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Enduring Crises: The Link Between Corporate Real Estate and Economic Policy Uncertainty

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This article examines the relationship between corporate real estate (CRE) and economic policy uncertainty (EPU), and how this relationship may aid companies in their decision-making, which form the impetus for this research. Multiple linear regressions are conducted to analyse corporate-level financial performance, using return on assets and market price as indicators, with regard to macroeconomic indicators such as gross domestic product (GDP) growth, inflation, and EPU. A vector error correction model is also used to ascertain the short- and long-term dynamics at play. The results reveal a statistically significant impact by both CRE and EPU on financial performance, as well as a significant interaction between the two variables. This novel estimate affirms that there is indeed a link between CRE held and financial performance during times of economic uncertainty. This article also establishes a link between CRE ownership and company sector, and explores the relationship between the maturity and ownership concentration of companies, with reference to the CRE held, thus providing the basis to show the different decision-making processes of companies at different stages of their lifecycle, and in different sectors.

Keywords

1.   Introduction

Real estate has been increasing in importance as an asset class over the years, and is the third-largest asset class for institutional investors (Andonov et al., 2013). Ravi and Goetzmann (2005) also find a strong trend among institutional managers toward increasing their real estate allocations. The attraction of real estate as an asset class may be due in part to its use as a hedge against inflation, as evidenced by Goetzmann and Ibbotson (1990) who conclude that real estate is the only major asset class that consistently exceeds inflation during the period between 1970 and 1986. Corporate real estate (CRE) represents land and buildings owned by non-real estate companies for purposes such as operations, investment and development (Liow, 2004). Rodriguez and Sirmans (1996) show that stock markets are aware of the impact of real estate decisions, and that they respond accordingly, pricing in the decisions. This has stirred more interest in the CRE portfolio of companies, and how to effectively manage them such that value is created.

CRE tends to be acquired due to business needs, and not market timing (Krumm and Vries, 2003) due to the general focus on the core business of a company and related requirements for CRE in phases of expansion or growth. Therefore, the strategy used when acquiring and managing CRE can be an effective measure of reducing costs of such necessities and producing a positive market outcome from CRE, thus aiding a company to obtain the most positive outcome from the necessary process of acquiring CRE.

Policy uncertainty is a class of economic risk where the future path of government policy is uncertain. This raises risk premia and leads businesses and individuals to delay spending and investment until such uncertainty has been resolved. The Economic Policy Uncertainty (EPU) Index is a measure of policy uncertainty, coined by Baker (2013), and constructed by tracking mentions of keywords in leading newspapers. Baker et al. (2016) also note that concerns about policy uncertainty began to increase following crises such as the global financial and Eurozone crises. Economists consider the former to be the most serious financial crisis since the Great Depression, during which the U.S. crisis ultimately triggered a global banking crisis and credit crunch that lasted through to 2009. The aftermath of the global financial crisis (GFC) contributed to the Eurozone crisis, which entailed several concurrent and long-term sovereign debt crises in the Eurozone, a prime example being Greece. The country had trouble servicing its debt as early as 2007 at the beginning of the GFC. Greece thereafter required bailout loans in 2010, 2012, and 2015 from the International Monetary Fund, Eurogroup, and European Central Bank, and only completed the bailout program on August 20, 2018. The crisis lasted approximately 11 years, persisting longer than the Great Depression.
Furthermore, entities such as the Federal Open Market Committee (2009) and the International Monetary Fund (2013) suggest that uncertainty around fiscal, regulatory, and monetary policies contributed to the economic decline during

the aforementioned crises, as well as slowed recovery afterwards. The current literature has also found that companies tend to hold back or limit investments during times of uncertainty, thus supporting the link between uncertainty and economic decline.

When a firm faces credit constraints, asset sales can provide the needed liquidity by providing an inflow of cash to the company. Hence, asset sales can play an important role in mitigating negative industry and company specific shocks, and to some extent, can be seen as a sort of liquidity buffer for a firm (Baros, 2019). As such, the direction of this article is to establish whether CRE may mitigate the effects of EPU.

There is a clear and intuitive link between uncertainty during crises, and both company and stock market performances, as seen during the Asian financial crisis (AFC) and the GFC. This is even clear in current times of crisis, whereby the novel coronavirus disease, coupled with the 2020 oil price war, saw major stock market indices plummeting, with the US Dow Jones Index and the S&P 500 Index falling by approximately 34.7% and 31.8% respectively in slightly more than a month since their peak in February 2020.

As CRE represents around 31 percent of gross total tangible assets (Nappi-Choulet et al., 2009), it is important to understand how CRE affects the performance of a company, especially during global crises. Furthermore, holding real estate entails a large capital commitment over a long period of time (Dirk and Piek, 2005), locking in corporate resources and determining the capital structure of a company. This could mean that the firm is at the mercy of real estate performance instead of its core business. Liow and Ooi (2004) find that CRE ownership has negatively impacted the Economic Value Added and Market Value Added of non-real estate firms between 1997 and 2001, the time of the AFC. This negative impact is even greater for conglomerates with high real estate asset intensity. When the real estate value of a firm appreciates by $1, its investment increases by approximately $0.06, financed through additional debt issues, as such, shocks that affect real estate may be expected to have a nontrivial impact on the balance sheet of a company (Chaney et al., 2012). Therefore, it is important to ascertain whether the opportunity cost of holding CRE is justified by the increased ability of companies to weather crises.

The key aim of this research is to examine the relationship, in terms of causality and predictability, between CRE and corporate-level performance during times of uncertainty. The objectives of the article are to analyse the correlation between CRE and financial performance, from both an operational and a stock market perspective, to examine the impact of uncertainty on financial performance, and determine whether CRE affects the impact of uncertainty on financial performance.

The outcomes of the above objectives are significant as they will highlight the relative importance of CRE to companies, and its possible role as a buffer

during crises. This will in turn indicate whether there is a need for dedicated CRE departments, and bespoke CRE strategies for various corporations. Hence, this article seeks to verify the potential of the EPU Index as an economic indicator and will be critical for managers to understand the effect that CRE has on navigating uncertainty, thereby affecting the decision making of companies.

This article focuses on global macroeconomic factors that affect the performance of corporate entities in different countries, specifically the 10 largest economies by GDP, as well as Singapore. The macroeconomic data are obtained from the Organisation for Economic Co-operation and Development (OECD) and the World Bank, and the EPU Indices are taken from the Economic Policy Uncertainty Index on www.policyuncertainty.com, which is maintained by Dr. Scott Baker of Northwestern University, Professor Nick Bloom of Stanford University and Professor Stephen Davis of the University of Chicago. These three research directors calculate the EPU indices in their article, 'Measuring Economic Policy Uncertainty' (2013). Company data for these countries are acquired from Orbis. Data obtained are for an 8-year period between 2010 and 2018.

