



Thesis submitted in partial fulfilment of the requirements
for the degree of Doctor of Philosophy

**Essays on Corporate Governance:
SRI Investing, Skill heterogeneity on Firm Performance
and Value Creation through M&As**

by

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August 2021

*To Yiannis
who left us too soon.*

*"All we have to decide
is what to do with the time that is given to us."*

J.R.R. Tolkien, The Fellowship of the Ring

Declaration of original authorship

I confirm that this is my own work and the use of all material from other sources has been properly and fully acknowledged.

Reading, 20 August 2021

Vasileios Katsoulis

Abstract

This thesis empirically investigates three prominent issues in the field of corporate governance. The first study delves into the area of Corporate Social Responsibility (CSR). The emergence and tremendous growth of socially responsible investing (SRI), along with the ambiguity which surrounds its application, make SRI-labelled funds ideal candidates for utilising “window dressing” strategies to attract assets from interested investors. I introduce a novel two-dimensional taxonomy of SRI funds, simultaneously based on their self-proclaimed label of SRI as well as the Environmental, Social and Governance (ESG) value that emanates from their actual holdings. I find that across the different SRI fund categories, “Greenwashers” attract the lowest amount of funds despite achieving comparable performance. ESG value exhibits a secondary stabilising effect on fund flow persistence across all funds.

In the second study, I focus on the skills of directors and I examine their effect on firm performance. To that end, I exploit a recent Regulation amendment to create a novel, hand-collected dataset of directors' skills for all SP500 constituents over the period 2010-2018. Then, I investigate how these skills cluster at a board and at a director level. Results evince that some boards have directors with more diverse skillsets. However, skill diversity does not appear to correlate with firm value. I find limited evidence of a positive link between skill diversity and ROE. Yet, boards exhibit a secondary predilection towards technological prowess. It appears that the presence of a technology-apt boardroom is positively linked with the firm's Tobin's Q.

The final empirical chapter studies the impact of director skills on M&As. I find that acquirers that exhibit more commonality in the skillsets of their directors, are associated with positive and statistically significant abnormal returns. However, directors and CEOs with more (less) skills appear to be linked with worse (better) acquisition performance. I consider two possible explanations for this counterintuitive finding; CEO overconfidence and window-dressing. I find evidence of the latter. Firms with bad corporate governance appear to inflate the skills of their board members in the proxy statements that share with their shareholders before the annual elections of their directors.

Acknowledgements

*“Most men, they'll tell you a story straight through.
It won't be complicated, but it won't be interesting either.”*

- Edward Bloom, *Big Fish*

In Daniel Wallace's novel, *Big Fish*, we follow the last days of Edward Bloom. Edward's life-long tendency to exaggerate about his life's achievements has alienated his son, William, from him. William is a pragmatist. Yet, in every birthday of his, he is forced to listen to his father telling the story of how he caught the biggest, most legendary fish in the whole world with his wedding ring the exact moment his son was being born. He listens of Edward's encounters with terrifying giants that would end up being gentle, with bank robbers who would later become famous Wall Street traders, with werewolves, and witches, and all sorts of mythical creatures. He listens about magical places where people could walk barefoot, and about fields with thousands of daffodils that his father would plant all alone as a gift for the love of his life, and William's mother, Sandra. The novel unfolds as William sits on his dying father's bed to listen to his stories for one last time. And maybe try to tell what is real and what is pure imagination...

I initially thought pursuing a career in academia was beyond my reach. In 2009, the year that I obtained my MBA, PhD openings in my country were non-existent, and all suggestions from my professors involved a financially unsustainable, self-funded pursuit abroad. I want to start by thanking one of them, my late professor, George Malliaris, for being the first who showed me that nothing is given. The success of an achievement is built on hard rejections. It was around that time, when a colleague of mine, Marina Katsaiti, who had recently obtained her own PhD, gave me an advice. That in order to obtain a PhD myself, I would need to find five people in my life who should be willing to step up and help me towards this goal. For some reason, I never forgot that advice. To this day, I consider her the first of that group. Not for a second did I think that this journey would be easy though. In fact, it would take me three whole years before I find the second one. And in the most unexpected place.

I want to thank Aris Karagiorgis for a cold, winter game of basketball at the courts of Dais. I learned why he was making shots in the rain that night, and he learned why I joined the action. None of this would happen if it wasn't for him. Memories of a lifetime at the ICMA Centre that I will cherish forever. The place where I was given the chance to introduce Robert Wichmann to tsikoudia, and to play basketball with Filippo Busetto. The place where I got to meet Despoina Kentrou, Dina Ghanma, and a most special group of people. Daniele, Vicky, Rohit, Siqi, Ran, Ludo, Moustafa you will be remembered in the warmest colours. The same applies to so many people of the administrative staff that made my work at ICMA easier, better, and surely more enjoyable. Leanne Ley, you were always there for us. As was the case for Matt Goss, Laura Carter, Caroline Saunby, Liz Adams, Dominique Freemantle, Kim Mountford and Sylwia Kosiek. I intentionally left Professors Adrian Bell, Michael Clements and Carol Padgett for the end. Their support through the hard times of this PhD cannot, and will never be, measured.

Which brings us to the most defining person of my career. Yianni, I will not put to words what you mean to me. In my first day at ICMA, the two of us were standing in front of the elevator. It was the first time that I realised that all this is true. I stopped you for a second and I tried to thank you for believing in me. You didn't let me finish my sentence, saying: "*yeah, yeah, okay, thank me when you finish.*" I never got to say it to you. I'm sure you can hear me now. So, I say it to you, I say it to your beloved mother, Eleni, who I will never forget, I say it to your father, Antoni, and to your brother, Vassili. I say it to your loving wife, Samsa. People who stood by the side of a wonderful human being that I had the chance to call my supervisor, my mentor, but most importantly, my friend.

Because of you I met the people that helped me become the academic that a few years earlier I could only dream of. I met Tony Moore, my co-supervisor, whose presence has been a beacon of kindness and support throughout this PhD. I met my subsequent supervisor, George Alexandridis. The person who stepped up for me during the hardest moments of this endeavour. And finally, I met Dimitris Koufopoulos and Nikolaos Antypas. Dimitri and Niko, the latter part of my PhD has your names written all over it. The circle of five people that I was looking for years could now close with you.

Before I go, I want to thank a few people who have been at my side since I remember myself. My friends since childhood, Nikolas Choursoulidis, Kostas Katsounis and Dimitris Patsiavouras for always being there for me one way or another. Akis Xantzaras, Ilias Siatis, Takis Kezas, and Apostolis Balamatsias for appearing in different stages of my life in ways that I will never forget. The "Hateful 8," Bud, Cedric, Lemmy, Pro, Saras, Tzi, and Yiannis. Argyris and Anna Argyriou, and their children Panos and Stathis Argyriou. My beloved cousins Despoina, Chrysoula, Mimis and Sevasti. My "second fathers" Michalis and Manthos. My late grandfather, Vassilis. The person who devoted his life to see me prosper and that hopefully will feel proud right now somewhere up there. And finally, my mother, Roula. The person who had nothing, and somehow managed to give me everything. My hero.

Tall tales are not meant to be true. We wish they were, like Edward Bloom. The distant memory of ourselves from the time we were kids would surely want them to be true. But in time we find out that they are not; leaving us with the cold, hard realisation that we have grown up. Or so we think.

I forgot to tell you all, about Konstantina. Well, you won't believe it, but Konstantina is the biggest, strongest, and most brave fish in the whole world. I wish I could tell you more about the times she saved me from drowning with her mighty fins, or how she can fight off hordes of sharks with just a splash of her tail. I could talk about all the rough seas and the beautiful sunsets. But she is waiting for me by the lake to begin our next journey...

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6. Conclusions

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1. Introduction

1.1 Motivation of the thesis

The dystopian view of firms as tenacious pursuers of profits is gradually being mitigated by the "invisible hand" of modern shareholders. Profits matter, but in a virtuous twist of stakeholder allure, they are not enough for today's corporations; good corporate governance matters as well. The first two decades of the 21st century have been marked by high-profile corporate scandals, major collapses of international organisations, and a widespread financial crisis, that led to the most severe global recession since the Great Depression of the 1930s. These events had profound implications for corporations, regulators, and investors alike. Massive regulatory reforms, new listing requirements, and official guidelines from international organisations, have placed the issue of corporate governance (CG henceforth) at the epicentre of a firm's strategic agenda. Companies are aware that the seamless adaptation to the evolving landscape of modern governance standards is now seen by investors as integral element of sustainable long-term value creation; ergo, they strive to implement governance practices that best respond to the interests of their stakeholders.

However, the meteoric rise of CG issues in the hierarchy of strategic priorities is accompanied by several challenges for modern corporations. The first and probably most discernible impediment for firms' proper implementation - and consequent evaluation - of CG practices is the absence of a clear, universally accepted definition of corporate governance. To this day, firms are allowed to provide their own idea of the CG concept, as well as to disclose the types of CG principles that they employ. Thus, at a global level, CG codes may differ, inter alia, by country, organisation, stock exchange, institutional investor, and corporation. Sir Adrian Cadbury's highly influential definition of corporate governance as "*a framework which is concerned with holding the balance between economic and social goals and between individual and communal goals,*" as reported in the seminal UK's Cadbury Report of 1992¹, is probably the most intuitive

¹ The full Cadbury report is published under the title "The Financial Aspects of Corporate Governance" and can be found online at: <https://www.icaew.com/-/media/corporate/files/library/subjects/corporate-governance/financial-aspects-of-corporate-governance.ashx?la=en>, last accessed 29 November 2020.

attempt to describe the network of principles, mechanisms, and processes that corporate governance entails, in order to align the interests of a company's stakeholders.

The problematic nature of the CG issue though, is not limited to definitional semantics. The general CG principles of the Cadbury Report have been updated thrice by the Organisation for Economic Co-operation and Development (OECD). In the meantime, there have been two comprehensive attempts, the Sarbanes-Oxley Act of 2002 (SOX) and the Dodd-Frank Act Wall Street Reform and Consumer Protection Act of 2010 (Dodd-Frank), to turn some of the principles that were proposed in the aforementioned reports into official legislation. Thus, firms are forced to deal with, not only a narrowly defined framework of principles and regulations, but also with a constantly evolving, increasingly complex, and fully customisable corporate tool of long-term sustainability. This lack of "one-size-fits-all" approach, essentially makes corporate governance a signal of business integrity for investors. In two shakes of a lamb's tail, corporations, and more specifically their boards of directors, have a self-assessed instrument in their hands that, if communicated properly, could induce value-creation for the firm, long before the enactment of the CG policies.

It is within this context that impediments arise in the investigation of the CG framework. If firms are motivated to promulgate their financial viability through the adoption of intricate CG controls, any research of the link between CG and corporate financial performance (CFP hereafter) will be plagued by the unobserved heterogeneity of this "window-dressing" propensity factor. By way of illustration, the pharmaceutical behemoth, Johnson & Johnson (J&J) in 2020, was ranked 1st - for second consecutive year - on Gartner's Healthcare Supply Chain Top list², 46% of its management roles in previous year were held by women, \$1.6 billion were spent in diverse suppliers, \$11.4 billion were invested in R&D, \$37 million were donated in disaster relief packages, 30% of its electricity was produced from renewable energy sources, its CO2 emissions were

² Gartner's Healthcare Supply Chain Top 25 reports for 2019 and 2020 are available at: <https://www.gartner.com/en/newsroom/press-releases/2020-11-12-gartner-announces-rankings-of-its-2020-healthcare-supply-chain-top-25>, last accessed 17 November 2020.

reduced by 32% compared to 2010³, while the company has already announced that, conversely to most industry peers, it intends to price its COVID-19 vaccine on a not-for-profit basis (Mancini & Crow, 2020). At the same time though, following a 2018 report from Reuters⁴, it was found that J&J knew for decades that its talc powder was contaminated with asbestos, a well-known carcinogen, resulting in the company having a jury verdict of \$2.12 billion award to 22 female plaintiffs, who claimed that J&J products were responsible for their ovarian cancer, and more than 21,800 pending lawsuits for the same reason (Stempel, 2020). In such case, if one wanted to investigate the CG-CFP link of Johnson & Johnson, she would first need to ensure that the company's CG performance is more than a public display of business morality to nervous investors.

The immense practical value of corporate governance has been documented in a variety of ways in the corporate finance literature (Shleifer & Vishny, 1997; Williamson, 1988). Scholars have identified and developed both aggregate and individual measures of corporate governance, which have subsequently been employed in the examination of CG's relationship with firm performance. Gompers et al., in their 2003 seminal paper, create an equally-weighted Governance index (GIM), comprised of 24 governance provisions from the Investor Responsibility Research Center (IRRC), showing that shareholder rights are positively related with several firm performance measures, like Tobin's Q, profits, and sales growth, and negatively related with capital expenditures. A few years later, in an equally influential paper, Bebchuk et al. (2009) narrow down the GIM index, creating their own CG metric⁵, which is compiled by the six provisions of GIM with the most impact on firm performance. Authors of this study corroborate that a decrease in shareholder rights is monotonically related with a reduction in firm value as well as with negative abnormal returns. To this day, the indexes of both studies are

³ The full Johnson & Johnson's 2019 Health for Humanity Report is available at: <https://h4h-2019.jnj-campaigns.jnj.psdops.com/document/2019-health-for-humanity-report-summary?id=00000172-a3fb-df3e-abf2-ebffd3210000>, last accessed 17 November 2020.

⁴ The full report is titled "Johnson & Johnson knew for decades that asbestos lurked in its baby powder" and can be found at: <https://www.reuters.com/investigates/special-report/johnsonandjohnson-cancer/>, last accessed 18 November 2020.

⁵ Bebchuk et al. (2009) call their index, "Entrenchment index," or simply "E-index."

employed in corporate finance literature as de facto measures of corporate governance⁶. Meanwhile, academic research is constantly providing new insights on individual corporate governance determinants⁷. From board independence (Ferreira et al., 2018; Armstrong et al., 2014), size (Coles et al., 2008; Hermalin & Weisbach, 2001), heterogeneity (Bernile et al., 2018; Anderson et al., 2011), female (Greene et al., 2020; Adams & Ferreira, 2009), foreign (Estélyi & Nisar, 2016), and cultural representation (Frinjs et al., 2016), to stock ownership (Bhagat & Bolton, 2019), and Chairman-CEO duality (Krause et al., 2014), academic literature has been consistently highlighting the impact of individual board and top management characteristics on long-term value creation.

Despite the vast body of corporate governance research though, the debate of its relationship with financial performance has not reached a definite conclusion. In most cases, the association of CG determinants with firm performance is neither straightforward, nor uniform across samples and time periods. For example, studies of the relationship between board independence and corporate financial performance (CFP) evince positive (Liu et al., 2015; Bhagat & Bolton, 2008; Dahya & McConnell, 2007), negative (Crespi-Cladera & Pascual-Fuster, 2014), or no association (Ferris & Yan, 2007; Bhagat & Black, 2001; Rosenstein & Wyatt, 1990). Likewise, research on the link between a firm's social responsibility (CSR hereafter) with CFP provides evidence of positive (Brammer & Millington, 2005; Porter & Kramer, 2002), negative (McWilliams & Siegel, 2000), or even no causal relationship (Waddock & Graves (1997)). To this day, scholars express equally robust views on the association between a firm's social and financial performance at both ends of the spectrum. Friedman (1970) has been famously quoted as saying that "*the social responsibility of business is to increase its profits.*" By contrast, Freeman (1984) highlights the importance of stakeholders' satisfaction in long-term value creation, and in the middle of the two extremes, Jensen

⁶ Cremers and Ferrel (2014) use the GIM index as proxy of shareholders' rights and corroborate the negative association of the latter with firm value (measured by Tobin's Q) in a sample that spans from 1978 to 2006.

⁷ See also Anginer et al. (2018), Appel et al. (2016), Wintocki et al. (2012), Ashbaugh-Skaife et al. (2006), and Brown and Caylor (2006), among others.

(2002) proposes the simultaneous pursuit of shareholder value maximisation through key stakeholder satisfaction⁸.

This lack of consensus, is not without an explanation. The primary objective of corporate governance is to provide a framework, so that the interests between the managers and the stakeholders of a corporation can be aligned (OECD, 2004). Good corporate governance in specific, assumes that managers are properly incentivised to represent the interests of their shareholders, and that stakeholders are adequately informed on the decisions of the management (Jensen & Meckling, 1976). The violation of this assumption not only hinders academic research of the CG-CFP link, but most importantly, leads to massive financial failures. It stands to reason, that most financial regulatory reforms of the 21st century have been employed to address this agency conundrum⁹. In that context, literature is constantly identifying the repercussions of these regulatory attempts on a wide spectrum of corporate governance determinants (Linck et al., 2008)¹⁰. Thus, it becomes apparent that the tremendous rise of corporate governance in response to agency-stemmed corporate scandals, along with the recency of the corresponding regulatory reforms, make this area of research an ideal field for novel insights, and impactful academic contribution.

⁸ Meta-analyses of the social-financial performance association gravitate towards a positive but weak link (Friede et al., 2015; Margolis et al., 2009; Orlitzky et al., 2003). Hence, literature today has shifted from the investigation of a direct corporate social and financial performance relationship, to the examination of value-creating mediators of corporate governance. For an incomplete review of recent literature on sources of value creation through corporate governance-induced, enhanced stakeholder satisfaction, see in De Roeck & Farooq (2018), Krüger (2015), Luo and Du (2015), Flammer (2015b), Oikonomou et al. (2014), Deng et al. (2013) and Aktas et al. (2011) among others.

⁹ The OECD principles of 1999, on which regulators based all corresponding legislation, are comprised of 6 main areas: corporate transparency, protection of shareholders' rights, fair treatment and role enhancement of shareholders, disclosure accuracy, and board monitoring. The subsequent Sarbanes-Oxley Act of 2002 (SOX), establishes laws centred around 11 major elements: board oversight, auditor independence and corporate responsibility, financial and analyst disclosure, enhanced disclosure and reporting from the Securities and Exchange Commission (SEC), corporate criminal, fraud, and CEO accountability, and financial reporting penalty enhancement. By the end of 2000s, NYSE and NASDAQ requirements for listed companies include a majority for independent directors, while through the Dodd-Frank introduction of Say-On-Pay (SOP), shareholders are given the power to oversee executive compensation. More recently, the 2009 amendment of Regulation S-K, requires firms to disclose the specific qualifications of their directors.

¹⁰ For instance, SOX requirement that CFOs must co-certify the firm's financial statements along with the CEOs, decreased the number of CFOs that serve on the board of their own firm (Mobbs, 2018), and increased the number of independent directors (Crespi-Cladera & Pascual-Fuster, 2014).

1.2 Contribution of the thesis

This study lays its eyes on the people who are responsible for corporate governance decision making. Had we wanted to single out the three main actors in building long-term value for a firm through corporate governance, these would be: a) the board of directors, b) the management, and c) the shareholders of the corporation (Business Roundtable, 2016). In this thesis, I delve into the first two stakeholder groups. First, using CSR as Trojan Horse, I examine whether fund managers employ window-dressing strategies to attract socially responsible investors. Then, I exploit a recent regulation amendment to study the skills of directors. Specifically, I investigate whether the diversity of skills inside the boardroom has an impact on firm performance. Lastly, I study whether the skills of directors create value for shareholders through mergers and acquisitions (M&As henceforth).

The results of the first study are of relevance to investors and financiers alike. One out of every three dollars under professional management in the US, is invested in a portfolio that has applied at least one CSR-related screen. Over the last twenty years, socially responsible investing (SRI hereafter) has seen immense growth, both in terms of the demand for CSR-themed assets under management (AUM), as well as in terms of the number of CSR-labelled mutual funds (US SIF, 2016). Knowing whether funds use the CSR label without actually applying the cost-inducing CSR screens would be of interest to the rapidly growing base of socially responsible individual and institutional investors. In addition to this, for the next two chapters of this study, I introduce a dataset of director skills which is comprised exclusively from the output of the Securities and Exchange Commission's (SEC hereafter) 2009 regulation reform. From an academic standpoint, the benefit of conducting research based on the exploitation of such sample is twofold. On the one hand, board members, shareholders, investors and financial institutions would want to know how directors' skills impact firm performance and corporate acquisitions, and on the other hand, since no study has examined the effectiveness of 2009's regulation amendment, the SEC itself would have interest knowing whether the newly added director skill requirement is of any use to shareholders.

Adding to that, methodologically, all three studies of this thesis deviate from common literature standards, opting to follow approaches that maximise the strength of the empirical findings. For example, the most common methodology of assessing a fund's CSR identity is through its self-reported CSR mandate label. Studies that examine the link of CSR with a fund or firm characteristic, usually create an SRI-labelled group (formed by all funds that self-proclaim themselves as being socially responsible), which is then matched with its closest - in terms of characteristics - conventional analogue (i.e., a fund that does not include a CSR label) for further testing. The intuitiveness of that method is accompanied by several robustness challenges: a) comparison of uneven samples, b) problematic matching of SRI and non-SRI groups¹¹ and c) unobserved heterogeneity in the strength of CSR screening. Chapter 3 of this thesis addresses these problems by creating an individual CSR score for every fund in the sample. To that end, the CSR-related information from each of the holdings of the fund's portfolio is extracted, and the social performance of the fund is determined based on the CSR scores of its portfolio constituents. This technique enables the treatment of the fund sample as a whole, and allows the novel categorisation of the mutual fund universe, which has no precedent in the CSR literature.

The methodological philosophy of utilising hand-collected information instead of relying on raw public data that can potentially carry serious robustness weaknesses, is even more pronounced in the following two chapters of the thesis. In most studies, director qualifications are implied, based on the biographical information of the individual (Drobetz et al., 2018; Guner et al., 2008). However, such approach may bias results due to unaccounted skill heterogeneity of several causes: a) firms may elect their directors for reasons that are not included in their curricula vitae (CV), b) CVs may fail to depict the full skillsets of the directors, and c) existing CV databases may provide insufficient information with respect to directors' employment history. In response to these potential inconsistencies, I create a taxonomy of skills for each director in the sample, as reported in the firms' own proxy statements. On that premise, I manually extract the specific skills that each firm discloses as reasons of electing every member

¹¹ Since it is difficult to establish a direct match between SRI-labelled and "conventional" funds/firms, in most cases, matching is performed based on unequal, or at least markedly deviating, fund/firm characteristics.

of its board, hence creating a dataset on the basis of the qualifications that really matter for the employers. Thereby, each board member is assigned with the full set of skills that its own board selected her for. To ensure the validity of that information, I also extract the proxy statements of all firms in the sample, and I write a Python algorithm to allow for robustness checking.

The aforementioned methodological approaches could not be implemented without the extraction of two very extensive, hand-collected datasets. For the needs of Chapter 3, I use Bloomberg to gather information on portfolio holdings of mutual funds. Bloomberg provides detailed portfolio distribution reports, in which it records the historical weights of every fund's invested holdings. I manually extract that information, in order to create a database of portfolio holdings for all US mutual funds since 2003. The breadth and scope of the dataset that was employed in Chapters 4 and 5 of the thesis, is even wider. I exploit a recent regulation amendment that requires firms to disclose the skills that each of their directors is expected to bring to their board. Specifically, I manually assess each director's skill-related section from firms' annual proxy statements¹², to create a novel database that entails the skill descriptions of all annual SP500 constituents since the regulation's enactment, in 2009. In supplementing the various models and robustness tests that are employed in this thesis with control variables, I also use hand-collected data from Thomson Reuters EIKON, SEC EDGAR, Morningstar, and Google. All CSR data are obtained from Kinder, Lydenberg and Domini (KLD henceforth) database, and all M&A information is accessed by Thomson Securities Data Company (SDC)¹³. Both databases are regarded as standard sources of information for academic research in their respective fields. Overall, the extremely time-consuming nature of the two main datasets which are employed in this study, is compensated by conceptual, methodological, and practical advancements in corporate governance research.

From an academic perspective, this thesis touches three strands of corporate finance literature. The first study expands research on SRI investing. The holdings-

¹² To gain access to annual proxy statements, I use the Securities and Exchange Commission (SEC) EDGAR database, which is available at: "<https://www.sec.gov/edgar/searchedgar/companysearch.html>".

¹³ Chapters 3 and 4 include corporate governance information that is obtained from ISS (formerly RiskMetrics) database, and all three chapters use accounting and equity data from Compustat and CRSP.

based approach of assessing a fund's CSR levels has been followed by only a handful of papers. Out of these papers, there is only a study from 2008 that tests for the application of window-dressing strategies from fund managers. To my knowledge, no research has shifted focus to investor demand for the so-called "ethical" funds. Chapter 3 provides evidence, *inter alia*, that demand for funds which tend to employ the self-reported CSR mandate label as a façade of ethical legitimacy is significantly lower compared to demand for their "conventional" counterparts. Findings are illuminating for portfolio managers and prospective investors of funds that have the CSR label at the forefront of their investment strategy.

Chapter 4 examines board diversity at the skill level. To this day, literature on board diversity is scarce and largely homogeneous. The few studies that deal with the issue, create a measure of board heterogeneity based on a set of director characteristics (Bernile et al., 2018; Anderson et al., 2011). On the other hand, literature on director skills is almost non-existent. With the exception of a recent paper from Adams et al. (2018), skills' research is mainly consisted of director expertise measures, which are mostly implied by their *curricula vitae*. I exploit the 2009 amendment of Regulation S-K to introduce a dataset that comprises the skill descriptions of all directors of SP500 firms. The novelty of the database could potentially extend corporate governance literature in many directions. I start by presenting a taxonomy of skills of US boards. Then, I study skills at the aggregate and at the individual level. I examine board heterogeneity in terms of directors' skills, and I assess the presence and the intensity of each skill category on the board. The impact of skills on firm performance is tested in several ways, expanding corporate finance literature in areas that have not been previously explored.

The third study of the thesis employs the newly obtained skills' information to investigate the effects of directors' skills on M&As. I posit that extending the scope of the study to the field of M&As contributes to academic research in a threefold way. The most obvious of the reasons is that due to lack of data, no research has been done on the respective field. The closest that literature gets to examining director qualifications at the board level, is by looking at directors' investment bank affiliations (Golubov et al., 2012), acquisition expertise (Field & Mkrtchyan, 2017), or political connections

(Ferris et al., 2016), or at some form of CEO abilities (Custódio & Metzger, 2013), and personal characteristics (Jiang et al., 2019; Wang & Yin, 2018; Yim, 2013; Malmendier & Tate, 2008). Moreover, M&As have seen immense growth over the last 10 years in terms of both volume and deal value (Alexandridis et al., 2017), and strategic M&A decisions are expected to play major role in the forthcoming post-Covid-19 period (Herndon & Bender, 2020). Meanwhile, the massive financial collapses of the last 20 years, have raised public interest for increased transparency, diversity, and corporate accountability to unprecedented levels. It is thus, not surprising that most regulatory developments include board monitoring reforms. In Chapter 5, I further exploit the information from the regulation amendment of 2009, examining whether skills contribute to value enhancing M&As. The idea that skill commonality on the boardroom creates value for shareholders through M&As, extends the findings of Adams et al. (2018) regarding the positive effects of skill commonality on firm value, and sets the ground for further research paths. This chapter also documents, for the first time in literature, a negative link between the number of board members' skills (including the CEO) and acquirer gains. Further analysis evinces that this effect is detected in firms with low management quality. Since, there is no other study examining the efficacy of the 2009 regulation reform, this finding could be a warning sign to regulators that some firms may use the new requirement to inflate the skills of their board members.

1.3 Outline of the thesis

The remainder of the thesis is organised as follows. Chapter 2 offers a brief overview of the issues that are discussed in the empirical chapters of this study. The main purpose of this part is not to present an exhaustive review of the corporate governance literature, but rather to provide some gentle insights on selected matters that would kindly introduce the reader to the themes of the empirical section. With that in mind, this chapter starts with a synopsis of the historical evolution of corporate governance. To that end, it discusses seminal moments regarding this matter in terms of academic, corporate and regulatory advancements. Focus then moves to the interconnected realm of Corporate Social Responsibility (CSR). This part of the thesis

cites the definitional and contextual evolution of CSR, the main advancements in academic thinking with respect to the CSR-CFP link, as well as certain critical challenges in CSR research. Finally, this chapter acquaints the reader with influential works on the role of boards in corporate governance. Leading board literature is discussed, with a special interest in the thematic strands of value enhancing/destroying board and director characteristics.

Chapter 3 looks at the demand for socially responsible mutual funds. After discussing the reasons that make research in the CSR field worthwhile, I present the related literature and the theoretical framework of the study. Details with respect to KLD database and variable construction of the CSR score measure are provided. I then, report summary statistics, sample characteristics, as well as the baseline regression model and the control variables that are employed throughout the study. In the main empirical part, I describe the novel categorisation process that is applied on the sample of mutual funds, and I present a series of models, statistics, and fund samples to investigate the flows of assets under management among the different fund categories. Matched-pair analysis is then employed to establish the robustness of the main study.

In Chapter 4, I bring corporate governance research inside the boardroom. I exploit a recent regulation amendment to extract novel information on the skills of all board members from a sample of US listed firms. Since no research has been conducted on the respective field, I begin by examining whether directors' skills have an impact on firm performance. After introducing the subject and the related literature, I move on with a careful description of the data collection and variable construction processes. Before I advance to the empirical part, I provide a series of figures, summary statistics and correlation tables of the 20 skill categories that are employed throughout the study, in order to evince how skills cluster across corporate boards. In the empirical section that follows, a multitude of factor analyses and panel regressions are performed, in pursuit of the aggregate and individual examination of the skills' impact on firm performance. Lastly, due to the novelty of the dataset, special consideration is given on the validity of its collection process as well as its informational value. To that end, I conduct an extended series of robustness tests, which I complement with additional information on the skill coding and on the skill identification processes.

Chapter 5 is essentially an advancement over the analysis of the previous section of the thesis. If skills are associated, at least in a certain way, with firm performance, I argue that investigating whether skills create value for shareholders through M&As would be a logical next step in skills-related research. Thus, in this chapter, I examine whether and how skills contribute in value-enhancing M&As. The dataset and the measures of skill heterogeneity are identical to those of the previous chapter, so after a thorough presentation of the M&A literature, I provide further clarifications on the appropriateness of the skills' dataset. After elaborating on the theoretical background and the hypothesis development of this chapter, I present all the empirical analyses on the impact of skills on acquisition performance. Conceptually, this study establishes that skill homogeneity is positively associated with acquirer's abnormal returns (CAR). However, further investigation reveals that more skilled directors and CEOs are associated with lower CARs. In that context, I propose and develop two potential explanations for that finding. Overall, this study is based on the ample evidence that director and CEO characteristics play major role in the success (or lack thereof) of an M&A. Given that, to this day, existing literature had no data to examine the impact of skills on acquisition performance, findings, as well as their potential implications for regulators, are summarised in the last section of this chapter.

Despite the fact that each chapter concludes with its own summary of relevant results, Chapter 6 presents an overview of the research that was conducted in all three empirical chapters of the thesis. Findings, contributions, and potential roads for future research in the respective strands of corporate governance literature are also reviewed and discussed.

2. Literature review

2.1 Introduction

Managerial decision making yields a cornucopia of research in the corporate governance field. Hambrick and Mason's 1984 seminal paper: "Upper echelons: The organization as a reflection of its top managers," places managerial background at the epicentre of a firm's strategic proposition. Authors of that study consider the individual characteristics of managers, as well as the personalised interpretations of the latter to contextual situations, as the main determinants of a firm's business strategy. The foundational premise of that reasoning is that of "bounded rationality;" the idea that a person's rationality in decision making is subject to the informational and cognitive constraints of each situation (Simon, 1957)¹⁴. From an academic standpoint, it is not surprising that Hambrick and Mason's "upper echelons" theory has endured until today (Hambrick, 2007). Corporate finance research has been continuously unveiling pathways through which the individual characteristics of managers affect a spectrum of corporate phenomena.

In the following sections of this chapter, I provide an overview of the aforementioned pathways. The basic motivation of this literature review is to help the reader capture the main developments regarding the quantitative side of corporate governance research. Before we begin though, it should be stated that the academic

¹⁴ The idea of "bounded rationality" is central to the Behavioural Finance realm and is proposed as an alternative to the neoclassical model of "rational" decision-making. The term was introduced by Simon (1957), and focuses on the informational and cognitive limitations of economic agents when making decisions. The concept relies on the fact that a person's "rationality" faces certain constraints that may hinder the assessment of that person's behaviour. Such constraints can be: the time that the person should make the decision, the cognitive requirements of the decision, and the difficulty of the problem that requires a decision. For instance, if an economic agent is given two options, the "rational" option A, and the "irrational" option B, the agent may decide against A if certain limitations hinder the agent's cost-benefit analysis of the outcomes. Imagine a person who enters a store to buy a car without having knowledge of either the car industry or the cars' specifications. The informational limitations of the economic agent with respect to the problem (buying a car), increase the agent's probability to select an option that would not be justified by the "rational" model of decision-making (e.g., that person opting to buy a car which is more expensive and of worse quality than its ignored alternatives).

field of corporate governance has a rich and fruitful qualitative domain¹⁵. However, the empirical nature of the thesis and the respective maximisation of the reader's support, mandate that our primary attention is aimed at the quantitative aspects of the related literature. In that context, the following sections of this chapter present the evolution and the main regulatory frameworks of corporate governance, while an extensive assessment of corporate social responsibility (CSR) research follows. The current literature review chapter concludes with an overview of the most impactful works on value creation through the characteristics of the board of directors.

