Social Capital and its Most Valuable Components

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Abstract

This paper examines the components of social capital at a firm level in Europe. Specifically, this paper investigates the effect that the different components have on the returns during the financial and Euro crisis through a channel of trust. The findings suggest that firm-level social capital consists of environmental, social, governmental and economical aspects, but not every element is valuable. A one-standard deviation increase in Social score is associated with an increase between 4 to 7% in return during the financial crisis, while increased environmental efforts significantly decrease returns during this period. I confirm the findings by Lins et al. (2017) that investments in social capital pay off when the overall level of trust in corporations and markets suffers a negative shock. Furthermore, I find a full reversal effect during the Euro crisis that implies trust in European financial markets has been restoring despite of the Euro crisis.

1 Introduction

The trust between a firm and both its stakeholders and investors, built through investments in social capital, pays off when the overall level of trust in corporations and markets suffers a negative shock (Lins, Serveas, & Tamayo, 2017). This negative shock of trust is what Sapienza & Zingales (2012) conjecture to be a cause of the decline in economic activity from late 2008 to early 2009. Whereas these are more recent studies, the debate on the economic importance of civic engagement, trust and, more in general, social capital is not born in recent years (see e.g., Coleman (1988), Putnam (1993; 2000), Knack & Keefer (1997), Guiso, Sapienza & Zingales (2004; 2008), Bjørnskov (2006)). Lins et al. (2017) focus on a 5 different aspects of a firm's Corporate Social Responsibility (CSR) activities and combine this into a single variable, following the work of Putnam (1993; 2000). However, on an individual level Bjørnskov (2006) finds level that a single measure of social capital is not proven functional in strictly scientific terms, but rather he finds 3 components. His paper suggests that any empirical result based on a singular measure of social capital is ought to be re-examined to determine whether trust, norms or networks underlie the results. My research will therefor make contributions to the debate by summarizing the abundant components that make up social capital on a firm level and examining their impact on the performance of firms on European stock markets during the financial crisis and, subsequently, the Euro crisis. Hence, the main objective of this paper is to answer to following question on a firm level:

Which components of social capital are most valuable when the overall level of trust in corporations and markets suffers a negative shock?

To test the components of social capital I use the Thomson Reuters ESG Scores (formerly known as Asset4 ratings) from Datastream for more than 500 non-financial companies across 14 Eu-

ropean countries. This database measures a company's relative ESG performance, commitment and effectiveness across 15 main themes.

Similar to the work of Bjørnskov (2006), I employ Principal Component Analysis (PCA) to identify patterns in the ESG data, and express the data in such a way as to highlight their similarities and differences. PCA helps to figure out which linear combinations of ESG variables matter the most. It is therefor a useful preliminary step for the regressions I do, as well as other statistical tests.

The PCA yields 2 orthogonal components that I interpret as a *Social Capital* and a *Corporate Governance component*. The first principal component (PC) loads heavily on all environmental and social variables [1], the governance variable *Vision & Strategy* and the economic variables *Client Loyalty and Performance*. Hence, firms that invest in social aspects are also more environmentally responsible, have a better CSR strategy and experience more client loyalty. I find firms with higher loadings on the rotated component score to experience a significant absolute increase in market-model adjusted return of 5,4%. My findings suggest that social capital is thus valuable when trust in financial markets suddenly erodes. The *Corporate Governance component* is insignificant during this period.

A subsequent multiple regression with the *Environmental, Social, Governmental and Economical score* elaborates my findings. Firms that score high on the social elements see an increase of approximately 4 to 7% during the crisis in raw and abnormal returns respectively. Environmental efforts, however, actually decrease a firm's return by an estimated 3 to 4%. What I find is that this model produces more significant results on the social variable. It better estimates the value of the different elements than the Principal Component Regression (PCR) model does, since it has better defined variables. The first PC consists of variables with adverse effects on crisis-period returns. The *Social score* of a company is found to be the most valuable indicator of a firm's social capital instead of the *Social Capital component* that PCA constructs.

The second objective I pursue in my research is to confirm the findings of Lins et al. (2017) for a European Sample. The researchers construct one variable for CSR activities as a net measure of a firm's social capital. They find that US firms with high social capital, as measured by CSR intensity, had stock returns that were 4 to 7% higher than firms with low social capital during the 2008–2009 financial crisis. I find approximately the same increase in crisis-period stock returns for my European sample. My results in the extensive form of the model translate to higher stock returns in the magnitude of approximately 3 to 6% for raw and market model adjusted returns if the CSR score goes up one-standard-deviation.

The third intention of my research is to relieve concerns that the outperformance of high-SC firms I observe in the financial crisis is due to some factor other than a negative shock to trust. I verify the above-mentioned findings with respect to the Euro crisis of 2010-2012, when trust was already at a low point. I conduct a similar statistical analysis and find a full reversal of the effect I find for the financial crisis. First of all, my *Social Capital component* now has a negative coefficient. It is significant at the 5% level in the extensive form, meaning underperformance between 3 and 5% for high-SC firms. Second of all, I observe a similar significant negative relationship between the *Raw Crisis-Period Return* and the *Social score* in the multiple regression model I do. These results suggest that the trust in European financial markets has been restoring over the estimation period.

My fourth aim is to examine whether the relation between CSR and crisis-period returns is stronger in the stock markets of PIIGS countries. The absolute difference in economic magnitude between *Abnormal and Raw Crisis-Period Return* in low- and high-trust countries is approximately 0.2 to 1,2%. This could indicate a more severe shock of trust in PIIGS countries during the financial, but the results are due to differ-

[1] The Environmental element of the *Social Capital component* consists of *Emission Reduction, Product Innovation and Resource Reduction.* The social element consists of *Community, Diversity, Employment Quality, Health & Safety, Human Rights, Product Responsibility and Training & Development.*

ences in standard deviation. An identical test is done for the Euro crisis, without conclusive results.

The remainder of the paper is structured as follows. Hypotheses and expectations are embedded in a theoretical framework in Section 2. Subsequently, I discuss my dataset in Section 3 and the chosen methodology is motivated in Section 4. This is followed by the presentation of my main results in Section 5. Section 6 concludes the paper.

2 Theoretical Framework

The concepts of social capital and trust need to be clearly defined in order to analyze and comment on their relationship. Of the two, trust is more straightforward and prevalent in everyday language, whereas social capital is an abstract term that comprises a lot of aspects. The Cambridge Dictionary defines trust as "the believe that someone is good and honest and will not harm you, or that something is safe and reliable". Its definition of social capital is "the value of the relationships between people who work or live together and the knowledge and skills that they have and share". Both these definitions are appealing, but they are not very useful in the context of this paper.

2.1 Social Capital

Social capital has become a popular topic in social sciences but a widely adopted and valid academic description of social capital is essentially non-existent. Social capital is for example defined as "features of social organization, such as trust, norms, and networks that can improve the efficiency of society by facilitating coordinated actions" (Putnam, 1993). From a scientific perspective, this definition is vague and bundles 3 different features of social capital into one concept. Putnam (2000) continues to use this singular index in his work that has been broadly cited by other academics. Another paper identifies four main ways in which the concept of "social capital" has been conceptualised and measured: (i) personal relationships, (ii) social network support, (iii) civic engagement, and (iv) trust and cooperative norms (Scrivens & Smith, 2013). They intent to facilitate the development of empirical measures, reflecting different views of what social capital 'is' and implying different research agendas.

Empirical evidence severs the hypothetical links between trust, norms, and networks (Bjørnskov, 2006). Bjørnskov analyses data using Principal Components Analysis, which yields 3 dimensions defined by the data. His findings suggest that social capital consists of 3 orthogonal[2] components corresponding to each of the three elements in Putnam's definition. His results does not support the notion of a unitary concept in the form Putnam and others treat it. Therefore, there's no particular reason to believe that these features have the same effects on economic or social development, as assumed by previous studies. Nevertheless Lins et al. make a similar assumption as Putnam did and bundle community, diversity, employee relations, environment and human rights into a single net CSR variable.

2.2 Corporate Social Responsibility

Effectively measuring social capital is challenging due to it being multifaceted. The concept entails aspects that are hard to quantify such as civic engagement, trust, cooperative norms between the firm and its stakeholders and other (social) networks. The effect of social capital should have a measurable proxy to be scientifically relevant, Solow (1995) argues. Observable changes in the social capital of a firm should correspond to investments and depreciation. A micro perspective based on behavioural economic theory and game theory is presented by Sacconi and Degli Antoni (2011). They present a set of papers focusing on the relationship between social capital and CSR and how these support the creation of self-sustaining networks of cooperative relations, showing that firms can

[2] Geometrically speaking, two objects are orthogonal if they form a right angle from each other. In a PCA this means they do not correlate.

build social capital and trust through CSR investments. These analytical studies suggest that a firm's CSR activities are a good proxy for its social capital.

More empirical research supports the view that CSR builds social capital and enhances stakeholder trust in and cooperation with high-CSR firms. High-CSR firms are more likely engage stakeholders, to be more long-term oriented, and to exhibit better disclosure of non-financial information (Eccles, Ioannou, & Serafeim, 2014). Eccles et al. (2014) also focus on corporate governance and find that the boards of directors of high-CSR companies are more likely to be formally responsible for sustainability and top executive compensation incentives are more likely to be a function of sustainability metrics. An earlier paper argues that long-term oriented companies are less prone to an intertemporal loss of profit and provoke less externalities to stakeholders because CSR can reduce the likelihood of short-term opportunistic behaviour by managers (Bénabou & Tirole, 2010). In addition, executives of high-CSR firms are less likely to engage in insider trading than executives of low-CSR firms and this effect is more pronounced when executives' personal interests are more aligned with the interests of the firm (Gao, Lisic, & Zhang, 2014). Moreover, high-CSR firms are less likely to manage earnings through discretionary accruals and to manipulate real operating activities (Kim, Park, & Wier, 2012).

