3 presents the relationship between a company's capital and its raw and abnormal stock returns during COVID-19. Columns (1) through (3) analyze the relationship between PC, OC, KC, and raw returns, while columns (4) through (6) analyze the relationship between abnormal returns and the same variables.

Table 3. Intangible capital and stock returns in COVID-19.

Variables	(1) Raw Ret.	(2) Raw Ret.	(3) Raw Ret.	(4) Abn Ret.	(5) Abn Ret.	(6) Abn Ret.
PC	0.049			0.078		
	(0.030)			(0.069)		
KC		−0.027			−0.107	
		(0.064)			(0.177)	
OC			0.040			−0.007
			(0.026)			(0.052)
Crisis	−0.137 ***	−0.141 ***	−0.206 ***	−0.193 ***	−0.199 ***	−0.199 ***
	(0.011)	(0.013)	(0.011)	(0.026)	(0.030)	(0.029)
PC*Crisis	−0.073 ***			−0.087 ***		
	(0.009)			(0.024)		
KC*Crisis		0.096 ***			0.091 ***	
		(0.027)			(0.031)	
OC*Crisis			0.063 ***			0.061 ***
			(0.012)			(0.021)
Market Cap.	−0.047 ***	−0.056 ***	−0.044 ***	−0.058 ***	−0.068 ***	−0.060 ***
	(0.007)	(0.008)	(0.008)	(0.012)	(0.015)	(0.013)
Long-term debt	−0.018	−0.016	−0.001	0.013	0.052	0.006
	(0.031)	(0.038)	(0.034)	(0.065)	(0.076)	(0.069)
Short-term debt	−0.045	−0.072	−0.030	−0.112	−0.167	−0.114
	(0.070)	(0.083)	(0.071)	(0.139)	(0.164)	(0.140)
Cash holdings	0.091 **	0.028	0.093 **	0.021	−0.034	0.008
	(0.039)	(0.041)	(0.039)	(0.066)	(0.075)	(0.066)
Profitability	−0.026	−0.002	−0.024	0.121	0.123	0.110
	(0.045)	(0.056)	(0.045)	(0.096)	(0.119)	(0.097)
Book-to-Market	0.005	0.002	0.008	0.005	−0.010	0.004
	(0.007)	(0.008)	(0.007)	(0.012)	(0.016)	(0.013)
Negative B/M	−0.005	−0.002	−0.008	−0.033	−0.022	−0.031
	(0.022)	(0.026)	(0.023)	(0.059)	(0.068)	(0.059)

Table 3. *Cont.*

Variables	(1) Raw Ret.	(2) Raw Ret.	(3) Raw Ret.	(4) Abn Ret.	(5) Abn Ret.	(6) Abn Ret.
Momentum	0.012 **	0.012 *	0.010	0.010	0.001	0.006
	(0.006)	(0.007)	(0.006)	(0.012)	(0.013)	(0.012)
Idiosyncratic risk	3.407 ***	2.994 ***	3.611 ***	3.570 **	3.971 **	3.802 ***
	(0.640)	(0.827)	(0.641)	(1.393)	(1.686)	(1.399)
Factor Loadings	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	1653	1266	1653	1653	1266	1653
Adj. R-Square	0.75	0.75	0.75	0.14	0.16	0.13

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

All the results from column (1) to column (6) demonstrate a similar pattern to those of the GFC. KC and OC exhibited a positive correlation with raw and abnormal returns during crisis periods, while PC showed a negative relationship, thus supporting our hypothesis. In Table 3, the results reflecting firm-fixed effects show that a one standard deviation increase in each key variable (PC 0.334, KC 0.230, OC 0.439) is associated with changes in raw returns during the COVID-19 period as follows: −2.44 percentage points for PC, 2.21 percentage points for KC, and 2.77 percentage points for OC. Additionally, abnormal returns are associated with a one standard deviation increase in each key variable as follows: −2.91 percentage points for PC, 2.09 percentage points for KC, and 2.68 percentage points for OC.

These findings imply that KC, and OC function as an immune system during exogenous economic shocks, instilling confidence in investors and mitigating damage to the company. As a result, companies with higher KC and OC tend to experience a relatively modest decline in stock returns during an economic crisis. Hypothesis 1, which claims that firms with higher KC and OC exhibit better market performance during economic crises, has been supported to a 1% statistical significance level.

4.3. Moderating Role of Generalist CEO

The accumulated capital within a company is utilized based on each firm's business strategy and top management's strategic decision-making. Therefore, the competencies and traits of the CEO hold significant importance in shaping the sustainability and future value of the enterprise. We employ the CEO as a proxy for top management, categorizing them into generalist and specialist CEOs based on their general managerial ability. We examine how CEOs' career backgrounds impact the relationship between IC and stock returns during a crisis. Specialist CEOs have annual GAI below the median, while generalist CEOs are at or above the median.

In Panels A and B of Table 4, we conduct a subsample regression analysis on raw and abnormal returns during the crisis period to identify the effectiveness of each capital's utilization by generalist and specialist CEOs during the GFC period. The analysis represents generalist CEOs in odd-numbered columns and specialist CEOs in even-numbered columns. The analysis of the impact of KC and OC on stock returns during crisis periods reveals that generalist CEOs display a moderating effect that strengthens the relationship between IC and crisis returns. In contrast, specialist CEOs did not significantly moderate this correlation; these results were consistent in both Panel A and B. This finding suggests that during economic crises, general managers were able to leverage their diverse professional backgrounds to enhance the relationship between IC and crisis returns.

Table 4. Intangible capital and crisis returns in GFC: the moderating role of the CEO.