2.2 The evolution of corporate governance

2.2.1 Introduction

From shareholder (Friedman, 1970), to stakeholder (Hannan & Freeman, 1984), to enlightened stakeholder (Jensen, 2002), theories about the objectives of the firm concern economic thinking for decades. Is shareholder wealth maximisation the sole purpose of the firm? Academia shows no signs of concurrence (De Baker et al., 2005). The theoretical framework of the traditional firm model is still sound, but traces of an evolutionary integration of social elements within the organisations' financial goals are now more visible than ever (Moskowitz, 1997; Zingales, 2000; Lee, 2008; Aguinis & Glavas, 2012). In recent years, corporations, institutional investors, and international organisations revisit, amend, and re-adjust their corporate governance principles, in order to reflect the strategic pursuit of sustainable long-term growth through the harmonic alignment between corporate and societal objectives (Paine & Srinivasan, 2019). Prominent governance failures from corporate behemoths like Enron, Parmalat, Bear Stearns, or Lehman Brothers have led to massive regulatory reforms at the global level¹⁶. In that context, it comes as no surprise that academic research has shown

¹⁵ A reader keen on finding more on the strategic management literature could look in: Barrick et al. (2013), Zhang and Bartol (2010), Porter (2008), McMullen and Shepherd (2006), Srivastava et al. (2006), Podsakoff et al. (2003), Shane and Venkataraman (2000), Boeker (1997), Barney and Zajac (1994), Mintzberg and Waters (1985), and Gupta and Govindarajan (1984) among others.

¹⁶ For more on the Enron scandal see in Klimt and Yang (2004), Healy and Palepu (2003), and Benston and Hartgraves (2002) among others. A brief overview of related literature on the fall of Lehman Brothers would include, inter alia, Crosina and Pratt (2019), Fernando and May (2012), Chakrabarty and Zhang

tremendous interest in unravelling and dissecting the multitudinous governance-related phenomena that have emerged.

This section does not attempt to cover the whole spectrum of corporate governance themes, as the magnitude of such task would far exceed the reach of even a full PhD thesis. Hence, the topics that are discussed in the following paragraphs are carefully selected, aiming to provide an inquisitive reader with all the necessary tools for a pleasant time reading the empirical chapters of this thesis. To that end, I offer insights on the strands of corporate governance that are explored in the main study.

2.2.2 The Berle-Dodd debate

Despite the fact that its widespread recognition as topic of strategic significance for corporations has less than 20 years of life, the idea that corporate managers should be accountable not only to their shareholders, but to society as well, can be traced back to the dawn of 20th century (Macintosh, 1999). The first reported debate on the issue of corporate accountability comes in the early 1930s from Harvard law professors Adolf Berle Jr and Merrick Dodd, in their respective papers "Corporate powers as powers in trust" (Berle, 1931) and "For whom are corporate managers trustees" (Dodd, 1932). In these papers, authors take two seemingly opposing stances. Berle (1931) asserts that any powers that are given to the corporation, or to the managers of the corporation, or to any group within the corporation, should be exercised solely to the interests of the shareholders. Dodd (1932) on the other hand, argues that managers should also be accountable to the society, and more specifically to those that the firm's operations affect.

Despite the fact that the two authors appear to take opposing stances on corporate accountability, their papers have a basic common denominator. They both call for legal protection against a potential exploitation of profits from corporate managers, essentially planting the seeds for what would become Michael Jensen's theory

(2012), and Swedberg (2010). Bebchuk et al. (2010) discuss executive pay in Bear Stearns and Lehman Brothers, Kensil and Margraf (2012) compare the failures of the two US investments banks, while Ferrarini and Giudici (2006), and Melis (2005) consider the scandal of Parmalat.

of agency, more than 40 years later. Most importantly though, the Berle-Dodd debate draws the attention to the importance of financial reporting, and provides the theoretical foundation for the philosophy of full disclosure that is followed until today by the US regulators. In point of fact, Berle himself, would later become an adviser to the US President, Franklin D. Roosevelt, and would help drafting and evaluating the Securities Act of 1933 (Macintosh, 1999). His 1932 book "The Modern Corporation and Private Property" entails most of his views on the agent-stemmed, corporate accountability conundrum and is regarded today as foundational piece in corporate governance (Berle & Means, 1932).

2.2.3 The governance resurgence of the 1970s

In spite of its identification as a valid corporate matter since the early 1930s, the internal governance of US corporations would not constitute a legitimate phrase among corporate boards until the 1970s (Greenough & Clapman, 1980). In his book "The history of corporate governance," Cheffins (2013) attributes the lack of interest of US companies for internal governance matters to the economic growth and consequent prosperity of the post-WWII period. According to Cheffins & Bank (2009), corporate governance appears for the first time in a 1976 report from the Securities and Exchange Commission (SEC hereafter). At that point, corporate governance is only referred as supplementary reason for the proposed SEC regulatory reform, following a series of corporate bribery incidents from US corporations. The same year, as per SEC's suggestion, the New York Stock Exchange (NYSE) introduces a listing requirement that all public companies had an audit committee, comprised solely by independent directors (Reeb & Upadhyay, 2010). The latter obligation has been circulating as an SEC recommendation since the 1940s (Mace, 1979). In point of fact, even though SEC's intention is to push for a broader pro-regulation agenda with respect to board structure, no reform apart from the audit committee formation, would become mandatory until the Sarbanes-Oxley Act (SOX) of 2002 (Chen & Wu, 2016). By the end of the 1970s, governance-related reforms are restricted to disclosure recommendations for independent directors, as well as to the voluntary introduction of audit, compensation and nominating committees on the boards of listed firms (Cheffins, 2009).

2.2.4 The stall of the 1980s

Even though the first governance-related regulation reforms appear in the public stage during the 1970s, the internal governance of firms has not been an upward trending issue ever since. In fact, the corporate governance momentum ends by the start of the following decade. While Harold Williams - who had previously been appointed as SEC chairman by president Jimmy Carter in 1977 - consistently asks for further attention on governance matters, his Reagan-elected successor, John Shad, effectively opposes the philosophy of his colleague (Cheffins, 2013). For the most part, the 1980s pass without serious corporate governance developments. During this time, the US Congress, the SEC, the NYSE, as well as most corporate law and economics scholars, reject the pro-regulation doctrines of Berle and Means, which are now ideologically replaced by two of the most cited papers in economics; the "Theory of the firm: managerial behavior, agency costs and ownership structure" from Jensen and Meckling (1976), and Fama's 1980 work: "Agency problems and the theory of the firm."

2.2.5 Theories of the firm

The basis of both these papers is the separation between security ownership and control, as was first described by Berle and Means, more than 40 years earlier. Jensen and Meckling's (1976) theory of the firm, generalises and formally contextualises this "principal-agent problem." The idea is both plain and intuitive: when the principal contracts the agent to perform a task on the former's behalf, there should be no divergence in the interests between the two parties. However, if both the principal and the agent are value maximisers, the "no-divergence of interests" notion can not be assumed safely. In other words, there is always a chance that the agent will not act in the principal's best interest, hence creating problems for the latter. In fact, Jensen and Meckling (1976) give a name to the losses that are induced by the conflict of interests between principals and agents: agency costs. Authors define agency costs as: a) the expenditures that principals incur for monitoring the agents, b) the expenditures that agents incur to showcase their bond with the firm to the principals, and c) all residual losses, that stem from the divergence of interests between the two parties.

Despite the fact that Jensen and Meckling's 1976 seminal work on agency theory is considered today as one of the most influential studies on corporate governance, it was initially employed by corporate law and economics professors to validate anti-corporate governance proposals (Cheffins, 2013). Fama's 1980 efficient explanation of the ownership-control separation problem plays a central role in that. According to Fama (1980), instead of any "behavioural," or "managerial" theories on agent motivation, the principal-agent problem can be regarded as "*an efficient form of economic organization.*" Fama asserts that the perception of firm as "*a set of contracts among factors of production*" - that was earlier proposed by Jensen and Meckling (1976) and Alchian and Demsetz (1972) - can stay intact, adding the notion that the market itself must be thought of as a controlling mechanism for the agency problems that occur due to the conflicting interests between principals and agents. What Fama essentially posits, in his highly-cited paper, is that managers are both incentivised and disciplined by the managerial labour market competition.

Other control mechanisms to agency problems are proposed over the years. Haugen and Senbet (1981) call for the attachment of executive compensation with equity performance, while Jensen and Fama (1983) argue that instead of concentrating ownership on agents, it would be better to diversify the associated risk by dispersing the tasks to different agents according to their specialisation. Jensen himself, takes his 1976 theory one step further, arguing that the agency problems can be further compounded by the presence of excess cash flows (Jensen, 1986). The idea here, is that when cash flows exceed those necessary for net present value financing, managers have discretion in their investment choices, which in turn creates a path for pursuing their personal interests. The author then moves on by making the point that debt may be another control mechanism to the induced principal-agent problem; increasing debt reduces excess cash flows, and hence limits managerial discretion.

2.2.6 The rise of institutional shareholders

As the issue of corporate governance is not explicitly addressed in any of the aforementioned studies, academic and corporate awareness on the respective field

remains low throughout most of the 1980s (Cheffins, 2013). However, that decade is responsible for the surge of a stakeholder group that would play material role in the subsequent expansion of the corporate governance phenomenon; the institutional shareholders. According to SEC Historical Society (2020), in the 1950s, institutional investors own 8% of the largest companies in the US, a percentage that rises to 45% in 1988¹⁷. The implicit connection between institutional shareholder surge and corporate governance advancement is fairly straightforward. As shareholdings increase in size, the investors who own them (let's call them "institutional investors") become more and more dependent to the decisions of the management. Corporate governance enters the equation as means of protection to these investments. It may not be acknowledged as a board matter of increased significance yet, but the groundwork to its subsequent recognition is being laid out throughout the whole span of the decade.

As will be seen in later chapter of this thesis, the 1980s are characterised by the emergence of the Fourth Merger Wave (Shleifer & Vishny, 1991), essentially providing the perfect setting for the institutional investors-backed, corporate governance rise of the 1990s. Being described as "the Deals Decade" (Blair, 1993), the 1980s experience an abundance of corporate takeovers and an unprecedented number of consummated, hostile acquisitions (Martynova & Renneboog, 2008). In response to the cataclysmic wave of hostile takeover bids, managers introduce a series of anti-takeover measures in order to entrench their board positions. The managerial defensive tactics are mostly seen with favour from courts, adding to the need for a more co-ordinated shareholder action (Cheffins, 2013). To that end, in 1985, prominent institutional investors found the Council of Institutional Investors (CII henceforth) and the Institutional Shareholder Services (ISS hereafter). Aim of these new entities is to lobby for shareholders' rights and to provide governance-related evaluation services to investors, respectively (SEC Historical Society, 2020). By the end of the decade, takeover pressure, along with a constantly increasing shareholder power, begin to curb board entrenchment, hence bolstering corporate accountability and essentially setting the stage for the first official corporate governance initiatives of the 1990s.

¹⁷ Based on the "Owners of the World's Listed Companies" 2019 report from OECD, by the end of 2017, institutional investors own 72% of all listed US equity.

2.2.7 Shleifer and Vishny

Until the mid-1980s, academia has provided several routes through which agency costs could be lowered. From managerial incentives (Grossman & Hart, 1983; Haugen & Senbet, 1981) and concentration of insider ownership (Jensen & Meckling, 1976; Berle & Means, 1932), to market competition (Hart, 1983; Fama, 1980), diversification of risk (Jensen & Fama, 1983) and debt structure (Jensen, 1986), different pathways of managerial monitoring are being proposed. With respect to the "institutional investor" route though, the most influential paper is no other than Shleifer and Vishny's 1986 work "Large shareholders and corporate control." In principle, the idea that outside concentration of ownership reduces agency costs appears counter-intuitive. Conversely to the obvious channel through which insider ownership addresses the principal-agent problem, the benefits of outside shareholding concentration are not clearly visible.

Yet, the argument that is put forward in the Shleifer and Vishny study is based on a rather intuitive premise: small shareholders are far worse monitors than large shareholders. Verily, the advantage of large against small shareholders as regards the value destructive informational asymmetry between principals and agents is twofold: a) the potential profits of large investors far exceed the costs of reducing the information asymmetry, and b) large shareholders can influence corporate decisions through their large share of votes. Conversely, low potential gains, along with possible "free-rider" problems, make agency costs an insurmountable problem for small investors. Shleifer and Vishny (1986) start with a set of Fortune 500 firms between 1980-1984 and study the probability distribution of large shareholders, identifying performance-enhancing strategies over and above the ones followed by the incumbent management. Authors find that such improvements can be identified by large shareholders, but since the latter have no control of the firm, they have to: a) either engage in informal negotiations, b) fight the current board in a proxy contest, or c) proceed in direct takeover of the firm. The era of what today we call "activist investors" begins¹⁸.

¹⁸ For an overview of the empirical research on the field of shareholder activism (the term which is utilised to describe the activities of "activist investors") see in Denes et al. (2017).

2.2.8 A "modest" introduction to corporate governance

At the dawn of 1990s, the shift in the perception of corporate governance unrolls both in the corporate and in the academic world. Institutional investors start issuing policies and performance evaluation frameworks for corporate executives. High-profile companies, like General Motors, IBM and Kodak are among the first to replace their chief executives, in response to pressures from institutional shareholders (Gordon & Pound, 1993). Meanwhile, the "pay-for-size" compensation scheme is gradually being replaced by a "pay-for-performance" analogue, hence increasing the adoption of equity-based compensation contracts for corporate executives (Dobbin & Zorn, 2005). Furthermore, SEC's management-friendly stance on corporate matters starts to gravitate towards the side of the shareholders. In 1991, proposals concerning a potential introduction of shareholder vote for managerial tenure and compensation are discussed, while in 1992, SEC passes rules regarding the disclosure of executive compensation (SEC Historical Society, 2020). Right from the dawn of the decade, it becomes apparent that corporate governance practices would not stay optional for very long.

Academic attention for governance matters follows the same route. A 1988 review of corporate governance literature from Cochran and Wartick (1988), shows that out of 110 reviewed papers, no study is published in a major finance journal (Cheffins, 2013). The highly-cited papers on agency theory from Jensen and Fama of the previous decade do not mention corporate governance explicitly. The period of academic disregard for the field of corporate governance comes to an end with two highly influential publications that take place in the early 1990s. In 1992, Martin Lipton and Jay Lorsch publish their seminal work: "A modest proposal for improved corporate governance," and one year later, Michael Jensen publishes in the *Journal of Finance* "The modern industrial revolution, exit, and the failure of internal control systems." Both papers constitute academia's ideological shift of the corporate governance issue, from the outskirts to the epicentre of corporate finance literature, and mark the beginning of more elaborate research on the field.

The issues raised in these papers set the tone of corporate governance literature for the subsequent generation of papers. In the early 1980s, Jensen and Meckling's

agency theory is employed as an argument against the pro-regulatory philosophy of Berle and Means (Cheffins, 2013). It is Jensen himself that, more than 15 years after his 1976 work, signals the direction change of corporate finance research with respect to the issue of corporate governance. Discussing the failures of internal corporate control mechanisms, he states: "*The era of the control market came to an end, however, in late 1989 and 1990. Intense controversy and opposition from corporate managers, assisted by charges of fraud, the increase in default and bankruptcy rates, and insider trading prosecutions, caused the shutdown of the control market through court decisions, state antitakeover amendments, and regulatory restrictions on the availability of financing*" (Jensen, 1993). He continues, suggesting that "*We therefore must understand why these internal control systems have failed and learn how to make them work. By nature, organizations abhor control systems, and ineffective governance is a major part of the problem with internal control mechanisms*" and concludes, arguing that "*...it appears that the infrequency with which large corporate organizations restructure or redirect themselves solely on the basis of the internal control mechanisms in the absence of crises in the product, factor, or capital markets or the regulatory sector is strong testimony to the inadequacy of these control mechanisms.*" (Jensen, 1993).

Lipton's change on the issue of corporate governance is equally, if not even more, remarkable. His 1979 paper "Takeover bids in the target's boardroom" is seminal in the academic literature that rejects any kind of "board passivity" within the context of hostile acquisition attempts. Lipton (1979) argues in favour of any necessary means of managerial action that aims to protect the interests of the firm's constituents, essentially establishing the theoretical foundation of board rights' advocacy. Verily, a few years later, in 1985, his positions on hostile takeovers are adopted by the Supreme Court of Delaware, while in 1982, through his law firm, Wachtell, Lipton, Rosen & Katz, Lipton creates the Shareholders Rights Plan (widely known as the poison pill defence mechanism) in protection of corporate boards against tender-based hostile acquisitions (Bebchuk et al., 2002). It is in this context, that his 1992 work with Jay Lorsch signals the shift in corporate perceptions, with respect to the issue of corporate governance. In this paper, Lipton and Lorsch (1992) make a number of governance-centred recommendations for voluntary implementation by the corporations. Their proposals

for "improved corporate governance" include, inter alia, a decrease in the size of boards, an increase in the percentage of outside directors compared to insiders, an annual evaluation of the CEO by the firm's independent directors, the introduction of a lead independent director, a systematic review of management and corporate performance, better disclosure of company information to shareholders, and access to the firm's proxy statement to larger shareholders.

2.2.9 The Cadbury Report

By the early 1990s, corporate governance enters the agendas of corporations all over the world. In point of fact, even though US companies are considered as the golden standard in organisational advancements since World War II, the recessionary environment of the late 1980s, along with the takeover and market pressures on short-term performance for domestic boards, give the edge on corporate governance developments elsewhere (Cheffins, 2013). In the regulatory front, Britain paves the way for corporate governance. In 1991, the London Stock Exchange, the Financial Reporting Council, and the accountancy profession establish the Committee on the Financial Aspects of Corporate Governance. Sir Adrian Cadbury is elected chairman of the Committee, and in December 1992, he produces the Financial Aspects of Corporate Governance Report, better known as the Cadbury Report¹⁹.

The 1992 Cadbury Report is regarded as the basis of all governance regulatory reforms to this day, and the cornerstone of the existing corporate governance principles worldwide. First and foremost, the Cadbury Report attempts to provide the first definition of corporate governance. Thus, according to the report: "*corporate governance is the system by which companies are directed and controlled.*" The landmark report also sets the key actors in the corporate governance setting, by stating that: "*Boards of directors are responsible for the governance of their companies,*" while "*The shareholders' role in governance is to appoint the directors and the auditors and to satisfy themselves that an appropriate governance structure is in place.*" From that point on, the report describes a set of corporate governance provisions in which corporations are

¹⁹ The full report can be found here: "<http://cadbury.cjbs.archios.info/report>".

asked to comply on a voluntary basis. Overall, the key elements of the Cadbury Report are: a) the separation between the role of Chairman of the Board from that of the Chief Executive Officer (CEO), b) the need for majority of independent directors in the firm's board, c) a requirement for the Compensation Committee to be comprised by a majority of independent directors, and d) a demand for the insertion of an Audit Committee on the board, comprised by at least three outside directors.

2.2.10 The "Principles" of corporate governance

At the time of its publication, the 1992 Cadbury Report is employed as an appendix to the listing requirements of the London Stock Exchange; firms have to either comply with the Cadbury recommendations, or justify their non-compliance. However, the Cadbury Report sets the stage for the corporate governance rules as we know them to this day. In 1999, the Organisation for Economic Co-operation and Development (OECD henceforth) publishes the "Principles of Corporate Governance" (Principles hereafter).²⁰ The OECD 1999 report constitutes the first attempt, conducted by an inter-governmental organisation, to provide official corporate governance guidelines to corporations. Specifically, it presents a set of principles of "good corporate governance" in order to aid governments and corporations to shape their respective regulatory frameworks (OECD, 1999).

The Principles cover five thematic areas: a) the protection of shareholders' rights, b) the fair and equal treatment of all shareholders, c) the encouragement of shareholders' active engagement in corporate matters, d) the disclosure on matters of financial & managerial performance, ownership and governance of the firm, and e) the effective monitoring of the board by the firm's shareholders (OECD, 1999). The OECD Principles have been updated twice since their first publication in 2004 and in 2015²¹,

²⁰ The full OECD report of 1999 can be accessed here:

["https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=C/MIN\(99\)6&docLanguage=En"](https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=C/MIN(99)6&docLanguage=En).

²¹ The OECD report of 2004 can be found here: ["https://www.oecd.org/daf/ca/Corporate-Governance-Principles-ENG.pdf"](https://www.oecd.org/daf/ca/Corporate-Governance-Principles-ENG.pdf), and the 2015 OECD report is available in this address: ["https://read.oecd-ilibrary.org/governance/g20-oecd-principles-of-corporate-governance-2015_9789264236882-en_page1"](https://read.oecd-ilibrary.org/governance/g20-oecd-principles-of-corporate-governance-2015_9789264236882-en_page1).

and they are currently adopted by the Financial Stability Board and the World Bank, as the standards for evaluation in the area of corporate governance (OECD, 2015).

2.2.11 The Sarbanes-Oxley Act of 2002

However, to this day, the most far-reaching development in the context of corporate governance, by far, has been the passing of the Public Company Accounting Reform and Investor Protection Act of 2002, more commonly known as the Sarbanes-Oxley Act of 2002 (SOX henceforth). Triggered by the massive accounting scandals of Enron and WorldCom in the early 2000s, the US Congress introduces an extensive series of corporate governance mandates to US corporations (SEC Historical Society, 2020). The move is without precedent in federal securities legislation (Romano, 2004); SOX is considered as the most extensive regulatory reform since the Securities Acts of the early 1930s (Zhang, 2007). The name of the landmark legislation comes from its co-writers; the recently passed, Senator Paul Sarbanes, and his co-sponsor, Mike Oxley (Clymer, 2020).

At its core, SOX aims to protect shareholders from frauds regarding financial reporting misconducts (Coates & John, 2007). It is comprised of 11 major actions: a) it establishes the Public Company Accounting Oversight Board (PCAOB) in order to monitor public accounting companies, b) it sets up standards of independence for external auditors, c) it introduces an extensive series of corporate social responsibility mandates for auditors and corporate executives, d) it presents additional reporting requirements for financial transactions, e) it requires extra disclosure from financial analysts, f) it establishes stricter rules for securities professionals, g) it initiates a series of recurring studies on securities-related issues, h) it introduces criminal penalties for matters concerning financial reporting and board monitoring, i) it increases sentences for criminal offences related with financial reporting, j) it compels the CEO to sign the firm's tax return, and k) it identifies a broad range of fraudulent corporate activities as criminal offences and stiffens sentences in the realm of corporate accountability²².

²² The Sarbanes-Oxley Act of 2002 is available here: "<https://www.govinfo.gov/content/pkg/COMPS-1883/pdf/COMPS-1883.pdf>".

The idea of the Sarbanes-Oxley Act is based on a premise that creates staunch advocates and fervent critics in the corporate as well as in the academic world. SOX's most impactful provisions are the founding of PCAOB, and the cost-intensive introduction of internal control requirements for all listed firms²³. The direct costs of SOX compliance for the average firm are estimated by SEC at \$91,000, with many arguing that the actual number for most firms is far higher (Ahmed et al., 2010). In reality, the costs of SOX compliance are not easily discernible, entailing a wide range of direct and indirect costs for listed firms. For instance, Beneish et al. (2008) study a sample of 330 firms that make unaudited disclosures and a matched sample of 383 firms that make audited disclosures, as required by Section 404 of SOX. Authors find statistically significant negative CARs of -1.8% for the former group of firms, against non-statistically significant CARs for the latter, suggesting that the disclosure of internal control weaknesses can also bear costs for firms that do not comply with the introduced regulation. In return for the higher costs that its elements bear, SOX promises a wide range of long-term profits; lower cost of capital for firms, lower risk of corporate fraud for shareholders, and better resource allocation for society (Coates & John, 2007).

In this context, it is not surprising that empirical research on the effects of SOX provides mixed evidence. For instance, a strand of literature examines stock price reactions to SOX-related legislative events. To that end, Li et al. (2008), as well as Jain and Rezaee (2006) find positive cumulative abnormal returns (CAR) to eight and twelve SOX events respectively²⁴, suggesting that the expected benefits from the Sarbanes-Oxley Act outweigh the costs that are related with its compliance. Conversely to these studies, Zhang (2007) shows that the overall CARs around seventeen SOX legislative events for the US market are not statistically significant, while employing different model specifications and estimating CARs relative to the returns of foreign firms, author finds negative and statistically significant CARs between -3.76% and -8.21%. Likewise,

²³ Internal control requirements are introduced in the Section 404 of SOX. Section 404 is considered the most controversial part of SOX, mainly because of its cost-intensive introduction of internal control mandates (Zhang, 2007).

²⁴ Jain and Rezaee (2006) find positive statistical significance in the three-day cumulative abnormal returns of six out of the twelve studied SOX events, concluding that the benefits of SOX compliance outweigh its related costs.

Litvak (2007) investigates market reactions around SOX events for SOX-exposed and SOX-unexposed foreign firms. Results of this study show that during SOX-related announcements for cross-listed firms, the stock prices of foreign firms which are subject to SOX decrease significantly, compared to the stock prices of foreign firms which are not subject to the regulation. On a similar note, Ahmed et al. (2010) study 1428 companies between 2001 and 2007, examining the impact of SOX on corporate profitability. Results of this study show that, post-SOX, the mean cash flows of the firms in the sample decrease by 1.3% of total assets, while the effect is more pronounced for smaller, low-growth, and more complex firms.

2.2.12 The Dodd-Frank Act of 2010

The final notable development in the field of corporate governance has been the enactment of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (Dodd-Frank hereafter). Comprised by numerous provisions that span in sixteen thematic areas, Dodd-Frank constitutes the most wide-ranging financial regulatory reform since 1929's Glass-Steagall Act (US Congress, 2010). Fuelled by the economic crisis of 2008, Dodd-Frank enacts stricter oversight on the whole spectrum of financial markets, from banking and non-banking financial institutions, to hedge funds and financial regulatory agencies²⁵. Failures in corporate governance are considered to be among the main reasons of the 2008 global financial crisis, and hence the landmark regulation imposes six corporate governance regulations on public companies: a) Section 951, that introduces a shareholder voting requirement on executive compensation, b) Section, 952, that establishes a requirement for all compensation committees to be occupied with independent directors, c) Section 953, that requires the disclosure of additional information on executive compensation, d) Section 954, that extends SOX's rules on clawbacks of managerial compensation, e) Section 971, that confirms the authority of SEC on granting shareholder access to the nomination of new

²⁵ The whole Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 can be accessed here: "<https://www.congress.gov/111/plaws/publ203/PLAW-111publ203.pdf>".

directors, and f) Section 972, that requires firms to disclose information relative to the separation (or lack thereof) of the Chairman and CEO positions (Bainbridge, 2010).

As is the case with SOX, literature provides mixed findings with respect to the impact of the governance-centred provisions of Dodd-Frank on firm value. In a similar manner to the research design concerning market reaction to SOX-related public announcements, Cai and Walkling (2011) document significant wealth creation around the announcement of the Say-on-Pay (SOP henceforth) bill for firms with high abnormal CEO compensation and for firms with low pay-for-performance sensitivity, suggesting that SOP can create value for firms with inefficient executive compensation schemes. Conversely, Larcker et al. (2011) find negative and statistically significant stock price reaction for firms that would be most affected by the new corporate governance regulations. Specifically, the study divides 18 key announcement events in two groups - events concerning "Executive Pay" and events regarding "Proxy Access" - providing evidence of insignificant market reaction to the former group and weak negative reaction to the latter group. Brunarski et al. (2015) argue against the intended positive effects of SOP on executive contracting by employing a different approach. Authors of this study, examine executive response to low SOP shareholder support. Results show that executives with low shareholder support increase dividends and corporate investments (i.e., increases in R&D) and decrease leverage. However, these reactionary managerial moves do not appear to have an impact on either subsequent SOP vote outcomes, or firm value. Meanwhile, the excess compensation schemes for the overcompensated executives seem to persist regardless of the SOP outcome²⁶.

2.2.13 A new era of corporate governance

The "raison d'être" of corporate governance has long been a matter of debate. From the early societal concerns of Berle and Dodd, to the neoclassical thinking of Friedman and Fama, the question of how corporations ought to be governed has not yet reached an explicit answer. The definitional problems of corporate governance still

²⁶ For the impact of Dodd-Frank on non-corporate governance issues see also in: Toscano (2020), Canil et al. (2019), DeHaan (2017), Dimitrov et al. (2015), and Balasubramnian and Cyree (2014) among others.

persist (Paine & Srinivasan, 2019). At the same time, as more firms than ever are now owned by Private Equity (PE) investors (Wilhelmus & Lee, 2018; Renneboog et al., 2007), voices are heard for a fundamental advancement of the entire corporate governance landscape towards a sustainable, long-term success (Subramanian, 2015). Today, while proponents of the idea that shareholder value maximisation should be the sole purpose of the firm are not by any means without presence, there is an unprecedented call for the consolidation of the firm's societal element to the core framework of its business activities.

The dawn of the new decade marks the proliferation of corporate governance revisions, stemming from major actors of the corporate world. In 2018, the UK Financial Reporting Council replaces the monumental Cadbury Report of 1992 - for the first time since its inception - with the UK Corporate Governance Code of 2018, and its subsequent accompanying report; the UK Stewardship Code of 2020²⁷. Meanwhile, in July 2016, Business Roundtable (BRT)²⁸ issues the landmark open letter "Commonsense Principles of Corporate Governance," which was later replaced by its updated version; 2018's "Commonsense Principles 2.0." BRT's 2016 letter is one of the most notable corporate governance developments in the US, signalling the deviation of corporate commitment from the needs of shareholders, as it was first expressed in BRT's 1997 "Statement of Corporate Governance," to the interests of all stakeholder parties²⁹. The revised BRT version of 2018 is driven by two equally influential public endorsements of the corporate governance initiatives: the "Framework for US Stewardship and

²⁷ The full UK Corporate Governance Code of 2018 can be accessed in the following address: "<https://www.frc.org.uk/getattachment/88bd8c45-50ea-4841-95b0-d2f4f48069a2/2018-UK-Corporate-Governance-Code-FINAL.pdf>" while the whole UK Stewardship Code of 2020 is available here: "<http://www.wlrk.com/docs/TheUKStewardshipCode2020.pdf>".

²⁸ Business Roundtable is an ad hoc group of 181 CEOs from the largest US corporations. Notable members are, inter alia, Warren Buffet from Berkshire Hathaway, Larry Fink from BlackRock, Bill McNabb from Vanguard, Brian Moynihan from Bank of America, James Quincey from Coca-Cola, Mary Barra from General Motors, Jamie Dimon from JP Morgan Chase, Jeff Bezos from Amazon, and Tim Cook from Apple. All members of Business Roundtable can be found here: "<https://www.businessroundtable.org/about-us/members>".

²⁹ The full "Commonsense Principles of Corporate Governance" report of 2016 can be found here: "<https://www.governanceprinciples.org/wp-content/uploads/2018/10/2016-Open-Letter-Principles.pdf>". The full "Commonsense Principles 2.0" report of 2018 can be accessed here: "<https://www.governanceprinciples.org/>", while 1997's "Statement on Corporate Governance" is available here: "<http://www.ralphgomory.com/wp-content/uploads/2018/05/Business-Roundtable-1997.pdf>".

Governance" of 2017, published by the Investor Stewardship Group (ISG) and "The New Paradigm" of 2016, from the International Business Council of the World Economic Forum³⁰.

Despite the vast differences in terms of their corporate governance definitions, frameworks and principles, the aforementioned statements have a common objective at their core: long-term value creation for all stakeholders. 2018's Commonsense Principles 2.0 open letter notes: *"Today, we endorse the ISG Framework, the BRT Principles and The New Paradigm as counterweights to unhealthy short-termism"* while the "The New Paradigm" adds: *"A short-term mindset in managing and investing in businesses has become pervasive and is profoundly destructive to the long-term health of the economy."* In essence, all modern corporate governance frameworks attempt to provide a roadmap for sustainable, long-term approach of strategic decision making, to second the idea of shareholder primacy, and to induce the notion that stakeholder engagement and ESG³¹ involvement enhances shareholder value. Key actors across all statements are the board of directors, the company's management, and the firm's shareholders, while issues regarding board composition, director responsibilities, shareholder rights, transparency, asset management, and executive compensation are in the epicentre of the new corporate governance landscape. In his seminal work "For whom are corporate managers trustees," Merrick Dodd (1931) writes: *"[The present writer] believes that public opinion, which ultimately makes law, has made and is today making substantial strides in the direction of a view of the business corporation as an economic institution which has a social service as well as a profit-making function."* The corporate purpose debate, that started almost 90 years ago, may not have come to a conclusion yet, but the "strides" are surely more "substantial" than ever.

³⁰ ISG group is an initiative on establishing principles of stewardship for institutional investors and corporate governance standards for US public companies. ISG is comprised of 70 institutional investors with combined total net assets of more than \$32 trillion in US equity markets. Additional information on ISG group, as well as the full "Framework for US Stewardship and Governance" of 2017, are available here: <https://isgframework.org/stewardship-principles/>. 2016's "The New Paradigm" report that was issued by the International Business Council of the World Economic Forum can be accessed here: <https://www.wlrk.com/webdocs/wlrknew/AttorneyPubs/WLRK.25960.16.pdf>.

³¹ The term "ESG" refers to the Environmental, Social, and Governance factors that are employed to measure the sustainability of an investment. More details on the term, its sub-components, and all related metrics of sustainability can be found here: <https://www.msci.com/what-is-esg>.

2.3 Corporate social responsibility

2.3.1 Introduction

"...one need not be unduly credulous to feel that there is more to this talk of social responsibility on the part of corporation managers than merely a more intelligent appreciation of what tends to the ultimate benefit of their stockholders."

- E. Merrick Dodd, Jr. 1932. "For Whom Are Corporate Managers Trustees"

The notion that corporations are more than just fiduciaries of shareholders' interests has been around for decades. The theoretical roots of what today is called "corporate social responsibility" (CSR henceforth) belong to Merrick Dodd's landmark 1932 Harvard Law Review paper. The work posits that corporations (and especially their managers) have responsibilities that extend beyond their shareholders and into their community. Specifically, he states: *"...there is in fact a growing feeling not only that business has responsibilities to the community but that our corporate managers who control business should voluntarily and without waiting for legal compulsion manage it in such a way as to fulfil those responsibilities."* The main idea surrounding the concept of CSR is that corporations are entities of significant social weight, and as such they must be responsive not only to the concerns of their shareholders, but also to the concerns of their employees, their customers, and the general public. His quote *"No doubt it is to a large extent true that an attempt by business managers to take into consideration the welfare of employees and consumers [] will in the long run increase the profits of stockholders"* encapsulates the gist of what more than 50 years later would become "the stakeholder theory."