We need a clear definition of CSR-activities to understand what is within the boundaries of this research. Sheehy (2015) arrives at a scientifically valid definition of CSR as "international private business self-regulation." By this definition CSR can be regarded as a self-regulating business model. CSR helps a company be socially accountable to its, investors, its stakeholders and the public in general. Companies show that they are conscious of the kind of impact they have on all aspects of society including economic, social, and environmental by practicing CSR. To engage in CSR activities means that a company is operating in ways that enhances society and the environment, instead of contributing negatively to it (Investopedia, 2018). The World Business Council for Sustainable Development defines CSR as "... the continuing commitment of a business to behave ethically and contribute to sustainable economic development, while improving the quality of life of the workforce and their families as well as of the local community and society at large." [3] This definition is somewhat more extensive than the first. Taking into account the above mentioned prior research and these CSR definitions I infer high-CSR companies to have a business model that will affect everyone involved in the company. This is why I not only perceive environmental, and social factors to be a part of a firm's CSR activities, but also governance.

2.3 Trust in Markets

Social capital, and the trust it engenders, should have an effect on the development of financial markets, Guiso et al. (2004) argue, since financial contracts are the "ultimate trust-intensive" transactions. That is, the capital provider exchanges a sum of capital today for a promise of a future payment. Sapienza and Zingales (2012) think of trust as a valuable asset in every commercial transaction as it reduces adverse selection and moral-hazard problems, thereby lowering agency costs. Investors need to spend less time, effort and resources in protecting themselves from the risk of being exploited.

In a similar vein, much of the interaction between a firm and other stakeholders (e.g., employees, customers, suppliers, and the community at large) also occurs through implicit or incomplete contracts. In exchanges characterized by mutual trust, the demand for formal written contracts is lower and written contracts don't need to specify every possible negative outcome (Knack and Keefer, 1997). Stakeholders may perceive that the probability of breaching an implicit contract is lower if a firm demonstrates greater attention to, and cooperation with, stakeholders in the past. This

[3] WBCSD Stakeholder Dialogue on CSR, The Netherlands, Sept 6-8, 1998

concept of reciprocity suggests that stakeholders are more inclined to help these firms weather a negative shock, given that such firms displayed cooperative norms and shared values. Empirical research from Guiso, Sapienza, and Zingales (2015) shows that employees tend to cooperate more when they perceive their top management to be trustworthy and ethical. Vice versa, cooperation breaks down, financing stops and investment is hindered when the level of trust in corporations, institutions, and capital markets plummets, as happened during the financial crisis (Sapienza & Zingales, 2012). The benefits of social capital derived from stakeholder cooperation may be present during any crisis, but firm-level social capital becomes even more relevant during such a negative shock of trust.

2.3.1 The Effect of Trust on Firm Valuation

If a firm's social capital enhances stakeholder trust in and cooperation with high-CSR firms, it should pay off when being trustworthy is more valuable, such as in an unexpectedly low-trust period or in societies where the propensity to trust is high (Putnam, 1993; Lins, Serveas, & Tamayo, 2017). When overall trust in companies is low, as in the 2008–2009 financial crisis, outside shareholders are likely to be more concerned that the financial information they previously trusted may not be reliable. They will seek metrics such as CSR ratings that speak to a firm's values and integrity and place a trustworthiness premium on high-SC firms. Serveas and Tamayo (2013) finds that CSR activities can enhance firm value for firms with high public awareness. Lins et al. (2017) identify the mechanisms behind the outperformance of high-SC firms during the crisis by examining firms' profitability and productivity as well as their capital raising. They find that high-SC firms have higher profitability and gross margins, experience higher sales growth, have higher sales per employee and are able to raise more debt compared to other firms during the crisis. Investors thus assign a premium to high-SC firms during a crisis of trust and real financial effects take place at the firm level. These results are consistent with investor and stakeholder commitment to help high-SC firms during the crisis.

In the same paper, Lins et al. analyse whether the relation between CSR and crisis-period returns is stronger in high-trust regions. By linking crisis-period returns earned by high-SC firms to regional variation in individual trust across the United States, they find that crisis-period returns are more affected by CSR in high-trust regions compared to low-trust regions. A one-standard-deviation increase in their net CSR variable is associated with a raw monthly excess return of 1.05% in high-trust regions, but only 0.59% in low-trust regions. For abnormal returns, there's a smaller but still substantial difference of 0.15% per month between the two sets of regions. This empirical evidence is consistent with the theory of a trust channel that links returns and CSR activities during the crisis. The impact of CSR on returns during the crisis period is related to the general level of trust in the area where the company is located (Lins, Serveas, & Tamayo, 2017). However, an individual's ability to trust people is not the same as someone's ability to trust firms or the trustworthiness of markets.

2.3.2 Trust in PIIGS

Greece lost access to external financing and faced a total lack of trust in the run-up to all four debt crises it faced. [4] This means that investors did not have any confidence in the health of the country's monetary and fiscal institutions (Garefalakis, Lemonakis, Alexopoulos, & Tabouratzi, 2017). In May of 2010 Greece reached an agreement with the troika to enter into a financial assistance programme. More countries followed [5] as investers lost trust in the soundness of their respecitive financial markets and the countries faced bankruptcy. Countries had to implement austerity measures such as

[4] Greece bankrupted 4 times. The first was in 1827, the second in 1893, the third in 1932 and the last in 2010.

[5] Ireland in November 2010, Portugal in May 2011 and Spain in June 2012.

public spending expenditure cuts in the social welfare system, tax increases and labour market reforms in order to receive financial assistence. All countries except for Greece managed to succesfully exit the assistence program by May 2014. For Greece, the problem was that the effect of these spending cuts had far less effect on the deficit than expected (Christodoulakis, 2015). In March 2012, Greece needed a second round of additional funds and more time to stabilize its economy, restore market trust and improve the competitiveness compared to other EU countries. Furthermore, private investors agreed to reduce Greece's debt by 53.5% (Karamichailidou, Margaritis, & Mayes, 2017). It could be inferred that this approach to the restoration of the countries' monetary and fiscal institutions was a collective act by several parties to regain confidence of investors.

Spain was considered to a have a fast growing economy before the onset of the financial crisis. Spain's deficit was never more than 3% during the period between 1998 and 2007 as opposed to Greece and Portugal (Karamichailidou, Margaritis, & Mayes, 2017). Its favorable conjuncture was mainly attributed to the boom on the real estate and construction market that had a positive effect on investors, building companies and the banks financing these investments. The collapse happened in October 2008 when the bubbles of the real estate and construction market bursted, which ended up in a banking crisis that affected the whole financial system (Guardiola & Guillen-Royo, 2015). The Spanish government immediately implemented austerity measures to reduce the country's defcit and regain the trust of the international fnancial markets, as did the next elected governement after the 2011 elections (Kickert & Ysa, 2011). The Spanish government realized that these measures were extremely important as trust in their financial system would erode if they default. Any country that would still agree to give them a loan would ask a high interest rate because of the risk of default. When Spanish banks are unable to pay these higher interests rates they will go bankrupt and the Spanish economy will decline even more, as happened in Greece.

It is only recent that the European Central Bank dares to say it has won the market's trust back and scale back its quantitative easing campaign (Giugliano, 2017).

2.4 Hypotheses

The empirical foundation of this research is the valuable relationship of trust between a firm and both its stakeholders and investors when the overall level of trust in corporations and markets suffers a negative shock. The relationship is built through a firm's investments in social capital. This research assumes the relationship to be multifaceted in contrast to prior work on the same subject (e.g. Lins, Serveas, & Tamayo (2017)). Many papers suggest that a firm's endeavours on Corporate Social Responsibility are a good and efficient proxy for its social capital. Accordingly, CSR activities are likely to be viewed by investors and other stakeholders as trust-enhancing activities. However, investor and other stakeholder could have different interests and might appreciate CSR activities in another way. Given the research focus and made assumptions, I present the following main research question:

Which components of social capital are most valuable when the overall level of trust in corporations and markets suffers a negative shock?

In this research I summarize the components that make up social capital on a firm level and evaluate their impact on the performance of firms on European stock markets during the financial crisis and, subsequently, the Euro crisis. It has empirically been confirmed that these exogenous financial shocks disrupt the pricing equilibrium, while perceived CSR activity remains fixed in the short term. I will follow this strand of literature, allowing me to directly observe how investors adjust their valuations of firms with differing CSR policies. The present research will further recent empirical findings and study the effect

of each SC component on crisis-period returns. The first and second hypotheses are herewith presented:

Hypothesis 1 : Firms that load on the components of social capital have higher stock returns during the financial crisis in Europe.

Hypothesis 1.1 : Firms with high social capital have higher stock returns during the financial crisis in Europe. [6]

Hypothesis 2 : Firms that load on the components of social capital have higher stock returns Euro crisis.

Hypothesis 2.1 : Firms with high social capital have higher stock returns during the Euro crisis in Europe.[7]

My third hypothesis follows the work of Putnam (1993; 2000), who argues that an agent's social capital is more valuable in a society where overall social capital is higher or in an unexpectedly low-trust period. Markets that face lower levels of trust should experience a more severe decline in crisis-period returns because the shock to market confidence is worse. It is important to realize an individual's ability to trust people is not the same as someone's ability to trust financial markets such as the Portuguese, Italian, Irish, Greek or Spanish. However, it can cause national variation since the reciprocity concept entails that societies with higher overall social capital will be more beneficial to high-SC firms. Employees, customers, and other stakeholders in more trusting societies are more likely to reward trustworthy firms, for example, by working harder and maintaining strong buying relationships, leading to higher crisis-period returns. Hence, the hypothesis I present ought to be interpreted with this caution in mind. In line with the theory of stakeholder trust and reciprocity, the third and fourth hypothesis are:

Hypothesis 3 : Social Capital is more valuable for firms headquartered in low-trust financial markets during the financial crisis in Europe.

Hypothesis 4 : Social Capital is more valuable for firms headquartered in low-trust financial markets during the Euro crisis in Europe.