Panel A: Raw Return						
Variables	**(1) Generalist**	**(2) Specialist**	**(3) Generalist**	**(4) Specialist**	**(5) Generalist**	**(6) Specialist**
PC	−0.090	0.052				
	(0.100)	(0.106)				
KC			−0.021	−0.007		
			(0.065)	(0.072)		
OC					−0.063	0.016
					(0.061)	(0.069)
Crisis	0.063	−0.017	−0.077 *	−0.075 *	−0.104 **	−0.107 ***
	(0.043)	(0.041)	(0.041)	(0.040)	(0.041)	(0.040)
PC*Crisis	−0.139	−0.073				
	(0.091)	(0.074)				
KC*Crisis			0.141 **	0.056		
			(0.056)	(0.062)		
OC*Crisis					0.160 ***	0.099
					(0.051)	(0.051)
Market Cap.	−0.037	−0.072 ***	−0.021	−0.084 ***	−0.033	−0.068 **
	(0.029)	(0.028)	(0.032)	(0.032)	(0.032)	(0.031)
Long-term debt	−0.032	−0.182 *	−0.031	−0.142	−0.046	−0.180
	(0.103)	(0.110)	(0.105)	(0.115)	(0.104)	(0.110)
Short-term debt	−0.019	0.047	−0.048	0.070	−0.045	0.016
	(0.219)	(0.268)	(0.220)	(0.279)	(0.218)	(0.268)
Cash holdings	0.060	−0.071	0.122	−0.114	0.101	−0.074
	(0.146)	(0.137)	(0.149)	(0.141)	(0.147)	(0.136)
Profitability	−0.364 **	−0.399 **	−0.373 **	−0.396 **	−0.344 *	−0.400 **
	(0.178)	(0.164)	(0.184)	(0.182)	(0.178)	(0.164)
Book-to-Market	−0.083 ***	−0.126 ***	−0.074 ***	−0.124 ***	−0.082 ***	−0.123 ***
	(0.020)	(0.023)	(0.022)	(0.025)	(0.022)	(0.025)
Negative B/M	0.096	0.617 **	0.083	0.604 **	0.091	0.613 **
	(0.231)	(0.286)	(0.231)	(0.285)	(0.230)	(0.287)
Momentum	−0.039 **	−0.047 **	−0.044 **	−0.051 ***	−0.042 **	−0.049 ***
	(0.019)	(0.018)	(0.019)	(0.019)	(0.019)	(0.018)
Idiosync. risk	−2.926 ***	−4.791 ***	−2.975 ***	−4.883 ***	−2.954 ***	−4.775 ***
	(0.753)	(0.910)	(0.757)	(0.926)	(0.751)	(0.911)
Factor Loading	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
N	1320	1435	1275	1300	1320	1435
Adj. R-Square	0.45	0.47	0.45	0.47	0.45	0.47
Panel B: Abnormal Return						
Variables	**(1) Generalist**	**(2) Specialist**	**(3) Generalist**	**(4) Specialist**	**(5) Generalist**	**(6) Specialist**
PC	−0.089	0.110				
	(0.099)	(0.107)				
KC			−0.077	0.031		
			(0.062)	(0.073)		
OC					−0.110 *	0.051
					(0.059)	(0.070)
Crisis	0.054	0.005	−0.091 **	−0.045	−0.112 ***	−0.078 *
	(0.043)	(0.042)	(0.041)	(0.041)	(0.041)	(0.041)
PC*Crisis	−0.111	−0.093				
	(0.079)	(0.076)				
KC*Crisis			0.173 ***	0.020		
			(0.057)	(0.063)		
OC*Crisis					0.183 ***	0.071
					(0.052)	(0.059)

Table 4. *Cont.*

Market Cap.	−0.026	−0.051 *	−0.033	−0.064 *	−0.045	−0.048
	(0.029)	(0.028)	(0.032)	(0.033)	(0.032)	(0.031)
Long-term debt	−0.068	−0.210 *	−0.088	−0.181	−0.104	−0.216 *
	(0.103)	(0.112)	(0.104)	(0.117)	(0.103)	(0.112)
Short-term debt	−0.040	0.026	−0.064	0.026	−0.083	−0.004
	(0.218)	(0.273)	(0.218)	(0.285)	(0.216)	(0.273)
Cash holdings	0.027	0.012	0.097	−0.002	0.084	0.010
	(0.146)	(0.139)	(0.147)	(0.144)	(0.145)	(0.139)
Profitability	−0.425 **	−0.438 ***	−0.422 **	−0.405 **	−0.383 **	−0.434 ***
	(0.177)	(0.167)	(0.182)	(0.186)	(0.176)	(0.167)
Book-to-Market	−0.115 ***	−0.151 ***	−0.116 ***	−0.146 ***	−0.125 ***	−0.146 ***
	(0.020)	(0.024)	(0.022)	(0.025)	(0.021)	(0.025)
Negative B/M	0.163	0.584 **	0.160	0.578 **	0.163	0.581 **
	(0.226)	(0.289)	(0.226)	(0.289)	(0.225)	(0.289)
Momentum	−0.045 **	−0.046 **	−0.049 ***	−0.050 **	−0.047 **	−0.047 **
	(0.019)	(0.019)	(0.019)	(0.020)	(0.019)	(0.019)
Idiosync. risk	−1.536 **	−2.293 **	−1.592 **	−2.519 ***	−1.555 **	−2.314 **
	(0.750)	(0.928)	(0.752)	(0.948)	(0.745)	(0.930)
Factor Loading	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
N	1320	1435	1275	1300	1320	1435
Adj. R-Square	0.09	0.07	0.08	0.04	0.08	0.05

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

After controlling for firm characteristics and firm fixed effects, it was observed that in companies led by general CEOs, an increase of one standard deviation in KC and OC, respectively, improved the raw returns during crisis periods by 5.85 percentage points and 7.74 percentage points, and the abnormal returns by 7.18 percentage points and 8.86 percentage points.