In reality, Dodd's paper signals the beginning of a debate on the issue of CSR that lasts to this day. Purpose of this section is to present the multiple dimensions of the CSR phenomenon, highlighting its academically rich, albeit inherently debatable nature. In this context, Elson and Goosen's 2016 criticism on Dodd's work, helps to kindly introduce the reader to the essence of the CSR debate. Specifically, authors posit that *"Dodd's suggestion is highly problematic, from an economic perspective, and if the suggestion were accepted, it would encompass a significant and damaging shift in*

property rights in our society." Correspondingly, in response to the Elson and Goosen critique, Vargas (2017) and O'Kelley (2018) note that Dodd's argument of stakeholder instead of shareholder primacy has not failed, but instead it has been integrated to modern corporate practices through the various dimensions of CSR. The following paragraphs of this section are dedicated in presenting the most notable theoretical and empirical findings in CSR literature.

2.3.2 The definition of CSR

Despite the growing presence of Environmental, Social, and Governance (ESG hereafter) concerns at the core of corporate behaviour (Brooks & Oikonomou, 2018), neither academic, nor corporate community has managed to define CSR in a uniform way. In point of fact, Dahlsrud (2008) reports 37 distinct definitions of CSR, that span for more than 50 years. In 1953, Bowen defines CSR as *"the obligations of business to pursue those policies, to make those decisions, or to follow those lines of action which are desirable in terms of the objectives and values of our society"* (Bowen, 1953), while in 1979, Carroll considers CSR as the *"economic, legal, ethical, and discretionary expectations that society has of an organization at a given point in time"* (Carroll, 1979). At the other end of the definitional spectrum, Levitt (1958) describes CSR as a *"fashion accessory of self-interested businessmen"* and most notably, Friedman (1962) regards CSR as a *"trend that could undermine the very foundations of our free society."*

From the aforementioned, cherry-picked definitions, it becomes apparent that the issue of CSR lies in the middle of an academic debate between two schools of thought. On the one hand, the neoclassical thinking with respect to CSR - as it was first introduced by Milton Friedman in his 1970 New York Times piece: "A Friedman Doctrine: The Social Responsibility of Business is to Increase its Profits" - which revolves around the premise that profit maximisation is the sole purpose of the firm (Friedman, 1970), and on the other hand, the stakeholder theory - as it was first presented by Robert Edward Freeman, in his highly cited 1984 book: "Strategic Management: A Stakeholder Approach," which extends the shareholder view of the company, integrating the interests of stakeholders to the corporate purpose (Hannan & Freeman, 1984). In broad

terms, the issue of CSR is characterised by lack of a uniform definition and of a comprehensive framework. However, advancements in both areas are substantial and worth mentioning.

2.3.3 The evolution of CSR

If one had to put academic thinking germane to CSR in historical perspective, she would identify a constant evolution of its public perception. In his widely-cited paper, Archie Carroll - one of the most influential voices in CSR literature - traces the first "glimpses" of CSR in the work of Bowen during the 1950s (Carroll, 1999). Yet, it is Martin Friedman's 1970's landmark essay, based on which any managerial initiatives related to social causes are seen as evidence of an increasing agency problem (Friedman, 2007), that establishes the first view of the CSR phenomenon in the corporate and in the academic world. The value destructing qualities of CSR remain the dominant opinion on the matter until Freeman's influential 1984 work on stakeholder theory, which acknowledges the interests of stakeholders as central aspects of the corporate cause. The foundation of modern thinking with respect to CSR though, is Carroll's 1991 seminal paper "The pyramid of corporate social responsibility: Toward the moral management of organizational stakeholders." Carroll's study sets - for the first time - a four-part framework of CSR, comprised by the firm's economic, legal, moral and philanthropic responsibilities, essentially creating the pathway for future works on the matter (Wood, 1991).

From that point on, ethics management progressively develops into an issue of strategic importance (Clarkson, 1995), and CSR takes its modern-day view as a fundamental source of competitive advantage (Jones, 1995). Meanwhile, in the early 1990s, literature witnesses the first studies that go beyond the investigation of the relationship between CSR and corporate financial performance (CFP henceforth) (Russo & Fouts, 1997). The firm's "philanthropic" aspect is integrated into the economic axis (Schwartz & Carroll, 2003), and more elaborate CSR models quantify and incorporate variables like moral values (Schuler & Cording, 2006), consumer beliefs (Barnett, 2007), managers' cognitive skills (Basu & Palazzo, 2008) and stakeholders'

prosocial behaviour (Benabou & Tirole, 2010), while CSR is studied in individual, organisational, national and international level (Aguilera et al., 2007). As more comprehensive databases of CSR become available in early 2000s³², CSR literature increases exponentially and extends in scope. Later chapters of this section provide a general overview of modern day developments in CSR investigation.

2.3.4 Why CSR?

Considering the existence of fundamentally opposing views on CSR, one could not but wonder what makes the CSR issue debatable. Before I continue with the most notable findings of empirical literature, I take it with a grain of salt and I briefly discuss two theoretical, CSR-stemmed problems, that extend beyond its abstract conceptual definition. The first hindrance to the CSR proposition is that the potential positive effects (if any) of CSR will be seen far in the future. Frederick et al. (2002) illustrate that people make time inconsistent choices when facing a dilemma between immediate and delayed rewards. At the same subject, Karp (2005) shows that the hyperbolic discounting model is related with procrastination on issues regarding climate change. The underlying intuition of hyperbolic discounting is that people discount future rewards more (less) easily as the length of the delay decreases (increases)³³. However, the logic that CSR is relied upon, is that we need to bear a direct and specific cost today, in order to help society indirectly in the future. Intuitively, finding motivation for such cause would be a challenge. In point of fact, Jenni and Loewenstein (1997) show that people are much more willing to help when the receiver of help becomes specific. On a similar note, Slovic (2010) evinces that during natural catastrophes (as is the case in global warming) people become more psychologically numb, as the number of those who get affected by the catastrophic act increases.

³² For instance, the most commonly employed database on CSR literature, Kinder, Lydenberg, Domini database (KLD hereafter) was launched in 1990, while the extensively utilised Thomson Reuters EIKON was launched in 2010. More details with regard to the former database are available here: "<https://www.msci.com/msci-kld-400-social-index>" and additional information with respect to the latter can be found here: "<https://www.refinitiv.com/en>".

³³ In other words, the more far to the future we move a decision, the easier it becomes for us to believe that we will make the right choice.

Conversely to what one would expect based on its debatable motive though, CSR experiences immense growth over the last twenty years. Based on data from the US Forum for Sustainable and Responsible Investment for 2016, the number of investment funds incorporating ethical, social, or corporate governance (ESG) criteria has increased dramatically, rising from 260 in 2007 to 1,002 in 2016, while one out every five dollars under professional management in the US is invested in a portfolio that applies at least one ESG-related screen, with socially responsible US assets under management (AUM henceforth) accounting today for the \$8.72 trillion out of the \$40.3 trillion total AUMs; a 14-fold increase compared to the \$0.64 trillion of 1995 (US SIF, 2016). Meanwhile, according to EPG, 132 US firms of Fortune Global 500 spend on average \$10.2 billion annually for CSR, while the aggregate annual spending in CSR is more than \$19.9 billion (EPG, 2015)³⁴.

The question in that case comes instinctively; Why CSR? Friedman's 1970 critique of CSR provides a legitimate argument against the application of CSR initiatives: the costs of implementing CSR policies increase corporate expenses and decrease shareholder wealth, essentially negating the fundamental purpose of the corporation. However, if that is actually the case, one cannot but wonder why does CSR experiences growth at every level among modern day's corporations, institutional investors and international organisations?

2.3.5 CSR and financial performance

2.3.5.1 Setting the stage of modern CSR empirical research

Intuitively, the first answer to the aforementioned question would be that CSR is correlated with the firm's financial performance (CFP hereafter). Unsurprisingly, literature on the CSR-CFP link is rich. Moskowitz, in his 1972 paper "Choosing Socially Responsible Stocks," identifies a set of 14 public firms with paradigmatic behaviour in terms of social responsibility and examines their stock market performance for a period

³⁴ To have a better view, UK's budget for industry, agriculture and employment in a single year is £24 billion (HM Treasury, 2016).

of six months. Then, he shows that these firms outperformed the SP500 Industrials index and the Dow-Jones index, suggesting that there is a positive relationship between CSR and equity returns. The shortcomings of such analysis are obvious to the experienced eye of modern day researcher. Since the selection of "socially responsible" firms is performed autonomously by the author, and as no statistical analysis is conducted to control for other established, performance-related factors, it is safe to assert that Moskowitz's model could potentially suffer, inter alia, from selection bias, endogeneity, and reverse causality. Nevertheless, this study constitutes the first attempt in investigating an issue that would intrigue academic community for the next 50 years.

A few years later, Belkaoui (1976) reaches to similar conclusions with those of Moskowitz, whilst employing a more elaborate model. His study examines the stock performance of a set of 50 US companies that publicly disclose information with respect to their expenditures for pollution control, against a control sample of 50 US firms from the same industry that make no such disclosure. Results show that firms of the former group underperform firms of the latter before the disclosure of environmental information and outperform them after the disclosure date. It is hence suggested that disclosure respective to environmental issues may have a temporary value enhancing effect to shareholder wealth around the date of the announcement. Belkaoui's work contributes to the literature of its time by the inclusion of a control group as robustness test to its respective findings, but as is the case in Moskowitz's paper, Belkaoui's model omits several factors that future research would identify as crucial in most studies of firm performance.

2.3.5.2 Cochran and Wood

A paper that would address both issues simultaneously would not come until Cochran and Wood's 1984 "Corporate Social Responsibility and Financial Performance." The contribution of this study to CSR literature is twofold. Before Cochran and Wood's paper, most studies employ investor returns as their main financial performance (FP) measures. For instance, Moskowitz (1972) - like Vance three years later (Vance, 1975) - uses price per share change to measure financial performance, while Abbott and

Monsen (1979) enhance this FP ratio with dividends. The main issue of these ratios though, is that none of them accounts for risk. Thus, it is not surprising that the aforementioned studies provide contradictory evidence on the CSR-CFP link. In point of fact, Cochran and Wood (1984) re-examine the sample of *high-CSR* firms that are found to outperform their benchmarks in Moskowitz's 1972 study, and find that a portfolio comprised of these stocks has a beta of 1.56, suggesting that it is the riskiness of the investments and not the socially responsible behaviour of the respective firms, the main driver behind Moskowitz's findings. As an advancement to the use of investor returns in CSR research, several studies opt to utilise accounting returns as proxies of firm performance. Using such measures enables the estimation of earnings' response to managerial policies. In this context, early studies employ the earnings per share (EPS), or the price to earnings (P/E) ratios (Tsoutsoura, 2004). However, both ratios are also regarded problematic, as they are influenced by the accounting practices of the firms.

Meanwhile, most early works in CSR face sampling issues. Specifically, studies either have small sample size, or are examined for small time period. Cochran and Wood (1984) report that out of the 14 studies that precede theirs, six have sample size of less than 30 firms, and seven examine a time period of less than 2 years. Sample-related problems hinder the use of control groups in these works, hence driving researchers to compare the performance of their sample with market indexes (e.g., Moskowitz employs the SP500 Industrials index as benchmark). Addressing the aforementioned concerns, Cochran and Wood (1984) employ three accounting ratios as measures of financial performance and examine a sample of 39 firms from 1970 to 1979. The ratios that are used in this study, are EBIT to assets, EBIT to sales, and a measure of excess market value³⁵. Also, each firm in the sample is matched with its industry average, provided that there are at least 10 firms in the industry control group. Results show that in terms of operating earnings to sales and market excess value, *high-CSR* firms outperform their low-performing counterparts. However, there is no statistically significant difference between *high-CSR* and *low-CSR* firms when dependent variable is operating earnings to total assets ratio. Moreover, researchers find that regressing the

³⁵ Authors define excess market value as the market value of equity plus book value of debt minus total assets, adjusted by sales (Cochran & Wood, 1984).

age of assets to Moskowitz's measure of CSR, outputs a negative, statistically significant coefficient for the *low-CSR* dummy, suggesting that the age of the firm's assets is negatively related with its CSR performance. Overall, this study provides evidence of a weak, positive relationship of CSR with financial performance.

2.3.5.3 The pendular verdict of the CSR-CFP association

Even though Cochran and Wood's work was published more than 35 years ago, the conclusions with regard to the direction and the significance of the CSR-CFP association have not deviated considerably since then. In point of fact, studies on the potential relation of a firm's ESG stance with its financial performance provide findings at literally every direction. For example, Waddock and Graves (1997) investigate the relationship, as well as the direction of causality, between CSR and CFP. This widely cited paper, is one of the earliest studies that employ the KLD database to measure CSR. However, asserting that equal weighting of the KLD sub-components is not appropriate, authors weigh each CSR dimension according to a panel of experts. Return on assets, return on equity and return on sales are employed as measures of financial performance. Findings reveal a bi-directional relationship between CSR and CFP. On the one hand, results corroborate the theory that slack resources - created by prior good financial performance - ultimately lead to higher investments in CSR-themed initiatives, and on the other, CSR is found to be positively linked with better future CFP. Authors introduce the notion of the "virtuous circle" between two distinct phenomena to explain the findings.

Almost ten years after this study, Nelling and Webb (2008) revisit the issue of the "virtuous circle." In a similar vein with the aforementioned study, these authors show that when using traditional methodologies, CSR and CFP exhibit causal relation. However, when employing time fixed effects to the model, results give a slightly different story. Specifically, good stock market performance appears to have an impact on subsequent CSR performance for the firm, mainly through a surge in employee-related initiatives. Yet, CSR activities fail to predict future firm financial performance,

essentially suggesting that Waddock and Graves' "virtuous circle" is in reality a "one-way road."

In an equally influential paper, McWilliams and Siegel (2000) take their critique of Waddock and Graves's 1997 study (WG hereafter) one step further. The WG model employs as control variables to the key independent variable (i.e., the proxy of firm's CSR performance), the firm's size, a proxy of the firm's risk, and the industry in which the firm operates. McWilliams and Siegel's contribution in this case, is the inclusion of two additional control factors to the WG model; namely, the research and development intensity (R&D) of the firm, and the advertising intensity of the firm's industry. Results show that when these two factors are inserted to WG's model, the magnitude of the CSR coefficient decreases considerably, the adjusted R-squared of the model increases, and the statistical significance of the CSR variable disappears. Taken jointly, findings identify the relationship of R&D with CSR performance, and underscore the importance of the former in all future considerations of the CSR-CFP link. The same authors though, in their highly-cited paper "Corporate Social Responsibility: A Theory of the Firm Perspective" extend the determinants of CSR, by including the level of the firm's diversification, the market conditions, and consumer income to their model. Yet, with regard to the CSR-CFP association, their study evinces a neutral relationship between the two variables (McWilliams & Siegel, 2001).

Brammer and Millington (2008) provide a different view of the CSR-CFP puzzle. This study employs the difference between predicted and realised levels of charitable giving as proxy for CSR, and examines its impact on CFP - as measured by firm's risk-adjusted market performance - between 1990 and 1999. Results of this study, exhibit a curvilinear CSR-CFP relationship. Specifically, authors evince that only firms with unusually good, or firms with unusually bad CSR performance are linked with higher financial performance. The explanation that is given to the unusual finding is that firms with unexpectedly high levels of CSR engagement may differentiate themselves from a stakeholder perspective, and hence be compensated by the latter with increased investor loyalty, employee motivation, or customer trust. On the other hand, firms with unexpectedly low levels of CSR expenditures may better allocate the reserved resources for alternative investments, or return them to the shareholders through dividends. In a

sense, Brammer and Millington's model combines Friedman's neoclassical motivation with the modern-day doctrines of stakeholder theory. It should be noted however, that the study only accounts philanthropic giving as measure of CSR, which limits any conclusions on the CSR-CFP link to only one aspect of CSR, which is a multidimensional issue by definition³⁶.

2.3.5.4 Reviews and meta-analyses

A more systematic view of the potential causality and direction of the CSR-CFP link, could be provided through the examination of the most comprehensive literature reviews and meta-analyses of the subject. In this context, the highly cited 2003's paper from Margolis and Walsh "Misery Loves Companies: Rethinking Social Initiatives by Business" reviews 127 studies between 1971 and 2001, that investigate the CSR-CFP relationship. In 109 out of 127 studies, CSR is treated as independent variable and CFP is treated as dependent variable, while in 22 studies the roles of the two variables are reversed³⁷. Out of the 109 studies where CSR is treated as independent variable, 54 evince a positive link between CSR and CFP, 7 show a negative CSR-CFP link, while 28 fail to exhibit statistical significance in the CSR-CFP association. Correspondingly, from the set of 22 studies where CSR is dependent variable, 16 report positive relationship, 2 fail to evince statistical significance, and 4 provide mixed evidence. Overall, study exhibits a positive, albeit weak association between a firm's social and financial performance.

All major meta-analyses which have been conducted over the last twenty years draw a similar picture of the CSR-CFP relationship. Orlitzky et al. (2003) perform a meta-analysis of 52 CSR studies, while a few years later, Margolis et al. (2007) increase the scope of the reviewed papers, conducting a meta-analysis of 251 CSR-themed

³⁶ Corporate philanthropy is also studied by Godfrey (2005). Author shows that through the generated moral capital and the subsequent protection of the firm's intangible assets, corporate philanthropy enhances shareholder wealth.

³⁷ Four studies investigate the CSR-CFP link in both directions (Margolis & Walsh, 2003).

studies. More recently, Friede et al. (2015) massively exceed that number³⁸, reviewing the findings of more than 2,200 papers on the CSR-CFP association. Despite differing substantially in the number of reviewed papers, as well as in the time period that is covered in them, the three meta-analyses report remarkably similar correlation coefficients of the CSR-CFP link. Specifically, the mean overall effect for the three studies is 0.15 for Orlitzky et al. (2003), 0.13 for Margolis et al. (2007), and 0.12 for Friede et al. (2015). Results do not conclusively suggest that social performance is a predictor of the firm's financial performance, but they establish the argument that the relationship between CSR and CFP is positive, albeit mildly.

The recent findings of Friede et al. (2015) shed most light to the CSR-CFP conundrum. This study examines 35 literature reviews and 25 meta-analyses of CSR papers between 1971 and 2015. Out of 1,816 primary papers that are contained in 35 review studies, 48.2% show positive relationship between CSR and CFP, 10.7% evince negative CSR-CFP link, while 41% of the reviewed papers report neutral or mixed findings. Correspondingly, from the set of 25 meta-analyses (in which 1,902 papers are reviewed), only one meta-analysis exhibits negative average correlation between CSR and CFP. In specific, with the exception of Revelli and Viviani (2015) who provide evidence of a negative - albeit close to zero - correlation coefficient ($r=-0.003$), all meta-analyses report a mean effect that ranges between 0.061 (Orlitzky, 2001) and 0.312 (Frooman, 1997). Overall, findings suggest that had we wanted to portray the never-ending quest for the CSR-CFP relation in a nutshell, we would modestly describe it as non-negative.

2.3.6 Sources of competitive advantage

Michael Porter and Mark Kramer, in their highly-cited 2006 Harvard Business Review article "Strategy and Society: The Link Between Competitive Advantage and Corporate Social Responsibility," highlight the importance of CSR to competitive success. In this piece, authors argue that instead of thinking of CSR as "damage control"

³⁸ The number of studies reviewed in the Friede et al. (2015) meta-analysis is 35 larger than the mean number of studies that are examined in all prior review studies.

or "PR campaign," each corporation should rather identify the specific societal problems that is better positioned to address, hence realising greater competitive advantages, and start working towards implementing the respective CSR initiatives. In point of fact, the article maps the activities that corporations engage in, and exhibit greater potential for positive social impact. As a whole, the core proposition of Porter and Kramer, is that the integration of a social dimension to the firm's value proposition is key for generating both economic and social value. Not far from this argument, Tang et al. (2012) show that firms realise higher profits when the CSR strategy that they decide to implement exhibits consistency, involves interrelated aspects of CSR, and stems from CSR dimensions that are internal to the firm. In that respect, it is not surprising that literature on the links between CSR and non-economic sources of competitive advantage is rich. In a recent meta-analysis of the CSR-CFP link, Vishwanathan et al. (2020) show that CSR enhances firm value through different CSR-CFP mediating mechanisms. Specifically, authors narrow down the spectrum of CSR-stemmed sources of competitive advantage in four distinct CSR-CFP mediators; firm reputation, stakeholder engagement, risk mitigation and innovation.

Indeed, researchers have been revealing links between CSR and dimensions of the aforementioned mediators to this day. For example, the reputational burden of environmental misdemeanour has long been established for corporations (Karpoff et al., 2005). In that context, Janney and Gove (2010) show that a firm's CSR reputation may act as a buffer against corporate governance violations, but in case these violations are revealed, the firm's enhanced CSR reputation acts as a call for harsher sanctions. This study follows Brammer and Pavelin's 2006 work on the importance of fit between CSR activities and stakeholders' perception of CSR. Authors show that the impact of a firm's CSR reputation varies across sectors, as well as across dimensions of social performance. In essence, Brammer and Pavelin's study underscores the value enhancing qualities of the way in which firms engage in CSR; an argument that was first introduced in Porter and Kramer's 2002 Harvard Business Review seminal article "The Competitive Advantage of Corporate Philanthropy." To further extend the empirical evidence on the link between CSR and firm value, He and Li (2011) evince the direct impact of CSR on brand identification and customer satisfaction, while Luo and Bhattacharya (2006)

identify the company's innovativeness capabilities as driver of customer satisfaction, and hence as potential mediator in the CSR-firm value link.

Meanwhile, the reciprocal association of the firm with its stakeholders is another point of interest for CSR research. In one of the most interesting studies in this area, Henisz et al. (2014) code 50,000 stakeholder events³⁹ of 26 gold mines which are owned by 19 listed firms for a span of 15 years (1993-2008) in order to create an index that measures the levels of stakeholder conflict/cooperation for each mine. Then, they attempt to explain the discrepancy between their sample firms' market valuation and respective intrinsic value based on the created stakeholder conflict/cooperation index. Their findings evince that the ability to increase support from external stakeholders increases the firm's financial valuation. On a similar note, Cheng et al. (2014) employ a dataset of 2,439 listed firms between 2002 and 2009, and examine the impact of shareholder engagement on a firm's access to finance. Results show that firms with better stakeholder engagement are linked with lower capital constraints. Moreover, Krüger (2015) studies a sample of 2,119 corporate events from 2001 to 2007, and provides evidence of positive abnormal returns for CSR news of firms with poor stakeholder relations, while more recently, Dai et al. (2020) examine the social performance of 34,117 customer/supplier pairs from 50 countries for the period 2003-2015 and find that customers can have positive influence on the CSR policies of their suppliers, whereas collaborative CSR initiatives have a positive impact on the operational efficiency and the firm value of both customers and suppliers, as well as on the sales growth of the customers.

A strong body of CSR literature also investigates the association between social responsibility and firm risk. In one of the earliest meta-analyses of CSR and firm risk, Orlitzky and Benjamin (2001) report a negative correlation between CSR and firm risk of -0.21. Specifically, the study provides evidence of reciprocal causality between the two variables; prior CSR appears to be negatively related to future firm risk, and prior firm risk is negatively associated with future CSR performance. More recent studies

³⁹ Henisz et al. (2014) define a stakeholder event as a public expression of sentiment from a media-relevant stakeholder. To create the respective dataset, authors employed the FACTIVA database to read and manually code 20,000 media documents that mention either the mine or the corresponding parent company.

extend research on the negative CSR/firm risk link. For example, Luo and Bhattacharya (2009) show that good social performance lowers firm-idiosyncratic risk, while Verwijmeren and Derwall (2010) find that firms with high-scores in the CSR area of employee well-being are associated with better credit ratings. Oikonomou et al. (2014) corroborate the positive link between CSR and credit ratings, after accounting all the dimensions of CSR that are accounted for in the KLD database. Specifically, this study examines a set of 3,240 bonds, issued by 742 distinct firms between 1993 and 2008 and finds that bonds of firms with high (low) CSR scores are associated with higher (lower) bond ratings and hence with lower (higher) bond yields. The same authors examine the social performance of all SP500 constituents from 1992 to 2009, and evince find that the *Strengths* components of a firm's social scores - as measured by the KLD database - are negatively related with firm systematic risk, but the relationship fails to exhibit statistical significance. Yet, the study shows that the link between the *Concerns* components of a firm's social performance and its systematic risk, is positive and statistically significant⁴⁰.

Overall, looking for a pattern emerging from CSR literature, one would note that from its first emergence as a fruitful topic of academic debate (around the early 1980s) and for the twenty years that followed, the respective research was focused on the investigation of a direct channel between CSR and CFP, whereas roughly over the last decade – and since studies have not shown any strong direct relationship between the two variables – academic focus has been turned towards the investigation of indirect relationships between CSR and CFP, and hence towards the examination of non-economic sources of competitive advantage. Thus, a bird's eye view of the respective strand of literature evinces that firms with higher levels of CSR performance are associated with a wide spectrum of corporate phenomena, like improved credit quality (Goss & Roberts, 2011), more favourable evaluation by investment analysts (Ioannou & Serafeim, 2015), superior stakeholder engagement (Choi & Wang, 2009) and transparency (Dhaliwal et al., 2011), better access to resources (Cheng et al., 2014;

⁴⁰ KLD database entails information respective to a firm's social performance (expressed as a set of activities in a series of social strengths and social concerns categories) in the areas of: community, corporate governance, diversity, employee relations, environment, human rights, and product. More details on the database are available at: "<https://www.msci.com/msci-kld-400-social-index>".

Cochran & Wood, 1984), better access to higher quality employees (Greening & Turban, 2000), lower idiosyncratic (Luo & Bhattacharya, 2009) and systematic risk (Oikonomou et al., 2012). Literature has also given us evidence that firms with high CSR scores are able to attract better applicants (Albinger & Freeman, 2000), to generate goodwill (Godfrey et al., 2009), to mitigate possible negative consequences resulting from consumers' perceptions of corporate hypocrisy (Wagner et al., 2009), to benefit from higher customer identification (Lichtenstein et al., 2004), and to be better evaluated by stakeholders (Bhattacharya et al, 2009).

2.3.7 CSR problems

Up to this point, the current part of the thesis has attempted to provide a brief overview of the definitional matters regarding the concept of CSR, the empirical research on the CSR-CFP link, as well as the association of CSR with firm value. Yet, in spite of the fact that CSR, has become one of the most prolific points of academic attention, its respective literature is characterised by some challenging issues, that in the writer's humble opinion should be noted.

2.3.7.1 Lack of definition

As mentioned in previous section of the current chapter, the definitional obscurity of CSR has a problematic effect in academic research. From the four pillars of Carroll (2001), and the implicit-explicit model of Matten and Moon (2008), to Clarkson's (1995) ethics management, Schuler and Cording's (2006) moral value, and McWilliams and Siegel's supply and demand model (2001), literature has been shifting the reader's view of CSR since its inception. The absence of a clear model for a firm's social performance, leaves researchers with an ever-expanding range of CSR frameworks on which to base their studies, hence hindering the robustness of their work. The lack of a coherent theory is not a new critique to CSR. On the contrary, it has concerned academia for more than 30 years (Ullmann, 1985), and it keeps being a matter of academic debate until today (Kitzmueller & Shimshack, 2012; Margolis & Walsh, 2003; McWilliams & Siegel, 2001). The lack of an explicit CSR model with catholic acceptance

from both the academic and the corporate community – similar to the CAPM or the APT, when discussing about asset valuation – can pose significant challenges in CSR studies. Researchers are led to utilise their own perceptions of CSR, hence evaluating the results of their studies based on their self-defined CSR frameworks. If being mistreated, this definitional inconsistency could enable authors to frame the problem of a CSR study in a way that better serves their research purposes. Prospective readers should be aware of such phenomena and adjust their reviews of such works accordingly.

2.3.7.2 Measurement inconsistencies

Beyond the existence of several conceptual CSR frameworks in the respective literature, CSR studies also vary across the metrics that they employ to measure a firm's social performance. In one of the earliest critiques on CSR research, Griffin and Mahon (1997) review 62 empirical studies, and highlight the inconsistency of the CSR/CFP findings, attributing the problem to methodological issues. Specifically, authors of this study posit that results in the CSR-CFP literature can vary according to the CSR dimensions that are examined, or according to the measures of financial performance that are being employed. Gjølborg (2009) re-states the problem; CSR performance calculation depends on the framework that is being used as a basis.

Verily, researchers employ a series of different measures to examine the social performance of a corporation. Among the variables most commonly utilised in CSR literature is the use of large-scale survey data from Fortune America's Most Admired Corporations (FAMA) (Luo & Bhattacharya, 2006). Later studies measure CSP through the use of an attribute-based index, that consists of ratings from the Kinder, Lydenberg and Domini (KLD) firm, on specific areas of corporate activity like: employee relations, human rights, corporate governance and environment (Oikonomou et al., 2014; Hull & Rothenberg, 2008; McWilliams & Siegel, 2001; Waddock and Graves, 1997). In more recent works, Thomson Reuters ASSET4 database is also employed by researchers (Cheng et al., 2014). On a similar premise with KLD, ASSET4 rates the social performance of its constituents based on three dimensions of CSR: environmental, social, and corporate governance. Finally, as Godfrey et al. (2009) point out, even after

taking into account the definition and measurement inconsistencies of the CFP variable, a strong body of studies utilise a single proxy as CSR measure, such as charitable giving (Brammer & Millington, 2008), or disclosure (Gamerschlag et al., 2011). Provided with the fact that CSR is a multidimensional activity, consisted of interrelated variables and measured in a variety of ways, the possibility of omitted variable bias in CSR findings must always be acknowledged.

2.3.7.3 Endogeneity

Finally, the aforementioned lack of a solid, academically accepted theory, along with the absence of a consistent CSR measure, leads us to a third critical challenge regarding the CSR establishment; the direction of causality. Firms' good social performance may lead to subsequent financial performance. Yet, it may very well be the other way around for the CSR-CFP link; firms with good financial performance may pay more attention to their social image. In point of fact, Waddock and Graves (1997) provide a name to the phenomenon that encapsulates the two opposing dynamics in the CSR-CFP arena: the theory of "slack resources" against "good management." The former theory posits that firms with good financial performance may have the "slack resources" which are needed for investments in the social domain, whereas the latter theory asserts that firms' good social performance may positively impact stakeholder relations and thus subsequent financial performance. In this setup of theirs, researchers give a simple answer; CSP and CFP are positively related "*whichever measure we choose as the dependent variable.*" Today, almost 25 years after Waddock and Graves' work, the causal link between CSR and financial performance has not yet been established unequivocally (Devinney, 2009; Wood & Jones, 1995; McGuire et al., 1988). In this context, the methodological inconsistencies at the foundations of the CSR concept and the consequent generalisability of the resulting variables, can inevitably lead to two-way causality issues and validity concerns.

2.4 The role of boards in corporate governance

2.4.1 Introduction

“Boards with a diverse mix of genders, ethnicities, career experiences, and ways of thinking have, as a result, a more diverse and aware mind-set.”

The above statement belongs to Larry Fink, Chairman & CEO of BlackRock, from his letter to CEOs, on January 12th, 2018 (BlackRock, 2018). Less than a month later, the asset manager behemoth would issue a guideline asking its portfolio firms to "have at least two women" directors (Krouse, 2018). Meanwhile, State Street plans to vote against the boards of companies that fail to meet its in-house, social responsibility metrics (Wigglesworth, 2020), and Goldman Sachs will not underwrite IPOs for companies that do not have at least one board member from an underrepresented group of people (Green, 2020). Boardrooms all over the world are becoming more diverse. Norway was the first to introduce gender quotas in 2008, requiring that all listed firms have at least 40% female representation on their boards, whilst an increasing number of countries (Spain, France, Belgium, Sweden, Denmark, Netherlands, Finland, Iceland) have passed similar legislations ever since (European Commission, 2019). Meanwhile, California, becomes the first US State to sign a similar "gender quota" law in 2018 for its publicly-traded headquartered firms (Smith, 2018).

Corporate world is in the midst of an ever-increasing call for more diversity, transparency and corporate accountability. The massive economic collapses of the last twenty years have led to unprecedented regulatory reforms in the realm of corporate governance. In this context, it is not surprising that corporate boards have seen tremendous changes in terms of characteristics (Ghosh et al., 2010; Linck et al., 2008); directors are key actors in building sustainable value through corporate governance (Business Roundtable, 2016). This section of the thesis narrows down the corporate governance literature to a set of board characteristics that are related to the empirical chapters of the study, with the hope of making the reading of the latter a pleasant endeavour for the reader.

2.4.1 Board composition

2.4.1.1 Director independency

Among the most noticeable trends regarding board composition over the last twenty years is the surge of outside directors. Drobetz et al. (2018) report that the percentage of independent directors across all S&P500 firms between 2000 and 2010 increased by 25%, while the mean share of inside directors in the sample decreased by 29%. The findings of Lehn et al. (2009) illuminate this trend even further. Authors of this study, examine a set of 82 US listed companies that managed to survive from 1935 until 2000. Their results show, inter alia, that the percentage of inside directors decreased from roughly 45% in 1935⁴¹ to 15% in 2000. Gordon (2006) corroborates the decrease of inside directors on corporate boards. By combining all available data on board composition from SEC and IRRC between 1950 and 2005, he evinces that the representation of independent directors on corporate boards increased from 25% in 1950 to 75% in 2005. The regulatory reforms of the early 2000s helped intensify the phenomenon. Linck et al. (2009) examine the impact of the Sarbanes-Oxley Act of 2002 on the supply and demand for outside directors in a sample of 8,000 US public companies. Among the most notable findings with respect to post-SOX changes in board structure, authors evince an increase in the size and independency of the average boardroom.