3 Data

3.1 Sample

3.1.1 ESG Scores

To test the components of social capital I construct a sample with explanatory variables on a firm's CSR ratings that is retrieved from Datastream. The Datastream database contains the environmental, social and governance (ESG) scores from 0 to 100[7] calculated by Asset4 (Thomson Reuters)[8] on approximately 1100 European companies since 2002. This dataset has already been adopted by a number of prior CSR studies (e.g., Cheng et al. (2014); Ioannou and Serafeim (2012); Kocmnova et al. (2011)). In comparison with the KLD database, used by Lins et al. (2017), Asset4 provides a more comprehensive calculation of CSR ratings. Asset4 transparently and objectively measures a company's relative CSR performance, commitment and effectiveness. Their CSR ratings are based on approximately 900 individual data points used as inputs to calculate 226 key performance indicators (KPIs) and to construct 15 categories within the E, S, or G pillar: *Board Functions (G), Board Structure (G), Community (S), Compensation Policy (G), Diversity (S), Emission Reduction (E), Employment Quality (S), Health & Safety (S), Human Rights (S), Product Innovation (E), Product Responsibility (S), Resource Reduction (E), Shareholder Rights (G), Training &*

[6] Hypothesis 1.1 & 2.1 are rather included for theoretical completeness than for their novel contribution to literature.

[7] I divide the scores by 100 later on to help interpretation.

[8] Asset 4 was originally owned by institutional investors Goldman Sachs and Bank of America Merrill Lynch. It was acquired by Thomson Reuters in 2009.

Development (S) and Vision & Strategy (G).

In addition to the E, S and G categories, Asset4 also scores firms on *Client Loyalty, Shareholder Loyalty and Performance* in a pillar called Economic. In contrast with Lins et al. (2017), I include all 18 categories in my first analysis since it is not my aim to make a priori grouping decisions based on the classification of a corporate entity, but to explore all facets of social capital. And since many scientist believe for example that client and shareholder loyalty are a direct effect of social capital, excluding them from my analysis would result in a biased outcome. Moreover, governance is not commonly seen as a part of social capital in literature, but merely as an effect brought about by social capital. Better governance is found to be a positive effect of an underlying gain in social trust (Knack, 2002; Bjørnskov, 2006). However, Gao et al. (2014) find that executives engage in less insider trading when their personal interests are more aligned with the interests of the firm. The inclusion is thus relevant due to possible correlation between categories that are governance related and the trustworthiness of a firm.

The obtained data has an initial sample size of 884 firms from Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden and the United Kingdom. I restrict my sample to these 14 countries on account of their EU-membership in August of 2003.[9] Companies that do not have a CSR rating from Asset4 between 2006 and 2011 are the dropped from the sample. In my specification of the empirical model for Hypothesis 1 I use year-end 2007 CSR ratings as variable of interest. This leaves me with a sample of 566 companies. To same reasoning holds for hypothesis 2 on the Euro crisis where year-end 2009 is most likely to be the most accurate moment of scoring, resulting in a sample of 594 companies. In other specifications of the model all my analyses will be repeated with different years of scoring for both hypothesis 1 and 2, resulting in different sample sizes for different specifications.

[9] No firms from Luxembourg, also a part of the EU at the time, are in the Thomson Reuters database.

3.1.2 Crisis Returns

The financial crisis is defined as the period from August 2008 to March 2009 (Lins, Volpin, & Wagner, 2013; Lins, Serveas, & Tamayo, 2017). According to Sapienza & Zingales (2012), there was a negative shock to the overall level of trust during this period that caused a decline in economic activity. The boundaries of the Euro crisis is for several reasons somewhat more diluted, but consensus is that the Euro crisis was at its height between the beginning of 2010 and end of 2012. I follow Ulrich et al. (2017) and Armingeon & Cranmer (2018) and define the Euro crisis as the period from April 2010 to December 2012. This period saw many landmark decisions and measures, including the first Greek and the Irish bailout.

The dependent variable in my regressions is the cumulated logarithm of stock returns during a particular time period. I obtain stock return and accounting data from Datastream for all 884 companies in the initial sample. From this sample I remove financial firms due to possible government support to these firms during the financial crisis and the subsequent quantitative easing campaign by the European and national central banks that still is in effect today. I also eliminate stocks with a market value below 250 million Euro as of December 2007, because these stocks tend to have low liquidity and are subject to more price pressure effects of trading (Lins, Serveas, & Tamayo, 2017). The two return measures for each firm are its raw buy-and-hold and market-model adjusted buy-and-hold return. Firms are excluded from the analysis if fewer than 12 months of data are available to estimate the market model parameters. UK firms' parameters are estimated using the MSCI UK Value Weighted index as market proxy. For the other 13 countries parameters are estimated using the MSCI Europe Value Weighted index excluding the United Kingdom. All crisis-period returns are winsorized at the 1st and 99th percentiles to avoid outlier problems.

3.1.3 Control Variables

Several control variables are included in the regression models to account for effects that have been found to significantly affect stock returns in previous research. I winsorize the control variables at the 1st and 99th percentiles as well.

The first set of control variables is based on a common risk factor from the *Fama-French 3-factor model* plus a *Momentum factor*. Fama & French introduced the 3-factor model in their papers of 1993 and 1996, adding *size factor* and *the book-to-market equity ratio factor* to the CAPM. The *size factor* is composed of the historical portfolio excess returns of small market capitalization stocks over big market capitalization stocks (SMB). The *the book-to-market equity ratio factor* consists of the historical portfolio excess returns of high book-to-market equity ratio stocks over low book-to-market stocks (HML). In their theory distressed firms -firms loading on the *size and book-to-market factors*- are more risky and sensitive to macroeconomics factors for which investors are compensated (Fama & French, 1993; 1996). The theory expects high loading stocks to perform worse during the crisis and it is therefore important to control for these risk factors.[10] The *Momentum factor* is an extension of the Fama & French 3-factor model proposed by Carhart (1997). Momentum is a stock price's tendency to continue rising if it is going up and to continue declining if it is going down.

The second set of proxies could be seen as the general adversary to the risk-based view of Fama & French. In the characteristics view of Daniel & Titman (1997) an omitted variable causes value stocks [11] to both earn higher returns and they provide evidence that the return premia on small market capitalization and high book-to-market stocks are not due to a common risk-factor. Although it might be true that some risk is priced, Daniel & Titman argue that the premium that should belong to the risk factor is too high of a reward for that risk. Relative distress drives stock returns and the book-to-market ratio is merely a proxy for this relative distress and that is why firms with a high book-to-market ratio show high returns and firms with low ratio show low returns, irrespective of their risk-factor loadings (Daniel & Titman, 1997). Firm characteristics I control for include *Size*, the natural logarithm of a firm's market cap, *Book-to-Market ratio*, computed as book value of equity divided by market value of equity and *Momentum*, the raw return over a 1-year period ending at the start of a particular crisis period. In addition to the 4 factors and characteristics variables, I add a *Negative Book-to-Market dummy* that is set to 1 when the book-to-market ratio is negative. Negative B/M firms are likely distressed and returns may behave more like those of high B/M firms than low B/M firms for that reason (Fama & French, 1992).

I apply some financial proxies known to affect crisis-period returns to control for a firm's financial health in the year before the start of a crisis. Duchin, Ozbas, and Sensoy (2010) find that firms low on cash or with high net short-term debt see a decline in corporate investment. Also, higher cash holdings mitigate refinancing risk (Harford, Klasa, & Maxwell, 2014). Almeida et al. (2012) find that firms with a large porting of long-term debt maturing at year-end 2007 significantly cut their investment-to-capital ratio. The inclusion of *Cash Holdings*, *Short-Term Debt*, *Long-Term Debt* and *Profitability* are justified because profitable, cash-rich firms with low debt can continue investing, while other firms may be forced to cut investments during a crisis.

Lastly, the outcomes of the regression models are controlled for the lagged average residual variance of a firm's stock return. Goyal & Santa-Clara (2003) document a significant posi-

[10] Market-model adjusted abnormal returns already capture the exposure to the market and will have little effect, but controlling for the three other factors will be important.

[11] A value stock is a stock that tends to trade at a lower price relative to its fundamentals, such as dividends, earnings and sales, making them appealing to value investors (Investopedia, 2018).

tive relation between this so called idiosyncratic equity risk and the return on the stock market.

3.2 Descriptive Statistics

3.2.1 Main Variables

Table I lists the descriptive statistics for my main dependent and independent variables in the financial and Euro crisis period respectively. *Raw Crisis-Period Return* is strongly negative during the financial crisis, with a mean of –31.3%, a median of –30.6%, and a 75th percentile value of –14.4%, indicating that the overwhelming majority of firms lost market value during this period. This must have been an anxious time for shareholders losing lots of money and other stakeholders such as employees afraid of losing their jobs. Despite this severe economic downturn there are no firms that went bankrupt in my sample. The median *Abnormal Crisis-Period Return* for the financial crisis period is 3.2%, while the mean is 7.7%. This means there's a majority of firms in my sample that outperformed their market proxy. Panel A also provides descriptive statistics for firm characteristics that I'm using as proxies in my models. The variable descriptions can be found in Appendix A.

While the majority of firms lost market value during the financial crisis, Panel B of Table I shows that this was not the case over the full span of the Euro crisis. *Raw Crisis-Period Return* is for the larger part positive during the Euro crisis, with a mean of 11,6% and a median of 7,8%. Both return variables have a larger spread during this period. What can be seen as well is a loss in average market capitalization from 13 billion euro in Panel A to under 10 in Panel B. This is off course the effect of the financial crisis. Panel A of Table II presents a correlation matrix of all the variables employed in my main analyses as an aggregate of both 2007 and 2009.

3.2.2 ESG Scores

The bottom five rows of Panel A and B in Table I present descriptive statistics on the total *CSR score* by Asset4 and the 4 categories it consists of. Since the scores on a firms' CSR activity are relative to their peer group, we can infer that the majority of companies in my sample score above average. Companies are scored from 0 to 1 on 18 categories within the 4 pillars.