The analysis results from Table 5 indicate that during the COVID-19 period, the relationship between IC and crisis returns is strengthened only under generalist CEOs, showing a pattern similar to that of the GFC period. After controlling for firm characteristics and firm fixed effects, it was observed that in companies led by general CEOs, an increase of one standard deviation in KC and OC, respectively, improved the raw returns during crisis periods by 3.57 percentage points and 2.58 percentage points, and the abnormal returns by 5.66 percentage points and 5.58 percentage points. This result supports Hypothesis 2 at a 1% statistical significance level. Hence, generalist CEOs are found to positively moderate the association between IC, including KC and OC, and crisis period returns.

Table 5. Intangible capital and crisis returns in COVID-19: the moderating role of the CEO.

Panel A: COVID-19 Period—Raw Return						
Variables	**(1) Generalist**	**(2) Specialist**	**(3) Generalist**	**(4) Specialist**	**(5) Generalist**	**(6) Specialist**
PC	0.097 *	0.070				
	(0.053)	(0.059)				
KC			0.121	−0.107		
			(0.145)	(0.107)		
OC					0.098 **	0.084 *
					(0.047)	(0.049)
Crisis	−0.116 ***	−0.100 ***	−0.198 ***	−0.125 ***	−0.169 ***	−0.118 ***
	(0.020)	(0.021)	(0.024)	(0.024)	(0.022)	(0.023)
PC*Crisis	−0.029	−0.027				
	(0.019)	(0.017)				

Table 5. *Cont.*

KC*Crisis			0.155 ***	0.094		
			(0.049)	(0.061)		
OC*Crisis					0.065 ***	−0.013
					(0.020)	(0.021)
Market Cap.	−0.045 ***	−0.038 ***	−0.040 ***	−0.059 ***	−0.031 **	−0.031 **
	(0.012)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
Long-term debt	−0.057	0.037	−0.043	0.024	−0.017	0.075
	(0.052)	(0.055)	(0.070)	(0.066)	(0.058)	(0.061)
Short-term debt	−0.025	0.025	0.069	0.015	0.018	0.051
	(0.120)	(0.132)	(0.162)	(0.143)	(0.125)	(0.135)
Cash holdings	0.092	0.091	−0.024	0.084	0.076	0.096
	(0.069)	(0.071)	(0.077)	(0.071)	(0.067)	(0.072)
Profitability	−0.063	−0.015	−0.040	−0.005	−0.085	−0.033
	(0.075)	(0.090)	(0.093)	(0.110)	(0.072)	(0.092)
Book-to-Market	0.036 ***	0.013	0.045 ***	−0.011	0.041 ***	0.019
	(0.013)	(0.012)	(0.016)	(0.016)	(0.014)	(0.013)
Negative B/M	0.006	−0.014	−0.008	−0.017	0.001	−0.027
	(0.042)	(0.033)	(0.061)	(0.034)	(0.043)	(0.034)
Momentum	0.029 ***	0.008	0.018	0.010	0.025 **	0.005
	(0.011)	(0.012)	(0.013)	(0.013)	(0.011)	(0.012)
Idiosync. risk	4.830 ***	3.239 ***	4.685 ***	3.664 ***	5.119 ***	3.496 ***
	(1.117)	(1.184)	(1.567)	(1.383)	(1.115)	(1.192)
Factor Loading	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
N	546	637	448	457	546	637
Adj. R-Square	0.76	0.79	0.74	0.81	0.76	0.79
Panel B: COVID-19 Period—Abnormal Return						
Variables	**(1) Generalist**	**(2) Specialist**	**(3) Generalist**	**(4) Specialist**	**(5) Generalist**	**(6) Specialist**
PC	0.032	0.148				
	(0.133)	(0.118)				
KC			0.112	−0.207		
			(0.362)	(0.294)		
OC					0.045	0.082
					(0.124)	(0.103)
Crisis	−0.275 ***	−0.237 ***	−0.343 ***	−0.216 ***	−0.304 ***	−0.203 ***
	(0.048)	(0.043)	(0.060)	(0.048)	(0.052)	(0.050)
PC*Crisis	−0.096	0.101				
	(0.051)	(0.063)				
KC*Crisis			0.246 ***	0.219		
			(0.088)	(0.142)		
OC*Crisis					0.127 **	−0.018
					(0.045)	(0.047)
Market Cap.	−0.042 *	−0.077 ***	−0.044	−0.084 ***	−0.031	−0.065 ***
	(0.023)	(0.020)	(0.035)	(0.025)	(0.029)	(0.025)
Long-term debt	0.032	0.088	−0.135	0.127	0.034	0.125
	(0.137)	(0.109)	(0.165)	(0.121)	(0.142)	(0.120)
Short-term debt	0.061	−0.067	−0.166	−0.089	0.033	−0.051
	(0.260)	(0.226)	(0.381)	(0.250)	(0.264)	(0.231)
Cash holdings	−0.014	0.009	−0.119	−0.015	−0.014	0.020
	(0.137)	(0.112)	(0.166)	(0.117)	(0.136)	(0.114)
Profitability	0.211	0.077	0.179	−0.015	0.183	0.062
	(0.188)	(0.171)	(0.236)	(0.186)	(0.188)	(0.174)
Book-to-Market	0.065 ***	−0.034	0.035	−0.045 *	0.066 **	−0.025
	(0.024)	(0.022)	(0.054)	(0.024)	(0.026)	(0.025)