Given the surging presence of independent directors on the boards of US corporations, it is not surprising that the relationship between director independency and firm performance is under constant examination from researchers. In that respect, literature appears to evince a pattern in the link between the two variables. Early papers either fail to report findings of statistically significant relationship between independent directors and firm's financial performance (Bhagat & Black, 2001; Bhagat & Black, 1999; Hermalin & Weisbach, 1991), or provide evidence that the association is negative (Agrawal & Knoeber, 1996; Yermack, 1996). However, more recent studies challenge these findings. In one of the most noteworthy works in the area, Nguyen and Nielsen (2010) investigate whether independent directors create value for shareholders by

⁴¹ The percentage of inside directors increased from 45% in 1935 to 49% in 1950 (Lehn et al., 2009).

examining stock market reactions to the announcement of their deaths. Specifically, researchers identify 108 suddenly deceased independent directors between 1994 and 2007 and employ their death announcements as a natural experiment of their contribution to firm value. Findings show that, on average, stock prices decreased by 0.85% at the announcement of an independent director's sudden death, suggesting that director independence is valuable for shareholders. Further tests evince that the abnormal stock returns are significantly more negative at the death announcements of outside directors than at the deaths of either inside, or grey board members (directors who are in any way related to the firms' businesses).

In line with the fairly established idea that director independence is positively linked with firm value, literature today is more focused on establishing the channels through which this relationship operates. For example, Duchin et al. (2010) provide evidence that the addition of outside directors on the board increases firm performance, as measured by either Tobin's Q or stock returns, but only when the cost of information is low. Conversely, performance is hurt from the addition of independent directors on the board when the information cost is high. On a slightly different note, Lu and Wang (2018) investigate the association between independent directors and innovation in a set of US listed firms between 1996 and 2007. Researchers employ a difference-in-difference model - using the mandate for majority of independent directors across the boards of NYSE and NASDAQ-listed firms as exogenous shock to the composition of the board - and provide evidence that board independence is positively related with corporate innovation. Overall, several other associations of board independence have been identified, from better accounting quality (Petra, 2007), and higher board transparency (Liao et al., 2015) to enhanced board (Liu et al., 2015) and CEO monitoring (Guo & Masulis, 2015).

2.4.1.2 Industry expertise

Industry expertise is among the most sought traits of director appointments (Faleye et al., 2018). As such, empirical research on the strand of literature studying industry expert directors is rich. Drobetz et al. (2018) examine whether industry

expertise has an impact on firm value, as measured by Tobin's Q. To that end, they employ a sample of SP1500 firms from 2000 to 2010. Their results show that firms whose boards are comprised of more experienced independent directors exhibit higher Tobin's Q, compared with firms whose boards have less experienced outside board members. Von Meyerinck et al. (2016) study a sample of 688 appointments of independent directors of SP500 firms between 2005 and 2010, and find that announcement returns around the appointments of experienced directors are significantly higher (on average, 0.4% to 0.8% higher), compared to the announcement returns of inexperienced board members. In both works from Drobetz et al. (2018) and Von Meyerinck et al. (2016), one can see the intuition of Nguyen and Nielsen (2010) according to which the deaths of directors are employed as identification strategy. In that context, the event studies on death announcements of directors corroborate both studies' main findings. Drobetz et al. (2018) report that the deaths of industry expert directors are associated with three-day cumulative abnormal returns which are 1.3%-1.6% lower, compared to the deaths of non-expert directors. In like manner, Von Meyerinck et al. (2016) evince that the deaths of experienced directors are linked with announcement returns which are 2.0%-2.7% lower than the deaths of inexperienced directors.

Industry expertise has also been associated with several indirect channels of value creation for shareholders. For instance, Faleye et al. (2018) provide evidence that industry expertise is positively related with investments in research and development (R&D hereafter). Furthermore, authors show that the increased R&D expenditures create value for shareholders; firms with more experienced directors receive more patents (for given number of R&D investments), and have lower volatility in their future earnings, compared to firms with inexperienced directors. Moreover, in the same study it is evinced that board industry expertise is positively associated with executive compensation incentives for increased R&D investment. In like manner with director independence, director industry expertise is also linked with enhancements in board monitoring (Wang et al., 2015). On a similar note, Cohen et al. (2014) show that industry expertise of directors enhances the monitoring function of audit committees, especially when combined with experience in accounting.

2.4.2 Board heterogeneity

2.4.2.1 *Heterogeneity indexes*

From institutional investors and state legislatures, to company executives and academic researchers, there is a growing dynamic favouring the view that diversity in the boardroom can have beneficial effects to the firm. Literature on the matter is plentiful. Academia approaches the issue of board heterogeneity in a variety of ways. For instance, there is a body of studies on the impact of board diversity that creates a board heterogeneity index based on the characteristics of the directors. In the most recent of these works, Bernile et al. (2018) examine the effect of board diversity on firm risk and corporate policies. The interesting aspect of this paper is that it creates an index of board diversity which accounts for six characteristics that can vary across directors: gender, age, ethnicity, prior board experience, education and financial competency. In essence, by including the first three factors in their model of board diversity, researchers attempt to measure the demographic heterogeneity of the firm's board, and with the latter three they measure board's cognitive heterogeneity.

Results of this study are revealing on several levels. First, findings reveal a causal relationship between board diversity and firm risk. Specifically, authors find that an increase in the diversity of a firm's board is associated with lower firm risk. However, results show that market volatility, as well as obstacles to the board's monitoring efficiency, hamper the moderating impact of board diversity to risk (i.e., a larger percentage of directors with long tenure may hinder the board's monitoring role, and hence impede the mediating impact of board heterogeneity on firm risk). Moreover, this study evinces that boards with greater diversity invest more in R&D, adopt less risky policies and rely less in debt to finance their investments. Operating performance and firm value are also found to be positively affected by higher levels of diversity in the boardroom. However, since in this thesis, a similar approach is adopted to measure board heterogeneity, it is interesting to note that no significant impact was detected when the heterogeneity index was broken down and investigated by its components, either individually (by the six director characteristics), or by type (demographic and cognitive heterogeneity).

Prior studies have employed similar approaches when attempting to model director heterogeneity. For example, Anderson et al. (2011) create their own index of board diversity. Thus, they also account for a similar set of six dimensions of director characteristics to measure the heterogeneity of a boardroom. Age, gender and ethnicity constitute the "social" heterogeneity component, whereas prior experience, education, and profession, account for the "occupational" heterogeneity factor. It becomes apparent that the categorisation of director traits, as well as their segregation in two different components has striking similarities with the model of Bernile et al. (2018). The difference in this instance, is that Anderson et al. (2011) focus on the impact of board diversity on firm performance. Results, in that respect, show that there is a positive and statistically significant association between the two variables. Specifically, researchers find that a 10% increase in the heterogeneity of a board, increases Tobin's Q by 7.49%. Also, contrary to the findings of Bernile et al. (2018) with regard to firm risk, Anderson et al. (2011) report that the positive association between board diversity and firm value stands even if we replace the aggregate heterogeneity index to its "social" and "occupational" sub-components⁴².

Carter et al. (2003) follow a slightly different approach on measuring board heterogeneity. Authors of this study create a board diversity index based on the percentage of women on the board, as well as on the fraction of directors who belong in ethnic minorities (i.e., the percentage of directors with African American, Hispanic, or Asian origin). Their goal is to study the impact of board diversity on a firm's financial performance, as measured by Tobin's Q, and to that end, they examine a sample of Fortune 1000 firms. Results indicate that the relationship between the percentage of female directors, or directors from ethnic minorities in the board and firm value is positive and statistically significant. An interesting finding of this study - a similar finding will also be identified and discussed in the empirical chapters of this thesis - is the provided evidence that board diversity, as measured by the percentage of women or minorities in the boardroom, is positively linked with board and firm size, and negatively linked with the number of inside directors. Yet, a serious limitation of this

⁴² However, an interesting note to that finding is that the impact of "occupational" heterogeneity in firm value is 50% stronger than the effect of its "social" analogue (Anderson et al., 2011).

work is that its sample includes observations of one year (namely, the data observations of 1997). The problem is attributed to data-related constraints, and it is an issue that later studies on the subject managed to overcome.

2.4.2.2 Gender-based diversity on corporate boards

Across the spectrum of academic research on board heterogeneity, studies on gender-stemmed board diversity constitute the vast majority. A kind introduction to the subject would be 2009's highly-cited paper from Adams and Ferreira: "Women in the boardroom and their impact on governance and performance." By employing a sample of all S&P500 constituents between 1996 and 2003, this study examines the impact of gender diversity on the governance of firms. Overall, researchers identify that gender diversity in corporate boards is linked with a series of corporate governance phenomena. For example, with respect to director attendance, results show that women directors have less attendance problems than men, whereas increasing the fraction of female directors in the boardroom has a positive impact on the attendance behaviour of their male counterparts. Moreover, authors evince that female (male) directors are more (less) likely to be assigned to corporate governance, audit, or nominating committees, and less (more) likely to be assigned to compensation committees. Also, gender diversity in the board appears to be positively linked with the sensitivity of CEO turnover to stock performance and with equity-based executive compensation schemes.

Despite the enhancing effects of gender diversity on corporate governance, the relationship of the former variable with the firm's financial performance is not straightforward. Adams and Ferreira (2009) show that the mean effect of board gender diversity on financial performance, as measured by Tobin's Q and ROA, is either negative or not statistically significant⁴³. For that reason, authors take research one step further, to establish whether gender diversity has heterogeneous impact on firm performance. To that end, they employ the governance index by Gompers et al. (2003),

⁴³ The majority of model specifications employed from Adams and Ferreira (2009) in order to examine the relationship between the fraction of female directors and financial performance report a negative and statistically significant coefficient of the gender diversity measure. Yet, certain specifications that authors use as robustness tests fail to corroborate the statistical significance of the effect.

and test the impact of gender diversity on firm performance according to the firm's board monitoring levels. Their results suggest that greater board gender diversity is beneficial for firms with weak shareholder rights, but detrimental for firms with strong shareholder rights. The intuition behind their finding is that firms with fewer takeover defences can benefit from the increased monitor qualities of greater female participation on the board, but the value of firms with good governance can be hurt from the excess monitoring of gender-diverse boards.

In point of fact, the question of whether gender diversity on corporate boards is related with firm performance has been drawing academic attention for years. Yet, evidence on the link between the two variables is not conclusive. Post and Byron (2015) conduct a meta-analysis of 140 studies on the association between female board representation and financial performance, suggesting that the nature of the relationship varies according to regulatory and societal contexts. For example, results show that the link between board gender diversity and firm performance is positive and statistically significant when financial performance is measured by accounting returns, but fails to exhibit statistical significance when firm performance is examined in a market performance context. However, in countries that foster strong shareholder rights gender diversity appears to have a stronger impact on firm performance, as measured by accounting returns, and even more interestingly, in countries with greater gender parity, higher board female representation is found to be positively related with market performance. The latter finding is explained by authors as result of investors' heterogeneous evaluations for the potential of firms with more female directors. Lastly, the meta-analysis from Post and Byron (2015) corroborates the findings of Adams and Ferreira (2009) on the positive relationship between higher female board representation and board monitoring, while presenting evidence of an additional association between board gender diversity and strategy involvement.

Apart from research of direct links between women representation on corporate boards and firm performance, literature provides ample evidence for the impact of gender board diversity on a wide range of corporate phenomena. However, if we had to put board gender literature into perspective, we would note a fairly common pattern: more women on the board appear to have a positive impact on the governance of all

firms, and on the financial performance of poorly-governed firms. For example, Liu (2018) examines the relationship of gender diversity with a series of environmental performance measures and finds that firms with more women in the board are less likely to face legal challenges due to environmental misdemeanours. Chen et al. (2017) study the impact of board gender composition on dividend policies, finding that higher fraction of women on the board are linked with high dividend payouts. Using a sample of French firms, Bennouri et al. (2018) find that an increase in a board's female percentage significantly increases its ROA but decreases its Tobin's Q, while Evgeniou & Vermaelen (2017) find that higher female representation in a firm's board is associated with higher probability of share buyback announcement, and with lower long-term excess returns. Yet, results of the latter study corroborate previous findings indicating that the impact of board gender diversity on long-term excess returns is positive for firms with poorly monitored boards.

The impact of gender on firm performance and corporate governance has also been studied extensively at the CEO level. For example, Faccio et al. (2016) provide evidence that firms with female CEOs are linked with higher chances of survival, lower leverage and lower volatile earnings compared to firms with male CEOs. Furthermore, the same study shows that transitions from male to female CEOs are associated with decreases in corporate risk-taking. The association between female CEOs and risk is also documented by Martin et al. (2009). Authors of this study match 70 announcements of female CEO appointments with 70 announcements of male CEOs between 1992 and 2007 and examine for differences in market measures of risk and performance. Results fail to exhibit statistically significant differences in the three-day cumulative abnormal returns, suggesting against the presence of gender bias in the financial market context. However, findings show that firms with high total and idiosyncratic risk are more likely to appoint female CEOs than low-risk firms, evincing the markets' perception of female CEOs as more risk-averse than their male counterparts. On a slightly different note, Frye and Pham (2018) find that female CEOs are positively related with board independency, board gender diversity and director network, and negatively related with board size and director age. Overall, this study is one of many that corroborate the recurring theme of gender diversity and board monitoring enhancements.

2.4.3.3 Other forms of board heterogeneity

As the issue of board diversity draws tremendous interest from scholars and corporations alike over - at least - the last decade, academic research has been studying the subject from different angles and in various contexts. By way of illustration, Frinjs et al. (2016) examine the impact of a board's cultural heterogeneity on financial performance. In this study, financial performance is measured by Tobin's Q and ROA. However, it is the measure of cultural diversity that steals the show. Authors employ a model of cultural identification that was introduced by Hofstede in 2001, to measure the "cultural identity" of a board. Specifically, they first assign each director with her own individual "cultural score," and they then calculate the "cultural" distance between all members of the board. Thus, each firm is attributed with a cultural diversity score. The dimensions that are being considered include societal evaluations on collectivism against individualism, masculinity versus femininity, views on the distribution of power across people, and societal views on overcoming uncertainty.

Findings of this study follow the common pattern of most studies in the board heterogeneity literature; cultural diversity does not appear to impact firms homogeneously. Results show that in complex firms, the cultural heterogeneity of the board has no impact on the firm's financial performance. Yet, non-complex firms are affected negatively by an increase in the cultural diversity of their board⁴⁴. In further examination of the issue, researchers find that the documented negative relationship between cultural diversity and firm performance disappears for firms with strong, worldwide market presence. Trying to analyse the source of this negative link between the two variables yet further, authors find cultural diversity to exert negative power on the monitoring function of outside directors. Lastly, this study examines the impact of each cultural dimension separately. Results evince that out of the four dimensions that were considered, cultural differences on individualism and masculinity drive most of the negative effect of the overall impact of a board's cultural heterogeneity on financial performance.

⁴⁴ Frinjs et al. (2016) define as "complex" all firms with more than three business segments, and as "non-complex," all firms that have less than three business segments.

Board heterogeneity is studied in several different contexts. For example, a recent paper from Rockey and Zakir (2020) examines board diversity in terms of political opinions of the directors. This study provides evidence that diversity in the context of directors' political ideology is negatively associated with firm performance. On a similar setting, Kim et al. (2013) find that boards diversity in political ideology is positively related with a firm's financial performance, and negatively linked with agency costs. Estélyi and Nisar (2016) on the other hand, study board heterogeneity in terms of directors' nationalities. The results of this study show that more diverse boards in terms of the nationalities of their directors, exhibit better operating performance and shareholder heterogeneity. Finally, in the context of corporate social responsibility, using a sample of SPI500 firms from 1999 to 2011, Harjoto et al. (2014) examine the impact of board diversity on the firm's social performance. Authors of this study measure board diversity using the heterogeneity index of Blau (1977). In specific, they consider director differences in the following aspects: gender, age, business experience, tenure, director power, and field of expertise⁴⁵. Findings show that overall board heterogeneity is positively associated with firm's social performance, whereas expertise, tenure, and gender are the main drivers of the effect of board diversity on the firm's CSR presence.

2.4.3 Board entrenchment

2.4.3.1 The M&As arena of the 1980s

The dynamics of power between shareholders and managers has been at the epicentre of corporate governance research for decades. Historically unaddressed management incumbency is labelled as one of the main reasons for the wave of hostile takeovers that characterises the corporate environment of the 1980s (Martynova & Renneboog, 2008; Bhagat et al., 1990). It is around that period, when managers start to employ various takeover defence measures to protect their vested interests, and when shareholders begin to join their voices with those who can more efficiently put pressure

⁴⁵ The areas of expertise that were considered for directors are: financial, management, consulting, legal, and "other" (Harjoto et al., 2014).

to the board for more transparency and better monitoring (Gompers et al., 2003). This chain of events creates substantial heterogeneity with regard to the magnitude of managerial power across the spectrum of corporate boards. Thus, it is not surprising that literature steps into the picture to investigate this phenomenon. In point of fact, the extent of shareholders' rights is considered today among the most common measures of a firm's corporate governance quality.

2.4.3.2 The "Governance Index" of Gompers, Ishii & Metrick

One of the most notable papers in the field is 2003's seminal work from Gompers, Ishii and Metrick: "Corporate Governance and Equity Prices." In this study, researchers examine the corporate governance provisions - as measured by the Investor Responsibility Research Center (IRRC) - from a set of 1500 firms (the vast majority of all listed firms from the NYSE, AMEX, and NASDAQ equity markets) between 1990 and 1999. The main goal of the study is to explore the heterogeneity of a board's implemented anti-takeover measures. To that end, the sample of firms is split in five thematic deciles, based on the extent of the boards' managerial power. Companies in the highest (lowest) decile have the highest (lowest) levels of management power, or - to put it differently - the weakest (strongest) shareholder rights. Authors then, create an index which is comprised of the full set of anti-takeover provisions (ATP hereafter) that are extracted from IRRC, and investigate its empirical relationship with firm performance. The pool of takeover defence measures that are employed in the study entails 24 unique provisions⁴⁶, while the construction of the index is plain; each firm is given one point for each implemented provision that is restrictive to shareholders' rights.

Findings of the study reveal significant correlations between the constructed governance index (G-index henceforth) and several firm characteristics. Specifically, G-index is positively correlated with institutional ownership, firm size, trading volume, stock price and SP500 inclusion, and negatively correlated with sales growth,

⁴⁶ The 24 unique anti-takeover provisions that are employed for the construction of G-index, span over five thematic areas: *Delay, State, Protection, Voting, and Other* (Gompers et al., 2003).

suggesting that larger SP500 firms, with high levels of institutional ownership, share price and trading volume are associated with higher managerial power, and hence with weaker shareholder rights. In terms of firm performance, the findings are even more interesting. Researchers show that an investment of \$1 in a portfolio of firms of the highest decile of anti-takeover protections (labelled by authors as the "Dictatorship portfolio") at the beginning of the examined period (1990), would return \$3.39 at the sample's end-period (1999). Correspondingly, a \$1 investment in the lowest decile portfolio (the "Democracy portfolio") over the same period, would return \$7.07. Authors sort the sample's firms by their G-index and estimate the monthly returns of the created portfolios. Four-factor regression results report that the "Democracy portfolio" (the portfolio of firms whose board implements less than six takeover defence measures) has positive and significant monthly alpha of 29 bp, while the "Dictatorship" counterpart (the portfolio of firms with more than 14 implemented provisions) exhibits negative and significant alpha of -42 bp on a monthly basis. Overall, findings show that an investment strategy that would go long on firms of the former group and short on firms of the latter would earn 8.5% annual abnormal returns during the 1990-1999 period.

2.4.3.3 The "Entrenchment Index" of Bebchuk, Cohen & Ferrell

A few years after the introduction of Gompers, Ishii and Metrick's "Governance Index," Bebchuk, Cohen and Ferrell (BCF henceforth) revisit the issue of ATPs through their 2009's seminal work: "What matters in Corporate Governance?". The main contribution of that paper is the identification of the provisions that drive most of the results in the Gompers, Ishii and Metrick (GIM hereafter) model. Specifically, the BCF study shows that six out of the twenty-four GIM entrenchment measures are the main drivers of the documented negative correlation between ATPs and corporate performance. The six most salient takeover defence initiatives could be split in: a) measures that relate to hostile takeover prevention (poison pills and golden parachutes), and b) to measures which are related to the voting power of shareholders (supermajority requirement for merger approval and for charter amendments, staggered boards, and limits to amendments of bylaws from shareholders). Walking at the footsteps of the GIM model, Bebchuk et al. (2009) attribute each firm with one

point for each implemented provision, creating their own aggregate measure of corporate governance quality (authors label it "Entrenchment Index", or "E-index").

As mentioned earlier, findings of the BCF study are strikingly similar to those from GIM, despite the fact that only a fraction of the latter's provisions are employed. Specifically, results show that an investment strategy of buying a portfolio of firms with zero implemented anti-takeover protections (i.e., a portfolio of firms with an Entrenchment index score of zero) and selling a portfolio of firms with more than four protections (E-index scores of either 5 or 6), yields a mean abnormal return of 7%. Moreover, researchers corroborate the negative and statistically significant (at the 1% level) relationship of their index with firm value, as measured by Tobin's Q. Lastly, the respective association of the eighteen GIM provisions that are not employed in the construction of the E-Index, with either firm value or abnormal returns, fails to exhibit signs of statistical significance. Overall, the BCF study can be thought of as an advancement over the GIM specification, putting forward a more parsimonious model with essentially the same qualities as those provided by GIM. Thus, it comes as no surprise that the BCF index was employed in more than 75 studies during the time between its first appearance as a working paper (Bebchuk et al., 2004) and its official publication (Bebchuk et al., 2009).

2.4.3.4 Anti-takeover provisions and M&As

Despite the fact that the implementation of takeover defence measures from entrenched managers appears to be associated with loss of shareholder wealth, the exact channel through which this link is realised has been an area of undergoing investigation. Masulis et al. (2007) have a candidate for the aforementioned channel; mergers and acquisitions (M&A). Authors of this study employ a sample of 3,333 acquisitions between 1990 and 2003 and examine whether anti-takeover provisions are related with value-generating acquisitions. To test that intuition, they use both the GIM and BCF specifications as proxies of corporate governance quality. Their main results report that the relationship of both GIM and BCF indexes with 5-day cumulative abnormal returns (CAR) is negative and statistically significant at the 5% and at the 1% level respectively.

In point of fact, consistent with the findings of Bebchuk et al. (2009), the link of the BCF index with acquirer CARs appears to be 1.5 times stronger than the corresponding association of the GIM index with acquisition gains; a one standard deviation increase in the BCF index decreases acquirer CARs by 0.435%, whilst one standard deviation increase of the GIM index is linked with a 0.29% decrease of acquirer CARs. Overall, this study puts forward the argument that the absence of market control offers more space to entrenched directors in order to chase value-destructing acquisitions.

Harford et al. (2012) take this argument one step further. Their study attempts to identify which are the specific value-destructing decisions that are made by protected directors during the consummation of M&As. To test that, they examine a sample, similar to those utilised from GIM and BCF, that consists of 3,935 acquisitions made by US firms between 1990 and 2005, and investigate for possible drivers of the documented M&A underperformance of entrenched boards. After corroborating the negative association of both GIM and BCF indexes with acquirer CARs of Masulis et al. (2007), researchers identify several channels through which this link is realised. If we had to locate a common denominator in these though, that denominator would be directors' aversion to targets that could potentially increase the risk of creating strong blockholders, and hence reducing their own control over the board. Specifically, they find that protected managers are less likely to consummate deals with private targets, they provide evidence that these managers tend to avoid all-stock acquisitions, while they show that apart from overpaying, entrenched managers appear to consummate deals with less synergistic targets. Overall, the findings of Harford et al. (2012) are interesting, because they further validate the argument that has been circulating in the field of anti-takeover provisions for years: directors try to protect their positions and that fact comes at a price for some firms.

More recently, Cuñat et al. (2020) examine anti-takeover protections in the context of acquisition probability and premiums. Among the main arguments that are employed by managers in favour of ATP adoption are the decrease of deal probability and the increase of negotiating power (and hence, an increase in acquisition asking price) for firms with better protected boards (Karpoff et al., 2017; Stein, 1988). Cuñat et al. (2020) show that this is not the case. Using a dataset that includes all shareholder

proposals which were voted on, and were aiming to put forward a change to the firm's ATP regime, from all SPI500 firms between 1994 and 2013, authors provide evidence that there is no trade-off between price and premiums in the context of ATPs. In point of fact, both acquisition probability and acquisition premiums are found to be lower for firms with more ATP protections, compared to those for firms with stronger shareholder rights.⁴⁷ Researchers show that more entrenched boards are associated with worse bidding opportunities and less synergistic targets, and hence with lower takeover premiums. The concluding remark of the respective literature is that weak shareholder rights are associated with value-destructing acquisitions through a series of different pathways. From worse target selection, lack of synergies, and compression of bidding alternatives, the adoption of takeover defence mechanisms by corporate boards appears to hinder shareholder wealth, at least for large, listed firms. That said, the impact of ATPs for the rest of the corporate spectrum is yet to be sufficiently investigated, hence providing a fruitful field for future academic research.

2.4.4 Board qualifications

The impact of board qualifications on firm value and financial performance has been a rapidly growing, albeit fairly underexplored, issue of the corporate governance literature. Prominent corporate scandals of the last twenty years, have ignited calls from individual and institutional investors alike, for more transparency and corporate accountability. Attempting to address the aforementioned shareholder concerns, policy makers put the disclosure of directors' professional and personal attributes at the forefront of a firm's suggested corporate governance enhancements. For instance, as will be seen in the empirical chapters of this thesis, an amendment in 2009's Regulation S-K, mandates firms to publicly disclose the reasons for selecting each member to serve in the firm's board, whilst listing the specific skills that every director is expected to bring to the board's operations. Apart from their practical importance on governance quality, such initiatives provide fruitful sources of information for prospective

⁴⁷ Specifically, researchers find that votes to lower ATP protections are associated with higher acquisition probability and higher acquisition premiums.

researchers. In this context, academic interest in the area of director qualifications has been consistently increasing over the last decade. The enhancement of firms' disclosure policies with regard to directors' personal characteristics, enables the extraction of information that was previously unobtainable, hence expanding director research in scope and depth. A bird's eye view of the respective literature would reveal two main sub-areas; studies on director characteristics and studies on CEO attributes. In the following section, I attempt to provide a brief overview of both.

2.4.4.1 Director qualifications

Research on the effects of individual qualifications of corporate directors reports several interesting findings. For example, Fedaseyeu et al. (2018) examine whether directors' personal characteristics matter for the role that these directors are hired to perform. To that end, they study a set of qualifications from the directors of all SP1500 constituents between 2006 and 2010. The attributes that are considered are the age, gender, tenure and independence of the person, as well as her professional experience and academic background. Researchers quantify the qualifications of each director by assigning them with a respective "Qualifications Index." This index is essentially the aggregate score of six thematic fields of expertise (legal, academic, accounting and finance, management, political, and military) and of a three-fold split of the individual's education level (undergraduate, postgraduate, and MBA). To examine whether these qualifications matter, researchers investigate their relationship with compensation and board functions. To proxy for the number of board functions that a director undertakes, authors consider three factors: whether a person is member in a board committee, whether she chairs a committee, and whether she chairs the board or acts as lead director. Results corroborate the "expertise hypothesis," according to which more qualified directors are associated with higher pay and more board functions. Overall, findings suggest that directors' skills play significant role in the allocation of responsibilities and pay within a firm's board.

Field & Mkrtchyan (2017) take the research of director qualifications in the field of M&As. This study employs a sample of 1,766 acquisitions consummated by 993

SPI5000 firms between 1998 and 2014 and examines whether the experience of directors in acquisitions has an impact on shareholder wealth. Researchers employ two metrics as measures of acquisition performance: a) the total number of previous acquisitions of a firm's outside directors, and b) the share of a firm's outside directors who have served on a board that has participated in M&As at least once over the past decade. Results of this study also corroborate the "expertise hypothesis" for corporate directors. Findings show that the relationship of both measures of acquisition experience with three-day acquirer CARs is positive and statistically significant, suggesting that the experience of a board's independent directors in M&As creates value for shareholders.

Another interesting niche area in the literature of director qualifications investigates the presence of academics on corporate boards. Chen et al. (2019) exploit the adoption of a recent regulation in China⁴⁸ that prohibits University employees to serve on the boards of public companies, in order to examine the impact of academic directors on firm value. Specifically, researchers isolate the resignations of 2,617 independent academic directors between 2013 and 2017, which are caused by the law's passing, and investigate the corresponding market reactions. First, they test for abnormal returns during the announcement of the regulation's issuance. Results of these tests, show that relative to firms with no academic directors on their board, firms with at least one academic director are associated with significantly more negative CARs at the announcement of the respective regulation. Then, the study compares the performance between firms with no academic directors, and firms with at least one academic director, before and after the passing of the prohibitive law. Findings reveal that firms of the latter group significantly underperform firms of the former, two years after the regulation's adoption. Overall results indicate that academic outside directors are positively linked with firm value.

Güner et al. (2008) examine the impact of directors' financial expertise on corporate decision making. Authors extract all relevant information regarding directors' financial qualifications from the annual proxy statements of 282 US public firms

⁴⁸ Authors of this study employ the Regulation II, that was issued in 2015 by the Ministry of Education in China.

between 1988 and 2001⁴⁹. What is interesting in this paper, inter alia, is that the financial expertise of directors is coded according to the specific category of their previous employment. Thus, directors with financial expertise are divided to prior or current: i) commercial bankers, ii) investment bankers, iii) executives of financial (albeit non-banking) institutions, iv) executives with finance titles (e.g., CFOs), v) professors in finance, vi) consultants, vii) lawyers, viii) executives of nonfinancial firms, and ix) individuals employed in non-corporate organisations. Overall findings of this study show that financial expertise is not always associated with value creation for shareholders. For instance, researchers find that the appointments of commercial bankers on the board assist unconstrained firms to take on larger loans, but do not help constrained firms, essentially indicating that the appointment of commercial bankers on a firm's board is more beneficial to the creditors of the firm rather than to the firm itself.

Lastly, a paper worth noting in the literature of director qualifications is Bertrand and Schoar's "Managing with style: The effect of managers on firm policies." In this study, Bertrand and Schoar (2003) investigate for skill differences among corporate managers. Mainly due to the scarcity of data for directors' skills, research in the area is limited. Thus, authors take an interesting approach in their examination for possible effects of managerial abilities on corporate decision making and performance. They employ a model of manager fixed effects, and test its explanatory power in the variation of corporate policies. The most straightforward problem in that respect is the possible correlation between manager specific factors and firm specific factors. To disentangle manager fixed effects from firm fixed effects, researchers create a dataset that comprises managers across different firms. Selecting from a pool of Forbes 800⁵⁰ and SP1500 upper-echelon managers that have stayed in their firm for at least three years and have served on the board of - at least - two firms, the study ends up testing approximately 500 managers from 600 firms between 1969 and 1999. Findings show that manager fixed effects can explain a significant part of firm heterogeneity in investment, financial

⁴⁹ Financial expertise information is extracted from the firms' annual proxy statements for the period 1988-1997. From 1997 until 2001, data on the financial expertise of directors are extracted from the IRRC database (Güner et al., 2008).

⁵⁰ Forbes 800 collects information for the CEOs of the 800 largest US corporations.

and organisational decisions. Results also evince a positive association between managerial performance and executive compensation, as well as a positive link between high-performing managers and the probability to be appointed in firms with high levels of corporate governance.

Overall, literature on director characteristics is constantly growing in scope, and provides different potential directions for more niche paths. For example, Nguen et al. (2015) focus on US banks. Their study examines the impact of several director characteristics on market performance of US banking institutions. Researchers test for abnormal returns at 252 announcements of director appointments from 145 US banks. Specifically, they test whether age, gender, number of prior and current directorships, professional experience, level of education, or MBA degree has the ability to generate wealth for shareholders. Results show that from the set of examined characteristics, age, education, and experience are positively associated with abnormal CARs, while the number of current directorships is negatively linked with market performance. Another interesting work in the field comes from Ferris et al. (2016). Authors of this study investigate whether the appointment of former politicians has an impact on acquisition performance, and provide evidence for a series of documented associations. They find that firms whose boards have politically connected directors have a higher probability to successfully complete an M&A than firms with no politically connected directors in the board. Moreover, compared to boards with no political connections, politically connected boards select larger acquisition targets, and are less likely to face regulatory obstacles regarding the consummation of the M&A. Interestingly, the latter is found to enhance target selection; firms with less regulatory concerns have higher flexibility, and hence are better positioned in identifying the more profitable targets. Lastly, the aforementioned benefits that stem from having a board with political connections are valued by the market: the cumulative abnormal returns (CAR) of politically connected acquirers are less negative than the CARs of acquirers whose boards do not have directors with political connections.

2.4.4.3 CEO qualifications

A strand of literature that is closely related to the area of director qualifications examines the impact of CEO characteristics on corporate performance and governance. An influential notion in the research of CEO attributes is the distinction between "generalist" and "specialist" CEOs. Custódio et al. (2013) investigate whether the skills of CEOs are associated with their pay. To that end, they construct an index of "General Managerial Ability" (GMA henceforth) based on five factors of a CEO's professional history: the number of positions held in the past, the number of firms she has worked for, the number of industries she has been associated with, whether she has prior CEO experience, and whether she has past experience in a conglomerate. The idea is that the higher the GMA is, the more transferrable the CEO's skills are. Thus, they calculate the GMA of each year, based on a sample of 4,451 unique CEOs from all SPI500 constituents between 1993 and 2007, and they label a CEO as "Generalist" if her GMA is above the annual median, and as "Specialist" if her GMA is below the annual median. Results provide clear evidence that compared to "Specialist" attributes, "Generalist" skills are better compensated by firms. Researchers find that CEOs with more transferrable skills receive almost one million dollars more in annual compensation, against CEOs with more specialised qualifications (the former group of CEOs receives a mean annual premium of 19% relative to the latter), supporting the idea that was later supported by more studies (Brockman et al., 2016), that general managerial skills are valued at a premium in the CEO market.

Close to this study is Kaplan, Klebanov and Sorensen's 2012 work: "Which CEO characteristics and abilities matter?". Researchers here, employ a similar setup of CEO skill assessment with that used in Custódio et al. (2013). Yet, the novelty in this case, is the exploitation of a sample of detailed assessments from 316 CEO candidates between 2000 and 2006. The assessments are conducted through 4-hour interviews, and result in 30-category ratings of CEOs' personal characteristics and abilities. Authors then, use factor analysis to identify the main dimensions of variation in the set of CEO abilities.⁵¹

⁵¹ The same econometric approach has later been employed in the similar studies of Adams et al. (2018) and Custódio et al. (2013) for the identification of specific skill dimensions from a large set of individual characteristics.