I examine the correlations in Table II to see if there is a variable that's not strongly correlated with the other variables I employ. In order to come to an answer on the research question I need to perform a variable-reduction technique that relies on the correlation of my 18 CSR variables and I therefor need variables that are sufficiently correlated with each other. The threshold of correlation that I consider satisfying is $r \geq 0.3$. A variable that doesn't correlate with any of the other variables in my sample might not be included in the final analysis due to the lack of a linear relationship between them. I thus scan the correlation matrix for any variable that does not have at least one correlation with another variable where $r \geq 0.3$. It can be seen from Panel B in Table II that in my dataset, all variables except Shareholder Loyalty have at least one correlation with another variable that's greater than 0.3. While Shareholder Loyalty's 17 correlation coefficients are all significant at the 1% level, none of them have a level that I could consider worthy of inclusion. In contrast, the environmental and social score variables have levels of correlation between them of at least $r \geq 0.385$. As you can see, the same argument holds for the categories Vision & Strategy, Performance and Client Loyalty. Their correlation coefficients are above 0.3 between the environmental and social variables and well below 0.3 for the governance category.

Table I *Descriptive Statistics*

(a) *Panel A: Financial Crisis Period*

	Mean (1)	SD (2)	25th perc. (3)	Median (4)	75th perc. (5)
Crisis-Period Raw Return	-0.313	0.250	-0.493	-0.306	-0.144
Crisis-Period Abn. Return	0.077	0.466	-0.217	0.032	0.311
Market Capitalization	13048	23804	1480	3872	12272
Long-Term Debt	0.199	0.160	0.065	0.171	0.304
Short-Term Debt	0.059	0.067	0.012	0.038	0.085
Cash Holdings	0.103	0.115	0.030	0.064	0.127
Profitability	0.103	0.091	0.047	0.085	0.138
Book-to-Market	0.309	0.350	0.005	0.222	0.469
Momentum	-0.250	0.269	-0.441	-0.274	-0.088
Idiosyncratic Risk	0.005	0.004	0.003	0.004	0.007
Corporate Social Responsibility Measures					
CSR Score	0.591	0.289	0.357	0.638	0.860
High-Trust CSR Score	0.601	0.283			
Low-Trust CSR Score	0.269	0.350			
Environment	0.601	0.289	0.338	0.671	0.881
Social	0.600	0.286	0.366	0.639	0.875
Governance	0.526	0.253	0.326	0.551	0.727
Economic	0.562	0.293	0.295	0.579	0.846

(b) *Panel B: Euro Crisis Period*

	Mean (1)	SD (2)	25th perc. (3)	Median (4)	75th perc. (5)
Crisis-Period Raw Return	0.116	0.522	-0.227	0.078	0.421
Crisis-Period Abn. Return	0.168	0.726	-0.281	0.059	0.401
Market Capitalization	9711	17661	1158	2755	8567
Long-Term Debt	0.220	0.167	0.084	0.203	0.327
Short-Term Debt	0.048	0.055	0.009	0.032	0.066
Cash Holdings	0.111	0.110	0.040	0.079	0.144
Profitability	0.074	0.076	0.028	0.064	0.104
Book-to-Market	0.442	0.493	0.007	0.331	0.721
Momentum	0.715	0.653	0.289	0.577	0.981
Idiosyncratic Risk	0.008	0.007	0.004	0.006	0.010
Corporate Social Responsibility Measures					
CSR Score	0.656	0.279	0.450	0.750	0.900
Environment	0.660	0.279	0.428	0.763	0.912
Social	0.655	0.280	0.419	0.733	0.913
Governance	0.577	0.252	0.372	0.623	0.785
Economic	0.594	0.297	0.340	0.661	0.870

Table II *Pearson Correlation Matrix for All Variables*

(a) *Panel A: Multiple Regression Variables*

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1.	*Crisis-Period Raw Return*	1														
2.	*Crisis-Period Abn. Return*	0.814***	1													
3.	*Market Capitalization*	0.037	0.007	1												
4.	*Long-Term Debt*	-0.075	-0.050	0.113***	-0.007	1										
5.	*Short-Term Debt*	0.112***	0.052	-0.040	-0.302***	-0.105**	1									
6.	*Cash Holdings*	0.180***	0.120***	-0.039	-0.168***	-0.059	0.284***	1								
7.	*Profitability*	-0.185***	-0.087**	0.271***	0.000	0.141***	-0.129***	-0.377***	1							
8.	*Book-to-Market*	0.046	-0.331***	0.170***	-0.166***	-0.119***	0.198***	0.090*	-0.164**	1						
9.	*Momentum*	-0.115***	0.029	-0.355***	-0.007	-0.057	0.242***	0.135***	-0.139***	-0.118***	1					
10.	*Idiosyncratic Risk*	0.133***	0.126***	0.450***	-0.041	0.035	-0.088**	-0.061	-0.036	0.113***	-0.274***	1				
11.	*Momentum*	0.070	0.061	0.502***	-0.035	0.059	-0.103**	-0.113***	0.090**	0.103**	-0.280***	0.825***	1			
12.	*Momentum*	0.135***	0.141***	0.424***	0.001	0.079	-0.095**	-0.067	0.004	0.093**	-0.274***	0.874***	0.721***	1		
13.	*Momentum*	0.154***	0.141***	0.103**	-0.009	-0.064	-0.044	0.029	-0.294***	0.089**	-0.072	0.680***	0.421***	0.505***	1	
14.	*Momentum*	0.083	0.089**	0.399***	-0.101**	0.020	-0.034	0.003	0.003	0.081	-0.228***	0.752***	0.457***	0.535***	0.370***	1

(b) *Panel B: PCA Variables*

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1.	*Emission Reduction*	1																	
2.	*Product Innovation*	0.61***	1																
3.	*Resource Reduction*	0.79***	0.59***	1															
4.	*Community*	0.62***	0.41***	0.61***	1														
5.	*Diversity & opportunity*	0.58***	0.44***	0.58***	0.55***	1													
6.	*Employment Quality*	0.54***	0.41***	0.50***	0.53***	0.56***	1												
7.	*Human Rights*	0.58***	0.49***	0.57***	0.50***	0.50***	0.41***	1											
8.	*Health & Safety*	0.66***	0.47***	0.62***	0.55***	0.42***	0.39***	0.51***	1										
9.	*Product Responsibility*	0.54***	0.48***	0.52***	0.47***	0.49***	0.44***	0.48***	0.40***	1									
10.	*Training & Development*	0.64***	0.51***	0.63***	0.57***	0.57***	0.53***	0.52***	0.54***	0.51***	1								
11.	*Board Functions*	0.18***	0.07***	0.19***	0.32***	0.15***	0.15***	0.12***	0.24***	0.07***	0.14***	1							
12.	*Board Structure*	0.03***	0.00	0.08***	0.14***	-0.01	0.00	0.07***	0.11***	-0.02	0.06***	0.46***	1						
13.	*Compensation Policy*	0.16***	0.05***	0.17***	0.29***	0.11***	0.11***	0.10***	0.28***	0.02	0.15***	0.58***	0.38***	1					
14.	*Shareholder Rights*	0.08***	0.02	0.09***	0.20***	0.11***	0.09***	0.04***	0.12***	0.05***	0.11***	0.43***	0.22***	0.29***	1				
15.	*Vision & Strategy*	0.78***	0.59***	0.74***	0.64***	0.61***	0.50***	0.62***	0.63***	0.52***	0.61***	0.20***	0.08***	0.19***	0.10***	1			
16.	*Client Loyalty*	0.49***	0.39***	0.50***	0.57***	0.49***	0.43***	0.37***	0.37***	0.47***	0.49***	0.22***	0.06***	0.15***	0.21***	0.54***	1		
17.	*Performance*	0.43***	0.32***	0.43***	0.45***	0.43***	0.43***	0.37***	0.34***	0.36***	0.44***	0.25***	0.22***	0.23***	0.17***	0.47***	0.48***	1	
18.	*Shareholder Loyalty*	0.17***	0.20***	0.16***	0.15***	0.17***	0.20***	0.23***	0.14***	0.20***	0.19***	0.07***	0.06***	0.04***	0.00***	0.24***	0.13***	0.21***	1

*** p<0.01, ** p<0.05,

4 Empirical Model

To come to an answer on the research question I first perform a Principal Component Analysis on the ESG scores of the firms in my sample. The objective of a PCA is to identify underlying constructs that explain the correlations among the 18 categories that I focus on. PCA is a dimension-reduction tool that is used to reduce a large set of variables to a small set that still contains most of the information in the original data. When I have determined how many dimensions the concept of social capital encompasses at a firm level, I am then able to use the newly derived dataset in a Principal Component Regression. These parameters are of primary interest in order to answer the research question. The 4 pillar scores, provided by Asset4, are of primary interest in a subsequent multiple regression model.

4.1 Principal Components Analysis

The hypothesis behind PCA is that the data on the different ESG score categories will show a tendency to covary given that they measure the same underlying feature. PCA reduces my 18 variables into a number of uncorrelated variables called principal components (PC). A PC should be a better representation of the underlying feature. The first PC accounts for as much of the variance as possible. I then remove this variance and seek a second linear combination which explains the maximum proportion of the remaining variability, and so on.

4.1.1 Assumptions

Making use of PCA to analyse social capital means that my data should satisfy 4 assumptions in order to give a valid result. The first assumption is having an adequate sample size. A minimum of 150 data points and at least 5 to 10 observations per variable is a recommended sample size in the literature. My 18 ESG score variables have almost 8000 data points each, which should be more than enough.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy tests whether it is appropriate to run a PCA on the dataset. It is used to test the second assumption of a linear relationship between all variables. The KMO statistic needs to be as close to 1 as possible and a value of 0.7 or higher means this assumption is sufficiently met. The reason for this assumption is that PCA is based on the values in a covariance or correlation matrix. Without linearity between variables this matrix would have small values off the diagonal. Bartlett's test of Sphericity tests the null hypothesis that the correlation matrix is an identity matrix, in which case the matrix will have all zeros off the diagonal. As such, the null hypothesis should be rejected.

The third and fourth assumption are no significant outliers and a continuous variable. Paragraph 3.1 shows these assumptions are met due to the fact that my continuous ESG variables are scaled from 0 to 100.

I perform the PCA conform the method described by Lindsay Smith (2002) and Bjørnskov (2006). For PCA to work properly, I subtract the mean from each of the data dimensions. This produces a dataset in which all the variables have a mean that is 0. What happens is that the data shifts so that the center is on top of the origin (0, 0) if it were in a 2-dimensional space. Shifting the data does not change how the data points are positioned relative to each other and doesn't affect its variance either. The variance of a variable X is expressed as $Var(X) = \frac{\sum_{i=1}^{n}(X_i - \overline{X})^2}{(n-1)}$ and since the sifted variable X its mean is $\overline{X}$=0 , the product of $(X_i - \overline{X})^2$ doesn't change.