Using this set of data and the proposed research methodology, this article will provide a novel estimate on the relationship between CRE and EPU, and its impact on corporate-level financial performance, with variables such as return on assets (RoAs) and market price as measures of such performance. The current literature primarily pertains to the relationship between uncertainty and the stock market. Hence, such an estimate would contribute to the existing literature by providing insight into how uncertainty impacts corporate-level financial performance, as well as how the sector of a company may change this impact. Furthermore, it presents novel findings on the effects of CRE on financial performance with regard to EPU, as well as how ownership concentration and company maturity may have explanatory power over how much CRE is owned. This article aims to highlight the importance of a CRE strategy, and one that is bespoke to the firm depending on its current characteristics.

2.   Literature Review

This article seeks to provide a synopsis of the relevant theories and literature on the relationship between CRE and company performance during crises. First, macroeconomic indicators and their relationship with financial performance are discussed. Secondly, studies on the extent of the effect that CRE can have on the financial performance of companies are discussed, as well as the importance of having a CRE strategy for companies. Lastly, EPU is examined as a novel, and possibly more accurate, measure of macroeconomic shocks.

2.1 Macroeconomic Indicators on Stock Market and Financial Performances

Araújo (2009) points out that the impetus for understanding the relationship between financial markets and the macro-economy is assessing the correlation between macroeconomic disturbances and stock market fluctuations, and macroeconomic shocks cannot be neglected in accounting for the dynamics of real stock returns. Furthermore, understanding the relationship between the macroeconomic environment and asset markets can improve policy making and financial decision making.

In today's modern economy, there are various players around the globe who invest in various stock markets regardless of their geographical location, whether direct or indirect, such as companies, institutional investors, and individual investors. Therefore, considerable attention is given to the evolution of the stock market due to the widely felt repercussions that occur during shocks. Furthermore, Rudzkis and Valkavičienė (2014) observe that the behaviour of financial markets has strong predictive power of the economic development of a country, which aids investors and policymakers.

However, such predictive power is not always accurate. There is no shortage of evidence that, at times, the stock market has been detached from the economy. Within a shorter time frame, significant variations of GDP growth and market prices are noted, particularly during periods of high instability. During the 2008 GFC, various stock markets around the globe plunged around 40-60%, yet the economy did not shrink commensurately during this period of time. Thereafter, the S&P 500 Index nearly tripled in only 6 years during the following bull market, which similarly does not correlate with real GDP growth. However, over a longer time frame, the two variables do not seem so far apart. Over the past 50 years, the US economy has grown at a compound annual growth rate of approximately 3%, while the past 10 years have witnessed noticeably slower average GDP growth of less than 1.5%, as noted from the World Bank database. From 2006 to 2014, the S&P 500 Index rose by 45%, an average simple growth rate of 5.6%, which is almost four times higher than the average growth rate of GDP. Therefore, it may be argued that economic growth is not a completely accurate measure for predicting stock market outcomes (Foresti, 2007).

Various studies have been conducted on the impact of inflation on stock markets. Abdullah and Hayworth (1993) reveal a positive relationship between stock return and inflation. Accordingly, Rapach (2002) notes that an increase in trend inflation generally does not erode the long-run real value of stocks. However, while a long run positive relationship is supported by Jaffe and Mandelker (1976) during the period of 1875-1970, they find a negative relationship between stock returns and expected rates of inflation over the shorter period of 1953-1971. Additionally, similar to the previous literature, Anari and Kolari (2001) find that stock prices show a negative response to an inflation shock in the short term, which transitions to a positive response over the long term.

These results help to synthesize the existing short-run and long-run results on stock returns and inflation, thus supporting the inverse relationships between short-run and long-run impacts of inflation on stock prices, and showing the varying effect of inflation over time.

Therefore, GDP growth and inflation are imperfect measures of macroeconomic shocks and their effects on financial and stock market performances. Hence, this article considers EPU as a more accurate measure.

2.2   Impact of CRE on company performance

When examining the efficiency of management in using CRE, ROA is the most frequently used performance measure (Daniel et al., 2004). Studies that investigate the relationship between the performance of a company and CRE holdings have indicated that it is a mixed relationship. Liow (2004) finds that companies with high CRE holdings in Singapore have lower returns and higher risk. Brounen and Eichholtz (2005) similarly report a negative relationship between CRE ownership and company performance. On the other hand, a more recent study by Tuzel (2010) shows that companies with higher proportions of real estate have higher returns than those with lower shares of real estate. These studies examine companies from various industries, which might explain for the conflicting results. For some industries, such as retail (Park and Glascock, 2010), CRE investment is more closely linked to business strategy than in other industries. Campello and Giambona (2013) have studied the relationship between asset tangibility and leverage, as well as broken down the different components of tangible assets. They find that property assets, among all of the categories of tangible assets, have the most explanatory power over leverage, thus implying a positive relationship between the two variables.

The effect of shocks on companies with regard to their CRE has been studied as well. CRE ownership has a significant and negative relationship with productivity risks of companies, thus indicating that companies with high-productivity risk own less CRE assets, so as to reduce potential losses during negative productive shocks due to owning CRE (Zhao and Sing, 2015). The slow depreciation of properties translates to a slow loss of capital, thus increasing the risk of real estate investment relative to other investment classes. Due to high adjustment costs, companies may find it harder to reduce their CRE holdings when they have a need to do so. Therefore, recessions impact companies with high CRE holdings harder than those with lower CRE. Furthermore, conditional beta estimates reveal that companies with high levels of CRE indeed have higher risk, and the spread between the risks of high real estate owning and low real estate owning companies is countercyclical (Tuzel, 2010).

2.3   CRE Strategy

Martin and Black (2006) observe that businesses generally adopt an overall strategy, yet such an overall business strategy tends to exclude a dedicated CRE segment. This may be attributed to bias in studies that research strategic management, which is felt in research that overlooks the role of CRE and its importance to the company (Ali et al. 2006). Additionally, Ali et al. (2006) note that CRE researchers may also be biased toward topics related to real estate issues rather than general business issues, which results in the neglect of issues that are vital to the core business itself. Such biases have translated into a lack of focus on the need to include CRE into business strategies, thus resulting in a literature gap.

It has also been noted that for non-real estate companies with significant amounts of CRE, shareholder wealth is generated from the profitability of their core business activities and the book value of their real estate portfolio (Liow and Ooi 2004). Since most companies try to maximize wealth of their shareholders, such that the potential value-adding attributes of CRE can be realized by the company, CRE managers ought to choose the most suitable CRE strategy for the business environment and overall goals of their company (Lindholm and Leväinen, 2014). It is therefore crucial that when considering overall business strategies, companies include their CRE strategy. Despite certain studies that examine such strategic alignment, their results vary in completeness, and the models produced appear impractical for applications in business practices (Appel-Meulenbroek et al., 2010).