Results of factor analysis evince that there are two factors on which the abilities of CEOs vary. The first factor considers CEOs' general managerial ability against specialisation abilities, and the second identified dimension positions CEOs' "communication" attributes against "execution" skills⁵². As a natural next step, researchers then, attempt to investigate the relationship between the two identified dimensions of CEO characteristics with subsequent firm performance. Their findings show that CEOs' general managerial and "execution" skills are positively associated with financial performance. Overall, the study establishes the importance of general managerial skills for prospective CEOs and provides interesting insights in the research of CEO characteristics.

Jaffe et al. (2013) employ an entirely different approach of CEO skill investigation. To begin with, authors study CEO skills in the context of corporate acquisitions. Specifically, they use the M&A research framework to examine whether there are identifiable differences in the levels of skill among corporate directors. Their methodology is novel, yet plain; they study persistence in acquisition performance. The intuition behind this approach is that persistence in acquisition performance proxies for enhanced levels of skill. To put it differently, managers who over-perform in one time period and keep over-performing in subsequent time periods must be associated with differential levels of skill. To test this idea, researchers study all completed deals announced by US listed firms at the NYSE, AMEX, and NASDAQ between 1981 and 2007. Regressing acquirer CAR of current deal on acquirer CAR of prior acquisition and a set of control variables, they first provide evidence of persistence in acquisition performance. Since these results suggest that managers possess differential levels of skills, but cannot identify either the source of these skills or their nature, authors focus their attention on the CEOs. The idea here is that if differential levels of board skills impact subsequent acquisition performance, then the impact of CEOs' skills must drive most of these results⁵³. Indeed, what further tests evince, is that persistence in

⁵² Authors label as "execution" skills, the abilities that have high scores in CEO descriptions that signify "resoluteness" like *Efficiency*, *Aggressiveness*, *Persistence*, among others.

⁵³ The intuition in this respect, is that CEOs are the most influential individuals in a corporation, and as such, if skills matter in acquisition performance, then the skills of CEOs must be responsible for the most part of this effect.

acquisition performance occurs only under the same CEO. Put together, their results show that the skills of CEOs play an important role in acquisition performance.

In more general terms, the attributes of CEOs have been extensively investigated in the context of M&As. For instance, Yim (2013) studies the impact of CEO's age in M&A propensity. The study shows that the age of the CEO is negatively associated with acquisition propensity. Specifically, it demonstrates that a 20-year differential in a CEO's age is linked with approximately 30% lower probability of an acquisition announcement. In another interesting paper, Wang and Yin (2018) employ a hand-collected dataset of CEO academic background from more than 3,500 CEOs between 2000 and 2015, and test the relationship of a CEO's education history with the selection of acquisition targets. The novel contribution of this paper is that it examines CEO educational background, not in terms of the CEO's academic level, or in terms of her field of expertise, as one would expect, but in terms of a rather niche factor; the location of the CEO's academic institution. Researchers provide evidence that it is more probable for CEOs to acquire firms that are headquartered closer to the state that they acquired their undergraduate and graduate degrees. Further results demonstrate that these deals are also associated with higher rates of consummation, better premiums and better stock market reaction. Overall, findings show that CEOs appear to exploit informational advantages, possibly stemming from networks created at the location that they received their academic degrees. On a similar note, Jiang et al. (2018) evince the existence of hometown bias in M&As. Authors of this study show that, for analogous target alternatives, the possibility of a firm acquiring a target that is located close to the CEO's childhood home is more than twice that of the firm acquiring a target which is headquartered elsewhere.

Custódio and Metzger (2014) make another interesting contribution in the research of CEO qualifications. Authors of this study examine the impact of financial expert CEOs on corporate policies. A few years earlier, Güner et al. (2008) had shown that the financial expertise of directors is not de facto associated with increase in shareholder wealth. In the current study, Custódio and Metzger (2014) provide a different story regarding the financial acumen of CEOs. By using a sample of 4,277 distinct CEOs from the SPI500 constituents between 1993 and 2007, researchers make

a series of noteworthy findings. First, they document that firms with financial expert CEOs are negatively associated with cash holdings, and positively associated with leverage, dividend payouts and share repurchases. Collectively, these results show that firms with financial expert CEOs appear to hold less cash, to issue more loans, and are more likely to proceed to share repurchases, compared to firms with non-financial expert CEOs. Since those findings indicate that the former set of firms may be linked with better access to external financing, relative to the latter group, authors put that intuition to test. Verily, results demonstrate that firms with financial expert CEOs have superior ability in increasing cash and debt levels during adverse economic conditions, which in turn, has beneficial effects for shareholders. Overall, this study adds to the growing evidence that the skills of CEOs matter in corporate decision making.

Hu and Liu (2015) also delve into the theme of CEO attributes and corporate decision making. More specifically, these authors focus on the professional experience of CEOs. The backbone of this study is the idea that CEOs with more diverse professional experiences may have informational advantages and hence better access to external financing, over CEOs with less diverse employment history. The assertion that is being made in that respect, is that of the CEOs' social connections; CEOs with more diverse past experiences may be linked with larger social network, which in turn can provide them with superior access to information. To test that intuition, authors hand-collect the full biographical information from 1,332 CEOs of 563 Chinese listed firms from 2000 to 2010. Their findings corroborate the initial hypothesis. Firms whose CEOs have more diverse professional experiences, display lower investment-cash flow sensitivity and evince better access to external financing. Moreover, both documented phenomena appear to be more evident in financially constrained companies.

As a last, albeit recurring theme in CEO attribute research that would be worth mentioning in this section, is the strand of CEO overconfidence. Malmendier and Tate provide interesting insights in this respect. Their 2005 paper "CEO overconfidence and corporate investment" shows that managerial overconfidence has a negative impact on corporate decision making, and subsequently on shareholder wealth. Yet, the most important contribution of this paper is the introduction of a set of measures of CEO overconfidence, most of which would later become standard measures of managerial

overconfidence in the respective literature. This study examines a sample of Forbes 500 CEOs between 1980 and 1994⁵⁴, and introduces three metrics of overconfidence for corporate directors. The first, which they call *Holder67*, is based on the idea that managers are normally expected to exercise their options when the amount in-the-money surpasses a certain threshold. Authors set this threshold to an exercisable option staying unexercised whilst being 67% in-the-money during its fifth year. Also, since researchers want to capture managers who are habitually overconfident, rather than those who have exhibited overconfident behaviour once, they assign the overconfidence label to managers who have failed to exercise their 67% in-the-money options while in their fifth year, at least twice during their CEO tenure. On a similar note, their second measure of managerial overconfidence is based on the expiration of exercisable options. Authors label a CEO as overconfident (specifically, they call her as *Longholder*) if she fails to exercise her option until the last year of its expiration date. Finally, the third metric of overconfidence (the *Net Buyer* metric) focuses on CEOs who are at least ten years at their position. From that group of CEOs, authors label as overconfident CEOs who have purchased more shares of their firms than their exposure to company risk commands during their first five years. In all three measures employed in this study, each CEO is classified as "overconfident" for the whole period after the first incident at which her "overconfidence" was identified⁵⁵. As mentioned above, findings of this study evince the negative impact of CEO overconfidence on corporate policy making. Regressions of investment on cash flows⁵⁶ and all three overconfidence measures show that the overconfidence of CEOs is positively related with investment-cash flow sensitivity.

⁵⁴ Authors include in their sample firms that appear in Forbes' list with the largest US firms at least four times between 1984 and 1994.

⁵⁵ For example, consider a CEO who failed to exercise her 67% in-the-money option while in its fifth year in 2015, and then fails again, for a second time, in 2018. That CEO will be classified as "overconfident," as she will have failed to exercise her option twice in the examined period, but not starting from 2018, which was the date that identified her as being habitually "overconfident," but for the whole period from 2015 onwards.

⁵⁶ Authors define investment as capital expenditures normalised by start of the year capital, and cash flows as EBXI (Earnings before extraordinary items) plus depreciation, normalised by start of the year capital.

After identifying the relationship of managerial overconfidence with corporate policies, Malmendier and Tate (2008) take CEO overconfidence research to the field of M&As. In like manner with their previous work, findings of this study corroborate the negative association between CEO overconfidence and shareholder wealth⁵⁷. Employing their already introduced set of managerial overconfidence metrics, authors provide evidence that among firms with abundant internal resources, firms with overconfident CEOs at the helm, are more likely to conduct M&As relative to firms with non-overconfident CEOs. Moreover, market reaction at the M&A announcement is significantly more negative for acquirers with overconfident CEOs than for acquiring firms with non-overconfident CEOs. An interesting note with respect to this study is the exploitation of a hand-collected dataset on CEO press descriptions as an extra layer of robustness to the main study. Specifically, researchers retrieve all articles on sample CEOs from leading business press. Then, they classify CEOs as either "Confident" or "Cautious" based on respective press descriptions⁵⁸. Thus, they create an "overconfidence" framework for their sample CEOs, analogous to that from the main study, and replicate their analysis. Results corroborate the overconfidence story in the realm of M&As; overconfident CEOs are more likely to proceed in M&As than their non-overconfident counterparts, and market reaction to M&A announcements of the former group will be more negative than market reaction of the latter.

Beyond the seminal works from Malmendier and Tate, literature on this area is rich, and provides insights in all directions as regards the effects of CEO overconfidence on firm value. For example, apart from the aforementioned studies from Malmendier and Tate (2005, 2008), the same authors show that overconfident managers have the tendency to overestimate the future prospects of their firms, hence proceeding in a series of value destroying decisions, like engaging in less external financing, and

⁵⁷ For an incomplete review of recent literature on the negative association between CEO overconfidence and M&As see also in: Renneboog and Vansteenkiste (2019), Aktas et al. (2016), Billett and Qian (2008), Doukas and Petmezas (2007) among others.

⁵⁸ Researchers assigned specific sets of keywords for the two classifications. For example, the keywords that were applied for the "Confident" classification were: *confident*, *confidence*, *optimism*, *optimistic*. An adjustment worth noting in that part of their empirical analysis is that authors only include CEO press characterisations prior to an M&A. The reason for that is to address possible endogeneity concerns; CEOs are more likely to be described as "Confident" by press coverages after an M&A, or managers themselves may try to protrude confidence soon after the consummation of the M&A.

preferring to use cash or riskless debt instead of equity or risky debt (Malmendier et al., 2011). The idea that overconfident CEOs overestimate their firms' external financing costs relative to internal resources is also investigated in the area of dividend payouts. Deshmukh et al. (2013) show that due to distortion in the costs of external financing, overconfident CEOs lower their firms' dividend payout to address future investment needs. Overconfident CEOs are also linked with increases in leverage. Ho et al. (2016) examine a set of publicly listed US banks between 1994 and 2009, and find that banks with overconfident CEOs are more likely to increase their leverage in non-crisis years, compared to banks with non-overconfident CEOs. As a result of the latter, "overconfident" banks experience higher default probability, CEO turnover, and lower operating and market performance during years of financial crisis, relative to non-overconfident banks. Lastly, firms with overconfident CEOs at the helm are found to be more prone to engage in earnings management. Hsieh et al. (2014) study a sample of US firms from 1991 to 2009 and show that overconfident CEOs are linked with managing the timing of cash flows pre-SOX, and the discretionary accruals post-SOX.

Conversely to the above, a strand of literature documents that overconfident CEOs may bring value enhancing qualities to the firm. For example, Hirshleifer et al. (2012) employ both options-based and press-based managerial overconfidence measures and provide evidence that when operating in innovative industries, firms with overconfident CEOs are associated with greater innovation relative to firms with non-overconfident CEOs. The link between CEO overconfidence and corporate innovation, as measured by citation and patent counts, is also documented by Galasso and Simcoe (2011). Also, overconfident CEOs are more willing to pledge collateral in turn for lower loan spreads. Lin et al. (2020) examine the bank loans of all SPI500 constituents between 1993 and 2015 and provide evidence that corroborates their rather interesting intuition; as overconfident CEOs are eager to negotiate lower loan spreads, they are willing to pledge collateral and accept covenants despite the low default probabilities of their firms, hence reducing their loan rates. Meanwhile, Aktas et al. (2019) provide another dimension of the CEO overconfidence phenomenon. Using a sample of SPI500 firms between 1993 and 2013, and employing both the option-based overconfidence metric of Malmendier and Tate (2005) and the press-based overconfidence metric of

Hirshleifer et al. (2012), authors of this study show that for financially constrained firms, CEO overconfidence enhances the value of cash. Specifically, they find that the presence of an overconfident CEO on the firm's board is associated with an increase of \$.028 for every \$1 of cash holdings.

Finally, a couple of Journal of Finance papers, both of which discuss the existence of an optimum level of CEO overconfidence, are worth noting in this section. In the first of the pair, Goel and Thakor (2008) examine CEO overconfidence in the context of a firm's internal organisational ladder. The main idea here is that prospective CEOs have to advance to their position through an internal tournament in which they compete with other company executives. What authors of this study show is that the overconfidence trait helps executives during the CEO selection process, but acts in a non-monotonic way when examined in terms of its relationship with firm value. Specifically, researchers find that CEOs who are either excessively overconfident or overly diffident are associated with value-destroying decision making, and hence they are more likely to be dismissed by the board. Yet, CEOs with moderate levels of overconfidence are positively related with shareholder value maximisation. Gervais et al. (2011) build on that premise to investigate how the apparent overconfidence of CEOs can affect corporate policies in a value-enhancing manner. To that end, they introduce a model which links the level of CEOs' overconfidence with the CEO compensation scheme. The central idea of these authors' study is plain and intuitive; moderately overconfident CEOs will be easier motivated to pursue and commit to risky investments than risk avert CEOs, and hence flatter compensation schemes will be enough to attain the services of the former group of CEOs relative to the latter. Also, in like manner with Goel and Thakor (2008), researchers demonstrate that despite the value-enhancing effects of moderate levels of CEO overconfidence on corporate decision making, the impact of excessive CEO overconfidence on firm value is detrimental; extremely overconfident CEOs are more likely to accept exceedingly convex compensation packages.

3. SRI Labels and ESG Values:

A Comparative Analysis of Investment Funds in Two Dimensions

3.1 Introduction

*“This very expensive global warming *** has got to stop. Our planet is freezing, record low temps, and our GW scientists are stuck in ice.”*

The above sentence belongs to the former President of the United States, as published on his personal Twitter account on January 2nd, 2014 (Trump, 2014). Aim of this chapter is not to provide evidence supporting or rejecting the aforementioned claim. Howbeit, that sentence in its simplicity, and combined with the fact that comes from one of the most powerful people on the planet, exposes an issue that has long been of concern to the academic and non-academic community for more than 50 years; is corporate social responsibility a measurable framework operating at the corporate level with the intention of providing protection to the environment, or is it a corporate prop that signals intangible characteristics to prospective investors?

From the fact that even well-respected individuals debate even on the existence of environmental problems (Davenport, 2016), it becomes apparent that the definition of Corporate Social Responsibility (CSR henceforth) by itself is the first conundrum. Academic and corporate community haven't managed to give a definite answer to this question until today. Dahlsrud (2008) analysed 37 different definitions of CSR. From Bowen's 1953 rationale *“the obligations of business to pursue those policies, to make those decisions, or to follow those lines of action which are desirable in terms of the objectives and values of our society”* (Bowen, 2013) and Carroll's *“economic, legal, ethical, and discretionary expectations that society has of an organization at a given point in time”* (Carroll, 1979), to Levitt's *“fashion accessory of self-interested businessmen”* (Levitt, 1958) and Friedman's *“trend that could undermine the very foundations of our free*

society" (Friedman, 1962), CSR has been in the epicentre of academic debate for more than 50 years. The definitional problem of the CSR narrative relies on the fact that it is seen as a vague concept, with no direct or distinct results, that is concerned with ex ante indefinite, negative future events, whilst having clear, distinct, quantifiable and visible corporate costs which refer to the present.

However, in the opposite direction of what we would expect based on its debatable premise, socially responsible investing (SRI hereafter) has been experiencing immense growth over the last 20 years in terms of assets under management (AUM), number of SRI funds, and CSR firm expenses. According to the US Forum for Sustainable and Responsible Investment, one out every five dollars under professional management in the US is invested in a portfolio with at least one ethical screen. Socially responsible AUMs account today for \$8.72 trillion out of the \$40.3 trillion total US assets under management; a 14-fold increase compared to the \$0.64 trillion of 1995 (US SIF, 2016). Over the last 10 years, the number of investment funds incorporating ethical, social, or corporate governance (ESG) criteria has increased dramatically, rising from 260 in 2007 to 1,002 in 2016. According to EPG, 132 US firms of Fortune Global 500 spend on average \$10.2 billion annually for CSR, while the aggregate annual spending in CSR is more than \$19.9 billion (EPG, 2015). To have a better view, UK's annual budget for industry, agriculture and employment is \$24 billion (HM Treasury, 2016). The question in that case comes instinctively; why do fund managers screen for CSR? Friedman would have every right to argue today, that those firms that choose to spend these \$20 billion in CSR, could instead spend it in wages and dividends to their employees and shareholders respectively, and the latter could pretty well spend that money for social causes. If that would be the case, then why did those managers put themselves into the difficult position of explaining to their shareholders that a significant part of their money was placed into an indistinct target that will probably – if at all – pay off in the distant future?

The first answer that comes to our mind is the one that academic community has focused on, for more than any other over the last 40 years: there must be some kind of relationship between CSR and financial performance (CFP) for the firm. Until today, no consensus has been reached on the relationship between CSR and CFP, as literature

gives us contradictory findings (Margolis et al., 2007). Studies have shown negative (Aupperle et al., 1985; Wright & Ferris, 1997), neutral (McWilliams & Siegel, 2001) and positive (Waddock & Graves, 1997) relationship between a firm's social and financial performance. Looking for a pattern emerging from the corresponding research on the subject, we would say that socially screened portfolios neither seem to outperform nor to underperform their "conventional" counterparts.

From a fund's standpoint, one would argue that taking a concept with so many definitional and contextualisation deficiencies like CSR, and placing it into the epicentre of your fund's selling proposition would be plain hubris. However, that exact argument is the backbone of this paper. Evidence suggests that socially responsible investors can be expected to be more loyal than their conventional counterparts (Bollen, 2007). Hubris cannot make fund managers increase their socially responsible investments from \$3.74 trillion in 2012, to \$6.57 trillion in 2014, to \$8.72 trillion in 2016 (US SIF, 2016). This study proposes a far more rational explanation. One would have reasons to believe that the emergence of SRI, along with the ambiguity which surrounds its application, make SRI-labelled funds ideal candidates for the application of "window dressing" strategies from fund managers in order to attract assets from socially responsible investors. In this paper, I attempt to examine whether CSR in the context of portfolio formation is used as a prop employed to drive demand from ethical investors. To that end, I investigate the relationship between CSR and fund AUMs. In that context, I ask whether the inclusion of a CSR mandate label to a fund is associated with corresponding changes in its assets under management. More specifically, using a sample of 1,609 U.S domestic equity funds: a) I study the relation of the fund CSR score with the SRI mandate label, b) I search for evidence of application of "window-dressing" strategies, c) I examine the effect of CSR labelling on the fund's AUMs, and d) I investigate investor flows with respect to fund CSR identity changes.

Methodologically, the study introduces certain empirical novelties. The vast majority of papers studying possible links of CSR with fund characteristics, follows the standard approach of comparing a sample of SRI funds with a control group of "conventional" counterparts. This technique, despite being direct and easily comprehensible, entails certain problems: a) it draws conclusions based on the

comparison of uneven sample sizes, b) it bases the matching of the SRI-labelled funds with their “conventional” analogues on unequal fund characteristics, and c) it does not account for the unobserved heterogeneity in the strength of the SRI screens which are being employed by the fund managers. I address all three problems, by utilising a holdings-based approach to determine the fund's CSR level. Specifically, instead of comparing the two unequal fund samples (SRI funds against conventional funds), I calculate a CSR score for each fund, by extracting the CSR-related information of its portfolio holdings. Thus, each fund in the sample is assigned its own, asset-weighted, individual CSR score, and hence it is examined without the limitations of belonging in either the SRI, or the non-SRI group.

The first set of regressions examines whether the calculated CSR scores are associated with a set of common fund characteristics. Since the CSR score is likely to be correlated within a fund over time, I follow Petersen (2009), applying OLS with clustered standard errors at the fund level. I regress fund CSR score⁵⁹ on a set of controls which are most common in fund literature. In line with previous studies' results, I document a negative relationship between a fund's CSR score and its alpha, the number of its stocks and its return volatility. Up to this point, all results corroborate literature that argues of a negative association of CSR with fund performance and certain risk measures. However, to shed more light to the link between CSR and the aforementioned set of fund characteristics, I follow Oikonomou et al. (2012) and I replace the calculated CSR fund score in the main OLS model with its “Social Responsibility Strengths” and “Social Responsibility Concerns” sub-components. In like manner with the findings of the main specification, results demonstrate a significant negative relationship with fund alpha using either *Strengths* or *Concerns* as our dependent variable. Notably, reported results show that the alpha coefficient in the former regression is higher than its latter counterpart, implying that the negative relationship between a fund's risk-adjusted performance and its CSR score is mainly driven by its *Strengths*. All three regression models that are used up to this point, include a *CSR mandate* label dummy⁶⁰ as an independent variable. I hypothesise that an SRI-labelled fund will have higher CSR

⁵⁹ Fund CSR score are normalised so that they all have values from 0 to 1.

⁶⁰ The *CSR mandate* dummy is 1 if the fund is labelled as socially responsible and 0 otherwise.

scores than its non-SRI-labelled counterparts. Inserting the *CSR mandate* dummy as an independent variable in those regressions makes this hypothesis testable. Results show that the *CSR mandate* dummy is positive, albeit small, and significant only at the 10% level, suggesting that the association of SRI-labelled funds with higher CSR scores requires further investigation.

To examine the impact of SRI labelling on fund characteristics in more depth, I employ another empirical novelty; this time in terms of fund sample categorisation. I begin by calculating the annual median CSR score for the 2003 – 2012 sample period. I then generate a *High* dummy, which takes the value of 1 if the normalised CSR score of the fund is above median at time *t*, and 0 otherwise. I combine the output, with information from Morningstar as to whether the fund has a *CSR mandate* label or not. The synthesis of the two pieces of information results to the creation of the *TrueID* dummy; a matrix of four fund categories with distinct characteristics as regards their CSR attributes. Thus, the four generated fund categories are: a) funds with no *CSR mandate* label and CSR score below median, b) funds with no *CSR mandate* label and CSR score above median, c) funds with *CSR mandate* label and CSR score below median, and d) funds with *CSR mandate* label and CSR score above median. For reasons of convenience the fund categories are labelled as: “Neoclassicals,” “Quiet Samaritans,” “GreenWashers,” and “True ESGs” respectively.

The four distinct fund categories are then examined for possible differences in terms of investor demand. The descriptive statistics of each category reveal differences with regard to fund age and number of portfolio holdings.⁶¹ However, the main focus of the study is to investigate the differences - if any - of the total net assets (AUM) between the four fund CSR categories. The summary statistics with respect to the AUMs of the four groups, demonstrate that *GreenWashers* have significantly lower mean AUMs than the other three groups. Thus, I examine the relationship of each group with their corresponding AUMs by employing a new set of regressions. In specific, I regress the natural logarithm of the AUMs on the four fund CSR categories. Results confirm the differences that were spotted in the summary statistics. Findings show that a change of

⁶¹ *GreenWashers* appear to be younger, and seem to invest in more stocks than the other 3 categories.

a fund's CSR identity from *GreenWasher* to either *Neoclassical*, *Quiet Samaritan*, or *True ESG*, is positively related with a change in its total net assets⁶².

Attempting to investigate this finding even further, I focus on fund flows. The descriptive statistics show that *True ESGs* have higher flows than the other three categories. I generate a *ChangeID* dummy according to the direction of the CSR identity change from time t-1 to time t. The changes between the SRI-labelled fund categories exhibit certain patterns in terms of fund flows. Funds that change from *TrueESGs* to *GreenWashers* have notably higher flows than funds that change from *GreenWashers* to *True ESGs*. In other words, investors appear to compensate funds that loosen their ethical constraints and to penalise funds that tighten them. In order to examine this phenomenon further I turn to flow persistence. Loyal investors are associated with persistent fund flows. I regress fund flows with lagged fund characteristics to investigate the relationship between CSR and flow persistence. Results provide evidence that CSR is negatively related with persistence. Findings indicate that as the level of a fund's CSR increases, the loyalty of its investor base decreases. As robustness check, I utilise a 1-1 matched-pairs analysis to replicate the main study. All results corroborate the findings of the main paper.

The remainder of this paper is organised as follows. Section 3.2 presents the related literature review. In Section 3.3, I describe the sample and the main variables. In Section 3.4, I report the empirical results with respect to CSR and *CSR mandate* label, CSR and AUMs, and CSR and fund flows. In Section 3.5, I replicate the study utilising matched-pair analysis. In Section 3.6, I conclude.

⁶² The terms assets under management (AUM) and total net assets (TNA) can be used interchangeably throughout the paper. In like manner, the terms "CSR-labelled" and "SRI-labelled" funds can be utilised interchangeably in the paper to dignify funds that have a *CSR mandate* label in the US SIF classification of socially responsible mutual funds.

3.2 Related literature

The current study of investor demand for socially responsible mutual funds is closely related to the strand of SRI investing literature. SRI investing relies on the premise that the adoption of socially responsible policies has positive implications for the financial performance (FP) of the firm. The idea that CSR and FP are correlated has been around for more than 40 years (Tang et al., 2012; Orlitzky et al., 2011; Mishra & Suar, 2010; McWilliams et al., 2006; Griffin & Mahon, 1997; McGuire et al., 1988; Aupperle et al., 1985; Cochran & Wood, 1984; Alexander & Buchholz, 1978; Fogler & Nutt, 1975). Moskowitz (1972) studied a group of 14 socially responsible-labelled public firms, showing that the stocks of these firms outperformed the Dow Jones and the SP Industrials indexes. The study had significant modelling inefficiencies, but nevertheless it established a research area that would keep producing novel findings to this day.

With respect to the direction of the sign of the CSR-FP link, scholars have provided evidence at both ends of the spectrum. Several earlier studies argue that there is either negative, or no relationship between a firm's social and financial performance (McWilliams & Siegel, 2000; Griffin & Mahon, 1997; Belkaoui & Karpik, 1989; Abbot et al., 1979). For instance, Belkaoui (1976) compares a sample of 50 US firms that disclose environmental information with an industry-adjusted set of 50 randomly selected US companies, and finds that the socially responsible-labelled firms underperformed the control group. Using the same database that is employed in the current study to measure CSR (KLD), Waddock & Graves (1997) find that a firm's lagged CSR score is positively associated with Return on Assets (ROA), and Return on Sales (ROS), but fails to show significant relationship with Return on Equity (ROE)⁶³.

Despite these early negative findings, the majority of related research finds a positive, albeit mild association between CSR and FP (Brammer & Millington, 2005; Porter & Kramer, 2002; Roman et al., 1999; Cochran & Wood, 1984). Reviewing the literature that focuses on the performance-related qualities of CSR, Margolis and Walsh (2003), and more recently Malik (2015), report that most studies gravitate towards a

⁶³ The coefficient of the firm's lagged CSR score is positive and statistically significant at the 5% level when authors use ROE as dependent variable. When ROS is the dependent variable of the model, the coefficient of firm's lagged CSR is positive and statistically significant at the 10% level.

positive CSR-FP link. In the largest meta-analysis by far, Friede et al. (2015) review the findings of 2,200 individual studies on ESG investing. Their results show that 90% of the analyses report a non-negative CSR-FP association, while the vast majority exhibits positive findings. All previous meta-analyses report analogous results (Margolis et al., 2009; Orlitzky et al., 2003). Interestingly, in spite of the notable differences in sample size and publish date of the reviewed studies⁶⁴, the three meta-analyses exhibit remarkably similar CSP-FP correlations. Friede et al. (2015) find a mean overall effect of 0.12, while the same metric for Margolis et al. (2009) and Orlitzky et al. (2003) is 0.13 and 0.15 respectively.

The lack of consensus as regards the relationship between social and financial performance is extended to the mutual fund universe. Derwall et al. (2005) construct two portfolios that differ substantially in the CSR scores of their constituents, and find that the higher CSR-ranked portfolio outperformed its low-CSR counterpart over the 1995-2003 period. Kempf and Osthoff (2007) report similar - if not even more impressive - results. They find that following a strategy of buying stocks of firms with high-CSR scores and selling stocks with low-CSR ranked firms, leads to abnormal returns of up to 8.7% per year. By way of contrast, Renneboog et al. (2008) study SRI funds across the world, and find that the risk-adjusted returns of these funds are not statistically different from the returns of their non-SRI counterparts. Laurel (2011) examines potential outperformance capabilities of SRI funds against their conventional analogues in Europe, while Derwall and Koedijk (2009) investigate the performance of SRI bond funds. In both studies, funds that apply some sort of social screens in their portfolios do not appear to either outperform or underperform their control groups of conventional funds. Statman (2006) compares the performance of Domini 400 index with SP500 from 1990 to 2004, and Schröder (2007) measures the performance of 29 SRI indexes. Both studies provide no evidence that the application of SRI strategies has an economically meaningful impact in portfolio formation⁶⁵.

⁶⁴ The meta-analysis of Friede et al. (2015) covers a sample of 2,200 studies, while Margolis et al. (2009), and Orlitzky et al. (2003) conduct a meta-analysis of 251 and 52 studies respectively. The three meta-analyses have been published in a span of 12 years (2003-2015).

⁶⁵ There is one notable exception to the widely-accepted notion that social screens do not matter in portfolio formation; sin stocks. Literature has been steadily providing evidence that portfolios comprised

In the current study, I examine whether SRI funds are good candidates for the application of window-dressing strategies. It has been shown that contrary to firm-based analysis of the CSR-FP link, the vast majority of fund literature endorses the idea that screening based on ethical considerations is not a performance-enhancing strategy. Recent meta-analyses support that notion (Friede et al., 2015; Revelli & Viviani, 2015). Conceptually, one could make the argument that as we make the transition to fund level analysis, any possible firm-based benefits of CSR may be counterbalanced by the negative effects of portfolio formation. Brooks and Oikonomou (2018) provide two possible explanations for that; the sub-optimal diversification of the SRI portfolios, and the exclusion of transaction costs in firm-level studies. Both stories would explain why SRI funds do not appear to outperform their conventional equivalents. The question though remains: why would fund managers screen for CSR if not to generate higher returns for their portfolios?

A recent meta-analysis of 344 individual studies on the CSR-FP link from Vishwanathan et al. (2020) provides the most intuitive answer to that; CSR activities enhance firm value through other empirical mechanisms. One such well-documented mediator in the CSR-FP relationship is firm reputation. Brammer and Millington (2008) show that firms use specific components of CSR, like charitable donations, in order to enhance their financial performance through better reputation. He and Li (2011) find that CSR has direct effects on brand identification, customer satisfaction and brand loyalty. The mediating qualities of customer satisfaction in the CSR-firm value relationship have also been established from the highly-cited paper of Luo and Bhattacharya (2006). Ioannou and Serafeim (2015) study analysts' views of CSR since the early 1990s, and show that investors over the last decade are gradually shifting their perception of CSR from a mere agency cost to a positive signal for the firm's future financial performance.

of stocks of firms operating in sin industries (tobacco, alcohol, weapons, gaming, adult services) outperform their benchmarks (Fabozzi et al. (2008), and hence the exclusion of the so-called "sin stocks" during portfolio formation is negatively associated with fund performance (Blitz & Fabozzi, 2017; Fauver & McDonald, 2014; Capelle-Blanchard & Monjon, 2014; Humphrey & Tan, 2014; Kim & Venkatachalam, 2011; Hong & Kacperczyk, 2009; Statman & Glushkov, 2009).

The reciprocal relationship of a firm with its stakeholders is another mediating mechanism of the CSR-FP link. The idea is that firms engaging in CSR enhance stakeholder satisfaction, which in turn, results in value creation through increased productivity, co-operation, and organisational commitment (De Roeck & Farooq, 2018; Bosse & Coughlan, 2016; Ali et al., 2010). Cheng et al. (2015) provide evidence that superior stakeholder engagement reduces capital constraints, while Krüger (2015) shows that investors react positively in positive CSR news of firms with problematic stakeholder relations. Coding more than 50,000 stakeholder events from 1993 to 2008, Henisz et al. (2014) evince that increasing stakeholder engagement increases firm's financial valuation. More recently, Dai et al. (2020) find that corporate customers infuse their CSR practices to their supply chains, improving the operational efficiency of all parties, as well as increasing the future sales growth of customers.

A strong body of literature for value-enhancing mediators of CSR, focuses on the relationship between CSR and firm risk. An earlier meta-analysis from Orlitzky and Benjamin (2001) shows that the mean correlation of CSR with firm risk is negative and significant (-0.21). More recent studies further evince the negative association of CSR with firm-idiosyncratic (Luo & Bhattacharya, 2009), and bankruptcy risk (Verwijmeren & Derwall, 2010). Sharfman and Fernando (2008) show that higher environmental risk management is linked with lower cost of capital. Studying a sample of SP500 firms from 1992 to 2009, Oikonomou et al. (2012) find that corporate social responsibility is negatively related with a firm's systematic risk, while corporate social irresponsibility is positively (and strongly) associated with financial risk. The same authors investigate the link between bond yields and CSR, and find that the bonds of firms with more CSR strengths (concerns) have better (worse) credit ratings, and hence lower (higher) yields (Oikonomou et al., 2014).