4.1.2 Calculate the Covariance Matrix

Generally, PCA is performed on a square and symmetric matrix. It can be a SSCP matrix, Covariance matrix, or Correlation matrix. The analysis results for objects of type SSCP and Covariance do not differ, since these objects only differ in a scaling factor. A correlation matrix is used if the variances of individual variates

differ much or if the units of measurement of the individual variates differ, which is not the case in my model. Since my sample is highly correlated a normalization is not needed and I thus choose using the covariance matrix with 18 dimensions. Due to the number of dimensions I calculate 153 covariances between my variables and put them in a matrix. The definition for my covariance matrix is:

$$C^{18\times 18} = \begin{pmatrix} cov(1,1) \cdots cov(1,18) \\ \cdot \\ cov(18,1) \cdots cov(18,18) \end{pmatrix}$$

Down the main diagonal of the matrix are the variances for the dimensions. The matrix is symmetrical about the main diagonal because the formula for covariance tells us that the only difference between $cov(X,Y)$ and $cov(Y,X)$ is that $(X_i - \overline{X})(Y_i - \overline{Y})$ is replaced by $(Y_i - \overline{Y})(X_i - \overline{X})$. Hence, my square matrix with 18 dimensions has $\frac{(18\times 18-18)}{2} = 153$ unique covariances. Since the covariance matrix is square and symmetrical I can then calculate the eigenvectors and eigenvalues. These are important, as they hold useful and decisive information about the data.

4.1.3 Eigenvectors and Eigenvalues

An eigenvector is a vector whose direction does not change when it is multiplied by its transformation matrix, in this case C. In general, the eigenvector $v^{\rightarrow}$ of matrix C is the vector for which the following holds:

$$Cv^{\rightarrow} = \lambda v^{\rightarrow}, \tag{1}$$

where λ is called the eigenvalue. Eigenvalues are closely related to eigenvectors and in fact they always come in pairs. A property of eigenvalues is that even if I scale the eigenvector by some amount before I multiply it with its transformation matrix, this equation still holds. It is common practice to make the eigenvector have a length of 1. This is called a unit vector and the proportions (x and y in a 2-dimensional space) that make up this unit vector are called component loadings.

Another way to look at eigenvectors is by drawing a line that goes through the origin in a 2-dimensional graph. This can be done because all variables are shifted and have a mean that is 0. PCA decides on what is the best fitting line through the origin by projecting the data onto that line and then maximizing the sum of the squared distances from the projected points to the origin. Necessarily, this is the vector that points into the direction of the largest spread of the data and whose magnitude is equal to the variance in this direction. This is PC1 as it accounts for as much of the variance in the data as possible. In fact, it turns out that PC1 is the eigenvector with the highest eigenvalue. Also, the eigenvalue is equal to the sum of the squared distances, SS(distances). All the eigenvectors of a normal matrix are perpendicular or orthogonal, which means they are at right angles to each other. This is important because it means that I can express the data in terms of these orthogonal eigenvectors, instead of expressing them in terms of the original x and y axes. What I mean by this is that I use the first 2 PCs as new x and y axes in the subsequent multiple OLS regressions that addresses hypothesis 1 and 2.

Once all the eigenvectors are found from the covariance matrix, the next step is to order the eigenvalues from highest to lowest (Smith, 2002). This gives me the components in order of significance. Because PCA is a dimension-reduction tool I leave out some of the components and my final dataset will have as many dimensions as components. A common criterion for determining the number of components is the Kaiser criterion. This criterion says that all components with an eigenvalue higher than 1 can be considered as reliable components (Kaiser, 1960). A visual presentation is given in a scree plot, a bar chart with the components on the x-axis and the eigenvalues on the y-axis. Lastly, I form a matrix of vectors, called the Feature Vector (FV), by taking the eigenvectors with an eigenvalue larger than 1 and putting them into the columns of the matrix.

4.1.4 Rotation

The final step before I can interpret the outcome of PCA is rotate the full dataset. In order to do so, the data is simply projected onto the eigenvectors. Let FV^T be the transposed matrix whose columns contain the eigenvectors and let AD be the mean-adjusted data whose columns contain the different observations with each row holding a separate dimension. Then the projected data is obtained as $FD = FV^T \times AD$, where FD is the final dataset. The original data is now in terms of the principal components. The PCs are perpendicular to each other and uncorrelated what makes this an orthogonal rotation. The procedure I use for the rotation is called the Varimax method with Kaiser normalization. This is the most common orthogonal rotation technique used in academic literature if a sharp separation between the components is sought and was suggested by Kaiser (1958). The Varimax rotation modifies the column vector of the matrix of component loadings by dividing them by their corresponding communality. Communality is the proportion of each variable's variance that is accounted for by the PCA. This is done so a choice of the number of variables saturating each component is clearer (Di Franco & Marradi, 2013). If a load is high on a certain component and low on other components, this will be noticed more quickly with the Varimax method. Evidently, a statistical software package will carry out this task.

4.2 Principal Component Regression Model

There are three major criteria that I use to help with the retention decision: (i) an eigenvalue of at least 1, (ii) the interpretability of a component, and (iii) the scree plot. I report FD with the components that fulfill the first criterion, proposed by Kaiser (1960). It is to be expected that the first couple of components, accounting for the most variability in the dataset, will present a similar interpretable result as in the research by Bjørnskov (2006). He finds that social capital on an individual level consists of the 3 components trust, norms, and networks. The results are interpreted and named by looking at loadings of the 18 variables within the *Environment, Social, Governance* and *Economic* pillar. The Rotated Component Matrix table shows coefficients above 0.3 and reports how the retained, rotated components load on each variable. What I look for in the dataset is a 'simple structure' such that each variable loads highly onto only one component, while maximizing the number of near zero loadings on the other components (Thurstone, 1947). Lastly, the scree plot will give a visual argument for the retention decision.

The retained rotated components can now be used in a PCR model along with the dependent and control variables. First, PCR will help answer the research question because it will clarify how my components contribute to crisis-period returns. I expect the components to better represent the variables in my dataset and be more accurate than a multiple regression model with a combined CSR score as the variable of interest. In order to address hypothesis 1 and 2 the following extensive regression model will be employed in the cross-section:

$$\begin{aligned} Return = \beta_0 &+ \beta_1 PrincipalComponents \\ &+ \beta_2 Industry + \beta_3 FF \\ &+ \beta_4 Ln(MarketCap) \\ &+ \beta_5 LTD + \beta_6 STD + \beta_7 Cash \\ &+ \beta_8 Profitability + \beta_9 B/M \\ &+ \beta_{10} Negative + \beta_{11} Momentum \\ &+ \beta_{12} IdiosyncraticRisk + \epsilon. \end{aligned} \tag{2}$$

Return is either represented by firm i's monthly buy-and-hold *Raw Crisis-Period Return* or *Abnormal Crisis-Period Return* during the financial crisis or Euro crisis. The first is calculated as monthly logarithmic return over an 8- or 33-month period by using Excel's LN function and added together. The total logarithmic returns are converted back to normal returns using the EXP function minus 1. Abnormal return (AR) is calculated as the raw return minus the expected return, which is based on the market

model regression estimated over the 5-year prior to the onset of a particular crisis. The expected return is equal to the intercept plus the share of systematic market risk a stock has. The market model formula looks as follows:

$$R_{i,t} = \alpha_i + \beta_i * R_{m,t} + \epsilon_{i,t} \tag{3}$$

where $R_{i,t}$ is the raw return on stock i at time t. α_i is the intercept or value of when $R_{m,t}$ equals 0. $R_{m,t}$ is the return at time t of the particular market proxy that is used. β_i is the slope estimate of systematic risk for stock i and $\epsilon_{i,t}$ is the estimation error on stock i at time t. How many *Principal Components* are included will depend on the fulfillment of the criteria. I include industry dummies in all regression models because firms in some industries may be more likely to invest in SC or may have been affected by the financial crisis in different ways. The dummies are based on firms' 2-digit SIC-codes.

Furthermore, I control for firm i's factor loadings based on the Fama-French three-factor model plus the momentum factor. I calculate these factor loadings by obtaining the monthly factor returns and risk-free rate from Kenneth French's website on the 4 mentioned factors for the European market and use them in the following regression formula: [12]

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_1 * R_{m,t} - R_{f,t} + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_3(MOM_t) + \epsilon_{i,t}, \tag{4}$$

where $R_{i,t}$-$R_{f,t}$ is the raw return of stock minus the risk-free rate in month t and α_i is the intercept in the regression model. The four betas are estimated factor loadings for a particular stock i at time t. $R_{m,t} - R_{f,t}$ is the market risk premium, SMB measures the historic excess returns of small caps over big caps, HML the excess returns of value stocks over growth stocks and MOM the excess returns of monthly winners over losers. The regression model is estimated using the LINEst function in Excel.

Accounting data are based on the last quarter ending at the end of either 2007 or 2009. $Ln(MarketCap)$ is the natural logarithm of firm i's market capitalization in millions of euros. LTD, STD, $Cash$ and $Profitability$ are long-term debt, short-term debt, cash & marketable securities and operating income divided by assets. B/M is computed as book value of equity divided by market value of equity. $Negative$ is a dummy for negative book-to-market ratios. $Momentum$ is the raw return over the 12-month period prior to the onset of a particular crisis. The proxy *Idiosyncratic Risk* is calculated as the residual variance from the market model, used to estimate AR, over a 5-year estimation period ending one month before the start of a particular crisis period. The residual variance of a firm is found by taking the sum of its squared residuals and dividing it by n-2, where n is the number of months in the estimation period. A short regression model will be employed as well that does not incorporate the accounting data as proxies.