Certain industry sectors are seen to be more in tune with CRE due to the nature of their business, meaning that their core business is to some extent inherently aligned with their CRE. A prime example of this would be the retail sector, whereby until the advent of e-commerce, companies have traditionally relied on physical real estate to conduct their business, as they need physical space for shoppers to browse and purchase their wares. It is thus no surprise that retail companies have been lauded as being pioneers of CRE management (Gibson and Barkham, 2001). Baen (2000) notes that retailers are demanding for less retail space with the growth of e-commerce and thus it will be interesting to track how retail companies will adapt their CRE strategies in the coming years.

Company size has been found to be negatively related to ownership concentration (Richter and Weiss, 2013), which indicates that as companies mature and expand, ownership concentration decreases. Hurriyati et al. (2018) find that company life cycle has an impact on leverage, whereby corporate funding is largely determined by the development of the life cycle stages of the company, such that there are different capital structure patterns in the different stages. This in turn may affect the CRE strategy employed at various stages, due to differing capital structures of a company.

Grönlund et al. (2008) highlight the use of the going concern principle in accounting, which assumes that companies acquire real estate assets to support their core business rather than to be sold forward, but cause real estate to be valued according to its net book value. This procedure creates a discrepancy between the value of real estate on the balance sheet, and the actual potential market value of the real estate. Over time, this discrepancy can create large "hidden reserves" in the balance sheets of mature companies. The untapped value of these reserves is hard to measure by shareholders due to the standard accounting principles used by companies, which may lack transparency. Furthermore, in the balance sheet, the ownership rather than renting of property would contribute to earnings only by the amount of costs saved on rental.

2.4   EPU Index

Theoretical work on policy uncertainty goes at least as far back as Bernanke (1983), who highlights that high uncertainty incentivizes companies to delay investment and hiring when projects are costly to reverse or exit from, or workers are costly to hire and fire, thus resulting in higher adjustment costs. There are also studies that focus on policy uncertainty, such as Higgs (1997) and Hassett and Metcalf (1999), which consider the negative effects of monetary, fiscal, and regulatory policy uncertainties on the economy. Shocks to monetary policy, economic growth, and inflation lead to lower than expected real estate returns, while a (positive) shock to default risk premium is linked to higher future returns (Ewing and Payne, 2005).

More recently, there has been an increase in interest from practitioners and academics on whether EPU affects stock prices (Baker et al, 2013; Brogaard and Detzel, 2015). Recent studies on EPU and its relationship with the stock market indicate that an increase in EPU is generally connected with a decline in stock returns and an increase in stock volatility (Antonakakis et al., 2013; Bhagat et al., 2013). However, one drawback of current studies on EPU is their use of proxies for uncertainty, and the conditions under which these proxies accurately represent the common theoretical concept of uncertainty may be quite rare (Jurado et al., 2015). While proxies may approximate the effect of uncertainty under certain conditions, they may not be completely accurate when generalized to a larger sample.

2.5   Summary

Overall, previous studies in the literature have largely established that macroeconomic indicators and EPU are tied to stock market performance. At the same time, macroeconomic shocks are linked with higher EPU, which negatively impacts real estate returns, and CRE has shown mixed results on its relationship with company performance. The lack of focus on CRE strategies in relationship to overall business strategy and company sector overstate the negative impact of CRE on performance, due to the lack of CRE strategies and different sectors possibly portraying CRE as negative. The relationship between

CRE and EPU is relatively understudied. Hence, this article seeks to fill the gaps by closely examining the relationship between CRE and EPU, which provides more insights into the, as yet indefinitive impact of CRE, particularly during times of uncertainty.

3.   Research Methodology

3.1 Data Collection and Treatment

The data set covers firms from the 10 largest countries in terms of GDP[1], as well as Singapore for comparison purposes, from 2010 to 2018. The EPU Index for each country was acquired from www.policyuncertainty.com. Using firm-level data, Bloom et al. (2013) find that policy uncertainty raises stock price volatility and reduces investment and employment in policy-sensitive sectors like defense, healthcare, and infrastructure construction. At the macro level, policy uncertainty innovations foreshadow declines in investment, output, and employment in the U.S. and, in a panel VAR setting, for the 12 major economies. In addition to this, GDP growth and inflation for each country are obtained from the Organisation for Economic Co-operation and Development (OECD) and World Bank databases, as additional measures of economic performance.

Company level data were collected from the Orbis database. Orbis is the flagship company database of Bureau van Dijk (BvD), a Moody's Analytics company. The data set covers a total of approximately 8000 companies after filtering for the indicators mentioned below. Net buildings as a fraction of total assets is used as a proxy for CRE owned. Financial performance indicators include net income, ROAs, gearing, and market price. Another indicator of interest is the BvD Independence Indicator, which measures the ownership concentration of the companies. The BvD Independence Indicator consists of 10 ranks that range from A+ to U, with an A+ rating indicating a low ownership concentration. These were grouped into A, B, C, and U for the purpose of this article, as shown in Appendix 1. The BvD sectors of each company are also examined to measure the extent that the business nature of a company affects the role of their CRE. A description of each variable can be found in Appendix 2.

3.2 Multiple Linear Regression Model

"A regression model, also called an econometric model, is a quantitative analytical tool in which the bahaviour of some variables is explained by other variables" (Welc and Esquerdo, 2017). This article employs a multiple linear regression model to explore the impact of the macroeconomic indicators on

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[1] Brazil, Canada, China, France, Germany, India, Italy, Japan, the United Kingdom, and the United States.

financial performance, and the interactions between the financial performance indicators. The study also examines whether EPU and CRE have explanatory power over financial performance indicators, as well as the extent to which EPU and CRE interact with one another. Macroeconomic indicators are denoted by percentage change for GDP growth and inflation, and EPU is measured with regard to the EPU indices of each country. Company financial variables are treated with log transformation, as such, the results are in terms of percentage changes to the dependent variables. Relationships between the variables are expressed in a linear equation as such:

$$y = \beta x1 + \beta x2 \ldots + \beta xn + c + \epsilon$$

3.2 Vector Error Correction Model

This article also employs a vector error correction model (VECM) to examine the short and long run dynamics between the variables. The lag order selection is done by automatic selection based on the Schwarz information criterion (Schwarz, 1998). The analysis begins by conducting panel unit root tests by utilising the tests in Levin, Lin and Chu (2002) and Harris and Tzavalis (1999) to affirm the nonstationarity of the variables. The results are shown in Table 1. All of the variables are found to reject the null hypothesis of having a unit root and therefore nonstationary.