Table 5. *Cont.*

Negative B/M	−0.134	−0.035	−0.107	0.041	−0.136	−0.025
	(0.119)	(0.079)	(0.120)	(0.106)	(0.119)	(0.080)
Momentum	−0.004	0.032	−0.027	0.038 *	−0.004	0.032
	(0.022)	(0.020)	(0.024)	(0.023)	(0.022)	(0.020)
Idiosync. risk	0.824	7.233 ***	2.777	6.035 **	0.483	7.696 ***
	(2.774)	(2.210)	(3.311)	(2.635)	(2.770)	(2.248)
Factor Loading	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
N	546	637	448	457	546	637
Adj. R-Square	0.22	0.12	0.25	0.13	0.22	0.09

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4.4. Moderating Role of Generalist CEO's Tenure

In Panel A and B of Table 6, we analyzed the moderating effect of a generalist CEO's tenure on the relationship between each capital and stock returns during the GFC and COVID-19 period. Columns 1 to 3 in Panel A show the results of analyzing raw returns, while columns 4 to 6 show the analysis of abnormal returns. The results consistently indicated that as the tenure of generalist CEOs increased, the correlation between IC and crisis returns was strengthened, as expected. However, the tenure of generalist CEOs did not significantly moderate the relationship between PC and crisis returns. Ceteris paribus, an increase of one standard deviation in KC and OC led to increases in raw returns by 7.10 and 8.18 percentage points, and in abnormal returns by 5.56 and 6.87 percentage points, respectively. Hypothesis 3, which posits that the tenure of generalist CEOs positively moderates the relationship between IC and crisis period returns, is supported at a 5% statistical significance level during the GFC period.

Table 6. IC and crisis returns: the moderating role of a generalist CEO's tenure.

Panel A: GFC Period						
	Raw Return			**Abnormal Return**		
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
PC (A-P)	0.029			0.007		
	(0.020)			(0.138)		
KC (A-K)		−0.095			−0.087	
		(0.129)			(0.071)	
OC (A-O)			−0.025			−0.125 *
			(0.019)			(0.072)
CEO Tenure (B)	0.000	−0.007	−0.005	−0.131	0.066	0.039
	(0.005)	(0.008)	(0.005)	(0.117)	(0.106)	(0.110)
Crisis (C)	−0.095 ***	−0.348 ***	−0.165 ***	0.014	0.002	−0.009
	(0.027)	(0.052)	(0.027)	(0.028)	(0.025)	(0.026)
(B)*(C)	−0.009	0.071 ***	0.002	0.361		
	(0.011)	(0.016)	(0.011)	(0.233)		
(A-P)*(B)	−0.006				−0.089	
	(0.008)				(0.134)	
(A-P)*(C)	−0.094 ***					−0.033
	(0.035)					(0.126)
(A-K)*(B)		0.023		−0.029		
		(0.045)		(0.054)		
(A-K)*(C)		1.203 ***			−0.004	
		(0.311)			(0.034)	
(A-O)*(B)			0.004			0.014
			(0.009)			(0.032)

Table 6. *Cont.*

(A-O)*(C)			0.050	0.088	−0.066	−0.067
			(0.044)	(0.061)	(0.057)	(0.058)
(A-P)*(B)*(C)	0.026			−0.198		
	(0.016)			(0.121)		
(A-K)*(B)*(C)		0.171 ***			0.134 **	
		(0.059)			(0.068)	
(A-O)*(B)*(C)			0.169 ***			0.142 **
			(0.064)			(0.072)
Market Cap.	0.004 *	−0.000	0.004 *	−0.019	−0.039	−0.044
	(0.002)	(0.004)	(0.002)	(0.028)	(0.032)	(0.031)
Long-term debt	−0.071 ***	−0.053	−0.073 ***	−0.135	−0.152	−0.153
	(0.018)	(0.038)	(0.018)	(0.098)	(0.101)	(0.099)
Short-term debt	−0.134 **	0.212	−0.131 **	−0.066	−0.078	−0.086
	(0.061)	(0.138)	(0.061)	(0.200)	(0.202)	(0.199)
Cash holdings	−0.133 ***	0.027	−0.110 **	0.014	0.060	0.050
	(0.047)	(0.090)	(0.045)	(0.140)	(0.141)	(0.139)
Profitability	0.127 ***	−0.070	0.156 ***	−0.412 **	−0.426 **	−0.345 **
	(0.037)	(0.087)	(0.036)	(0.174)	(0.183)	(0.173)
Book-to-Market	−0.012 **	−0.033 **	−0.012 **	−0.124 ***	−0.132 ***	−0.136 ***
	(0.005)	(0.014)	(0.005)	(0.021)	(0.023)	(0.023)
Negative B/M	0.021	0.014	0.023	0.221	0.229	0.222
	(0.016)	(0.053)	(0.017)	(0.217)	(0.218)	(0.216)
Momentum	−0.047 ***	−0.034 **	−0.048 ***	−0.034 *	−0.034 *	−0.036 **
	(0.008)	(0.015)	(0.008)	(0.018)	(0.018)	(0.018)
Idiosync. risk	1.505 ***	0.756	1.581 ***	−1.840 **	−1.858 **	−1.827 **
	(0.518)	(1.029)	(0.516)	(0.751)	(0.756)	(0.748)
Factor Loading	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
N	1318	1269	1318	1318	1269	1318
Adj. R-Square	0.43	0.44	0.44	0.07	0.07	0.08