A wide spectrum of related studies examines the value-creating qualities of CSR through its impact on corporate finance decisions. Deng et al. (2013) use KLD to examine whether CSR creates value for shareholders through Mergers and Acquisitions (M&As). Authors find that acquiring firms with high (low) CSR scores realise higher (lower) cumulative abnormal returns (CARs), better (worse) post-merger operating performance, while deals initiated by high (low) CSR acquirers take less (more) time to

complete and have lower (higher) probability of failing. Using a different database to evaluate a firm's CSR⁶⁶, Aktas et al. (2011) provide similar findings. On a different note, Flammer (2015b) shows that firms use CSR as a viable strategy for differentiating their product, Berrone and Gomez-Mejia (2009) find that good environmental performance is linked with higher CEO pay, while Mahoney and Thorne (2005) identify a negative link between CSR weaknesses and executive compensation, and a positive link between CSR strengths and stock options. Investigating the relationship of CSR with innovation, Luo and Du (2015) show that firms with greater CSR activities exhibit higher levels of innovativeness, release more new products, while the positive link between CSR and innovation is even stronger for firms that invest more in R&D and firms that operate in more competitive industries.

The current study is located in the niche area of investigating whether firms (funds in our case) exploit the advantageous benefits of CSR identification, whilst circumventing the corresponding cost-intensive CSR activities. Since the CSR-FP channel is not direct, but is rather connected through several mediating mechanisms, one could argue that firms may be incentivised to use CSR as a means of manipulating these mediators. Godfrey (2005) provides the theoretical foundation for that process. He finds that corporate philanthropy creates positive moral capital across all stakeholders, which in turn acts as insurance for the firm's goodwill. Delmas and Burbano (2011) are more straightforward, arguing that firms engage in greenwashing through their implied environmental performance. Hemingway and Maclagan (2005) argue that the adoption of CSR policies at the corporate level is, *inter alia*, driven by the individual beliefs of the managers, while Barnea and Rubin (2010) take this investigation one step further. Authors of this study find that insider ownership and leverage are negatively associated with the firm's social performance, supporting their hypothesis that insiders induce CSR over-investment to promote their own reputation⁶⁷. In a similar vein, Du (2015) studies a sample of Chinese family-owned firms, and finds that firms with higher levels of philanthropic giving are associated with

⁶⁶ Aktas et al. (2011) use Innovest's Intangible Value Assessment ratings to calculate a firm's CSR involvement.

⁶⁷ Authors name it the "warm-glow effect."

higher levels of environmental violations. Koehn and Ueng (2010) also evince that corporate philanthropy is employed in order to divert investor attention from substandard financial results. Studying a sample of seasoned equity offerings (SEOs) from 2004 to 2013, Dutordoir et al. (2018) find that post-SEO, issuers with high (low) CSR scores have higher (lower) increases in cash holdings, and worse (better) operating and stock market performance, suggesting that the CSR has a greenwashing effect on the motives that investors attribute to SEOs⁶⁸.

3.3 Data and methodology

3.3.1 Hypotheses development

The absence of international regulatory standards with respect to SRI practices, along with the benefits of SRI labelling, make socially responsible mutual funds ideal candidates for the application of window-dressing strategies. As shown in the previous section of this chapter, mutual funds can be self-labelled as socially responsible⁶⁹, and hence reap the economic and non-economic benefits of the so-called "ethical" investing. Given the voluntary basis of the SRI-labelling, one would have reasons to believe that fund managers could be tempted to adopt the CSR mandate label for their mutual fund without actually applying the cost-inducing CSR screens. This study uses CSR as Trojan Horse⁷⁰, in order to examine whether fund managers employ window-dressing strategies regarding the social responsibility levels of their portfolios, to attract socially responsible investors.

The methodology is plain. I test whether a fund's CSR label is associated with higher (or lower) CSR scores of its holdings compared to the CSR scores of its "conventional" counterparts. Intuitively, a mutual fund that is perceived as "socially responsible" should invest in companies with higher social performance than its non-

⁶⁸ Dutordoir et al. (2018) argue that investors wrongly attribute value creation as the motive of SEOs.

⁶⁹ Mutual funds can be labelled as "socially responsible" by informing their investors that they apply CSR screens when forming their portfolios.

⁷⁰ According to Homer's Iliad (Lattimore, 1962), the Trojan Horse was the mythological wooden horse that was employed by the Greeks as a supposed gift to Trojans, in which the Greek troops hid themselves in order to invade the mythical city of Troy.

SRI analogue. Thus, in the absence of window-dressing as regards the incorporation of CSR screens (or lack thereof), we would expect the holdings of mutual funds which are labelled as "socially responsible" to exhibit higher CSR scores than the holdings of "conventional" mutual funds.

Hypothesis 1: A mutual fund's CSR label is positively associated with its assigned CSR score

After establishing the relationship between a fund's CSR label and its actual social performance, attention is turned to investor attitude towards the set of SRI mutual funds. Literature suggests that socially responsible investors (i.e., "ethical" investors) exhibit higher levels of loyalty compared to their conventional counterparts (Bollen, 2007). In that context, the decision of a mutual fund to apply CSR screens when forming its portfolios, could be associated with the loyalty of its investor base. More specifically, we would expect the loyalty of "ethical" investors to increase as the social performance of a mutual fund increases.

To examine the loyalty of "ethical" investors, we study fund flow persistence. Fund flow persistence is a de facto proxy of investor loyalty. Persistent flows signify the existence of loyal investors. In point of fact, Benson and Humphrey (2008) evince that "socially responsible" mutual funds exhibit higher levels of flow persistence than their non-SRI analogues. We would expect a similar phenomenon to emerge in our investigation as well; SRI funds that decide to enhance (weaken) the sensitivity of their CSR screens, should be linked with higher (lower) inflows.

Hypothesis 2: The loyalty of SRI investors increases as the CSR scores of a fund's holding increase

3.3.2 Sample Selection

First, I use the Survivorship Bias-free Bloomberg database to extract information on mutual fund holdings. Bloomberg provides historical data on the weights of each invested holding for all US mutual funds per year starting from 1999. I also utilise Bloomberg to obtain annual data on the following mutual fund characteristics: age, annual total returns, portfolio holdings, expense ratio, turnover, total net assets and

return volatility. I then use the MSCI ESG KLD STATS database (KLD hereafter), which is the most widely used source of social responsibility information in the respective literature, to derive annual data with respect to the social responsibility initiatives of each portfolio constituent. Finally, I match the historical weights of each holding with their respective CSR scores, to obtain an aggregate CSR score for every fund-year observation in the sample.

KLD uses indicators to monitor the CSR considerations for a number of public firms since 1990. During its first decade, the database covered the CSR information of every firm in the SP500 and Domini 400 Social Index. In 2001, it was extended to include the Russell 1000, and in 2003 it was further extended to include the Russell 2000. KLD evaluates firms using positive and negative screens, which indicate their strengths and weaknesses respectively. Each screen indicator is a binary variable that reflects whether the firm meets the particular criterion. The database covers 80 indicators, which are renewed at the end of each calendar year and are categorised in seven Qualitative Issue Areas: community involvement, corporate governance, diversity, employee relations, environment, human rights and product. It includes exclusionary screens for alcohol, gambling, tobacco, firearms, military and nuclear power.

The aggregate CSR score of each firm-year observation is derived by the aggregate score of its strengths minus the aggregate score of its concerns, adjusted by the number of strengths (concerns) that KLD had employed in the respective year (Oikonomou et al., 2012). To construct the CSR fund score, I match the Bloomberg-extracted holdings' weights of each fund from 2003 to 2012, with the corresponding firm CSR scores that are extracted from KLD, hence coming up with an asset-weighted annual CSR score for every fund in the sample. Since KLD provides information only on US stocks, the study focuses on US domestic equity funds. Following Borgers et al. (2015), I exclude index funds, ETFs, Closed-End investment funds, and Funds of funds from the sample. I also exclude funds that have less than \$1 million total net assets (Gil-Bazo et al., 2010). For each fund that appears to have more than one class, I follow Wermers (2000), selecting only the primary share class. Moreover, to avoid the problem of not sufficient coverage of a fund's holdings from the KLD database (from

which the corresponding CSR scores are extracted), I follow Kempf and Osthoff (2008), first requiring that the sum of holdings' weights that are covered by KLD accounts for at least 60% of the portfolio each year, and then normalising those weights so that they sum up to one. Finally, I exclude from the sample, funds of which there are less than two years of reported holdings. The final sample comprises 1,609 U.S domestic equity funds and covers a period from 2003 to 2012.

3.3.3 Variable Construction

To measure the level of a fund's CSR, I follow El Ghouli and Karoui (2017) by creating an asset-weighted CSR score for each fund, through the combination of the CSR ratings of its holdings, as seen in the following equation:

$$CSR_{j,t} = \sum_{i=1}^{N_{j,t}} w_{i,j,t} \times CSR_{i,t}$$

where $w_{i,j,t}$ is the weight of holding i of fund j at the end of year t ; $N_{j,t}$ is the number of holdings invested by fund j at the end of year t ; and $CSR_{i,t}$ is the CSR score of holding i at the end of year t .

To distinguish whether a mutual fund is labelled as a socially responsible (SRI) fund, I obtain information from US SIF, Bloomberg and Morningstar⁷¹. I hand-collect the relevant data for each fund over the whole sample period and I assign a *CSR mandate* dummy, which is 1 if the fund has a sustainability mandate label and 0 otherwise. The control variables that I employ are common in the mutual fund literature (El Ghouli & Karoui, 2017; Oikonomou et al., 2012; Kempf & Osthoff, 2008). Return is the gross annual return of the fund, which is derived as the sum of its monthly returns, as reported from Bloomberg. Alpha is the fund's risk-adjusted performance. Fund age is the number of years since the inception of the fund. Log (number of stocks) is the logarithm of the number of holdings that the fund has in its portfolio annually. Log (AUM) is the logarithm of the fund's annual total net assets, and is measured in millions of US dollars. Volatility is the annualised volatility of the fund's raw returns. Expense ratio is the yearly ratio of the fund's operating expenses divided by its total net assets. Turnover is the

⁷¹ All three sources derive the corresponding sustainability mandate straight from the funds' prospectuses.

ratio of the minimum of aggregate sales or aggregate purchases of securities of the fund, divided by its annual average of its total net assets.

3.3.4 Descriptive Statistics

Table 3.1 reports summary statistics for the CSR scores and fund characteristics over the 2003 - 2012 period. In particular, I present the aggregate adjusted CSR fund scores, their aggregate adjusted *Strengths* and *Concerns* sub-components, as well as the full set of control variables that are used in the regressions of this study: fund annual raw return, alpha, age (reported in years), number of stock holdings, annual total net assets (reported in \$ million), fund return volatility, expense ratio and turnover ratio.

The average CSR score for the whole set of US domestic equity mutual funds is 0.475, with a standard deviation of 0.162, suggesting that the majority of mutual funds are centred around the average levels of CSR with regard to the ethical scores of their holdings. The average *Strengths* and *Concerns* sub-scores are 0.359 and 0.365 respectively. The mean annual fund raw return is positive and equal to 0.092, while the annualised risk-adjusted fund performance is -.003. A mutual fund in our sample is, on average, 14.7 years of age, and has 96 stocks in its portfolio. The mean total net assets under management of a fund are \$1.721 billion, ranging from \$1.01 million to \$193.45 billion. The median is notably lower than the aforementioned AUM mean, at \$346.4 million, indicating a positive skewness in the sample.

The last column of Table 3.1 reports pairwise correlations between fund CSR score and the set of control variables. All pairs are significant (except for correlation between fund CSR score and risk-adjusted fund performance), indicating that CSR score is related with the set of control variables. Aggregate CSR score is positively correlated with its *Strengths* and *Concerns* sub-scores, with fund raw return, fund age, and fund total net assets. CSR appears to be negatively related with the number of stock holdings and return volatility, as well as with expense and turnover ratio. The latter results support previous studies' findings that higher CSR score is associated with lower risk, lower number of portfolio holdings, and lower expense and turnover ratio.

Table 3.1

Descriptive statistics: CSR scores and fund characteristics

Variable	Mean	Median	Std. Dev.	Min.	Max.	Corr.
CSR	0.475	0.474	0.162	0.000	1.000	1.000
Strengths	0.359	0.369	0.235	0.000	1.000	0.500***
Concerns	0.365	0.339	0.206	0.000	1.000	0.089***
Return	0.092	0.124	0.213	-0.728	1.185	0.151***
Alpha	-0.003	-0.004	0.123	-0.875	0.814	0.041
Fund Age	14.792	12.000	12.727	1.000	89.000	0.026***
Number of Stocks	96.964	60.000	128.918	1.000	2050	-0.102***
AUM	1721.4	346.4	6369.6	1.0	193453.0	0.041***
Volatility	0.245	0.222	0.106	0.051	1.333	-0.184***
Expense Ratio	0.011	0.011	0.004	0.000	0.058	-0.041***
Turnover	70.431	48.0	104.167	0.000	1506.0	-0.025***

This table presents the descriptive statistics of the whole sample of US domestic equity mutual funds for the period 2003 - 2012. Specifically, I report the mean, median, standard deviation, minimum and maximum of aggregate CSR fund scores, the corresponding *Strengths* and *Concerns* sub-scores. All three variables are normalised and take values from 0 to 1. Next, I report a fund's annual fund raw return, risk-adjusted performance, number of its stock holdings, assets under management, return volatility, as well as expense and turnover ratios. The last column reports Pearson's correlation coefficients between fund CSR score and each of the variables in the list. *, **, and *** indicate significance levels at the 10%, 5%, and 1% respectively.

3.4. Empirical results

This section provides the research methodology and presents empirical results. Sub-section 3.4.1 examines the relationship between CSR score and the social responsibility mandate label. Sub-section 3.4.2 introduces a novel categorisation of the fund sample that will be utilised throughout the remainder of the paper. Sub-section 3.4.3 investigates the association of the constructed categories with the fund's total net assets. Sub-section 3.4.4 focuses on changes in fund flows between fund CSR categories.

3.4.1 Corporate social responsibility and CSR mandate label

In this section, I test whether a fund's CSR score is related with its respective *CSR mandate* label. Controlling for the most common fund characteristics, I hypothesise that funds with (without) a social responsibility mandate must be associated with higher (lower) CSR scores. To examine the aforementioned claim, I employ the following regression model:

$$\begin{aligned} CSR_{j,t} = & \beta_0 + \beta_1 Return_{j,t} + \beta_2 Alpha_{j,t} + \beta_3 Fund\ age_{j,t} \\ & + \beta_4 Log(Number\ of\ Stocks_{j,t}) + \beta_5 Log(AUM_{j,t}) + \beta_6 Volatility_{j,t} \\ & + \beta_7 Expense\ ratio_{j,t} + \beta_8 Turnover_{j,t} + \beta_9 CSR\ Mandate_{j,t} \\ & + Year\ dummies + Style\ dummies + MarketCap\ dummies + \varepsilon_{j,t}, \end{aligned} \quad (1)$$

where j denotes funds and t denotes years. *CSR mandate* is a dummy which takes the value of 1 if the mutual fund has a social responsibility mandate from Morningstar, and 0 otherwise. I also control for time (Year), style (Style), and market capitalisation (MarketCap) with the corresponding dummies. To rank the mutual funds with regard to style and market capitalisation, I utilise the Bloomberg default categories. Specifically, with regard to *Style*, funds are assigned as either *Growth*, *Value*, or *Blend*, and with regard to *MarketCap*, funds are labelled as *Small*, *Large*, or *Broad Market*⁷². The rest of the variables are defined in previous section.

Table 3.2 presents the relationship between CSR score and the *CSR mandate* label. In the first specification, I use the aggregate CSR fund score as dependent variable, and I focus on the *CSR mandate* dummy. The dummy appears to be positive, whether we include fund raw returns, or risk-adjusted performance in the model (columns 1 and 2 respectively). The sign is the expected one, as it implies that funds with (without) a social responsibility label, are linked to a higher (lower) CSR score. In other words, we would expect SRI-labelled funds to be associated with higher CSR scores. However, the coefficient (at only 0.03 in both models) is significant at the 10% level, indicating that the relationship between the two variables is not particularly strong.

⁷² We also control for funds being *Dead* (Liquidated, sold, or closed) as listed on Bloomberg, or *Institutional* as listed on Morningstar, by including the corresponding dummies.

Table 3.2
CSR and social responsibility mandate

	CSR Score		Strengths	Concerns
	(1)	(2)	(3)	(4)
Return	0.021 (1.24)			
Alpha		-0.070*** (-4.61)	-0.123*** (-8.09)	-0.094*** (-6.85)
Fund age	0.000 (0.52)	0.000 (0.22)	0.001* (2.47)	0.001* (2.13)
Log (number of stocks)	-0.010*** (-3.63)	-0.011*** (-3.70)	0.008 (1.73)	0.014*** (3.41)
Log (AUM)	-0.001 (-1.18)	-0.001 (-1.14)	0.001 (0.75)	0.003** (1.68)
Volatility	-0.506*** (-8.80)	-0.548*** (-9.53)	-0.769*** (-12.04)	-0.357*** (-6.03)
Expense ratio	-0.295 (-0.46)	-0.451 (-0.69)	-1.782* (-2.16)	-2.295** (-2.99)
Turnover	0.000 (0.59)	0.000 (0.75)	0.000 (0.97)	0.000 (-0.87)
CSR mandate	0.032* (2.04)	0.031* (1.97)	0.001 (0.04)	-0.040** (-2.44)
Year dummies	YES	YES	YES	YES
Style dummies	YES	YES	YES	YES
Market Cap dummies	YES	YES	YES	YES
Constant	0.813*** (35.99)	0.837*** (37.62)	0.575*** (19.32)	0.410*** (15.03)
R-squared	0.265	0.267	0.703	0.637
Observations	10296	10060	10060	10060

This table reports the results from three model specifications. In the first specification (columns 1 and 2), I regress the fund's CSR score on the *CSR mandate* dummy. In the last two specifications (columns 3 and 4), I replace the CSR score as the model's dependent variable, with its *Strengths* and *Concerns* sub-components. In all three specifications, I control for the following fund characteristics: fund raw return, risk-adjusted performance, fund age, the natural logarithm of the number of the fund's stock holdings, the natural logarithm of its annual total net assets (AUM), return volatility, expense ratio, and turnover ratio. I also include year, style, and market capitalisation dummies, as well as unreported dummies for liquidated, acquired or closed (dead) funds. The t-statistics between parentheses are based on standard errors, clustered at the fund level, and *, **, and *** indicate significance at the 10%, 5%, and 1% respectively.

In the last two specifications, I replace the CSR score as dependent variable of the model with its respective *Strengths* and *Concerns* sub-components. When we have the fund's *Strengths* score as dependent variable, the *CSR mandate* dummy is positive, but the coefficient becomes insignificant, indicating that an SRI (non-SRI) fund is not linked with higher (lower) CSR *Strengths* scores. When the *Concerns* sub-component becomes the model's dependent variable, the *CSR mandate* dummy is negative, as expected, equal to - 0.040, and significant at the 5% level. This indicates that funds with (without) an SRI label are associated with lower (higher) CSR *Concerns* scores, and hints that the already weak relationship between CSR and *CSR mandate* label is mainly driven by the *Concerns* rather than by the corresponding *Strengths* scores.

The inclusion of the fund characteristics which are used as control factors, support previous studies' results. Most notably, the coefficient of alpha (column 2) is negative and significant at the 1% level, confirming the negative relationship between a fund's CSR score and its risk-adjusted fund performance. The number of stocks and return volatility coefficients are both negative as well, indicating that high (low) CSR funds are linked with smaller (larger) number of holdings and lower (higher) levels of risk. Raw returns, fund age, total net assets, expense and turnover ratios, all load insignificantly on the fund's CSR score. In the next two specifications (columns 3 and 4), I replace the CSR score as the model's dependent variable, with its *Strengths* and *Concerns* sub-scores. Results support the risk-adjusted under(over)performance narrative for high (low) CSR funds, as the alpha coefficient loads negatively and significantly at the 1% level in both cases. However, the coefficient is stronger for the *Strengths* specification compared to its *Concerns* analogue, which implies that the detected negative link between CSR and risk-adjusted performance is primarily driven by the *Strengths* component rather than by the *Concerns* correspondent.

3.4.2 Is SRI another word for window dressing?

Kempf and Osthoff (2008) posit that SRI (non-SRI) funds are associated with high (low) CSR scores. Testing the relationship of CSR fund score with a *CSR mandate* label by including the corresponding dummy variable in Eq. (1), we found a weak positive

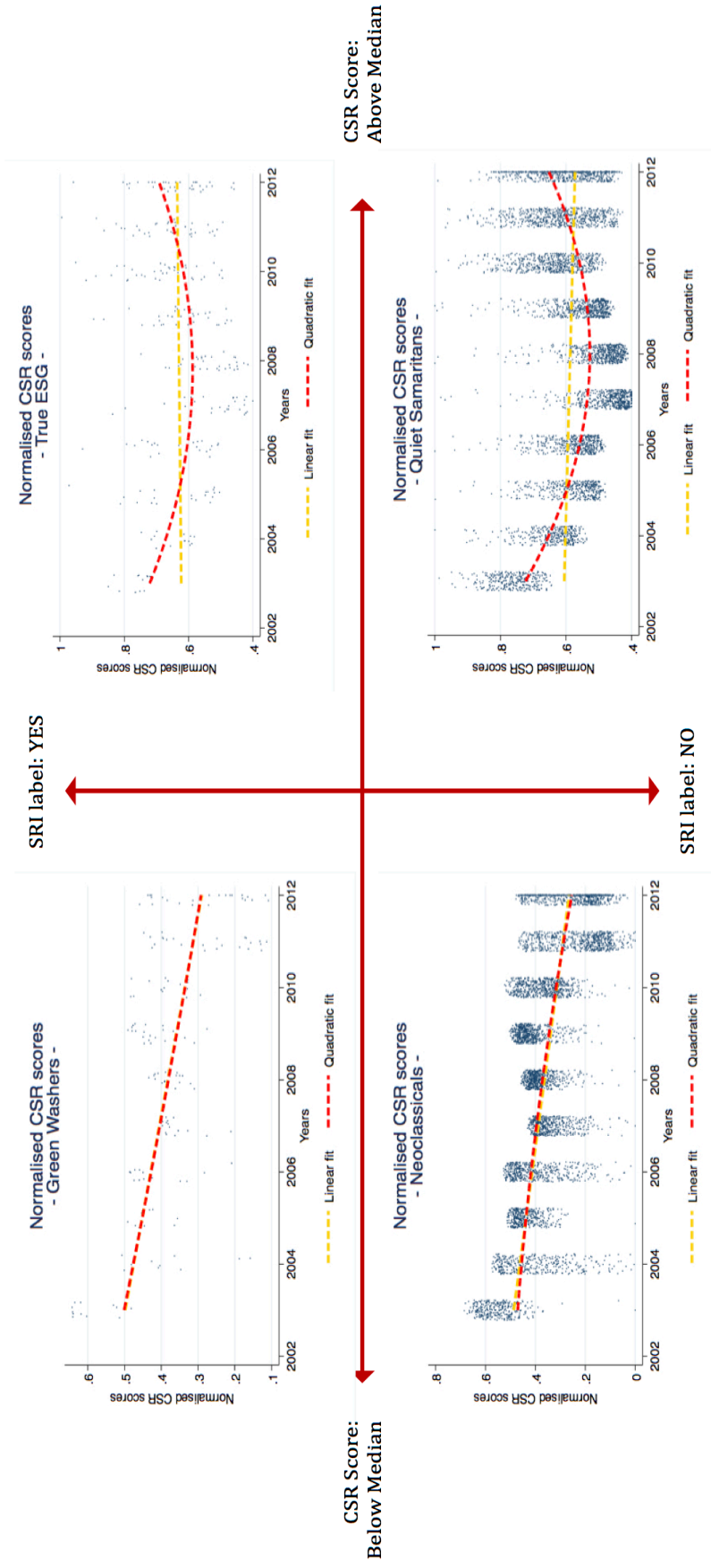
relationship, which turns insignificant once we replace the CSR score with its *Strengths* equivalent as dependent variable of the model. The primary selling point of an SRI-labelled fund is its investment in socially responsible stocks. A weak relationship between a fund's CSR score and its respective CSR mandate is counterintuitive. To examine whether SRI (non-SRI)-labelled funds actually invest in portfolios with higher (lower) CSR scores, I employ a novel approach of fund sample categorisation.

I begin by calculating the median CSR fund score for every year over the 2003 - 2012 period. Then, I generate dummy *High*, which takes the value of 1 if $CSR_{j,t} > \text{Median } CSR_t$, and 0 otherwise. Finally, I combine the fund CSR score information that was calculated in the previous section, with the fund *CSR mandate* label that we extract from Morningstar, in order to divide the whole sample of mutual funds into four distinct groups: a) funds with no *CSR mandate* label and CSR score below median, b) funds with no *CSR mandate* label and CSR score above median, c) funds with *CSR mandate* label and CSR score below median, and d) funds with *CSR mandate* label and CSR score above median. For convenience reasons, we call the non-SRI funds with a CSR score below the corresponding year's median "Neoclassicals," and those with a CSR score above it "Quiet Samaritans." We call the funds which are labelled as SRI and have a CSR score below the corresponding year's median "GreenWashers," and those with a CSR score above that year's median "True ESGs." I incorporate the four groups in a dummy variable (called *TrueID*), and I name its four categories *Neo*, *Sam*, *Green*, and *True* respectively. Figure 1 shows the normalised CSR fund scores over the 2003 - 2012 period according to each fund category⁷³. The horizontal axis denotes funds with a CSR score below median on its left, and funds with a CSR score above median on its right. The vertical axis, denotes funds with no SRI label below 0, and funds with an SRI label above it. The CSR scores for the two categories with CSR scores below median (*Neoclassicals* and *GreenWashers*) seem to follow a downward trend during the sample time period. Conversely, the trend for the two categories with CSR scores above median (*Quiet Samaritans* and *True ESGs*) appears to have a U-shape.

⁷³ In all four graphs, I have added noise to the data with the use of jitter, to make the trend clearer. I have also added a linear and a quadratic fit.

Figure 3.1

CSR scores by TrueID, 2003 - 2012



This figure shows the jittered normalised CSR fund scores of each TrueID category over the 2003 - 2012 period. *Neoclassicals* are comprised of the funds that have no SRI label and their CSR score is below median, *Quiet Samaritans* are funds that have no SRI label but their CSR score is above median. *GreenWashers* are the SRI funds with CSR score below median, and *True ESGs* are SRI funds with CSR score above median. All 4 graphs present the respective linear and quadratic fit.

Table 3.3 presents the descriptive statistics of the fund characteristics by each of the four categories: *Neoclassicals*, *Quiet Samaritans*, *GreenWashers*, and *True ESGs*. The fund CSR scores, as well as the *Strengths* and *Concerns* equivalents, are lower for *Neoclassicals* and *GreenWashers*, compared to *Quiet Samaritans* and *True ESGs* respectively. This result is expected based on the construction of the variable; the former two are funds with CSR scores below median, and the latter two above it. However, there seems to be no notable pairwise difference between the aforementioned groups. Specifically, the mean CSR score of *Neoclassicals* is 0.360, while for *GreenWashers* the mean score is 0.374. The same pattern applies to the other pair; the average CSR score of *Quiet Samaritans* is 0.586 and of *True ESGs* is 0.631. We see no notable difference to the respective values of the two pairs for their *Strengths* and *Concerns* sub-scores; *Neoclassicals* – *GreenWashers* on the one hand, and *Quiet Samaritans* – *True ESGs* on the other, present similar numbers in their *Strengths* and *Concerns* mean scores.

Summary statistics of fund characteristics reveal notable differences between the four pairs. The mean age of a *Neoclassical* fund is 14.4 years, the age of a *Quiet Samaritan* is 15.3, while that of a *True ESG* is 13.9 years, and of a *GreenWasher* is 10.1. Results suggest that both SRI-labelled funds (*True ESGs* and *GreenWashers*) seem to be younger than their non-SRI counterparts (*Neoclassicals* and *Quiet Samaritans*)⁷⁴. *GreenWashers* have younger fund age than the other three categories, no matter if we compare them to their SRI-labelled counterpart, or to their below-median analogues. The same pattern appears to be followed when we look at the number of stock holdings of each group. *Neoclassicals* and *GreenWashers* hold more stocks in their portfolios than *True ESGs* and *Quiet Samaritans*. The latter group has on average 87 stocks in its portfolio, while *True ESGs* have 91. *Neoclassicals* hold 105 stock holdings on average, and *GreenWashers* hold 133 stocks in their portfolio. Results indicate that the *GreenWasher* group is notably different from its counterparts with respect to that characteristic, no matter how we choose to compare them.

⁷⁴ The age of *True ESGs* and *GreenWashers* are 14.2 and 10.4 years, compared to the age of *Neoclassicals* and *Quiet Samaritans* which is 14.7 and 15.7 years, respectively.

Assets under management (AUM) are characteristically different between the four fund categories. The mean AUM of a *Neoclassical* fund is \$1478.7 million, while that of a *Quiet Samaritan* is \$1958.3 million. The mean AUM of a *GreenWasher* fund is \$1354.1 million, and that of a *True ESG* fund is \$2297.0 million. Results indicate that *GreenWashers* have smaller size, measured as total net assets than the other three categories. Conversely, *True ESG* group seems to have the larger size out of the three categories. *Neoclassicals* have the lowest AUM standard deviation (\$4214.5 million), while *True ESGs* have the highest (\$10676.1 million). The largest difference in terms of AUM is between *GreenWashers* and *True ESGs*, (\$1354.1 million and \$2297.0 million respectively) and is in favour of the latter fund group. Finally, both groups with CSR scores above the median, (*Quiet Samaritans* and *True ESGs*) have higher mean AUM than the groups with CSR scores below median (*Neoclassicals* and *GreenWashers*). With respect to risk-adjusted performance measures and return volatility, results do not reveal notable differences between the four categories.

3.4.3 Assets under management and fund categories

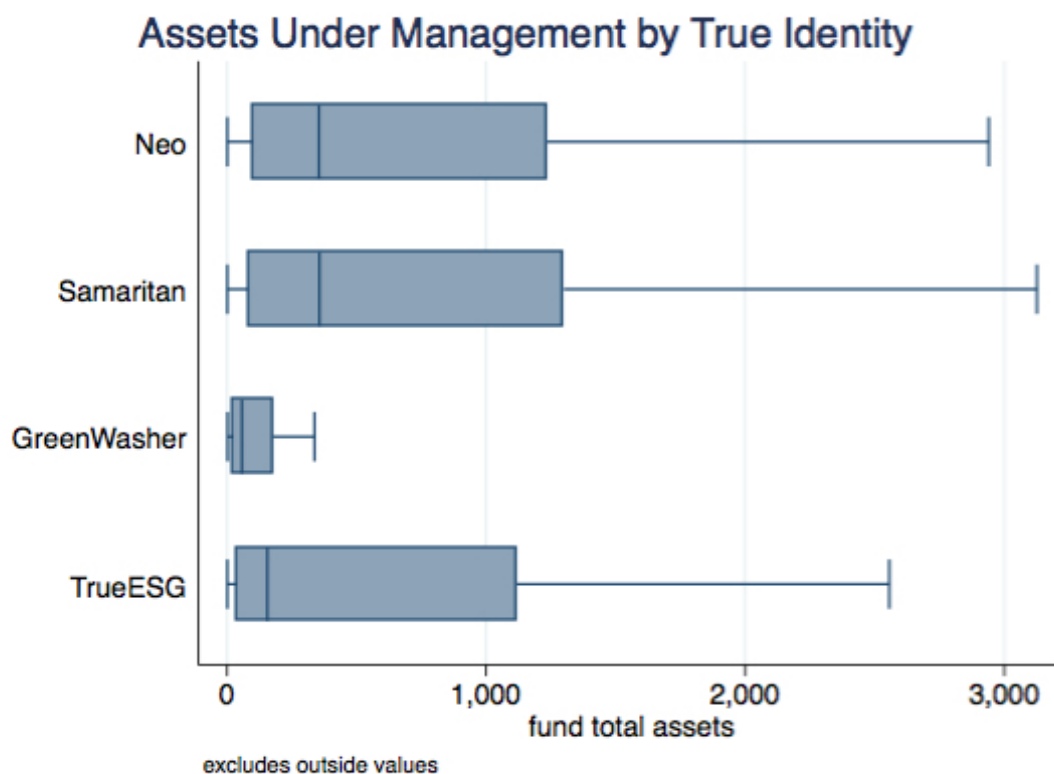
The categorisation between the four groups is based on the combination of the fund holdings' CSR scores with the Morningstar *CSR mandate* label. In Eq. (1) we find no significant relationship between a fund's CSR score with its assets under management. However, Figure 3.2 reveals a notable difference between the four categories with respect to the latter fund characteristic. Based on the descriptive statistics from Table 3.3, we observe that the *GreenWasher* group has lower mean AUM value compared to the other three categories. The box plot of Figure 3.2 shows that the mean, median, first and third quartile, as well as the maximum value of its total net assets, are also lower than its other three counterparts.

Table 3.3
Fund characteristics by TrueID category

TrueID Category	Variable	Observations	Mean	Std. Dev.
Neoclassicals	CSR score	6001	0.360	0.121
	Strengths	6001	0.279	0.207
	Concerns	6001	0.362	0.222
	Fund age	5906	14.473	11.755
	Number of stocks	5921	105.245	142.772
	AUM	5388	1478.798	4214.519
	Return	5631	0.096	0.213
	Alpha	5442	-0.000	0.129
	Beta	5444	1.122	0.671
	Volatility	5581	0.254	0.108
Quiet Samaritans	CSR score	5879	0.586	0.109
	Strengths	5879	0.436	0.237
	Concerns	5879	0.369	0.192
	Fund age	5776	15.301	13.782
	Number of stocks	5789	87.681	105.402
	AUM	5136	1958.389	7720.690
	Return	5442	0.085	0.191
	Alpha	5253	-0.007	0.119
	Beta	5269	1.043	0.664
	Volatility	5385	0.236	0.104
GreenWashers	CSR score	184	0.374	0.116
	Strengths	184	0.301	0.187
	Concerns	184	0.370	0.206
	Fund age	174	10.097	8.799
	Number of stocks	173	133.098	250.556
	AUM	161	1354.127	8688.462
	Return	163	0.085	0.191
	Alpha	148	0.003	0.102
	Beta	148	1.079	0.548
	Volatility	155	0.250	0.097
True ESGs	CSR score	300	0.631	0.120
	Strengths	300	0.498	0.187
	Concerns	300	0.356	0.149
	Fund age	290	13.965	10.950
	Number of stocks	294	91.724	136.425
	AUM	259	2297.023	10676.150
	Return	270	0.080	0.203
	Alpha	256	-0.006	0.104
	Beta	256	1.046	0.484
	Volatility	252	0.221	0.090

This table reports fund characteristics for each of the following fund categories: *Neoclassicals*, *Quiet Samaritans*, *GreenWashers*, and *True ESGs*. The fund characteristics that are listed are: the aggregate, normalised CSR fund score, the *Strengths* and *Concerns* equivalents, the fund's age (measured in years), the number of a fund's stock holdings, the annualised total net assets (AUM) measured in \$ million, the fund's annual raw return, its annualised risk-adjusted performance, its beta and return volatility. For each category's characteristic, listed are: the number of its observations, its mean, and standard deviation.