Cointegration is tested by using the maximum eigenvalue and trace tests in Johansen (1988, 1991). The results of both methods are shown in Table 2. The null hypothesis of no co-integration is rejected at the 5% significance level under both the trace statistic and the maximum eigenvalue method, and at least 5 cointegrating vectors are found.

Table 1   Unit Root Test Results.

Variable	Levin-Lin-Chu		Harris-Tzavalis	
	Level	1st Difference	Level	1st Difference
GDPGrowth	0.000(0)***	0.000(0)***	0.000***	0.000***
Inflation	0.000(0)***	0.000(0)***	0.000***	0.000***
EPU	0.000(1)***	0.000(0)***	1.000	0.000***
Gearing	0.000(0)***	0.000(0)***	0.000***	0.000***
CRE	0.000(0)***	0.000(0)***	0.000***	0.000***
Marketprice	0.338(2)	0.000(0)***	0.000***	0.000***
ROA	0.000(0)***	0.000(0)***	0.000***	0.000***

Notes: The values shown are the p-values of the tests. *, **, and *** represent the 10%, 5%, and 1% levels respectively. The test value in parentheses is the lag length.

Table 2   Johansen Cointegration Test Results

Null Hypothesis	Trace Statistic	5% Critical Value	Prob. **	Max-Eigen Statistic 5%	Critical Value	Prob. **
CE = 0	40302.78*	125.615	0.000	12234.780*	46.231	0.000
CE ≤ 1	28068.000*	95.754	0.000	12120.530*	40.078	0.000
CE ≤ 2	15947.470*	69.819	0.000	11817.050*	33.877	0.000
CE ≤ 3	4130.421*	47.856	0.000	4085.695*	27.584	0.000
CE ≤ 4	44.726*	29.797	0.001	26.224*	21.132	0.009
CE ≤ 5	18.502*	15.495	0.017	10.839	14.265	0.163
CE ≤ 6	7.663*	3.841	0.006	7.663*	3.841	0.006

Notes: Trace test indicates 7 cointegrating equations at the 0.05 level; Max-eigenvalue test indicates 5 cointegrating eqn(s) at the 0.05 level; * denotes rejection of the hypothesis at the 0.05 level; ** p-values in MacKinnon and Michelis (1999)

4.   Empirical Findings and Analysis

4.1   Multiple Linear Regressions

4.1.1   Impact on Firm CRE

The model run on CRE intends to examine the effects of the aforementioned variables on the amount of CRE owned by companies, as seen in Table 3 below. GDP growth has a highly significant positive impact on CRE of 0.018 percent for every unit change in GDP growth. This is in line with companies that are experiencing growth along with the general economy. Inflation has a highly significant negative impact on CRE as well, with a –0.023 percent fall in CRE for every unit increase in inflation. EPU has a highly significant negative impact of -0.0004 percent on CRE for every unit increase in EPU. This implies that companies hold less CRE during times of uncertainty and reinforces the findings in Baros (2019) whereby asset sales may be employed during shocks as a liquidity buffer. The impact of gearing is a highly significant positive effect of 0.076 per unit change, and market price has a highly significant positive impact of 0.010. This follows the literature findings of a positive relationship between leverage and CRE, with the added equity from a higher market price magnifying this effect. To expound on this, the interaction term c.Gearing#c.Marketprice has a highly significant positive impact of 0.0304 percent change in CRE. This further enforces the notion that the impacts of gearing and market price on CRE are related, whereby their impact is affected by the magnitude of each variable. RoA has an insignificant negative impact of -0.00168, and thus will not be discussed.

Table 3   Multiple Linear Regression on CRE

Indicator	CRE	CRE	CRE	CRE	CRE	CRE	CRE	CRE
GDPgrowth	0.00303**						0.0175***	0.0174***
	(2.74)						(10.84)	(10.72)
Inflation		-0.0119***					-0.0225***	-0.0214***
		(-9.72)					(-14.29)	(-13.56)
EPU			-0.000302***				-0.000384***	-0.000427***
			(-6.13)				(-7.70)	(-8.55)
Gearing				0.0722***			0.0760***	0.0505***
				(18.88)			(18.82)	(12.54)
Marketprice					0.00490		0.0103**	-0.0214***
					(1.94)		(3.16)	(-5.67)
RoA						-0.00598***	-0.00168	-0.000690
						(-3.82)	(-1.11)	(-0.46)
BvD Independence Indicator 'A'							0 (.)	0 (.)
BvD Independence Indicator 'B'							0.0593***	0.0589***
							(6.59)	(6.57)
BvD Independence Indicator 'C'							0.0194	0.0198
							(1.63)	(1.67)
BvD Independence Indicator 'U'							-0.543***	-0.595***
							(-6.34)	(-5.43)
Interaction term c.Gearing#c. Marketprice								0.0304***
								(12.54)
Intercept	0.986***	1.032***	1.048***	0.928***	0.994***	1.006***	0.934***	0.966***
	(150.89)	(203.11)	(126.79)	(196.74)	(204.42)	(235.73)	(67.46)	(69.32)
N	69714	69714	69714	69714	65176	69714	65176	65176
R-squared	0.0001	0.0013	0.0007	0.0083	0.0002	0.0002	0.0135	0.0181

Notes: t statistics in parentheses: * $p<0.05$, ** $p<0.01$, and *** $p<0.001$

4.1.2   Relationship between Ownership Concentration and CRE

The BvD Independence Indicator shows a highly significant positive impact on the market price for companies with a 'B' rating, of a 0.059 percent increase in CRE. Companies with a 'C' rating have a positive impact, albeit insignificant, of a 0.019 percent increase in price. Companies with a 'U' rating have a highly significant negative impact of –0.543 percent decrease in CRE. These results indicate that a company with lower ownership concentration would have a larger proportion of CRE, and vice versa.

As noted in previous studies in the literature, mature firms tend to have lower ownership concentration. At an earlier stage of maturity, or smaller size, the original owners tend to have a larger portion of ownership. It follows that a higher ownership concentration generally means that original owners of the firm would be investing in assets that add value to the core business, rather than investment properties, hence they would not focus on developing or owning corporate real estate.

Therefore, when there is smaller shareholder concentration, it is generally when companies have become publicly listed, or already gone through multiple rounds of funding and expansion. At this stage, these companies would be either aggressively expanding, or already have multiple areas in which they operate, hence they may own a larger proportion of CRE. However, a smaller shareholder base would involve opinions from new shareholders which might deviate from the vision of the original shareholders, such as diversifying the business or expanding the business to a different scale.