Panel B: COVID-19 Period

	Raw Return			Abnormal Return		
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
PC (A-P)	−0.059			−0.096		
	(0.173)			(0.222)		
KC (A-K)		0.392			0.539	
		(0.481)			(0.608)	
OC (A-O)			0.139			0.131
			(0.136)			(0.175)
CEO Tenure (B)	0.110 **	0.165 ***	0.071	0.129 **	0.202 ***	0.075
	(0.048)	(0.047)	(0.050)	(0.062)	(0.059)	(0.065)
Crisis (C)	0.002	0.019	0.015	−0.000	0.029	0.019
	(0.024)	(0.019)	(0.020)	(0.031)	(0.024)	(0.026)
(B)*(C)	−0.071			−0.092		
	(0.103)			(0.133)		
(A-P)*(B)		−0.785 **			−1.074 **	
		(0.376)			(0.475)	
(A-P)*(C)			0.024			0.039
			(0.113)			(0.146)
(A-K)*(B)	0.021			0.034		
	(0.052)			(0.067)		
(A-K)*(C)		−0.014			−0.052	
		(0.129)			(0.163)	
(A-O)*(B)			−0.011			−0.014
			(0.041)			(0.053)

Table 6. *Cont.*

(A-O)*(C)	−0.031	−0.061 ***	−0.030	−0.035	−0.076 ***	−0.031
	(0.022)	(0.019)	(0.021)	(0.029)	(0.024)	(0.027)
(A-P)*(B)*(C)	0.009			0.003		
	(0.050)			(0.065)		
(A-K)*(B)*(C)		0.279 **			0.372 **	
		(0.125)			(0.159)	
(A-O)*(B)*(C)			0.006			−0.004
			(0.046)			(0.059)
Market Cap.	−0.044 **	−0.043	−0.025	−0.042 *	−0.033	−0.024
	(0.019)	(0.030)	(0.024)	(0.024)	(0.038)	(0.030)
Long-term debt	−0.020	−0.111	0.009	0.005	−0.104	0.032
	(0.111)	(0.136)	(0.114)	(0.143)	(0.172)	(0.148)
Short-term debt	0.091	−0.047	0.149	−0.090	−0.327	−0.041
	(0.208)	(0.311)	(0.213)	(0.268)	(0.393)	(0.275)
Cash holdings	−0.063	−0.134	−0.060	−0.027	−0.159	−0.028
	(0.110)	(0.136)	(0.110)	(0.142)	(0.171)	(0.142)
Profitability	0.243	0.186	0.235	0.198	0.162	0.208
	(0.160)	(0.205)	(0.162)	(0.206)	(0.260)	(0.209)
Book-to-Market	0.061 ***	0.024	0.071 ***	0.076 ***	0.060	0.084 ***
	(0.020)	(0.045)	(0.021)	(0.025)	(0.057)	(0.027)
Negative B/M	−0.091	−0.091	−0.105	−0.178	−0.175	−0.191
	(0.095)	(0.098)	(0.096)	(0.122)	(0.124)	(0.123)
Momentum	−0.018	−0.026	−0.015	−0.014	−0.027	−0.011
	(0.017)	(0.020)	(0.018)	(0.022)	(0.025)	(0.023)
Idiosync. risk	1.404	3.001	1.140	2.562	4.187	2.213
	(2.330)	(2.838)	(2.313)	(2.995)	(3.588)	(2.981)
Factor Loading	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
N	543	394	543	543	394	543
Adj. R-Square	0.75	0.72	0.75	0.16	0.18	0.16

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Results from columns 1 through 6 in Panel B, targeting the COVID-19 period, represent different outcomes for KC and OC. The tenure of a generalist CEO significantly strengthened the relationship between KC and crisis returns, whereas it did not significantly explain the relationship between OC and crisis returns. A CEO's tenure enhances the utilization of IC by generalists, but results may vary depending on the characteristics of economic crises. It is presumed that the uniqueness of the abrupt onset economic crisis of COVID-19 has acted differently from the GFC, necessitating further analysis through future research. After considering corporate characteristics and firm fixed effects, the tenure of a generalist CEO was found to strengthen the relationship between KC and crisis returns. With each one standard deviation increase in KC, the raw returns improved by 6.42 percentage points and the abnormal returns by 8.56 percentage points. Hypothesis 3, which posits that the tenure of a generalist CEO positively moderates the relationship between IC and crisis period returns, is supported at a 5% statistical significance level only for KC during the COVID-19 period.

5. Conclusions

This study analyzes the impact of KC and OC on stock returns during crisis periods, examining their influence on a company's sustainable competitiveness. By investigating the GFC and COVID-19 periods together, the study ensures the robustness of its findings, expanding the existing literature on the positive contribution of IC to stock returns during economic crises. During the GFC period, a one-standard-deviation increase in KC and OC was associated with changes of 4.57 and 6.53 percentage points in crisis returns, respectively. Similarly, during COVID-19, a one-standard-deviation increase in KC and OC was linked

to 2.21 and 2.77 percentage points in crisis returns, respectively. These results suggest the role of KC and OC as buffers protecting companies from external economic shocks during periods of high uncertainty.

Generalist CEOs exclusively moderate the IC-stock return relationship during economic crises. When classifying CEOs as either generalists or specialists based on their general managerial skills, the moderating effects of each group on the relationship between IC and stock returns during crises were found to differ. This observation highlights the situational impact of CEO characteristics on the utilization of KC and OC within firms during economic crises. Furthermore, the increase in the tenure of a generalist CEO strengthened the relationship between IC and crisis returns. Nevertheless, while the moderating effect of generalist CEO tenure was observed in KC and OC during the GFC, it did not explain the relationship between OC and crisis returns during COVID-19.