In order to address the third hypothesis the following regression will be employed in the cross-section:

$$\begin{aligned} Return = {} & \beta_1 High + \beta_2 Low + \beta_3 Industry \\ & + \beta_4 FF + \beta_5 Characteristics \\ & + \beta_6 Accounting + \epsilon. \end{aligned} \tag{5}$$

This PCR model has a lot of similarities with the previous model. High and Low-trust dummies are added to the model and multiplied with the social capital components. The Low-trust dummy is 1 when a company is listed and headquartered in one of the PIIGS countries, while the High-trust dummy represents the remaining 11 countries. The same control variables are used as in the previous model.

4.3 Multiple Regression Model

The first multiple regression model is important since I believe it could really further the search and deliver an more in-depth answer to my research question. Asset4 namely provides a firm's aggregate score on all 4 pillars. In the following model, these scores are my variables of interest,

[12] The European portfolio also includes Switzerland, which is not a part of my sample.

since it concerns me which of them contribute to an out- or underperformance.

$$\begin{aligned} Return = \beta_0 &+ \beta_1 Environment \\ &+ \beta_2 Social + \beta_3 Governance \\ &+ \beta_4 Economic + \beta_5 Industry \\ &+ \beta_6 FF + \beta_7 Characteristics \\ &+ \beta_8 Accounting + \epsilon. \end{aligned} \tag{6}$$

The second multiple regression model is formulated for the sake of theoretical completeness. It also gives me the opportunity to relate the PCs to the an overall score of CSR and compare results. This last model is straightforward as:

$$\begin{aligned} Return = \beta_0 &+ \beta_1 CSR + \beta_2 Industry \\ &+ \beta_3 FF + \beta_4 Characteristics \\ &+ \beta_5 Accounting + \epsilon. \end{aligned} \tag{7}$$

In order to address the fourth hypothesis the final multiple regression model will be employed in the cross-section. This last model has exactly the same specification as equation 5. These models don't have a constant since this will cause multicollinearity problems. This occurs when there are 2 or more independent variables that are highly correlated with each other, leading to problems with understanding which independent variable contributes to the variance explained in the dependent variable. Multicollinearity can be detected with the variance inflation factor (VIF). I will use a 'rule of thumb' of 10 and delete the independent variables causing the multicollinearity from the model.

The multiple regression models need to fulfill some more assumptions in order to be relevant and interpretable. As with the PCA there need to be continuous variables in the model that display a linear relationship. Outliers make the model a less accurate estimator, so therefore I winsorize all my non scaled variables at the 1 and 99% level. The model should have independence of observations, which I can easily check using the Durbin-Watson statistic. If problems do occur I will report on this.

Lastly, the data in the multiple regression model needs to exhibit homoscedasticity, which is where the variances along the line of best fit remain evenly distributed. Visual checks are done fairly easily done by letting a statistical program generate 2-dimensional scatterplots on all the variables in the model. The variance of the residuals should be constant across all the values of the independent variables. When the dots in a scatterplot are of a funnel or fan shape, it means the data probably is not homoscedastic. In the following model there was homoscedasticity, as assessed by a visual inspection of plots of standardized residuals versus standardized predicted values. However, I will follow Lins et al. (2017) in calculating heteroskedasticity-consistent standard errors.

5 Empirical Result and Analysis

5.1 Components of Social Capital

The first step in determining what components of the social capital concept are most valuable at a firm level is interpreting the PCA results and deciding on the number of components to retain based on the 3 criteria I mentioned in Paragraph 4.2. Table III reports the results of running a PCA on all 18 variables and 7944 data points that measure CSR intensity, using yearly indicators from 2006 to 2016. The PCA identifies 3 distinct components with an eigenvalue of more than 1. The rotated solution almost exhibits a simple structure. Only the economic performance variable has more than 1 loading onto the components that is higher than 0.3. It is hard not to dismiss this as being noise. These 3 components seem to be fairly interpretable as a *Social Capital*, a *Corporate Governance* and a *Shareholder Loyalty component*.

Firstly, all environmental and social variables load heavily onto the first component. In addition, the governance variable *Vision & Strategy* and the economic variables *Client Loyalty* and *Performance* also load onto the first component. What I find is conform the academic definition of CSR,[13] the argument of stakeholder

[13] "International private business self-regulation".

trust and reciprocity and empirical findings that high-CSR firms are financially sounder. *Performance*, although it's an economic variable, is not to be dismissed since it entails KPIs such as cost innovations, employee productivity, employee satisfaction improvements, margins and growth. The result is consistent with a CSR concept that encompasses all environmental and social aspects of social capital, as discussed in the Literature Review. Social Capital also includes a firm's corporate strategy and loyalty of its clients, in line with Eccles et al. (2014) who find that high-CSR firms are more likely to have established processes for stakeholder engagement and to be more long-term oriented. Long-term oriented companies are less prone to an intertemporal loss of profit and provoke less externalities to stakeholders (Bénabou & Tirole, 2010).

Secondly, all governance variables except *Vision & Strategy* load onto the second component, which I therefor named *Corporate Governance*. Again, *Performance* loads onto this component although in a smaller amount. *Shareholder Loyalty* loads heavily on the third component in addition to a much smaller loading of the *Performance variable*. This is another indication that this variable does not have any linear relationship with the other 17 variables in my dataset, one of the assumptions I discussed in paragraphs 3.2 and 4.1.

PCA allows for the clustering of variables that all load on the same component. However, if one component only loads on one particular variable, this could be an indication that this variable is not related to the other variables in a dataset. The *Shareholder Loyalty* variable is deemed not to be measuring social capital, as I already presupposed in paragraph 3.2.2. A visual argument for the decision only to extract PC 1 and PC 2 comes from the scree plot in Figure 1. The components to retain are those before the point where the graph begins to level out and subsequent components add little to the total variance explained (Cattell, 1966). Visual inspection of the scree plot would lead to the retention of 2 components, as they are visibly distinct from the rest in terms of the length of the eigenvalue and explained variance. Extracting 2 components thus makes sense from the perspective of the interpretability and scree plot criteria. I dismiss the eigenvalue-of-one criterion and will use only the *Social Capital* and *Corporate Governance* component in the regression model.

It is interesting to notice how distinct *Shareholder Loyalty* is from other variables on CSR. It carries the heaviest loading of all variables on a component that does not load on any of the variables I anticipated to be a part of a firms social capital. The question rises whether a firm with a high amount of social capital shouldn't attract more loyal shareholders? From a firm's perspective Lins et al. (2017) see an investment in social capital as "... an insurance policy that pays off when investors and the economy at large face a severe crisis of confidence and when the reward for being identifiably trustworthy increases markedly." Their results certainly imply this, but a shareholder might not regard this in the same way. The PCA indicates that *Shareholder Loyalty* isn't a part or result of social capital, by disproving that it is in some way related with a firm's investments in social capital.

The KMO measure is 0.942, which classifies as 'marvelous' according to Kaiser (1974). Bartlett's Test of Sphericity is statistically significant at the 1% level, indicating that the sample is adequate for any factor analysis. Furthermore, all years are included in the analysis by virtue of less noise in the final result. A comparison between an 'All years PCA' and a '2006 PCA' is presented in Figure 2, showing the latter to have a less sharp separation between the first 2 PCs in a 2-dimensional space.[14]

5.2 Financial Crisis Returns

I estimate the PCR model of stock returns during the financial crisis as a function of firms' factor loadings on the *Social Capital* and *Corporate Governance components* and a number of specified control variables. Both components have a mean of 0, as is required by

[14] For interpretability reasons I dismiss the third component in Figure 2.

Table III *The Rotated Principal Component Matrix*

CSR Variables	Rotated Component Coefficients			Communalities
	1. Social Capital	2. Corporate Governance	3. Shareholder Loyalty	
Emission Reduction	0.870			0.761
Product Innovation	0.708			0.516
Resource Reduction	0.846			0.726
Community	0.745			0.644
Diversity & opportunity	0.744			0.559
Employment Quality	0.671			0.472
Human Rights	0.705			0.529
Health & Safety	0.709			0.551
Product Responsibility	0.691			0.505
Training & Development	0.779			0.616
Board Functions		0.835		0.714
Board Structure		0.687		0.520
Compensation Policy		0.765		0.600
Shareholder Rights		0.610		0.393
Vision & Strategy	0.852			0.745
Client Loyalty	0.650			0.461
Performance	0.527	0.304	0.309	0.466
Shareholder Loyalty			0.916	0.867
Eigenvalue	7.469	2.174	1.000	
% Total Variance Explained	41.5%	12.1%	5.6%	
Observations		7944		
Kaiser-Meyer-Olkin		0.942		
Bartlett's test of Spericity		0.000		

Components have been rotated with the Varimax method with Kaiser normalisation; loadings below 0.30 have been deleted.

Figure 1: *The Scree plot of PCA.*

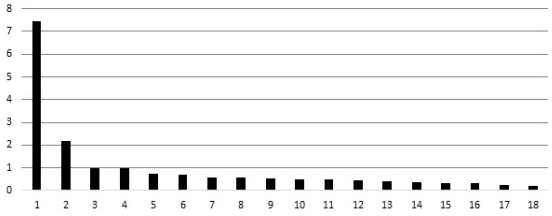
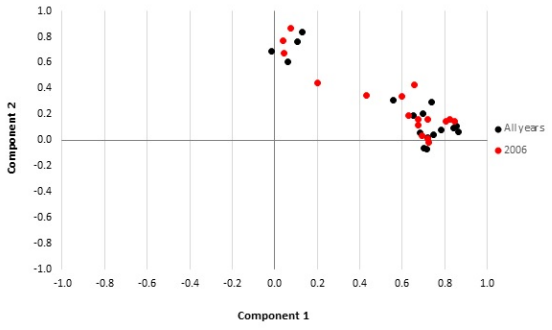


Figure 2: *Scatterplot of Rotated Factor Loadings for Principal Component 1 and 2.*



PCA, and a standard deviation of 1 since they're normalized using Kaiser's Varimax method. In addition to a short model in column (1) and (2), I also specify a PCR model with financial variables and firm characteristics that should alleviate concerns relating to the crisis-period outperformance of financially sounder firms. The empirical validity of the following findings is not threatened by multicollinearity since the VIF of all explanatory variables in all PCR models is smaller than 5 – well below the 'rule of thumb' of 10.