4.1.3   Impact on Return on Assets

The model run on RoA intends to examine the effects of the aforementioned variables on financial performance, as seen in Table 4. GDP growth is seen to have a highly significant positive effect on RoA, with every unit increase in GDP growth resulting in a 0.126 percent increase in RoA. This is a logical result as when an economy is doing well and experiencing growth, there will be a general uplift in the business environment, increasing net income and therefore RoA, ceteris paribus. Similarly, inflation has a highly significant positive effect with a 0.103 percent increase in RoA per unit increase in inflation. There is a threshold level of inflation, below which, inflation has a positive effect on financial depth, but above which, the effect turns negative (Khan and Senhadji 2001), thus indicating that the economies covered in this article generally manage to contain inflation well. Gearing has a highly significant negative impact on RoA, whereby every percentage increase in gearing reduces RoA by -0.331 percent. The significantly negative correlation of gearing on RoA which implies that more profitable companies adopt measures to keep their debts low.

Table 4 Multiple Linear Regression on RoA

Indicator	RoA	RoA	RoA	RoA	RoA	RoA	RoA	RoA
GDPgrowth	0.0677***						0.126***	0.125***
	(24.07)						(26.86)	(26.86)
Inflation		0.0715***					0.103***	0.103***
		(22.25)					(26.66)	(26.69)
EPU			-0.00145***				-0.000205	-0.000892***
			(-8.71)				(-1.24)	(-3.71)
CRE				-0.0426***			-0.0107	-0.133***
				(-4.41)			(-1.15)	(-5.94)
Gearing					0.341***		-0.331***	-0.330***
					(-39.77)		(-37.53)	(-37.28)
Marketprice						0.261***	0.451***	0.452***
						(34.02)	(40.56)	(40.58)
BvD Independence Indicator 'A'							0 (.)	0 (.)
BvD Independence Indicator 'B'							0.149***	0.146***
							(6.38)	(6.28)
BvD Independence Indicator 'C'							0.236***	0.231***
							(9.95)	(9.76)
BvD Independence Indicator 'U'							-1.200*	-1.208*
							(-2.48)	(-2.49)
Interaction term c.CRE#c.EPU								0.000735***
								(5.47)
Intercept	0.693***	0.809***	1.229***	1.043***	1.341***	0.672***	-0.0799	0.0387
	(39.47)	(61.63)	(49.08)	(63.44)	(92.21)	(43.09)	(-1.61)	(0.70)
N	69714	69714	69714	69714	69714	65176	65176	65176
R-squared	0.0069	0.0062	0.0002	0.0002	0.0268	0.0247	0.0984	0.099

Notes: t statistics in parentheses: * $p<0.05$, ** $p<0.01$, and *** $p<0.001$

The BvD Independence Indicator shows a low significantly negative impact on RoA for companies with an unknown level of ownership, in the 'U' category, with a -1.200 percent decrease in RoA. The impact of the indicator for companies in the 'B' and 'C' categories is a highly significant positive effect of 0.149 and 0.236 unit increase in RoA respectively. This implies that a higher ownership concentration of a company would have a negative impact on RoA, and vice versa.

Before introducing the interaction term c.CRE#c.EPU, a percentage increase in CRE and a unit increase in EPU are seen to have insignificant negative effects on RoA of -0.0107 and -0.0002 percent respectively. However, upon introducing the interaction term, the results become highly significant. The new coefficients for CRE and EPU represent -0.133 and -0.0009 percent changes in RoA respectively. The results indicate that having more CRE results in a lower RoA, likely due to CRE yielding lower returns than the core business of a company. The negative impact of EPU is in line with the results in the literature of companies holding back or limiting investments during times of uncertainty. The interaction term, c.CRE#c.EPU, has a highly significant positive impact of 0.000735 percent change on RoA. This suggests that the impact of CRE on RoA is dependent on the level of EPU at any given time, and vice versa.

4.1.4   Impact on Stock Market Performance

The model run on market price intends to examine the effects of the aforementioned variables on stock market performance, as seen in Table 5. GDP growth has a highly significant negative impact on market price of –0.251 percent for every unit change in GDP growth. Inflation has a highly significant negative impact on market price as well, with a –0.102 percent fall in market price for every unit increase in inflation. This implies that as general consumer prices increase, and purchasing power falls, there is less demand for investments such as stocks. The impact of gearing is a positive effect of 0.0128 per percentile change at a low significance. RoA has a highly significant positive impact of missing text and 0.133 respectively. This is a logical result as a financially well-performing company is likely to attract investment.

The BvD Independence Indicator shows a highly significant positive impact on market price for companies with a 'U' rating, of a 1.622 percent increase in price. Companies with a 'C' rating similarly have a highly significant positive impact, albeit lower in magnitude, of a 0.269 percent increase in price. Companies with a 'B' rating have a highly significant negative impact of – 0.0971 percent decrease in price. These results indicate that a higher ownership concentration of a company would have a positive impact on market price, and vice versa.

CRE and EPU have opposite effects on market price. Without the interaction term between CRE and EPU, every percentage increase in CRE results in a highly significant positive 0.0216 percent increase in market price, while every

Table 5   Multiple Linear Regression on Market Price

Indicator	Marketprice	Marketprice	Marketprice	Marketprice	Marketprice	Marketprice	Marketprice	Marketprice
GDPgrowth	-0.290*** (-188.93)						-0.251*** (-146.40)	-0.251*** (-146.45)
Inflation		-0.238*** (-110.41)					-0.102*** (-43.29)	-0.102*** (-43.28)
EPU			-0.00185*** (-6.20)				-0.00235*** (-37.18)	-0.00218*** (-24.11)
CRE				0.0245*** (3.31)			0.0216*** (3.57)	0.0513*** (4.45)
Gearing					-0.0342*** (-24.65)		0.0131* (2.40)	0.0128* (2.35)
RoA						0.102*** (16.07)	0.133*** (15.56)	0.133*** (15.56)
BvD Independence Indicator 'A'							0 (.)	0 (.)
BvD Independence Indicator 'B'							-0.0976*** (-8.30)	-0.0971*** (-8.26)
BvD Independence Indicator 'C'							0.268*** (15.64)	0.269*** (15.71)
BvD Independence Indicator 'U'							1.620*** (3.48)	1.622*** (3.48)
Interaction term c.CRE#c.EPU								-0.000177** (-3.06)
Intercept	2.403*** (252.10)	1.717*** (208.91)	1.055*** (105.78)	1.371*** (99.95)	1.113*** (131.51)	0.977*** (104.30)	2.680*** (150.89)	2.651*** (126.38)
N	68922	68922	68922	68922	68922	68922	68922	68922
R-squared	0.3020	0.1623	0.0079	0.0002	0.0006	0.0247	0.3792	0.3793

Notes: t statistics in parentheses: * $p<0.05$, ** $p<0.01$, and *** $p<0.001$

unit increase in EPU results in a highly significant negative impact of –0.00235 percent decrease in market price. This is a logical result as while CRE yields lower returns than the core business of a company, the returns are relatively more stable and lower in risk, which are attractive to many investors. At the same time, uncertainty would make investors less likely to place money in the stock markets, thus resulting in a drop in prices. With the addition of the interactive term c.CRE#c.EPU, the impact of CRE increases in magnitude while the impact of EPU decreases in magnitude, to 0.051 and –0.002 respectively, while remaining at a highly significant level. The interaction term itself has a negative impact of –0.0002 percent change in market price at the 1% level. This suggests that the impact of CRE on market price is dependent on EPU at any given time, and vice versa.