This result suggests that the role of generalist CEOs in influencing the company may vary depending on the nature of economic crises. A plausible hypothesis could be that there were differences in the unfolding patterns of economic crises. COVID-19 emerged abruptly and unpredictably, whereas the GFC accumulated warnings from the market regarding credit risks associated with the subprime mortgage crisis and the collapse of Bear Stearns (Ding et al. 2021; Mishkin 2011). This aspect could be explored as a topic for further research, examining the impact of the scope of precursor symptoms and information on resource utilization strategies in response to economic crises.

Our empirical evidence quantitatively confirms the relationship between IC and stock returns, validating prior research viewpoints and expanding the research area to include economic crisis periods. Furthermore, our research results go beyond confirming the inherent nature of KC and OC within the company and the CEO's general managerial abilities. We offer additional insights by examining how the impact of KC and OC may vary based on decision-maker characteristics, including generalist and specialist CEOs. This expansion shifts the research area from passively analyzing the effects of a fixed level of IC on firm value to a dynamic analysis of how performance can differ based on IC utilization in diverse environments and conditions. We explore under which conditions KC and OC can optimally perform to achieve desired results in varying market environments.

Our model provides resource allocation strategies from both operational and investor viewpoints. It offers insights into projected stock returns linked to the firm's IC, facilitating informed investment decisions for internal and external stakeholders during crises. Furthermore, the model assists in forecasting the influence of a CEO's general managerial ability and tenure on the association between IC and stock returns during crises.

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Appendix A. Variable Definitions

Variables	Description	Source
Daily Excess Return	((1 + r/100) − (1 + rf/100)) where r equals the daily return based on the price or bid/ask Average (PRC) in the CRSP database, and the rf is the 1-month daily Treasury bill rate taken as a measure of the risk-free rate.	CRSP
Cumulative Excess Stock Return	$\prod(1 + daily\ excess\ return_{i,t}) - 1$.	CRSP
Knowledge Capital	$KC_{i,t} = KC_{i,t-1}(1-\delta_0) + (R\&D_{i,t}/CPI_t)$. Initial stock: $KC_{i,t0} = R\&D_{i,t1}/(g+\delta_0)$ *R&D* represents the research and development expenses (XRD) *CPI* represents the consumer price index g = 10.08 percent δ_0 = 15 percent	COMPUSTAT
Organization Capital	$OC_{i,t} = OC_{i,t-1}(1-\delta_0) + (SG\&A_{i,t}/CPI_t)$. Initial stock: $OC_{i,t0} = SG\&A_{i,t1}/(g+\delta_0)$ *SG&A* represents the selling, general, and administrative expenses (XSGA) *CPI* represents the consumer price index g = 10.08 percent δ_0 = 15 percent	COMPUSTAT
Physical Capital	Book value of property, plant, and equipment to asset total $(PPEGT_{i,t-1})/(AT_{i,t-1})$	COMPUSTAT
Crisis	A binary variable is set as one for the crisis period and zero otherwise.	COMPUSTAT
Generalist CEO	Dummy variables above the median of annual GAI	General Ability Index [1]
Specialist CEO	Dummy variables below the median of annual GAI	General Ability Index
CEO's Tenure	YEAR − BECAMECEO(YEAR) + 1	EXECUCOMP
Market Capitalization	Log{Common shares outstanding $(CSHO)_{i,t-1}$ × Annual closing stock price $(PRCC\_F)_{i,t-1}$}	COMPUSTAT
Long-term debt	Long-term debt $(DLTT)_{i,t-1}$/Total assets $(AT)_{i,t-1}$	COMPUSTAT
Short-term debt	Debt in current liabilities $(DLC)_{i,t-1}$/Total assets $(AT)_{i,t-1}$	COMPUSTAT
Profitability	ROA = Net income $(NI)_{i,t-1}$/Total assets $(AT)_{i,t-1}$	COMPUSTAT
Book-to-Market	Common equity total $(CEQ)_{i,t-1}$/Market Cap.{$(PRCC\_F)_{i,t-1} \times (CSHO)_{i,t-1}$}	COMPUSTAT
Negative B/M	The dummy variable is set as one if the Book-to-Market is negative and zero otherwise.	COMPUSTAT
Idiosyncratic Risk	The variance of the residuals in the market model's expected return for sixty months leading up to the date preceding the onset of the crisis and its corresponding date for normal periods. The expected return is calculated using the market model with the CRSP value-weighted index as the market proxy, estimated over 60 months up to the day before the start of the stock return period for each respective year.	CRSP & Kenneth French's website [2]
Fama–French Four-factor Loadings	Factor loadings of the Fama–French three factors plus the momentum factor—Rm-Rf, SMB, HML, and MOM—over the sixty months leading up to the date preceding the onset of the crisis and its corresponding date for normal periods.	Kenneth French's website

Note: COMPUSTAT and CRSP item codes are presented in parentheses. [1] Following the Custódio et al. (2013). [2] https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html (accessed on 1 March 2024).