Figure 3.2
Total net assets and fund categories



This figure shows the total net assets (AUM) measured in \$ million, for each fund category. *Neo* denotes the *Neoclassicals* category, *Samaritan* denotes the *Quiet Samaritans*, *GreenWasher* denotes the *GreenWasher* group, and *TrueESG* denotes the *True ESGs*. The box plot shows the minimum, first quartile, median, third quartile, and maximum values of the fund total assets in \$ million. It excludes outside values.

I posit that SRI-labelled funds will attract investors from the same pool of socially responsible individuals. Since fund holdings are not publicly available, socially responsible investors are more likely to base their investment decisions on either industry information, or the funds' prospectuses. Both options have the *CSR mandate* label as the main informative point of a fund's ESG⁷⁵ considerations, and not an analytical CSR score of the fund's holdings. Therefore, we would expect to find differences in the assets under management between SRI-labelled and non-labelled funds, but not between the AUMs of the *GreenWashers* and the *True ESGs*. However,

⁷⁵ ESG stands for Environmental, Social and Governance criteria. The term refers to social responsibility factors that investors take into account to determine the level of firm's CSR standards.

summary statistics reveal that the *GreenWashers* group behaves differently than its other three counterparts. To test this argument, I estimate the following regression model:

$$\begin{aligned}
 \text{Log}(AUM_{j,t}) = & \beta_0 + \beta_1 \text{Return}_{j,t} + \beta_2 \text{Fund age}_{j,t} + \beta_3 \text{Log}(\text{Number of Stocks}_{j,t}) \\
 & + \beta_4 \text{Volatility}_{j,t} + \beta_5 \text{Expense ratio}_{j,t} + \beta_6 \text{Turnover}_{j,t} \\
 & + \beta_7 \text{TrueID}_{j,t} + \text{Year dummies} + \text{Style dummies} \\
 & + \text{MarketCap dummies} + \varepsilon_{j,t}
 \end{aligned} \tag{2}$$

where *j* denotes funds and *t* denotes years. *TrueID*_{*j,t*} is a dummy with 4 categories; *Neo* for *Neoclassicals*, *Sam* for *Quiet Samaritans*, *Green* for *GreenWashers*, and *True* for *True ESGs*. I use the *GreenWashers* dummy as the base category. I also control for time (Year), style (Style), and market capitalisation (MarketCap) dummies⁷⁶. The rest of the variables are defined in previous section.

Table 3.4 reports the estimation results of Eq. (2). The regression results show that the *Neo*, *Samaritan*, and *TrueESG* dummy variables are all positive and significant in all three specifications, suggesting that there is a positive association between the change in the total net assets and the change in the levels of the aforementioned fund categories from their base. Since *GreenWashers* is the base dummy, it appears that a change from that category to any of the three others, is associated positively with the change in their assets under management. More specifically, in the third specification, *Neoclassicals* appear to have 115.9% larger size in terms of their total net assets compared to *GreenWashers*. Similarly, *Quiet Samaritans* are associated with a 105.6% change in their AUMs as they move from the base group, and likewise, *True ESGs* are also linked with a 63.4% change in their total net assets as they move from their SRI-labelled counterparts. Both *Neo* and *Samaritan* dummies are significant at the 1% level, whereas the *TrueESG* dummy is significant at the 5% level.

⁷⁶ I also control for funds being *Dead* (Liquidated, sold, or closed) as listed on Bloomberg, or *Institutional* as listed on Morningstar, by including the corresponding dummies.

With respect to the other fund characteristics, results support previous studies of the AUM fund literature. In the second model specification⁷⁷, *Return* is positive and significant at the 1% level, confirming that an increase in the fund's returns is linked with a positive change in its total net assets. *Fund age* is also positive and equal to 0.047, suggesting that a 1 year increase in a fund's age is associated with a 4.7% increase in its total net assets. The coefficient denoting the number of a fund's holdings is positive and significant at the 1% level as well, indicating that a 100% increase in the number of a fund's holdings is associated with a 55.7% increase of its AUMs. Both expense and turnover ratios are negatively related with the log(AUMs), implying that higher expenses and higher turnover ratios are linked with a decrease in the fund's total net assets.

Based on the regression model of Eq. (2), Table 3.5 reports the pairwise comparisons of marginal linear predictions between the categories of the *TrueID* dummy variable⁷⁸. With the exception of the *True ESG – Quiet Samaritans* pair, every other result is statistically significant. All comparisons between non-SRI funds and their SRI-labelled counterparts, favour the former. The coefficient of *Green Washers* against *Neoclassicals* and *Quiet Samaritans* is -1.158 and -1.056 respectively, indicating that a fund moving from any of the latter two categories into the *GreenWasher* one, is negatively linked with the change in its total net assets. Similarly, the coefficient of *True ESGs* against *Neoclassicals* is -0.524, indicating that a change in the level of the dummy variable from *Neo* to *TrueESG* will result in a decrease of its AUMs. Notably though, the coefficient is less strong than it was in the previous two pairs, indicating that even though the relationship is negative in both cases, the transition from a non-SRI fund into a *GreenWasher* fund is associated with a stronger change in its AUMs than into a *TrueESG*.

⁷⁷ Results from the third model specification corroborate those of the second with respect to all the aforementioned fund characteristics.

⁷⁸ The pair-wise comparisons of marginal linear predictions are estimated based on the third model specification of Table 3.4. The results are similar in unreported estimations based on the second model.

Table 3.4

Total net assets and fund categories

	Log(AUM)		
	(1)	(2)	(3)
Return		0.598*** (3.98)	
Alpha			-0.140 (-0.92)
Fund age		0.047*** (11.80)	0.044*** (11.19)
Log (Number of Stocks)		0.557*** (10.15)	0.555*** (10.00)
Volatility		0.478 (0.81)	0.214 (0.34)
Expense Ratio		-107.1*** (-10.54)	-109.7*** (-10.73)
Turnover		-0.002*** (-5.82)	-0.003*** (-5.66)
Neo	1.488*** (6.51)	1.181*** (6.29)	1.159*** (5.91)
Samaritan	1.341*** (5.82)	1.077*** (5.73)	1.056*** (5.38)
TrueESG	0.742*** (2.94)	0.609** (2.80)	0.634** (2.88)
Year, Style and MarketCap dummies	YES	YES	YES
Constant	4.008*** (14.53)	2.530*** (6.59)	2.955*** (7.61)
R-squared	0.033	0.309	0.304
Observations	10944	10296	10060

This model presents the results from regressing the natural logarithm of the fund's total net assets on the *TrueID* dummy. The control variables included in the three model specifications are: annual fund raw return, fund risk-adjusted performance (alpha), fund age (measured in years since its inception), the natural logarithm of the number of the fund stock holdings, annualised return volatility, expense and turnover ratio. The model also includes time (year), style, and market capitalisation (MarketCap) dummies, as well as unreported dummies for institutional funds and funds that were liquidated, acquired or closed (dead) during the 2003 - 2012 period. The t-statistics between parentheses are based on standard errors, clustered at the fund level, and *, **, and *** indicate significance at the 10%, 5%, and 1% respectively. All *TrueID* variables are defined in previous sections.

Focusing on the comparison of the marginal linear predictions between the two SRI-labelled categories, we find that the coefficient of *TrueESGs* against *GreenWashers* is positive and statistically significant. Specifically, the *TrueESG* against *GreenWasher* contrast coefficient is 0.634 and its p-value is 0.004, suggesting that a move from the *GreenWasher* group to the *True ESG* analogue is linked with a 63.4% increase of its

assets under management. Finally, the pairwise comparison between the non-SRI funds, implies that a change in the fund category from *Neoclassical* to *Quiet Samaritan* is associated with a 10.2% decrease of the fund's assets under management.

Table 3.5
Pairwise comparisons of marginal linear predictions

TrueID	Contrast	Std Err.	t	P>t	[95% Confidence Interval]	
Samaritan vs Neo	-0.102	0.050	-2.01	0.004	-0.209	-0.002
GreenWasher vs Neo	-1.158	0.196	-5.91	0.000	-1.543	-0.774
TrueESG vs Neo	-0.524	0.249	-2.10	0.036	-1.013	-0.035
GreenWasher vs Samaritan	-1.056	0.196	-5.38	0.000	-1.441	-0.671
TrueESG vs Samaritan	-0.422	0.249	-1.69	0.090	-0.910	0.066
TrueESG vs GreenWasher	0.634	0.219	2.88	0.004	0.202	1.065

This table reports the pairwise comparisons of marginal linear predictions between the four categories of the *TrueID* dummy variable; *Neo* denotes the *Neoclassicals* fund group, *Samaritan* denotes the *Quiet Samaritans*, *Green* indexes the *GreenWashers*, and *TrueESG* denotes the *True ESG* fund category. For each pairwise comparison listed are: the contrast coefficient, standard error, t-statistic, p-value, and 95% confidence interval.

3.4.4 Fund flows and fund categories

The positive relationship between mutual fund performance and fund flows has been established long ago. Investors are expected to react positively to a fund's performance, directing their flows accordingly⁷⁹. Table 3.5 provided evidence that the four fund categories, that were designed based on their CSR scores, display different behaviour with respect to changes in the total net assets of their constituents. In this section, I investigate whether investors direct their assets according to a change of a mutual fund's CSR identity from one category to another. To measure the change in fund flows, I utilise the standard measure of fund flows from the relative literature which is calculated as:

⁷⁹ In unreported results, I estimated the relationship between fund flows and fund performance. I confirm the positive relationship between lagged performance and mutual fund flows for the 2003 – 2012 sample period.

$$Flows_{j,t} = \frac{AUM_{j,t} - AUM_{j,t-1}(1+R_{j,t})}{AUM_{j,t-1}}$$

where $AUM_{j,t}$ and $AUM_{j,t-1}$ are the total net assets for fund j at the end of years t and $t - 1$ respectively, and $R_{j,t}$ is the annualised raw return of fund j in year t .

Table 3.6 presents the descriptive statistics of fund flows for each of the *TrueID* categories. The mean flows for *GreenWashers* and *True ESGs* are 0.267 and 0.355 respectively, both higher than *Neoclassicals* (0.190) and *Quiet Samaritans* (0.234). The median values of fund flows are negative for *Neoclassicals* and *Quiet Samaritans* (the corresponding values are -0.039 and -0.048), and positive for *GreenWashers* and *True ESGs* (0.012 and 0.025 respectively).

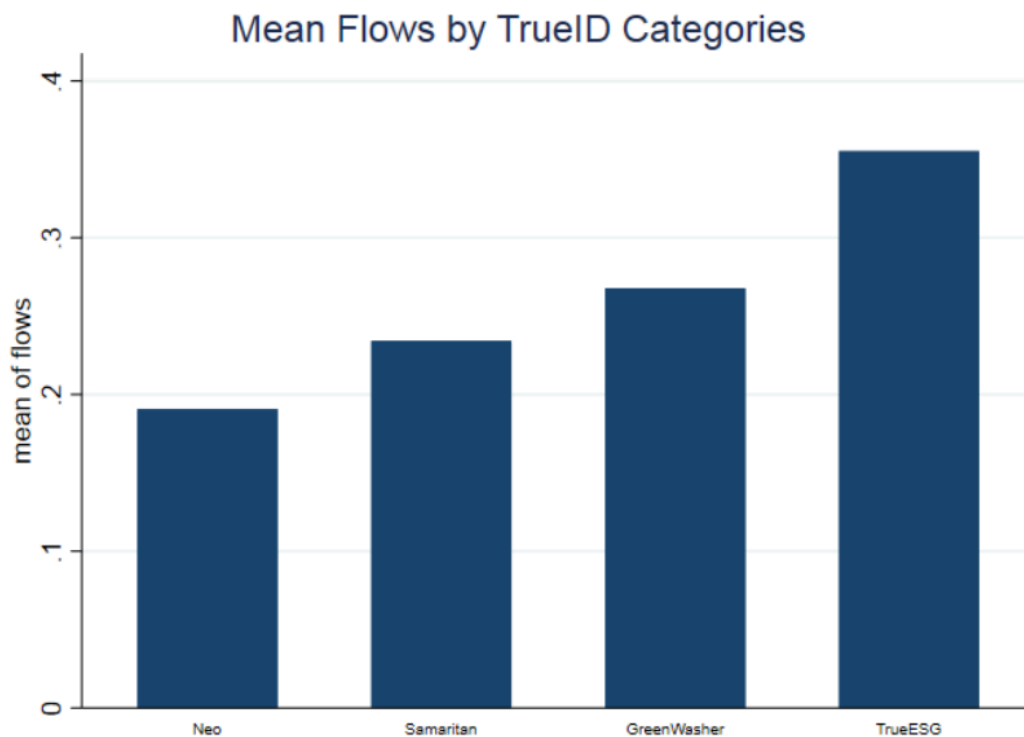
Table 3.6
Flows by TrueID

TrueID	N	Mean	Median	Std. Dev.	Min.	Max.
Neoclassicals	4419	0.190	-0.039	1.186	-1.268	25.214
Quiet Samaritans	4165	0.234	-0.048	1.736	-1.321	43.445
Green Washers	133	0.267	0.012	1.093	-0.421	10.847
TrueESGs	206	0.355	0.025	1.488	-0.975	13.794

This table reports the descriptive statistics of Flows for each *TrueID* fund category over the 2003 - 2012 period. The statistics reported are: the number of flows observations, its mean, median, standard deviation, minimum and maximum values. All *TrueID* categories are defined above.

Figure 3.3 presents the mean flows for each of the four *TrueID* categories. Starting from the *Neoclassicals* group, which is associated with the lowest CSR score, and moving up to *True ESGs* (which is linked with the highest), the mean flows of each group seem to move in tandem with the levels of their CSR scores. That pattern hints at a positive relationship between the levels of a fund's CSR score and its fund flows.

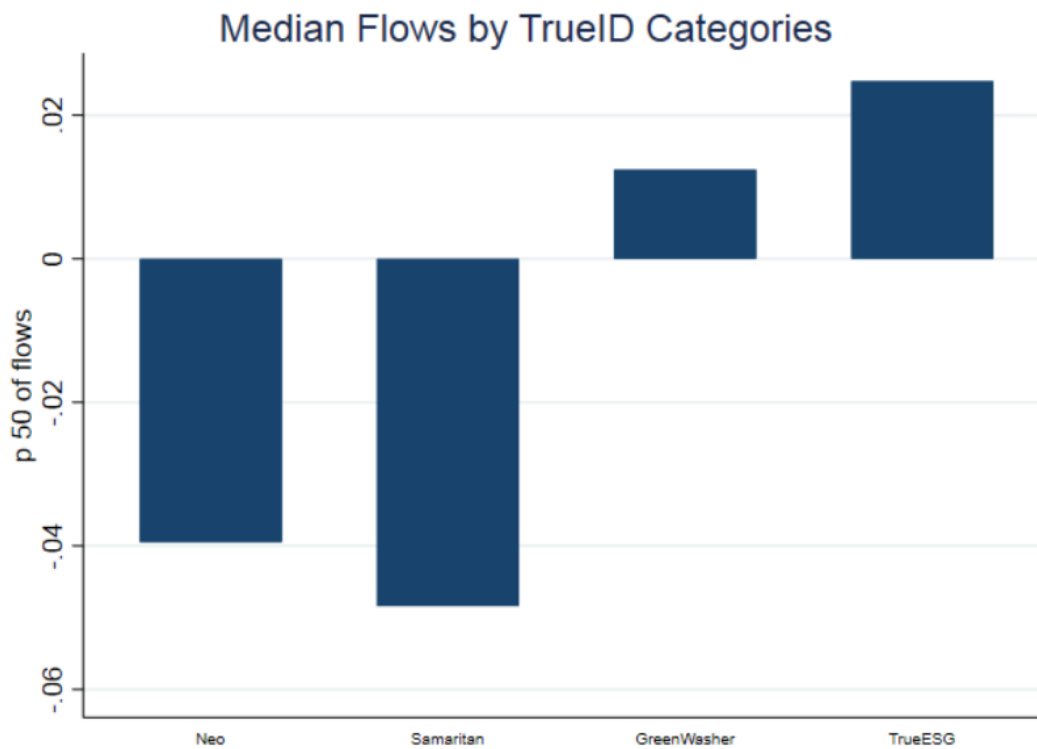
Figure 3.3
Mean flows by TrueID categories



This bar-graph shows the fund flows for each fund category of the *TrueID* variable over the 2003 - 2012 period. Vertical axis denotes the mean flows as a percentage, and the horizontal axis denotes each of the four categories of the *TrueID* dummy. All variables are defined in previous sections

Figure 3.4 displays median fund flows for the four *TrueID* categories. SRI and non-SRI groups exhibit a distinctively different behaviour. *Neoclassicals* and *Quiet Samaritans* have negative median flows, while *GreenWashers* and *True ESGs* have positive flows. The *Quiet Samaritans* group is linked with the most severe outflows, and its SRI-labelled equivalent, *True ESGs*, with the highest inflows. The difference in the sign of flows between SRI and non-SRI groups, suggests that investor flows respond positively to the inclusion of a *CSR mandate* label in a mutual fund, and negatively to the absence of it. However, investors do not appear to favour non-SRI funds that invest in socially responsible stocks over their less ethical counterparts (with or without a *CSR mandate* label).

Figure 3.4
Median flows by TrueID categories



This bar-graph shows the fund flows for each fund category of the *TrueID* variable over the 2003 - 2012 period. Vertical axis denotes the median flows as a percentage, and the horizontal axis denotes each of the four categories of the *TrueID* dummy. All variables are defined in previous sections.

Since investors are not aware of the CSR levels of funds' holdings, they are not expected to respond to possible identity changes between the SRI and non-SRI groups respectively. To investigate the association between fund flows and identity changes further, I construct a dummy variable that takes into account the change of a fund's category from time $t-1$ to time t . I call the dummy *ChangeID*, and I give it 8 categories according to the direction of the change. I also include the case that a fund stays in the same category from $t-1$ to t . I define the dummy categories as follows: a) *NeoNeo*: a fund that is *Neoclassical* at time $t-1$ and stays *Neoclassical* at time t , b) *NeoSam*: a fund that is *Neoclassical* at time $t-1$ and becomes *Quiet Samaritan* at time t , c) *SamSam*: a fund that is *Quiet Samaritan* at $t-1$ and stays *Quiet Samaritan* at t , d) *SamNeo*: a fund that is *Quiet Samaritan* at $t-1$ and becomes *Neoclassical* at t , e) *GreenGreen*: a fund that is *GreenWasher* at $t-1$ and stays *GreenWasher* at t , f) *GreenTrue*: a fund that is *GreenWasher* at $t-1$ and becomes *True ESG* at t , g) *TrueTrue*: a fund that is *True ESG* at

t-1 and stays *True ESG* at t, h) *TrueGreen*: a fund that is *True ESG* at t-1 and becomes *GreenWasher* at time t.

Table 3.7

Flows by ChangeID categories

ChangeID	N	Mean	Median	Std. Dev.	Min.	Max.
NeoNeo	3070	0.122	-0.046	0.824	-1.025	13.434
NeoSam	917	0.187	-0.052	1.709	-1.178	43.445
SamSam	2776	0.184	-0.053	1.543	-1.320	37.189
SamNeo	915	0.198	-0.033	1.094	-1.018	18.418
GreenGreen	83	0.150	-0.022	0.592	-0.339	4.307
GreenTrue	32	0.061	-0.070	0.374	-0.299	1.606
TrueTrue	150	0.301	0.024	1.284	-0.855	10.381
TrueGreen	31	0.232	0.078	0.466	-0.335	1.438

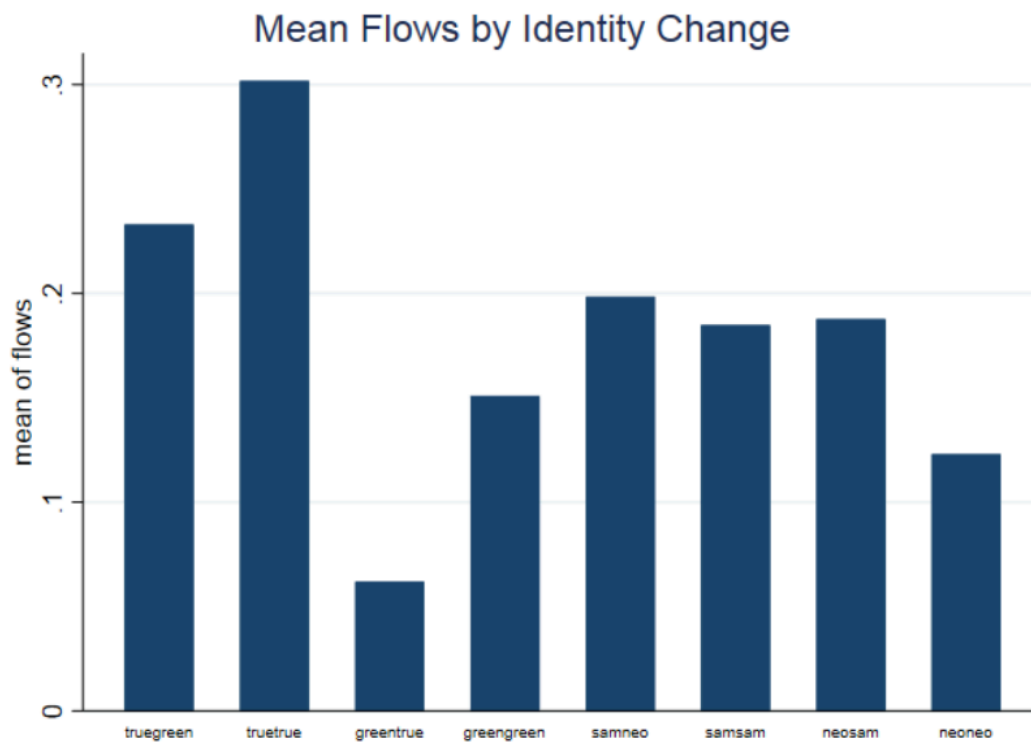
This table reports the descriptive statistics of Flows for each *ChangeID* fund category, over the 2003 - 2012 period. The statistics reported are: the number of flowchange observations, its mean, median, standard deviation, minimum and maximum values. All *ChangeID* categories are defined above.

Table 3.7 presents the descriptive statistics of Flows for each *ChangeID* category. The mean flows for all pairs of identity changes are positive. The average inflows for *TrueTrue* (0.301) and *TrueGreen* (0.232) fund groups are notably higher than the inflows for any other category. Both *GreenGreen* (0.150) and *GreenTrue* (0.061) funds have markedly lower mean inflows than their SRI-labelled counterparts (the aforementioned *TrueTrue* and *TrueGreen* groups). *SamSam* have higher inflows than *NeoNeo* (0.184 against 0.122 respectively), but *SamNeo* (0.198) and *NeoSam* (0.187) do not have notable differences. The median flows for *TrueGreen* (0.078) and *TrueTrue* (0.024) funds are positive. The median values of fund flows for the other six *ChangeID* categories are negative. *GreenTrue* funds have the most severe outflows (-0.070), while there are no notable differences in the outflows between any of the non-SRI groups. *NeoSam*, *SamSam*, and *SamNeo* have the highest maximum mean inflows (43.4, 37.2 and 18.4 respectively) compared to all the other *ChangeID* groups.

Figure 3.5 shows the mean flows for each of the 8 categories of the *ChangeID* variable. The first and second columns of the figure (which denote *TrueGreen* and *TrueTrue* funds respectively), show that investor flows are notably higher for funds

which decided to invest in more socially responsible stocks, whilst having a *CSR mandate* label. However, investors do not seem to penalise the SRI-labelled funds that decide to loosen their ethical considerations; we see no considerable drop to the flows of *TrueGreen* compared to those of *TrueTrue*. In a nutshell, *TrueGreen* funds appear to keep the socially responsible investor base of the *True EGSs*, even after their transition to *GreenWashers*. Conversely, investors do not appear to compensate *GreenWashers* that decide to tighten their CSR considerations but rather to penalise them for that decision. Instead of reaching the inflows of the *TrueTrue* category, the *GreenTrue* group experiences the lowest inflows out of all the other categories. *GreenGreen* do not seem to have marked differences in their fund flows compared to the non-SRI categories.

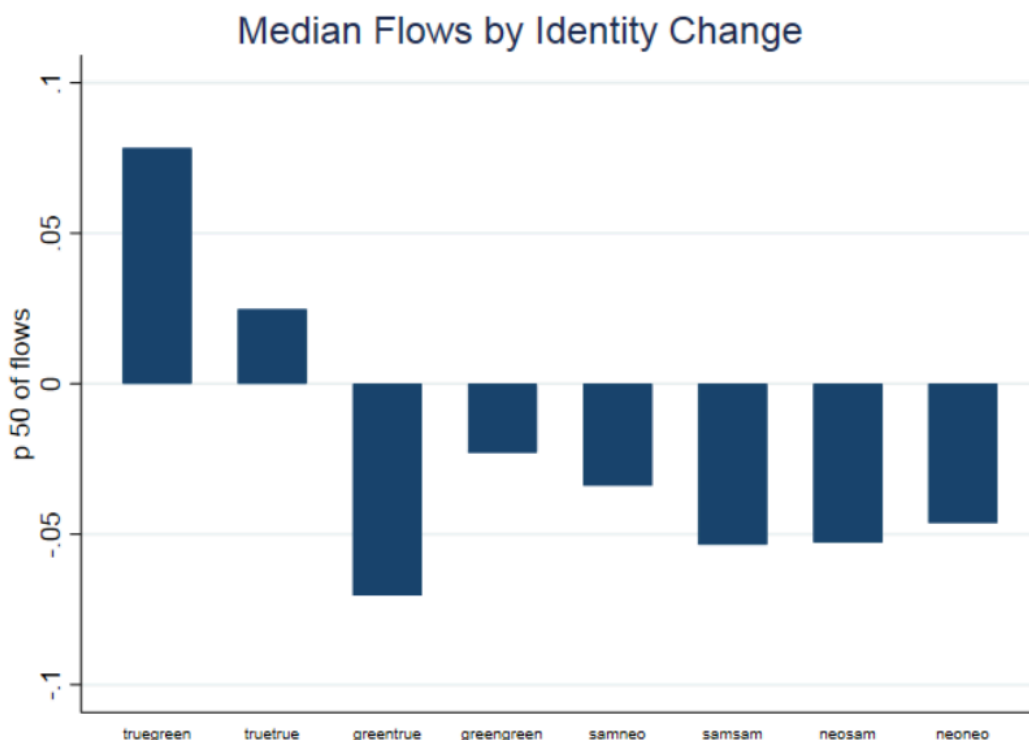
Figure 3.5
Mean flows by ChangeID categories



This bar-graph shows the fund flows for each fund category of the *ChangeID* variable over the 2003 - 2012 period. Vertical axis denotes the median flows as a percentage, and the horizontal axis denotes each of the 8 categories of the *ChangeID* dummy. All variables are defined in previous sections.

Figure 3.6 shows the median flows for each of the 8 categories of the *ChangeID* variable. As evidenced by the mean flows of the *ChangeID* constituents, investors appear to favour SRI funds that incorporate more ethical considerations in their portfolios against their less ethical counterparts, irrespective of whether the latter funds have a *CSR mandate* label. The changes between all combinations of the three *TrueID* identities that do not involve the *True ESG* analogue, present negative median flows. Funds that do not incorporate CSR obligations in their portfolios do not have markedly higher outflows, compared to their non-SRI counterparts that invest more ethically than their suggested label. Investors do not seem to be responsive of changes from *Neoclassical* to *Quiet Samaritan* and vice versa. Consistent with the mean flows exhibit, *GreenWashers* that tighten their CSR constraints experience the most severe outflows of all 8 *ChangeID* groups.

Figure 3.6
Median flows by ChangeID categories



This bar-graph shows the change in fund flows for each fund category of the *ChangeID* variable over the 2003 - 2012 period. Vertical axis denotes the median flows as a percentage, and the horizontal axis denotes each of the 8 categories of the *ChangeID* dummy. All variables are defined in previous sections.

The descriptive statistics of fund flows reveal a pattern with respect to the four *TrueID* fund categories. *Quiet Samaritans* and *Neoclassicals* do not display considerable differences compared to each other. Investors do not appear to notice the changes in the CSR sensitivity of the funds' holdings. However, between *GreenWashers* and *True ESGs*, flows appear to have a puzzling behaviour. *True ESGs* have higher mean and median flows than *GreenWashers*, but a change from the first to the latter and vice versa, does not perform in the same manner. We would expect an SRI fund that decides to enhance (weaken) the CSR sensitivity of its portfolio constituents, to be linked with higher (lower) flows. Instead, what we see is that investors compensate an SRI fund that decides to reduce its ethical constraints, and penalise its SRI analogue that decides to stop reducing them. Renneboog et al. (2011) find that as funds become more socially responsible, investors become less sensitive to performance. Thus, unlike what our descriptive statistics suggest, we would expect the loyalty of SRI investors to increase as the CSR scores of the funds' holdings increase.

To investigate this relationship, I study flow persistence. Persistent flows hint at a loyal investor base. Benson and Humphrey (2008) find that SRI funds show stronger persistence compared to conventional funds, whereas El Ghouli and Karoui (2017) find a negative but insignificant relationship between fund flow persistence and CSR. I argue that funds with high (low) CSR scores will attract more (less) loyal investors. To test this argument, I regress fund flows on lagged fund flows, lagged fund flows interacted with lagged fund CSR score, and lagged control variables. Specifically, I estimate the following regression model:

$$\begin{aligned}
 Flows_{j,t+1} = & \beta_0 + \beta_1 Flows_{j,t} + \beta_2 CSR\ Score_{j,t} + \beta_3 Flows_{j,t} \times CSR\ Score_{j,t} \\
 & + \beta_4 Alpha_{j,t} + \beta_5 Fund\ age_{j,t} + \beta_6 Log(Number\ of\ Stocks_{j,t}) \\
 & + \beta_7 Log(AUM_{j,t}) + \beta_8 Volatility_{j,t} + \beta_9 Expense\ ratio_{j,t} \\
 & + \beta_{10} Turnover_{j,t} + Year\ dummies + Style\ dummies \\
 & + MarketCap\ dummies + \varepsilon_{j,t}
 \end{aligned}$$

where *j* denotes funds and *t* denotes years. All variables are defined in previous section.⁸⁰

⁸⁰ I also control for time (*Year*), style (*Style*), and market capitalisation (*MarketCap*) dummies, for funds being *Dead* (Liquidated, sold, or closed) as listed on Bloomberg, or *Institutional* as listed on Morningstar.

Table 3.8

Flow persistence and CSR scores

	Flows		
	(1)	(2)	(3)
Flows	0.079*** (4.68)	0.055*** (3.10)	0.178*** (3.92)
CSR		0.105 (0.80)	0.155 (1.14)
Flows × CSR			-0.214*** (-3.01)
Alpha		0.375*** (4.87)	0.358*** (4.54)
Fund age		-0.003*** (-3.85)	-0.002*** (-3.80)
Log (number of stocks)		-0.024 (-1.61)	-0.024 (-1.59)
Log (AUM)		-1.107*** (-6.70)	-0.108*** (-6.66)
Volatility		-1.640*** (-3.70)	-1.620*** (-3.62)
Expense ratio		-19.57*** (-6.14)	-19.900*** (-6.19)
Turnover		0.000 (0.33)	0.000 (0.30)
Year, Style and MarketCap dummies	YES	YES	YES
Constant	0.349*** (4.15)	1.657*** (7.63)	1.635*** (7.45)
R-squared	0.013	0.046	0.047
Observations	7407	7083	7083

This model presents the results from regressing fund flows on the following lagged, fund characteristics: flows, the fund's CSR score, fund flows interacted with the fund's CSR score, fund risk-adjusted performance (alpha), fund age (measured in years since its inception), the natural logarithm of the number of the fund stock holdings, total net assets (AUM) measured in \$ million, annualised return volatility, expense and turnover ratio. The model also includes time (year), style, and market capitalisation (MarketCap) dummies, as well as unreported dummies for institutional funds and funds that were liquidated, acquired or closed (dead) during the 2003 - 2012 period. The t-statistics between parentheses are based on standard errors, clustered at the fund level, and *, **, and *** indicate significance at the 10%, 5%, and 1% respectively.

Table 3.8 reports the estimation results of Eq. (3). The first two model specifications show that fund flows exhibit persistence, as the lagged flows coefficient (Flows) is positive and significant at the 1% level, even after controlling for the most common fund flow characteristics. The third model shows that fund flow persistence has a negative relationship with CSR. The interaction term between lagged flows and

lagged CSR scores ($Flows \times CSR$) is negative and significant at the 1% level, implying that as a fund's CSR score increases, its flows' persistence decreases. These results suggest that the decision of an SRI fund to invest more ethically does not necessarily attract more loyal investors. The latter argument corroborates the results from the descriptive statistics of this section; investors not only do not compensate an SRI-labelled fund for tightening its ethical constraints, but they seem to penalise it for stop violating its CSR obligations. The control factors that were used in the last two specifications enter with the expected sign and confirm previous studies' results. I find that lagged, risk-adjusted performance is positive and significant at the 1% level, indicating that investor flows respond positively to previous year's alpha. I also find that Log (AUM) is negative and significant, supporting the argument that as funds increase in size they start having difficulties sustaining the rate of their inflows. Lagged volatility and expense variables are also negatively related to fund flows, reaffirming investors' aversion to high return volatility and expense ratio.