4.1.5   Influence of Sectors on Firm Performance and CRE

The results of the modeling on RoA and market price (Tables 6 and 7) include the various sectors as labelled by Bureau van Dijk. The impact of the initial variables is generally consistent with the models which exclude the various sectors. However, certain sectors are indeed seen to have varying and significant impacts on the dependent variables of RoA and market price. One notable sector would be that of waste management and treatment, which shows a low significant impact of 0.842 percent on RoA, a highly significant impact of 0.589 percent on market price, and a highly significant impact of -0.546 percent on CRE. This implies that certain sectors do indeed benefit more from the different variables in the model than other sectors. Such a result is in line with the mixed results provided by previous studies in the literature, whereby studies conducted in various sectors can be used to derive varying conclusions.

The impact of sectors on CRE (Table 8) is even more noteworthy: almost every sector, with the exception of food and tobacco manufacturing, has a statistically significant impact on CRE ownership. Another notable sector would be the retail sector. It is understood that due to the nature of the retail business, physical shop space traditionally plays an important role in this sector. This is noted in the highly significant positive impact of retail on RoA of 0.535 percent, and its moderately significant positive impact of 0.060 on CRE. This indicates that companies in the retail sector indeed own more CRE, and this CRE has a positive impact on RoA as seen in Table 6. Therefore, it can be inferred that industry and sector are indeed confounding factors when it comes to CRE being either beneficial or detrimental to a company, which indicate that there may be a need for bespoke CRE strategies for different sectors, due to the varying role that they play in the operations of a company.

Table 6   Multiple Linear Regression on RoA with Sector

Indicator	RoA		RoA	
GDPgrowth	0.128***	(27.03)	0.127***	(27.04)
Inflation	0.100***	(24.44)	0.100***	(24.47)
EPU	-0.000123	(-0.75)	-0.000816***	(-3.39)
CRE	-0.0157	(-1.58)	-0.140***	(-6.13)
Gearing	-0.338***	(-36.71)	-0.337***	(-36.48)
Marketprice	0.448***	(40.18)	0.448***	(40.20)
BvD Independence Indicator 'A'	0	(.)	0	(.)
BvD Independence Indicator 'B'	0.137***	(5.90)	0.134***	(5.78)
BvD Independence Indicator 'C'	0.233***	(9.75)	0.227***	(9.53)
BvD Independence Indicator 'U'	-1.085*	(-2.25)	-1.091*	(-2.26)
Agriculture, Horticulture & Livestock	0	(.)	0	(.)
Biotechnology and Life Sciences	-2.075***	(-4.22)	-2.072***	(-4.21)
Mining & Extraction	-0.195	(-1.18)	-0.188	(-1.14)
Media & Broadcasting	-0.0976	(-0.65)	-0.0897	(-0.59)
Computer Hardware	0.128	(0.81)	0.140	(0.89)
Industrial, Electric & Electronic	0.189	(1.08)	0.196	(1.12)
Machinery	0.220	(1.68)	0.225	(1.72)
Wholesale	0.256	(1.94)	0.250	(1.89)
Printing & Publishing	0.262	(1.76)	0.272	(1.83)
Banking, Insurance & Financial Services	0.263	(1.07)	0.273	(1.11)
Leather, Stone, Clay & Glass products	0.280*	(2.08)	0.276*	(2.06)
Travel, Personal & Leisure	0.293*	(2.17)	0.309*	(2.29)
Metals & Metal Products	0.302*	(2.31)	0.301*	(2.31)
Wood, Furniture & Paper Manufacturing	0.334*	(2.46)	0.339*	(2.49)
Transport Manufacturing	0.337*	(2.54)	0.343**	(2.59)
Utilities	0.356*	(2.48)	0.355*	(2.47)
Public Administration, Education, Health Social Services	0.387*	(2.37)	0.396*	(2.43)
Food & Tobacco Manufacturing	0.417**	(3.12)	0.418**	(3.13)
Textiles & Clothing Manufacturing	0.438***	(3.34)	0.443***	(3.38)
Chemicals, Petroleum, Rubber & Plastic	0.444***	(3.40)	0.446***	(3.41)
Construction	0.459***	(3.49)	0.466***	(3.54)
Transport, Freight & Storage	0.474***	(3.64)	0.493***	(3.78)
Retail	0.532***	(3.99)	0.535***	(4.01)
Property Services	0.573***	(4.25)	0.578***	(4.28)
Computer Software	0.638***	(4.36)	0.637***	(4.35)
Business Services	0.748***	(5.27)	0.756***	(5.32)
Waste Management & Treatment	0.837*	(2.17)	0.842*	(2.18)
Interaction term c.CRE#c.EPU			0.000739***	(5.50)
Intercept	-0.422**	(-3.11)	-0.307*	(-2.22)
N	65176		65176	
R-squared	0.1056		0.1061	