Appendix B. Intangible Capital and Crisis Returns: PC, KC and OC (2 Years Lagged) "Adjustment of Lag Periods Analysis Results"

Panel A: GFC Period

Variables	(1) Raw Ret.	(2) Raw Ret.	(3) Raw Ret.	(4) Abn Ret.	(5) Abn Ret.	(6) Abn Ret.
PC	0.054			0.056		
	(0.060)			(0.060)		
KC		0.029			0.021	
		(0.038)			(0.039)	
OC			−0.001			−0.003
			(0.036)			(0.037)
Crisis	−0.285 ***	−0.251 ***	−0.243 ***	−0.325 ***	−0.250 ***	−0.233 ***
	(0.028)	(0.030)	(0.030)	(0.029)	(0.030)	(0.030)
PC*Crisis	−0.136 ***			−0.125 ***		
	(0.047)			(0.048)		
KC*Crisis		0.101 **			0.155 ***	
		(0.045)			(0.046)	
OC*Crisis			0.102 **			0.162 ***
			(0.040)			(0.040)
Market Cap.	−0.142 ***	−0.140 ***	−0.149 ***	−0.135 ***	−0.138 ***	−0.145 ***
	(0.016)	(0.018)	(0.017)	(0.016)	(0.018)	(0.018)
Long-term debt	0.012	0.024	−0.002	0.036	0.039	0.017
	(0.061)	(0.063)	(0.062)	(0.062)	(0.063)	(0.062)
Short-term debt	0.134	0.145	0.131	0.123	0.130	0.117
	(0.139)	(0.142)	(0.140)	(0.141)	(0.144)	(0.141)
Cash holdings	0.015	0.009	0.008	0.026	0.016	0.015
	(0.083)	(0.084)	(0.083)	(0.084)	(0.085)	(0.084)
Profitability	−0.416 ***	−0.440 ***	−0.420 ***	−0.307 ***	−0.326 ***	−0.309 ***
	(0.089)	(0.093)	(0.088)	(0.090)	(0.094)	(0.089)
Book-to-Market	−0.006	0.000	−0.008	−0.005	−0.002	−0.008
	(0.011)	(0.012)	(0.012)	(0.011)	(0.012)	(0.012)
Negative B/M	0.044	0.038	0.056	0.053	0.054	0.068
	(0.169)	(0.168)	(0.169)	(0.171)	(0.171)	(0.171)
Momentum	−0.094 ***	−0.092 ***	−0.092 ***	−0.093 ***	−0.092 ***	−0.091 ***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.013)	(0.012)
Idiosyncratic risk	−3.521 ***	−3.664 ***	−3.518 ***	−1.941 ***	−2.088 ***	−1.953 ***
	(0.445)	(0.450)	(0.448)	(0.451)	(0.457)	(0.452)
Factor Loadings	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	3841	3571	3841	3841	3571	3841
Adj. R-Square	0.50	0.51	0.50	0.16	0.17	0.17

Panel B: COVID-19 Period

Variables	(1) Raw Ret.	(2) Raw Ret.	(3) Raw Ret.	(4) Abn Ret.	(5) Abn Ret.	(6) Abn Ret.
PC	0.051 *			0.062 *		
	(0.029)			(0.036)		
KC		−0.110 *			−0.136 *	
		(0.059)			(0.072)	
OC			−0.032			−0.044
			(0.026)			(0.032)
Crisis	−0.132 ***	−0.138 ***	−0.200 ***	−0.142 ***	−0.166 ***	−0.215 ***
	(0.011)	(0.013)	(0.011)	(0.013)	(0.016)	(0.014)
PC*Crisis	−0.081 ***			−0.086 ***		
	(0.009)			(0.011)		

KC*Crisis		0.089 ***			0.138 ***	
		(0.025)			(0.031)	
OC*Crisis			0.050 ***			0.054 ***
			(0.011)			(0.013)
Market Cap.	−0.053 ***	−0.062 ***	−0.060 ***	−0.063 ***	−0.073 ***	−0.072 ***
	(0.008)	(0.009)	(0.009)	(0.010)	(0.011)	(0.011)
Long-term debt	−0.016	−0.010	−0.009	−0.009	−0.017	−0.005
	(0.031)	(0.038)	(0.033)	(0.037)	(0.046)	(0.041)
Short-term debt	0.074	0.091	0.073	0.107	0.148	0.095
	(0.068)	(0.081)	(0.071)	(0.083)	(0.098)	(0.086)
Cash holdings	0.009	0.041	0.013	0.033	0.062	0.038
	(0.040)	(0.041)	(0.039)	(0.048)	(0.050)	(0.048)
Profitability	0.037	0.035	0.028	0.049	0.050	0.035
	(0.049)	(0.058)	(0.048)	(0.060)	(0.070)	(0.058)
Book-to-Market	−0.000	0.002	−0.005	−0.000	0.003	−0.007
	(0.006)	(0.008)	(0.007)	(0.008)	(0.010)	(0.008)
Negative B/M	0.003	−0.003	−0.001	−0.002	−0.011	−0.005
	(0.022)	(0.024)	(0.022)	(0.027)	(0.030)	(0.027)
Momentum	−0.061 ***	−0.069 ***	−0.057 ***	−0.072 ***	−0.081 ***	−0.067 ***
	(0.006)	(0.007)	(0.006)	(0.007)	(0.008)	(0.007)
Idiosyncratic risk	4.887 ***	2.259 ***	5.093 ***	6.676 ***	3.514 ***	6.890 ***
	(0.666)	(0.835)	(0.668)	(0.813)	(1.016)	(0.813)
Factor Loadings	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	1637	1224	1637	1637	1224	1637
Adj. R-Square	0.71	0.72	0.71	0.14	0.13	0.13

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix C. Intangible Capital and Crisis Returns: PC, KC and OC (3 Years Lagged)