Panel A of Table IV reports the estimates of the PCR model with *Raw Crisis-Period Return* or *Abnormal Crisis-Period Return* as dependent variables in columns (1) and (3) or (2) and (4) respectively. Supportive to hypothesis 1, *Principal Component 1* appears to be positive but only significant for the specifications with *Abnormal Crisis-Period Return* as the dependent variable. The effect of a one-standard deviation increase in factor loading for this *Social Capital component* corresponds to a 5.4% increase in market-model

adjusted return over the period from August 2008 up until March 2009. The outperformance is slightly higher if I dismiss financial control variables, with a magnitude of 6.2% over the 8-month crisis period. Looking at *Principal Component 2* in column (1) and (2), I observe a significant positive effect on both a firm's *Raw and Abnormal Crisis-Period Return*. In the model specified in columns (3) and (4), the positive relation lessens and becomes insignificant.

Panel B of Table IV shows regression coefficient estimates on the *Environmental, Social, Governmental and Economic score*. As would be expected by theory, a firm's Social activities are economically of the highest importance compared to the other explanatory variables. Remarkably, this is only true when financial control variables are added to the model in column (3) and (4). The estimated coefficients on the Environmental and Social score become more pronounced in their respective directions while the opposite effect is found for the Governance and Economic variables. This effect is analogous to the effect found for the *Corporate Governance component* in Panel A. An explanation to this finding is that the positive relation between the Governance and Economic variable and crisis-period returns is actually the effect of better financial soundness. This is a straightforward interpretation for the *Economic score* since it is based on a number of financial KPIs. Also, better governance leads to better financial health.

The *Social score* in column (3) and (4) become statistically significant at the 5%-level. A one-standard-deviation increase in *Social score* (0.289) is associated with an absolute increase of 4.51% in raw returns and 6.99% in abnormal returns during the crisis. Environmental efforts, however, actually decrease a firm's return by an estimated 3,20% to 4,85%. It should be noted that these findings are at the edge of what would be considered a significant result.

Panel C of Table IV contains the multiple regression models with a single CSR variable, measured at year-end 2007. This model aims to confirm hypothesis 1.1, which is included for comparison reasons rather than for a novel contribution to literature. Firms with a higher CSR score (0.289) performed significantly better during the financial crisis, thus confirming hypothesis 1.1 in all specifications of the model. The results presented in columns (3) and (4) show that firms' raw returns increase by 2.83% if CSR score goes up one-standard-deviation, or even increase by 6.73% if the market-model adjusted return is specified as the dependent variable in the model. Additionally, the results in columns (1) and (2) show the magnitude of a one-standard-deviation increase are 2,98% and 7.14% in the short model respectively. I document a similar effect of approximately equal size for the European sample, as Lins et al. (2017) did for the US sample.

I control for the firm's systematic risk in all PCR models, based on the SMB, HML, market and momentum factor. Factor loadings are estimated over the 5-year period ending in June 2008. Due to possible industry related CSR investment effects I also include Industry dummies in all specifications, defined at the two-digit SIC level. As described, financial controls are added in an extensive specification of the models. As expected, higher cash holdings, higher profitability and lower short-term debt significantly increase crisis-period returns. The one-year stock price momentum is found to have a positive effect on returns, while firms with higher book-to-market ratios had lower returns.

Subsequent to the findings reported in Table IV and necessary to come to a more detailed answer to the research question, I specify two regression models with the 7 and 13 elements that make up the Social score and *Social Capital component* and report their coefficients in Table VI in the Appendix. All elements are insignificant except the social category Diversity & Opportunity, which is significant at the 5%-level in Panel A and at the 10%-level in Panel B. *Diversity & Opportunity* has several KPIs such as *Equal Management Opportunity, Family Friendly, Male/Female ratio* and *Work-Life Balance*. The findings are thus consistent with the reciprocity concept

that suggests that employees are more likely to help high social capital firms weather a negative shock if a these firms demonstrated greater attention to, and cooperation with, employees in the past. That the element of *Diversity & Opportunity* is the only significant contributor to higher crisis-period return in my sample is noteworthy and does not directly suggest others are not of importance in my opinion. The reciprocity concept is certainly not restricted solely to this element. I could merely observe a sample specific effect in this one variable. The models I specify in Table VI have a large number of independent variable, that make interpretation too hard and inaccurate unfortunately.

Turning to the coefficients in columns (2) and (4) reported in Table VII, I find no distinguishable results between the magnitude of the effect in Portugal, Ireland, Italy, Greece and Spain or the rest of Europe. The *Abnormal Crisis-Period Returns* are found to be significant in both groups and the differences are minimal. There difference in economic magnitude is associated with a difference in the standard deviation between the 2 groups, which is 0.283 in high-trust markets and 0.350 in low-trust markets. Abnormal returns from column (4) have 1,22% between them and only 0.27% from column (2) in favor of low-trust markets. These results suggest that hypothesis 3 is confirmed for the financial crisis, but the evidence is rather thin.

My third hypothesis builds on the work of Putnam (2000), who argues that a firm's social capital is more valuable in a society where overall social capital is higher. The argument of high versus low trust regions is a little different in my context, because I look at the trustworthiness of markets instead of the propensity to trust in societies. Markets that were hit harder by the financial crisis experience a more severe shock of trust is what I conjecture. A problem I encounter in the extensive model is that Market Cap has a VIF of >30, which indicates that there are multicollinearity problems. I remove this variable from the extensive form and find find no VIF above 5. There are no problems in the short form of the model that challenge my empirical findings.

5.3 Euro Crisis Returns

The evidence so far indicates that CSR activities are positively related to stock returns during a negative trust-shock. The following paragraph is aimed at this positive relation during a subsequent time of crisis in Europe. I examine whether the effect of CSR is unique to a period when the overall trust in corporations, institutions and financial markets sharply declines or whether it's common to another period of economic downturn, the Euro crisis. Lins et al. (2017) perform two similar tests on periods right before and after the height of the financial crisis, using a panel data sample. Euro crisis-period returns in my specification are computed over a 33-months period ranging from April 2010 until December 2012, the height of the Euro crisis, using the cross-section of European firms. I report PCR coefficient estimates of *Principal Component 1 and 2* in Panel A of Table V and Panel B shows the effects of the *Environmental, Social, Governmental and Economic score*. Columns (3) and (4) contain the extensive PCR model of stock returns during the Euro crisis, next to another short model in column (1) and (2).

The first thing that meets the eye are negative coefficients on PC1 in column (3) and (4) of Panel A, significant at the 5%-level. This is contrary to the effect that I observed in Panel A of Table IV. On the one hand, it is to be expected that the positive relation between the Social Capital component would diminish over time, since theory foretells this only to be observable during a negative shock of trust or if one could accurately measure exogenous shocks to a firm's social capital. On the other hand, what I observe is a definite reversal effect suggesting the trust in the European financial markets has been restoring over the period between April 2010 and December 2012. To call attention to the economic extent of this reversal, a one-standard-deviation increase in loading on the *Social Capital component* meant a reduced *Raw Crisis-Period Return*

of 2,9%, meaning less than 0,1% of underperformance a month. Column (4) shows that this is 4,8% for *Abnormal Crisis-Period Return*, which is still only -0,15% per month. Furthermore, the *Corporate Governance component* shows to have a positive relation with *Raw Crisis-Period Return* that attenuates after I include financial control variables.

Turning to Panel B of Table V, I observe similar significant relationships between the *Raw Crisis-Period Return* and the *Social* (0.280) and *Governance score* (0.252). Because the *Social score* shows significant results in 3 out of 4 columns, I consider this a strong result. The increase of one-standard-deviation in the *Social score* has an economic magnitude of -4.76% over the estimation period in the extensive specification of the regression model. The result is significant at the 1%-level, thus confirming a full reversal of the 4.51% outperformance I find for the financial crisis. Better governance is observed to have a positive effect on raw returns. In the short specification a one-standard-deviation increase of the *Governance score* means a monthly increase in return of approximately 0,16% between April 2010 and December 2012.

The financial controls that are added in the extensive specifications show market capitalization and lower short-term debt to have a positive effect on crisis-period returns. Other variables have varying significance. The one-year stock price momentum is found to have a positive effect on returns, while firms with higher book-to-market ratios had lower returns. *Idiosyncratic Risk* is significant at the 1%-level in column (4). A concern with the specifications reported in all columns (2) and (4) of Table V is that the estimation period of several proxies also incorporates the financial crisis period. The crisis may have distorted the estimation of the market model and negatively influence the accuracy of my calculated abnormal returns. Hence, raw returns are a more reliable source of information than the regression models with market model adjusted returns as the dependent variable.

Finally, I review the findings of the the model specified in equation (5) for hypothesis 4. The insignificant results for the *CSR score* are presented in Panel B of Table VII. The coefficients for the *High-Trust Markets* are all positive while the opposite is true for *High-Trust Markets*. However, these results give me no reason to believe that there is a sure difference in the reversal effect between them. The fourth hypothesis is not proven based on these results unfortunately. More tests are performed with different variables of interest, where I encounter some multicollinearity problems. *Market Capitalization* had a VIF of above 20, similar to the models for the financial crisis, and was deleted accordingly. Some models that had this variable in the specification were found very significant. After I dealt with the problem this was not the case anymore. Models that had numerous high-low variables like the 4 pillars scores suffered from the same problem. The deleting of variables did not alleviate the multicollinearity and for that reason I have cannot give a sure and valid answer to hypothesis 3 for the Euro crisis-period.