Notes: t statistics in parentheses: * $p<0.05$, ** $p<0.01$, and *** $p<0.001$

Table 7   Multiple Linear Regression on Market Price with Sector

Indicator	Marketprice		Marketprice	
GDPgrowth	-0.256***	(-135.40)	-0.256***	(-135.44)
Inflation	-0.0953***	(-38.34)	-0.0953***	(-38.34)
EPU	-0.00236***	(-36.64)	-0.00221***	(-23.93)
CRE	0.00575	(0.82)	0.0320**	(2.60)
Gearing	0.0129*	(2.18)	0.0127**	(2.15)
RoA	0.130***	(14.56)	0.130***	(14.55)
BvD Independence Indicator 'A'	0	(.)	0	(.)
BvD Independence Indicator 'B'	-0.0953***	(-7.74)	-0.0947***	(-7.69)
BvD Independence Indicator 'C'	0.265***	(14.99)	0.266***	(15.07)
BvD Independence Indicator 'U'	1.632***	(3.42)	1.633***	(3.42)
Agriculture, Horticulture & Livestock	0	(.)	0	(.)
Printing & Publishing	-0.488***	(-6.53)	-0.490***	(-6.56)
Mining & Extraction	-0.412***	(-5.55)	-0.413***	(-5.57)
Public Administration, Education, Health Social Services	-0.306***	(-3.75)	-0.308***	(-3.77)
Textiles & Clothing Manufacturing	-0.270***	(-4.32)	-0.271***	(-4.34)
Business Services	-0.230***	(-3.62)	-0.232***	(-3.65)
Construction	-0.226***	(-3.50)	-0.227***	(-3.52)
Wood, Furniture & Paper Manufacturing	-0.208**	(-3.12)	-0.209**	(-3.13)
Communications	-0.178**	(-2.60)	-0.179**	(-2.63)
Banking, Insurance & Financial Services	-0.176*	(-2.29)	-0.178*	(-2.31)
Property Services	-0.160*	(-2.34)	-0.161*	(-2.36)
Metals & Metal Products	-0.146*	(-2.39)	-0.146*	(-2.39)
Computer Hardware	-0.137	(-1.47)	-0.138	(-1.49)
Biotechnology and Life Sciences	-0.0762	(-0.62)	-0.0766	(-0.62)
Utilities	-0.0385	(-0.57)	-0.0383	(-0.57)
Wholesale	-0.0374	(-0.60)	-0.0362	(-0.59)
Computer Software	-0.0210	(-0.31)	-0.0209	(-0.31)
Retail	0.0402	(0.61)	0.0396	(0.60)
Travel, Personal & Leisure	0.0719	(1.11)	0.0684	(1.05)
Industrial, Electric & Electronic Machinery	0.140*	(2.38)	0.139*	(2.36)
Miscellaneous Manufacturing	0.157	(1.59)	0.158	(1.60)
Transport, Freight & Storage	0.163**	(2.58)	0.159*	(2.52)
Chemicals, Petroleum, Rubber & Plastic	0.178**	(3.00)	0.178**	(3.00)
Leather, Stone, Clay & Glass products	0.179**	(2.72)	0.180**	(2.73)
Media & Broadcasting	0.216**	(2.90)	0.214**	(2.86)
Food & Tobacco Manufacturing	0.246***	(3.87)	0.246***	(3.87)
Transport Manufacturing	0.294***	(4.58)	0.293***	(4.56)
Waste Management & Treatment	0.590***	(3.37)	0.589***	(3.36)
Interaction term c.CRE#c.EPU			-0.000156**	(-2.59)
Intercept	2.676***	(44.29)	2.651***	(43.37)
N	68,922		68,922	
R-squared	0.3909		0.3910	

Notes: t statistics in parentheses: * p<0.05, ** p<0.01, *** p<0.001

Table 8   Multiple Linear Regression on CRE with Sector

Indicators	CRE		CRE	
GDPgrowth	0.0156***	(10.58)	0.00354***	(4.93)
Inflation	-0.0244***	(-16.86)	-0.00582***	(-8.29)
EPU	-0.000273***	(-5.85)	-0.00431***	(-106.48)
Gearing	0.0488***	(13.10)	0.0184***	(10.36)
Marketprice	0.00137	(0.44)	0.00395**	(2.89)
RoA	-0.00169	(-1.25)	-0.00428***	(-5.11)
BvD Independence Indicator 'A'	0	(.)	0	(.)
BvD Independence Indicator 'B'	0.0228**	(2.81)	-0.00902*	(-2.11)
BvD Independence Indicator 'C'	-0.0366***	(-3.37)	-0.0397***	(-7.78)
BvD Independence Indicator 'U'	-0.375***	(-5.59)	-0.133*	(-2.36)
Agriculture, Horticulture & Livestock	0	(.)	0	(.)
Banking, Insurance & Financial Services	-0.898***	(-18.04)	-0.175***	(-6.13)
Computer Hardware	-0.691***	(-9.84)	-0.173***	(-4.39)
Communications	-0.710***	(-15.23)	-0.134***	(-5.22)
Computer Software	-0.294***	(-6.59)	-0.0648**	(-2.65)
Business Services	-0.753***	(-15.94)	-0.148***	(-5.65)
Biotechnology and Life Sciences	-0.813***	(-16.09)	-0.163***	(-5.82)
Miscellaneous Manufacturing	-0.724***	(-15.12)	-0.191***	(-7.21)
Construction	-0.601***	(-12.60)	-0.119***	(-4.56)
Media & Broadcasting	0.0105	(0.22)	-0.00774	(-0.29)
Wholesale	-0.490***	(-11.01)	-0.0959***	(-3.92)
Waste Management & Treatment	-0.186***	(-3.86)	-0.0690**	(-2.65)
Printing & Publishing	-0.601***	(-11.40)	-0.0873**	(-3.05)
Property Services	-0.361***	(-7.98)	-0.0981***	(-3.97)
Mining & Extraction	-0.517***	(-10.78)	-0.0909***	(-3.51)
Industrial, Electric & Electronic Machinery	-0.618***	(-12.40)	-0.191***	(-7.13)
Transport Manufacturing	-0.521***	(-10.17)	-0.0789**	(-2.87)
Metals & Metal Products	-0.531***	(-9.06)	-0.108***	(-3.89)
Utilities	0.313***	(4.27)	0.134***	(3.56)
Textiles & Clothing Manufacturing	0.167***	(3.31)	0.0603*	(2.23)
Chemicals, Petroleum, Rubber & Plastic	-0.310***	(-6.70)	-0.0549*	(-2.18)
Wood, Furniture & Paper Manufacturing	-0.363***	(-7.84)	-0.0571*	(-2.27)
Leather, Stone, Clay & Glass products	0.140**	(2.67)	0.138***	(4.97)
Food & Tobacco Manufacturing	1.016***	(17.39)	0.342***	(10.43)
Retail	-0.350***	(-6.58)	-0.100***	(-3.66)
Transport, Freight & Storage	-0.515***	(-7.05)	-0.0952*	(-2.26)
Public Administration, Education, Health Social Services	-0.573***	(-12.38)	-0.188***	(-7.41)
Travel, Personal & Leisure	-0.271***	(-5.75)	-0.0431	(-1.68)
c.CRE#c.EPU			0.00446***	(71.12)
Intercept	1.321***	(28.24)	1.039***	(38.89)
N	68922		68922	
R-squared	0.1404		0.7869	

Notes: t statistics in parentheses: * p<0.05, ** p<0.01, and *** p<0.001

4.2   Vector Error Correction Model

The parameters of the VECM are estimated as shown in Table 9 below. The equation for CRE may be given as:

$$\Delta CRE_t = -1.019ECT_{t-1} - 0.00867\Delta CRE_{t-1} + 0.00167\Delta Gearing_{t-1} + 0.0149\Delta MarketPrice_{t-1} - 0.00896\Delta ROA_{t-1} - 0.00042\Delta EPU_{t-1} + 0.00506GDPGrowth_{t-1} - 0.0226\Delta Inflation_{t-1} + 0.104 \tag{1}$$

The results are significant at the 1% level and the error correction term (ECT) signifies an adjustment speed of 1.019% per annum. The lagged impact of CRE(-1) is -0.00867 percent on the CRE levels. The results of the VECM generally support those of the multilinear regressions, as seen in Table 3, with GDP growth and gearing maintaining their positive impacts on CRE, while EPU, Inflation, and RoA maintain their negative impacts on CRE. On the other hand, market price is seen to have a positive short term impact on CRE.