Panel A: GFC Period						
Variables	**(1)** **Raw Ret.**	**(2)** **Raw Ret.**	**(3)** **Raw Ret.**	**(4)** **Abn Ret.**	**(5)** **Abn Ret.**	**(6)** **Abn Ret.**
PC	−0.061			−0.076		
	(0.066)			(0.067)		
KC		−0.076 *			−0.055	
		(0.045)			(0.046)	
OC			−0.088 **			−0.068
			(0.042)			(0.043)
Crisis	−0.298 ***	−0.296 ***	−0.281 ***	−0.342 ***	−0.311 ***	−0.286 ***
	(0.029)	(0.031)	(0.030)	(0.029)	(0.032)	(0.031)
PC*Crisis	−0.091 *			−0.076 *		
	(0.048)			(0.049)		
KC*Crisis		0.096 **			0.101 **	
		(0.047)			(0.048)	
OC*Crisis			0.091 **			0.087 **
			(0.040)			(0.041)
Market Cap.	−0.093 ***	−0.103 ***	−0.108 ***	−0.102 ***	−0.104 ***	−0.110 ***
	(0.017)	(0.019)	(0.019)	(0.018)	(0.020)	(0.019)
Long-term debt	0.094	0.085	0.066	0.075	0.080	0.056
	(0.067)	(0.070)	(0.068)	(0.068)	(0.072)	(0.070)
Short-term debt	0.143	0.129	0.104	−0.012	−0.041	−0.042
	(0.149)	(0.155)	(0.150)	(0.153)	(0.159)	(0.154)
Cash holdings	−0.052	−0.031	−0.040	−0.060	−0.041	−0.052
	(0.088)	(0.090)	(0.088)	(0.091)	(0.093)	(0.091)
Profitability	−0.309 ***	−0.354 ***	−0.323 ***	−0.288 ***	−0.357 ***	−0.302 ***
	(0.094)	(0.100)	(0.094)	(0.097)	(0.103)	(0.097)

Book-to-Market	0.065 ***	0.051 ***	0.057 ***	0.055 ***	0.046 ***	0.050 ***
	(0.012)	(0.013)	(0.013)	(0.012)	(0.014)	(0.013)
Negative B/M	−0.051	−0.041	−0.024	−0.050	−0.053	−0.035
	(0.172)	(0.173)	(0.172)	(0.177)	(0.178)	(0.177)
Momentum	−0.128 ***	−0.129 ***	−0.129 ***	−0.131 ***	−0.132 ***	−0.130 ***
	(0.013)	(0.014)	(0.013)	(0.014)	(0.014)	(0.014)
Idiosyncratic risk	−3.047 ***	−2.985 ***	−2.938 ***	−1.325 ***	−1.307 **	−1.259 **
	(0.445)	(0.450)	(0.448)	(0.451)	(0.457)	(0.452)
Factor Loadings	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	3826	3543	3826	3826	3543	3826
Adj. R-Square	0.54	0.53	0.54	0.16	0.15	0.16

Panel B: COVID-19 Period

Variables	**(1) Raw Ret.**	**(2) Raw Ret.**	**(3) Raw Ret.**	**(4) Abn Ret.**	**(5) Abn Ret.**	**(6) Abn Ret.**
PC	0.069 *			0.056		
	(0.041)			(0.050)		
KC		−0.014			−0.058	
		(0.088)			(0.110)	
OC			−0.007			−0.012
			(0.037)			(0.046)
Crisis	−0.106 ***	−0.108 ***	−0.154 ***	−0.099 ***	−0.120 ***	−0.143 ***
	(0.013)	(0.015)	(0.013)	(0.015)	(0.019)	(0.016)
PC*Crisis	−0.062 ***			−0.055 ***		
	(0.010)			(0.013)		
KC*Crisis		0.094 ***			0.132 ***	
		(0.028)			(0.035)	
OC*Crisis			0.040 ***			0.038 ***
			(0.012)			(0.015)
Market Cap.	−0.026 **	−0.015	−0.029 **	−0.026 *	−0.014	−0.028 *
	(0.012)	(0.014)	(0.013)	(0.015)	(0.018)	(0.016)
Long-term debt	−0.041	0.071	−0.018	0.020	0.126 *	0.038
	(0.042)	(0.052)	(0.045)	(0.051)	(0.065)	(0.056)
Short-term debt	−0.146	−0.071	−0.103	−0.079	−0.053	−0.039
	(0.091)	(0.109)	(0.094)	(0.112)	(0.135)	(0.116)
Cash holdings	−0.053	−0.049	−0.051	−0.095	−0.091	−0.089
	(0.055)	(0.057)	(0.055)	(0.067)	(0.071)	(0.067)
Profitability	−0.048	0.027	−0.022	−0.025	0.051	0.005
	(0.078)	(0.081)	(0.073)	(0.096)	(0.100)	(0.090)
Book-to-Market	−0.019 *	0.012	−0.023 **	−0.012	0.017	−0.015
	(0.010)	(0.013)	(0.011)	(0.013)	(0.016)	(0.013)
Negative B/M	−0.051 *	−0.057 *	−0.054 *	−0.061	−0.059	−0.064 *
	(0.031)	(0.032)	(0.031)	(0.038)	(0.040)	(0.038)
Momentum	−0.048 ***	−0.053 ***	−0.044 ***	−0.057 ***	−0.063 ***	−0.053 ***
	(0.007)	(0.008)	(0.007)	(0.008)	(0.010)	(0.008)
Idiosyncratic risk	5.528 ***	3.605 ***	5.235 ***	6.915 ***	4.237 ***	6.539 ***
	(1.033)	(1.315)	(1.027)	(1.273)	(1.640)	(1.261)
Factor Loadings	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	1629	1218	1629	1629	1218	1629
Adj. R-Square	0.74	0.73	0.74	0.22	0.16	0.22

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Note

[1] In models with lagged periods of two and three years, the results were found to be consistent with those of the model with a one-year lagged. The results of the regression analysis with lagged periods adjusted to two and three years are presented in Appendices B and C.

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