Table IV *Crisis-Period Returns and CSR during the Financial Crisis*

(a) *Panel A: Short and Extensive Principal Component Regression Model with 2 Principal Components*

	Raw return (1)	Abnormal return (2)	Raw return (3)	Abnormal return (4)
Social Capital component	0.020	0.052**	0.022	0.054**
Corporate Governance component	0.021*	0.046**	0.011	0.030
Ln(Market Cap)			0.007	0.007
Long-Term Debt			-0.079	-0.187
Short-Term Debt			-0.213	-0.504*
Cash Holdings			0.348***	0.339*
Profitability			0.462***	0.653***
Book-to-Market			-0.064*	-0.105
Negative B/M			-0.048	-0.136
Momentum			-0.153***	-0.577***
Idiosyncratic Risk			-1.115	4.189
Constant	-0.160***	-0.050	-0.249***	-0.124
Adj. R^2	0.189	0.202	0.223	0.261

(b) *Panel B: Short and Extensive Multiple Regression Model with 4 Elements of CSR*

	Raw return (1)	Abnormal return (2)	Raw return (3)	Abnormal return (4)
Environmental score	-0.094	-0.099	-0.115**	-0.174
Social score	0.101*	0.152	0.156**	0.242**
Governmental score	0.086*	0.178**	0.057	0.133
Economical score	0.057	0.118	0.028	0.101
Ln(Market Cap)			0.007	0.008
Long-Term Debt			-0.080	-0.171
Short-Term Debt			-0.241	-0.537*
Cash Holdings			0.325***	0.300
Profitability			0.484***	0.670***
Book-to-Market			-0.055	-0.096
Negative B/M			-0.035	-0.118
Momentum			-0.155***	-0.581***
Idiosyncratic Risk			-0.019	6.442
Constant	-0.256***	-0.279***	-0.334***	-0.328**
Adj. R^2	0.161	0.210	0.231	0.271

(c) *Panel C: Short and Extensive Multiple Regression Model with a CSR Score*

	Raw return (1)	Abnormal return (2)	Raw return (3)	Abnormal return (4)
CSR Score	0.103***	0.247***	0.098**	0.233***
Ln(Market Cap)			0.005	0.005
Long-Term Debt			-0.068	-0.163
Short-Term Debt			-0.202	-0.481
Cash Holdings			0.354***	0.351*
Profitability			0.465***	0.655***
Book-to-Market			-0.065*	-0.112*
Negative B/M			-0.045	-0.126
Momentum			-0.149**	-0.566***
Idiosyncratic Risk			-0.501	5.537
Constant	-0.231***	-0.223***	-0.311	-0.270
Adj. R^2	0.156	0.209	0.227	0.268
Four-factor loadings	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
N	566	566	566	566

*** p<0.01, ** p<0.05, * p<0.1

Table V *Crisis-Period Returns and CSR during the Euro Crisis*

(a) *Panel A: Short and Extensive Principal Component Regression Model with 2 Principal Components*

	Raw return (1)	Abnormal return (2)	Raw return (3)	Abnormal return (4)
Social Capital component	-0.017	-0.015	-0.029**	-0.048**
Corporate Governance component	0.067***	0.034*	0.022*	0.008
Ln(Market Cap)			0.024***	0.050***
Long-Term Debt			-0.0.28	-0.027
Short-Term Debt			-0.484**	-0.580*
Cash Holdings			-0.097	-0.265*
Profitability			0.393**	-0.238
Book-to-Market			-0.145***	-0.071**
Negative B/M			-0.074	-0.021
Momentum			-0.209***	-0.387***
Idiosyncratic Risk			0.308	8.168***
Constant	0.014	-0.045	-0.187	-0.406***
Adj. R^2	0.240	0.170	0.401	0.276

(b) *Panel B: Short and Extensive Multiple Regression Model with 4 Elements of CSR*

	Raw return (1)	Abnormal return (2)	Raw return (3)	Abnormal return (4)
Environmental score	0.060	0.064	0.053	-0.003
Social score	-0.225***	-0.185*	-0.170***	-0.147
Governmental score	0.215***	0.097	0.090*	0.034
Economical score	0.088*	0.073	0.047	0.048
Ln(Market Cap)			0.016*	0.039***
Long-Term Debt			-0.031	-0.035
Short-Term Debt			-0.496**	-0.597*
Cash Holdings			-0.097	-0.273*
Profitability			0.400**	-0.236
Book-to-Market			-0.148***	-0.075**
Negative B/M			-0.080	-0.027
Momentum			-0.214***	0.391***
Idiosyncratic Risk			0.564	8.257***
Constant	-0.053	-0.064	-0.119	-0.266**
Adj. R^2	0.236	0.169	0.402	0.271
Four-factor loadings	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
N	594	594	594	594

*** p<0.01, ** p<0.05, * p<0.1

6 Conclusion

My findings suggest that firm-level social capital consists of environmental, social, governmental and economical aspects. There are no less than 13(!) variables that load on only one component, the *Social Capital component*. I conjecture that due to this large number of highly correlated variables, the first Principal Component isn't a better representation of the underlying feature. The results indicate that different categories of variables have adverse effects on crisis-period returns during the financial and Euro crisis. A firm's socially related CSR activities are the most valuable during a shock to the overall level of trust.

Through a multiple regression with the Environmental, Social, Governmental and Economical score I find that high scoring firms on the social elements see an increase of approximately 4 to 7% during the crisis in raw and abnormal returns respectively. Environmental efforts, however, actually decrease a firm's return by an estimated 3 to 4%. It is this contradictory effect that makes my Principal Component a lesser estimator. The social efforts and investments that a firms make do contribute to a higher return when the overall level of trust in corporations and markets suffers a negative shock. This is evidence for the reciprocity argument made by Lins et al. (2017).

Another interesting finding of this paper is the full reversal of returns that I find during the Euro crisis. This indicates that the trust in the European financial markets has been restoring and the valuation premium thus erodes. However, this full reversal is found over a 33-month period while the trust premium was of effect over a much shorter time.To call attention to the economic extent of the reversal that I find: a one-standard-deviation increase in loading on PC1 meant a reduced *Raw Crisis-Period Return* of 2,9% and a decrease in *Abnormal Crisis-Period Return* of 4,8%, meaning less than 0,1% and 0,15% of underperformance per month respectively.

Further research is needed to examine these results, as it is not clear what made investors and other stakeholders regain market trust over the span of the Euro crisis. The results I present are robust to timing of variables, but it could be that this finding is specific to my sample. Other CSR variables from other corporate entities than Asset4 can be used to verify my findings. In addition, a panel dataset would be fruitful for further work as the results I find might diminish if the time-variability of CSR activities is incorporated into the models.

Another point of interest is the way in which a trust channel is valuable to a firm during times of low trust. Studying this channel and the way CSR activities contribute to the formation of trust would be worthwhile since CSR activities are only trust increasing and valuable to a firm if they are noticed by their stakeholders is the argument I present. This is more suitable to qualitative research though.

I did not anticipate to find only 1 Principal Component that loads on the many elements of social capital. This finding presented me with the problem that I could not differentiate between valuable and value destroying CSR activities, based on a PCR. Moreover, I found some hiatuses in the first 2 rows of Tables IV and V in term of significance, but overall more than half of the estimated coefficients have a p-value under 0.1. The *Social Capital component* even had a p-value under 0.05 in 3 out of 4 extensive forms of the model. In my opinion the PCA is effective in summarizing the identify underlying constructs of social capital, but not as effective in valuing social capital. Subsequent models with 4, 7 or 13 variables of interest didn't facilitate the purely significant results I wished to obtain either. The set of specifications I used seem fairly exhaustive though. More variables are certainly not the solution, but another method exploratory factor analysis could be effective.

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Appendices

Appendix A: Additional Tables

Appendix B: List of Abbreviations

Table VI *Crisis-Period Returns and CSR during the Financial Crisis*

(a) *Panel A: Extensive Multiple Regression Model with 7 Social Variables*

	Raw return (1)	Abnormal return (2)
Community	0.000	0.001
Diversity & Opportunity	0.003**	0.005**
Employment Quality	0.000	-0.003
Human Rights	0.001	0.003
Health & Safety	-0.002	-0.002
Product Responsibility	0.000	0.003
Training & Development	0.001	0.002
Financial Control Variables	Yes	Yes
Constant	-0.381***	-0.376
Adj. R^2	0.254	0.287

(b) *Panel B: Extensive Multiple Regression Model with 13 Variables from the Social Capital Component*

	Raw return (1)	Abnormal return (2)
Emission Reduction	-0.001	-0.001
Product Innovation	-0.001	-0.001
Resource Reduction	-0.001	-0.001
Community	0.000	0.001
Diversity & Opportunity	0.003*	0.004*
Employment Quality	0.001	-0.002
Human Rights	0.001	0.003
Health & Safety	-0.001	-0.002
Product Responsibility	0.001	0.003
Training & Development	0.001	0.002
Vision & Strategy	0.001	0.002
Client Loyalty	-0.001	0.002
Performance	-0.001	-0.004
Constant	-0,313**	-0.280
Financial Control Variables	Yes	Yes
Adj. R^2	0.250	0.282
Four-factor loadings	Yes	Yes
Industry dummies	Yes	Yes
N	566	566

*** p<0.01, ** p<0.05, * p<0.1

Table VII *Crisis-Period Returns and CSR in High- vs. Low-Trust Markets*

(a) *Panel A: Models with CSR Score during the Financial Crisis*

	Raw return (1)	Abnormal return (2)	Raw return (3)	Abnormal return (4)
High-Trust Markets	-0.012	0.139**	0.002	0.149***
Low-Trust Markets	0.005	0.120*	0.049	0.155*
Financial Control Variables	No	No	Yes	Yes
Adj. R^2	0.660	0.216	0.688	0.274

(b) *Panel B: Models with CSR Score during the Euro Crisis*

	Raw return (1)	Abnormal return (2)	Raw return (3)	Abnormal return (4)
High-Trust Markets	0.075	0.015	0.028	0.021
Low-Trust Markets	-0.110	-0.187	-0.025	-0.070
Financial Control Variables	No	No	Yes	Yes
Adj. R^2	0.456	0.186	0.571	0.270

Appendix B: List of Abbreviations

B/M	Book-to-Market ratio
CAPM	Capital Asset Pricing Model
CSR	Corporate Social Responsibility
ESG	Environmental, Social and Governance
HML	High minus Low (factor)
KMO	Kaiser-Meyer-Olkin test
KPI	Key Performance Indicator
MOM	Momentum (factor)
MSCI	Morgan Stanley Capital International
PC	Principal Component
PCA	Principal Component Analysis
PCR	Principal Component Regression
PIIGS	Portugal, Italy, Ireland, Greece and Spain
SMB	Small minus Big (factor)
SRI	Socially Responsible Investing
SSCP	sums of squares and cross products
VIF	variance inflation factor