5   Concluding Remarks

This article provides a novel estimate for the relatively understudied impact of CRE on firm performance during times of uncertainty. EPU is found to negatively affect RoA, market price, and CRE. This study supports the findings of earlier research work on the subject, which has shown that companies tend to be more reserved in times of uncertainty, delaying investment and therefore lowering returns for the given period, which the stock market adjusts. It also supports the notion that companies may dispose of CRE assets during crises in order to utilize CRE as a liquidity buffer, which indicates that it may play such a role in CRE strategy should companies choose to do so. The interaction term between CRE and EPU is found to be statistically significant, offering the insight that the financial impact of CRE is dependent on levels of EPU at any given time, and supporting EPU as an indicator of macroeconomic and policy shocks. These results are affirmed by the short term dynamics shown in the VECM, which allow for the additional error correction term.

The impact of uncertainty on corporate-level financial performance is also found to be in line with the current literature. A positive relationship between CRE and gearing is found, thus indicating the explanatory power these variables may have over one another. CRE is also found to have similar explanatory powers at highly significant levels, negatively affecting RoA, but positively affecting market price. This indicates that the relatively lower return of CRE compared to the core business of a company may be attractive to players in the stock market, likely due to the relatively lower inherent risk of CRE compared to core businesses. Furthermore, it is found that the interaction between CRE and EPU is highly significant, which indicates that there is indeed

a relationship between the two variables, and thus influences how they each impact financial performance.

Table 9   Vector Error Correction Model

Error Correction	D(CRE)	D(Marketprice)	D(ROA)
CointEq1	-0.982815	-0.106743	-0.030399
	(0.00538)	(0.008)	(0.01427)
	[-182.585]	[-13.3451]	[-2.12963]
CointEq2	-0.008	0.14789	0.007126
	(0.00427)	(0.00635)	(0.01133)
	[-1.87302]	[23.3027]	[0.62915]
CointEq3	-0.027784	-0.009364	0.130695
	(0.00066)	(0.00099)	(0.00176)
	[-41.8236]	[-9.48604]	[74.1879]
D(CRE(-1))	-0.008665	0.055447	0.009063
	(0.00383)	(0.00568)	(0.01014)
	[-2.26501]	[9.75412]	[0.89338]
D(Gearing(-1))	0.001666	-0.080061	0.010538
	(0.00305)	(0.00454)	(0.0081)
	[0.54578]	[-17.6485]	[1.30166]
D(Marketprice(-1))	0.014916	-0.492648	-0.070472
	(0.00231)	(0.00343)	(0.00612)
	[6.46572]	[-143.716]	[-11.5199]
D(ROA(-1))	-0.000896	0.044714	0.013247
	(0.0015)	(0.00223)	(0.00398)
	[-0.59783]	[20.0736]	[3.33231]
C	0.103977	0.007303	-0.347669
	(0.01001)	(0.01488)	(0.02656)
	[10.3833]	[0.49077]	[-13.0924]
EPU	-0.00042	-0.00015	-0.000985
	(4.60E-05)	(6.80E-05)	(0.00012)
	[-9.18884]	[-2.20030]	[-8.11913]
GDP Growth	0.005059	0.006722	0.080189
	(0.00139)	(0.00207)	(0.00369)
	[3.63948]	[3.25450]	[21.7536]
Inflation	-0.022601	-0.005346	0.051355
	(0.00157)	(0.00234)	(0.00417)
	[-14.3659]	[-2.28699]	[12.3099]
R-squared	0.496307	0.266386	0.495244
Adj. R-squared	0.496234	0.266279	0.495171
F-statistic	6789.651	2502.11	6760.842

The results of the various models show a clear relationship among ownership concentration, RoA, and market price. A lower shareholder concentration tends to signify a higher RoA but a lower market price, and vice versa. Furthermore, a lower ownership concentration indicates a higher CRE ownership. This affirms the findings of existing literature, whereby there is hidden value in the CRE of mature companies that is not recognized by shareholders. Additionally, there is a highly significant relationship between sectors and CRE ownership, thus implying that the role of CRE varies in different sectors, and CRE strategies for different sectors ought to vary accordingly.

This study sheds light on possible new research paths, notably the use of EPU as a measure of shocks, and the value of CRE to companies in times of crisis, thus highlighting the understudied importance of a CRE strategy that accounts for firm sector and maturity.

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Appendices

Appendix 1   BVD Independence Indicator Groupings

Group for Paper	Independence Ranking	Description
A	A+ A A-	No shareholder with more than 25% of direct or total ownership ("independent companies")
B	B+ B B-	No shareholder recorded with more than 50% of direct, indirect, or total ownership One or more shareholders recorded with more than 25% of direct or total ownership
C	C+ C D	No shareholder recorded with more than 50% of direct ownership One shareholder recorded with more than 50% of total ownership (indirectly majority owned One shareholder recorded with more than 50% of direct ownership (directly majority owned)
U	U	Unknown shareholder ownership

Appendix 2   Variable Definitions.

Variable	Definition	Source
GDPgrowth	Annual growth of gross domestic product from 2010-2018	OECD* and The World Bank
Inflation	Annual inflation from 2010-2018	OECD*
Economic Policy Uncertainty	Economic policy uncertainty is considered a risk in which government policies and regulatory frameworks are undefined for the near future.	Economic Policy Uncertainty Indices
Corporate Real Estate	Corporate real estate represents land and buildings owned by non- real estate companies for purposes such as operation, investment and development. This paper uses a proxy derived from net buildings/total assets.	Orbis
Return on Assets	Return on assets, derived from (P/L before tax & extr. items/total assets).	Orbis
Gearing	A measure of the leverage of companies, using Orbis data which derives it from [(non-current liabilities + loans)/shareholder equity].	Orbis
market price	Annual closing stock price from 2010-2018.	Orbis
Net Income	Annual P/L from 2010-2018, derived from (P/L after tax + extr. and other P/L).	Orbis
BvD Independence Indicator	Shareholder ownership rankings of company from 2010-2018, with an 'A' indicating lower ownership concentration.	Orbis
BvD Sector	Sector classification of companies by Bureau van Dijk.	Orbis

Notes: *Organisation for Economic Co-operation and Development