3.5 Robustness checks

In order to investigate the relationship between a fund's CSR and its assets under management, I have utilised a novel categorisation of our fund sample based on the CSR scores of its constituents. However, since we have less SRI than non-SRI funds in our sample⁸¹, the SRI-labelled *TrueID* groups are comprised of fewer observations than their non-SRI counterparts⁸², possibly biasing our results. I address this issue by creating a new dataset in which each SRI fund of the initial sample is matched with its conventional analogue. I then replicate the main analysis using the matched sample. For the fund matching process, I follow Henke (2016), selecting for each SRI fund, a non-SRI fund with the same objective, a comparable fund age and annual raw return⁸³.

⁸¹ Our sample comprises 11,880 non-SRI and 484 SRI-labelled fund-year observations over the 2003-2012 period.

⁸² *GreenWashers* and *True ESGs* against *Neoclassicals* and *Quiet Samaritans* respectively.

⁸³ Each year, an SRI fund was matched with a conventional on objective (exact match), total return (closest match) and age (comparable match). For funds, less than 15 years of age the maximum deviation was set to 1 year. Due to limited number of matching observations for funds with more than 15 years of age, the matching criterion was set to a 5-year deviation for the latter.

Table 3.9 reports the fund observations of the generated dataset. The matched sample comprises now 264 SRI funds and 264 conventional for the whole 2003 – 2012 period.

Table 3.9

Descriptive statistics: Fund observations by CSR mandate label (2003-2012)

CSR mandate	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
No	7	15	12	23	22	29	36	41	38	41	264
Yes	7	15	12	23	22	29	36	41	38	41	264
Total	14	30	24	46	44	58	72	82	76	82	528

This table presents descriptive statistics of the matched sample. Specifically, it reports the number of fund observations with and without a CSR mandate label for the 2003 – 2012 period.

I follow the approach of fund categorisation that was utilised in Section 3.3.2, sub-setting the matched sample to the four constituents of the *TrueID* variable. Table 3.10 presents the descriptive statistics for the 2003 – 2012 period. The new sample is now comprised of 125 *Neoclassicals*, 139 *Quiet Samaritans*, 97 *GreenWashers*, and 167 *True ESGs*.

Table 3.10

Descriptive statistics: Fund observations by TrueID (2003-2012)

CSR mandate	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
Neo	6	8	6	13	9	14	17	19	13	20	125
Samaritan	1	7	6	10	13	15	19	22	25	21	139
Green	3	7	5	8	9	13	14	12	12	14	97
TrueESG	4	8	7	15	13	16	22	29	26	27	167
Total	14	30	24	46	44	58	72	82	76	82	528

This table presents descriptive statistics of the matched sample. Specifically, it reports the number of fund observations based on their TrueID category for the 2003 – 2012 period.

Table 3.11 reports the results of the regressions on the matched sample. In columns 1 and 2, I estimate Eq. (1) to determine whether funds with a CSR label are associated with higher CSR scores. I regress fund CSR Score on the *CSR mandate* label and a set of control characteristics. In both specifications, the *CSR mandate* dummy is positive and significant, but the relationship is weak. In columns 3 and 4, I replace the

CSR Score in the left-hand side of Eq. (1), with its *Strengths* and *Concerns* sub-scores correspondingly. The CSR dummy is negative and significant in the *Concerns* specification, and insignificant in the *Strengths* model, supporting the argument that the relationship between SRI funds and their CSR scores is mainly linked with their *Concerns* considerations. In column 5, I estimate Eq. (2) to examine the relationship between the assets under management of a fund and its CSR identity. I regress the logarithm of the fund's total net assets on the *TrueID* dummy and a set of control characteristics. I find that a change in a fund's net assets is positively associated with a change of its CSR identity from *GreenWasher* to any of the other three groups. *Neoclassicals* have the highest coefficient (0.975) compared to *Quiet Samaritans* (0.706) and *True ESGs* (0.505). All three dummies are significant. In column 6, I estimate Eq. (3) to investigate the relationship between fund flows and CSR identity changes. I regress fund flows on lagged flows, the interaction term between lagged flows and lagged CSR Scores, and a set of lagged control characteristics. I find the *Flows*×*CSR* coefficient to be negative and significant at the 10% level, implying that as a fund's CSR score increases, the fund flow persistence decreases. The latter finding suggests that investor loyalty and CSR have an inverse relationship. The control characteristics in all 6 specifications confirm previous studies' results. A fund's CSR score is negatively related with risk-adjusted performance, number of stocks, return volatility, expense and turnover ratio. A fund's total net assets are positively related with age and number of stocks, and negatively related with volatility, expense and turnover ratio. Fund flows display one-year persistence, and are negatively related with total net assets and expense ratio.

All results of the matched-pairs regressions confirm the empirical findings of the respective regressions from the main paper.

Table 3.11
Matched-pairs regressions

	CSR Score		Strengths	Concerns	Log(AUM)	Flows
	(1)	(2)	(3)	(4)	(5)	(6)
Flows						0.863*** (4.00)
Flowst×CSR						-1.571* (-2.31)
CSR Score						0.461 (1.57)
Return	-0.012 (-0.13)				-0.344 (-0.39)	
Alpha		-0.091 (-1.36)	-0.158* (-2.31)	-0.117 (-1.60)		0.238 (0.91)
Fund age	-0.000 (-0.00)	0.000 (0.17)	0.002* (2.40)	0.001 (1.68)	0.063*** (6.06)	-0.004 (-1.32)
Log (number of stocks)	-0.024* (-2.51)	-0.022* (-2.55)	0.018 (1.75)	0.036** (3.05)	0.483*** (4.80)	-0.112 (-1.86)
Log(AUM)	-0.001 (-0.12)	-0.001 (-0.31)	-0.001 (-0.19)	0.001 (0.15)		-0.151* (-2.55)
Volatility	-0.805** (-2.94)	-1.241*** (-5.10)	-1.119*** (-3.83)	-0.271 (-0.86)	-3.101 (-1.32)	-1.29 (-1.37)
Expense ratio	-4.925* (-1.98)	-3.205 (-1.37)	-7.320* (-2.31)	-3.729 (-1.23)	-122.6*** (-4.03)	-78.41** (-2.74)
Turnover	0.000 (0.42)	0.000 (2.60)	0.000 (1.88)	0.001* (2.54)	-0.001*** (-0.81)	-0.001 (-1.15)
CSR mandate	0.045** (2.84)	0.042* (2.76)	-0.004 (-0.25)	-0.058** (-2.83)		-0.442 (-2.01)
Neo					0.975*** (3.99)	
Samaritan					0.706** (2.90)	
TrueESG					0.505* (2.08)	
Year, Style & MarketCap dummies	YES	YES	YES	YES	YES	YES
Constant	0.927*** (9.76)	1.006*** (12.41)	0.692*** (6.82)	0.328** (2.84)	3.189*** (3.49)	2.912** (2.69)
R-squared	0.315	0.352	0.681	0.62	0.507	0.641
Observations	488	471	471	471	488	146

This table reports results from the matched-pairs regressions. In columns 1 and 2, the dependent variable is fund CSR Score. In columns 3 and 4 dependent variables are its *Strengths* and *Concerns* subcomponents respectively. In column 5, dependent variable is the natural logarithm of the fund's AUM. In column 6, dependent variable is the fund's flows. Columns 1-5 display common fund characteristics, TrueID and CSR mandate dummies, and fund CSR score. Column 6 reports lagged values of these variables. The model also includes year, style, and market capitalisation dummies, as well as unreported dummies for institutional funds and funds that were liquidated, acquired or closed (dead) between 2003 and 2012. T-statistics between parentheses are based on standard errors, clustered at the fund level, and *, **, and *** indicate significance at the 10%, 5%, and 1% respectively. All variables are defined in previous sections.

3.6 Conclusions

This chapter examines the impact of CSR on the demand for socially responsible mutual funds. Specifically, it investigates whether the inclusion of an SRI label has an effect on the flows of the fund. To test that, it studies the holdings of all US domestic equity mutual funds from 2003 to 2012 to determine their CSR levels. The fund sample is then split into four distinct categories with respect to a combination of two CSR-related factors: a) the fund's CSR score, b) the presence (or not) of a *CSR mandate* label.

In that context, first, I study the relationship between the fund's CSR score with the *CSR mandate* label. I find that the inclusion of an SRI label from a fund is positively linked with its CSR score. This implies that SRI funds have more socially responsible portfolio holdings than their non-SRI counterparts. However, the link is weak, and statistically significant only at the 10% level. The link becomes insignificant if we replace the fund's CSR score with its *Strengths* equivalent; SRI funds do not seem to be related with higher *CSR Strengths* scores than non-SRI ones. All model specifications, support a series of previously established links. CSR score is negatively related with: the fund's alpha, number of stocks, and return volatility, adding weight to the argument that CSR has a negative relationship with risk-adjusted performance, and certain measures of risk.

Then, I investigate the relationship between CSR and assets under management. I find that if we combine the CSR score holdings' information of each fund, with the (or with the absence of) SRI label that some funds give to themselves, we come up with four fund categories with distinct characteristics: a) funds with no SRI label and CSR score below the annual median, b) funds with no SRI label and CSR score above median, c) funds with an SRI label and CSR score below median, d) funds with SRI label and CSR score above the annual median. We call these categories: *Neoclassicals*, *Quiet Samaritans*, *GreenWashers*, and *True ESGs* respectively. The presence of a *GreenWasher* group throughout the sample's 10-year period connotes the application of window dressing strategies from the fund managers. The “unethical” (funds with CSR scores below median) and the corresponding “ethical” (funds with CSR scores above median) fund categories, show similarities in the CSR score trend pattern during the time

studied. The four categories also reveal differences in several fund characteristics, most notable of which is the difference in their mean assets under management.

I focus on the relationship between each fund category and its total net assets. I find that a change in a fund's identity from *GreenWasher* to each of the other three groups is positively related with a change in its total net assets. As expected, investors seem to prefer non-SRI funds against their SRI counterparts, as the pool of socially responsible investors is smaller than the rest of the investor spectrum. However, investors also seem to favour *True ESGs* against their SRI-labelled analogues. The specification also supports previous studies' findings with respect to the AUM literature. Risk-adjusted performance, age, and number of stocks, are all positively related with a change in a fund's total net assets. Expense and turnover ratio have a negative relationship with fund AUM change.

Finally, I investigate whether a change of a fund's CSR identity from time $t-1$ to time t , is associated with a change in its flows. SRI-labelled funds with CSR score above median, are linked with higher flows than their non-SRI analogues. Moreover, socially responsible investors do not appear to stay loyal when they detect deviations in the CSR strategy of their fund. However, the link between a fund's social responsibility level and the loyalty of its investor base is not the expected. Investors appear to compensate SRI funds that loosen their ethical considerations when forming their portfolios, and penalise their SRI analogues that tighten them. The regression results provide evidence that fund flow persistence is negatively related to fund CSR score. Therefore, the loyalty of socially responsible investors decreases, as the level of a fund's social constraints increase.

Investigation must be turned now towards the mechanism through which socially responsible investors unmask these divergences from an advertised SRI strategy. Not much is known about the interpretation that an SRI investor gives to possible loosening or tightening of a fund's CSR obligations. From the fund's standpoint, it has long been held that becoming socially responsible seems to be a less than ideal choice in terms of risk-adjusted performance. Results of this study suggest that if it chooses to be one though, in terms of asset attraction it would be better if it offered what it says, but in terms of investor loyalty it would be better if it didn't.

4. Director skills and firm performance

4.1 Introduction

Skills are the natural product of a person's academic, professional, and interpersonal background. In theory, people work throughout their lives towards acquiring skills for which they can be compensated. Shareholders elect their directors on the grounds that they are adequately skilled for steering their company. However, due to lack of data, research of individual skills on a corporate setting is scarce. In this chapter, I study director skills at an individual and at a board level. Specifically, I decompose each board member into her unique set of skills, using a novel dataset on director qualifications. I then examine their impact on firm performance.

Following the financial crisis of 2008, the Securities and Exchange Commission (SEC) proposed a number of revisions to Regulation S-K, regarding proxy disclosure requirements of US public firms, in an attempt to address investors' concerns over corporate accountability. As a result, a set of amendments focusing on enhanced shareholder information and improved board leadership evaluation were adopted on December 16, 2009 and became effective on February 28, 2010. Item 401(e) of Regulation S-K, requires all US public firms to disclose the particular skills that each director or director nominee are expected to add to their board in an annual basis. I capitalise on that information in order to create a taxonomy of skills for the board members of all SP500 constituents from 2010 to 2018. Based on a set of US public firms from 2010 to 2013, Adams et al. (2018) find that skill commonality at the board level improves firm performance. Authors attribute this association to potential optimisation problems over bundled skills, complemented by regulation constraints on individual director characteristics (i.e., board gender, independence, or diversity quotas). On the other hand, using a sample of 615 industrial firms of 2003 and 2005, Anderson et al. (2011), provide evidence that board heterogeneity has a positive effect on firm performance.

I revisit the role of directors' skills on firm performance with three main innovations. First, I utilise a more comprehensive, hand-collected sample of directors' skills descriptions that span from 2010 to 2018, in order to examine skill diversity on firm performance. To that end, I examine how skills cluster at the board level. I then, complement the study from Adams et al. (2018), investigating whether skill diversity is related to firm operating performance. I further explore a set of skills that appears to create value for the firm.

Findings provide some novel insights for skill research. First, I corroborate Adams et al. (2018) in terms of skill heterogeneity across corporate boards; when it comes to their directors' skills, boards vary primarily in terms of skill diversity. To put it differently, some boards appear to have more diverse skillsets than others. Despite the fact, that skill diversity was previously linked negatively with firm value, results of this study provide no evidence supporting a negative relationship between skill diversity and Tobin's Q. In point of fact, I provide some evidence that skill diversity is positively related with firm operating performance. Results also show that a secondary dimension that boards cluster is their technological prowess. Following the research model suggested by Adams et al. (2018), I find that there is a positive relationship between Tobin's Q and a set of 5 distinct skills; *Technology, Academic, Scientific, Government & Regulatory, and Manufacturing*. The effect is statistically significant and economically relevant.

4.2 Related literature

This study adds to the literature of corporate governance and firm performance, specialising on director characteristics. The Sarbanes-Oxley Act of 2002 (SOX henceforth) was the first to ignite a wave of corporate governance enhancements at the boards of US public firms. Followed by NYSE, NASDAQ and AMEX requirements for larger board independence, non-executive directors saw their percentage in public boards increasing from 20% in 1950 to more than 70% in 2005 (Gordon, 2007). In like manner, the number of independent directors with industry expertise increased by 25% during the 2000 - 2010 period (Drobetz et al., 2018). These cataclysmic changes in

board structure gathered academic attention with respect to the actual SOX contribution to corporate transparency (Krishnan & Visvanathan, 2009). At the epicentre of the debate has been the lack of individuals possessing the range of skills that were now required due to regulatory constraints (Erkens & Bonner, 2013).

To address the growing needs in skills, firms had to expand their reach in director qualifications. Linck et al. (2009) examine the effect of SOX on director demand, providing evidence that as a result of the new regulatory objectives, boards increased in size, non-executive director presence, and range of expertise. In their study, authors find that retired directors, academics, and directors with financial or legal skills, increased their presence in corporate boardrooms, arguing that post SOX firms would keep evolving the skillsets sought of their new directors. The increasing heterogeneity of corporate boards in the post-SOX period, prompted SEC to proceed in the 2009's Regulation S-K amendment, in order to further aid corporate transparency. The idea is that as boards become more diverse, shareholders can become more easily confused with respect to the qualifications of their board candidates. Fedaseyeu et al. (2018) show that firms assign their more qualified directors with more roles, and compensate them with higher pay. However, until today, due lack of relevant data, the collective effect of director qualifications on firm performance is only scarcely examined.

Literature on board diversity - which is the closest to skill diversity - is limited and gives contradictory results. Anderson et al. (2011) create a measure of board heterogeneity based on a set of director characteristics and find that firms with more heterogeneous boards have higher Tobin's Q. Creating their own measure of board diversity⁸⁴, Bernile et al. (2018) provide similar evidence that director heterogeneity is associated with lower firm risk and higher performance. To this day, Adams et al. (2018) is the only study that examines director qualifications directly. Findings of these authors, however, contrast the aforementioned studies on board heterogeneity, providing evidence that more diverse boards in terms of skills are associated with lower Tobin's Q. The current study adds to the literature of board heterogeneity, by providing

⁸⁴ Anderson et al. (2014) create a measure of board heterogeneity based on directors' age, gender, ethnicity, educational and professional background, and board experience. In like manner, Bernile et al. (2018) provide their own measure by using directors' age, gender, ethnicity, education, outside directorships, and financial expertise.

evidence of a positive relationship between skill diversity and firm operating performance. Specifically, it evinces that more heterogeneous boards in terms of skills are associated with higher ROE.

However, definite conclusions about the relationship of board composition with firm performance should be treated with caution (Bhagat & Black, 1999). The percentage of independent directors has been linked negatively (Crespí-Cladera & Pascual-Fuster, 2014; Agrawal & Knoeber, 1996), positively (Bhagat & Bolton, 2008), or not linked at all with firm performance (Ferris & Yan, 2007). Even though possessing academic (Francis et al., 2015), accounting (Defond et al., 2005), or financial expertise (Hellmann & Puri, 2002) may enhance the boards monitoring role, the impact of specific director qualifications on firm performance does not provide evidence of direct relationship. White et al. (2014) provide an explanation to the aforementioned problem; unaccounted director heterogeneity. Focusing on academic directors, authors find that professors in science, engineering and medicine improve firm performance, while business professors do not. In like manner, studying financial experts, Güner et al. (2008) find that commercial bankers are associated with increased financing for financially unconstrained firms, while investment bankers are linked with worse acquisitions. The present study further extends literature on unaccounted director heterogeneity, by identifying a set of technology-related skills that improve firm value.

Anecdotal evidence follows this intuition. The governance enhancements of the post-SOX period, brought along significant changes in boards' attitudes towards the technology acumen of their directors (Sarrazin & Willmott, 2016). According to the Spencer Stuart Board Index (2019), technology expertise for new directors has moved up from being the 9th most sought skill in 2014 to 2nd in 2019,⁸⁵ while directors with technology industry background account today for most new SP500 appointments⁸⁶.

⁸⁵ Based on the Spencer Stuart Board Index survey for 2014, 27% of directors reported technology expertise as the 9th most sought consideration in new appointments (The 8 most sought recruitment profiles, in descending order were: women, minorities, active CEOs/COOs, international expertise, industry expertise, financial expertise, retired CEOs/COOs, and social media experts). Spencer Stuart Index of 2019 reports technology expertise as being the 2nd highest priority in director profiles with 34%.

⁸⁶ Based on Spencer Stuart Board Index (2019), directors with background in the technology sector account for 17% of all new SP500 appointments, followed by directors from consumer (16%) and financial services sectors (10%).

Firms are gradually creating Chief Data Officer (CDO hereafter) positions for strategic data and governance utilisation. Gartner reports a 100-fold increase in CDOs during the last ten years, while 62% of firms either have or plan to have one by 2022 (Gartner, 2019). The need for increased boardroom awareness with respect to technology-related matters has even led an increasing number of firms to form technology committees. In the post-SOX period, the percentage of technology committees increased from 0% in 2000 to 6% in 2011, to 10% in 2019 (Nash, 2015).

The novelty of the trend has not yet allowed for definite conclusions with respect to its effect on firm performance. Until today, almost the entirety of anecdotal and small-scaled studies gravitates towards a positive association between technology considerations to the board and firm value. Premuroso & Bhattacharya (2007) examine a sample of 23 SP500 companies, suggesting that firms with better governance and higher firm performance ratios were more likely to form technology committee on their board, as signal of adopting value-maximising decisions. In like manner, a 2017 study from Deloitte shows that during the 2010-2016 period, high-performing firms with at least one technology expert director are, on average, 10% more, relative to low-performing firms with a tech-savvy member on their board. Notably, that percentage has been increasing throughout their sample, and almost doubles during the last year of the study.

The intuition behind the seemingly positive association between board's technological prowess and firm value lies on a twofold incidence with respect to directors; skill scarcity and skill identification. Despite accounting for a major part of capital spending, IT activities are mostly left without effective board oversight (Nolan & McFarlan, 2005). In the absence of tech-savvy directors, technology matters are left to the judgement of CIOs (Kark, 2019). A 2011 survey from McKinsey reports that 46% of executives answer that board attention to IT matters is insufficient, while the impact of technology on their businesses is their firms' most misaligned board priority in terms of address versus importance (Bloch et al., 2011). According to Rickards and Grossman (2017), there is a misconception that bringing a director with a sound technological background is enough to address the issue of adaptation to the digital age. Director background, prior industry, gender, or age are not accurate proxies of a director's

technology acumen. For example, studying a sample of Global 300 firms from 2014 to 2016, Russell Reynolds finds that 58% of new technology-savvy directors were women, while the age of the average technology expert on corporate boards is only one year younger than non-experts (Russell Reynolds, 2016). Augustson et al. (2017) suggest that finding directors who combine technological astuteness with a more traditional managerial skillset is not easy. I posit that some firms have identified and solved the aforementioned two-dimensional problem, by appointing directors with the optimal, technology-focused skillset. The empirical results of the present study provide evidence that increasing the number of technology-savvy directors on the board, is associated with an increase in Tobin's Q.

This study further adds to corporate governance literature that focuses on the impact of directors' governance and sustainability attributes on shareholder wealth. From academic standpoint, *Sustainability*, and *Governance* skills would be intuitively associated with Corporate Social Responsibility (CSR henceforth). The KLD STATS database, which is the de-facto source of information in CSR literature, bases its assigned CSR scores to the firm's responses in seven corporate matters: community involvement, corporate governance, diversity, employee relations, environment, human rights and product. *Sustainability* and *Governance* are directly linked to these areas. To this day, research on the link between CSR and financial performance has not yet reached consensus on either the sign, or the significance of the relationship (Margolis et al., 2007). From Milton Friedman's view of CSR as misallocation of company resources (Friedman, 2007), to more recent views regarding its positive effects on firm value through indirect channels (Bae et al., 2019; Buchanan et al., 2018; Breuer et al., 2018; Flammer, 2015; Oikonomou et al., 2014), the concept of CSR has been approached from several angles. Seen in a skills' setting, results of the current study suggest that an increase in the presence of CSR in the boardroom could potentially work against the growth opportunities of the firm.

Some findings of this study are also related with the link between the presence of legal skills on the board and firm value. Mainly due to data limitations, the question of whether lawyers should serve at corporate boards has not been answered to this day (Spencer Stuart, 2013). Anecdotal evidence suggests that the lawyer-directorship

phenomenon has progressed in a non-monotonic way over the years. While in the pre-Enron era, firms commonly reserved a board seat for their law firm partner, in the post-SOX period lawyers' appointments would mostly raise liability concerns over the company (Jones, 2006). Thus, the percentage of US public firms having at least one director on the board increased from 24.5% in 2000 to 47.5% in 2005, dropping to 43.9% in 2009 (Litov et al., 2014). Findings of this study suggest that the latter percentage has stayed relatively stable during 2010-2018 period, as the percentage of SP500 boards with at least one director possessing legal skills is 45.9%.

Despite its post-SOX fluctuations, the only study to this day on the matter, comes from two law professors, who provide counter-evidence to the value-destroying theories that were related to their directorships (Tett, 2013). Authors report that during 2000-2009, SP1500 firms with a lawyer director had an average increase of 9.5% in Tobin's Q (Litov et al., 2014). To our best knowledge, the current study is the only work that revisits that issue. Based on our skill framework, we do not find evidence that having a lawyer serving at a firm's board has an impact on Tobin's Q. However, results report a negative and statistically significant relationship between *Legal* intensity and firm value. Specifically, findings show that increasing the number of directors with legal skills on the board, decreases is associated with a decrease in Tobin's Q. Results, in general, are consistent with anecdotal evidence. The presence of a lawyer on the board does not destroy firm value, but it appears that increasing the number of lawyers at a firm's board may undermine its growth opportunities. Overall, the present study extends board heterogeneity literature, both in terms of collective director qualifications, and in terms of individual skill qualities, finding positive relationships in both settings.

A detailed portrayal of a firm's board with regard to the skills that are present in the boardroom, serves a threefold purpose in terms of contribution to the literature. First, in most studies, directors' attributes are implied, based on the individual's biographical information. For example, Guner et al. (2008) look at directors' professional background, to provide evidence that an increase in financial expertise on a firm's board is not always beneficial to its shareholders. Likewise, Drobetz et al. (2018) create a measure of board industry expertise by examining the CVs of all SP1500 board

members, and find that board industry experience is positively related to firm value. The Regulation S-K amendment allows us to look further than the skills that are implied by the director's professional history, and investigate the individual on the basis of skills that the firm elected her for. Adams et al. (2018) provide evidence that directors are multi-dimensional. As such, a company may nominate an individual for reasons that can deviate considerably from her professional background, thus obscuring any results regarding her effect on the studied issue. A female director can belong to several minority groups simultaneously, whilst bringing her own set of unique, professional, cultural and academic qualities to the board. For example, 3M's reasons for electing Ms Sondra Barbour in its board provide a clearer view of her skillset: "*Ms. Barbour's degree in Computer Science and Accounting from Temple University, her leadership roles and experiences in Information Systems and Global Solutions at Lockheed Martin, her skills in information technology operations, including cyber security expertise, financial, internal controls and audit matters, and her experiences as a senior executive at Lockheed Martin, qualify her to serve as a director of 3M.*" Disentangling the multi-dimensionality of a director's human nature requires a more comprehensive approach with respect to unaccounted skill heterogeneity. The current study addresses this problem by decomposing each board member to their sets of skills that are most sought by their employers.

Secondly, Item 401 of Regulation S-K enables the extraction of the full set of a board member's qualifications, even in situations that her CV would fail to do so. To give an instance, had we wanted to access the professional background of director Al Gore from Apple's proxy statement, we would obtain this: "*Al Gore, 69, has served as Chairman of Generation Investment Management, an investment management firm, since 2004, and as a partner of Kleiner Perkins Caufield & Byers, a venture capital firm, since 2007. Mr. Gore is also Chairman of The Climate Reality Project.*" Controlling for the fact that Mr. Gore is a well-known individual to the public, his officially stated professional qualifications do not provide a clear picture of the full skillset that he brings to the company. Item 401 requires that Apple steps into the picture to correct for that unaccounted information to its stakeholders. Thus, the company now adds the following skill-specific part for its director: "*Mr. Gore was elected to the U.S. House of*

Representatives four times, to the U.S. Senate two times, and served two terms as Vice President of the United States. Among other qualifications, Mr. Gore brings to the Board executive leadership experience, a valuable and different perspective due to his extensive background in digital communication and technology policy, politics, and environmental rights, along with experience in asset management and venture capital."

Third, literature around the effect of director characteristics on firm performance treats directors homogeneously. Bennouri et al. (2018) find that an increase in a board's female percentage significantly decreases its Tobin's Q, and Evgeniou & Vermaelen (2017) find that greater gender diversity in a firm's board improves its corporate governance but decreases its long-term excess returns. In like manner, Frijns et al. (2016) point that cultural diversity on the board can negatively affect firm performance. White et al. (2014) underline the importance of unaccounted director heterogeneity. In their study of academic director appointments on firm performance, authors examine academics individually, providing evidence that effects of these directors vary according to their academic profession. In the current study, I provide a similar setup, addressing individuals based on the qualifications that they bring to the board.

The remainder of this paper is organised as follows. In Section 4.3, I describe the design of the empirical research and I provide summary statistics. Section 4.4 reports the empirical findings. In Section 4.5, I present a series of robustness checks. Section 4.6 concludes.

4.3 Data and methodology

4.3.1 Hypotheses development

The impact of managerial skill on corporate outcomes has been concerning corporate finance literature for decades. SEC's 2009 amendment of Regulation S-K, according to which firms are required to disclose the skills of their directors, highlights the emphasis that regulators place on the issue. As seen in the previous section of this chapter, academic research employs a wide spectrum of tools to proxy for managerial skill. Yet, until today there is only one paper that takes advantage of the informational

treasure stemming from the recently amended regulation. The study of Adams et al. (2018) examines the effect of skill diversity on firm value, as measured from Tobin's Q, for a set of US listed firms between 2010 and 2013. The authors of that study find an inverse relationship between skill diversity and Tobin's Q, suggesting that the commonality of skills on a firm's board contributes to value creation for the firm.

The current chapter of the thesis expands the work of Adams et al. (2018) in scope and breadth. First, it increases the examined time period from 4 years to 9 years in order to provide a clearer picture of the link between managerial skill and firm performance. In that context, it starts with investigating whether skill commonality creates value for the firm. Based on the results of the 2018 study, we would expect to find a negative association between skill diversity and Tobin's Q.

Hypothesis 1: Boards with more diverse skills are negatively associated with firm value, as measured by their firms' Tobin's Q

As shown in the previous section, research on the impact of director heterogeneity on firm value evinces contradictory results. Studies from Anderson et al. (2011) and Bernile et al. (2018) provide evidence that more heterogeneous boards are linked with higher Tobin's Q. One could have reasons to believe that the examination of skills in the context of only one measure of performance (Tobin's Q) cannot provide definite answers with regard to the relationship between the two variables. Addressing that issue, many empirical studies employ a series of operational efficiency measures to proxy a firm's financial performance (Brown & Caylor, 2009). Following the seminal paper from Gompers et al. (2003), I examine the impact of managerial skill on three measures of operating performance; namely, on the firm's return on assets (ROA), return on equity (ROE), and one year sales growth. Based on the findings of Adams et al. (2018), we would expect to find a negative association between skill diversity and all three measures of operating performance.

Hypothesis 2: Boards with more shared skills are positively associated with their firms' ROA, ROE and one year Sales Growth

4.3.2 Sample selection

I start by identifying all firms in the SP500 index between 2010 and 2018 from the Center for Research in Security Prices (CRSP). The 2009 amendment to Regulation S-K requires from every US publicly traded firm to disclose the skills that each director is expected to bring to its board. I hand-collect the descriptions of directors' skills from the sample firms' respective proxy statements. The initial sample collection yields a pool of 46,417 director-year observations, out of which 39,371 are outside director-year observations, and 7,046 are inside director-year observations. I eliminate 787 firm-year observations for utilities and financial firms (SIC codes 4900-4949 and 6000-6900 respectively).

I exploit the hand-collected proxy statements by extracting all relevant director and board information. For each firm-year observation, I retrieve each director's name, age, gender, employment history, the start and the end date of her directorship in the firm, and her independency status in the particular board. I add the directors' committee assignments information from ISS database (formerly RiskMetrics), and supplement it with information from Thomson Reuters EIKON. I obtain data on the sample firms' financial characteristics from Compustat and data on stock returns from CRSP. I eliminate 226 firm-year observations for firms with missing financial data. As a result, I build a novel dataset of 3,542 firm-year observations, which contain 37,332 directors' skills descriptions and full biographical information for the boards of 546 distinct US public firms between 2010 and 2018.

4.3.3 Variable construction

On July 10, 2009, the Securities and Exchange Commission (SEC henceforth) proposed a set of amendments to Regulation S-K, in order to enhance firms' disclosure with respect to a series of corporate governance issues, and assist shareholders in their investment decisions. Effective from February 28, 2010, Item 401(e) of Regulation S-K amendment states the following (SEC, 2010): *"The final rules require companies to disclose for each director and any nominee for director the particular experience, qualifications, attributes or skills that led the board to conclude that the person should*

serve as a director for the company as of the time that a filing containing this disclosure is made with the Commission."

The process of skill identification is simple. I manually extract the skills-related informational part for each board member from 4,782 SEC filings. This process yields 46,417 skills descriptions that belong to 7,540 unique directors. The SEC filings' extracted information covers all annual constituents of the SP500 index from the year of the Regulation S-K amendment's adoption until 2018. I follow Adams et al. (2018), which is the only paper in literature that draws such skill information from proxy statements, and I assign their cloud of keywords and phrases to each particular skill⁸⁷. Each skill category is a dummy, which is set to one if the keyword or phrase appears to the respective director's skill description, and zero otherwise. Trying to establish a reproducible channel of turning skills' descriptions to distinct skills' variables, I also employ a text-based algorithm. I check the accuracy of the manually extracted director skills information, by creating a hand-collected database of the 4,782 SEC filings in text format, in which I apply a python-based algorithm for each skill category. I compute the matching observations between the hand-collected and the python-assessed samples. Section 3C of Appendix encloses a detailed description of the data collection and coding process.

Table 4.1 presents a list of the created skills categories. I introduce 20 different skill categories based on the pool of 46,417 directors' skills descriptions from the firms' proxy statements. The categories are: *Academic, Company Business, Compensation, Entrepreneurial, Finance and Accounting, Governance, Government and Policy, International, Leadership, Legal, Management, Manufacturing, Marketing, Outside Board, Outside Executive, Risk Management, Scientific, Strategic Planning, Sustainability and Technology*. For a director to be assigned with a skill, in the qualifications description of the proxy statement, it must be clearly stated that the firm selects that director to serve on its board because of the possession of that specific skill.

⁸⁷ The full set of our coded skills' dictionary can be found in Table 4A of Appendix.

Table 4.1
Skill categories

Variables	Description
Academic	The director is from academia or has a Ph.D.
Company Business	The director has experience in the firm's business or respective industry.
Compensation	The director has compensation skills.
Entrepreneurial	The director has entrepreneurial business history.
Finance & Accounting	The director has experience in banking, finance, accounting, or economics related activities.
Governance	The director has corporate governance experience.
Government & Policy	The director has governmental, policy, or regulatory experience.
International	The director has international experience.
Leadership	The director has leadership experience.
Legal	The director has legal expertise.
Management	The director has management skills.
Manufacturing	The director has manufacturing experience.
Marketing	The director has marketing and/or sales experience.
Outside Board	The director has outside board experience.
Outside Executive	The director is an executive in another company.
Risk Management	The director has risk management experience.
Scientific	The director has research & development, or scientific experience.
Strategic Planning	The director has strategy skills, or strategic planning experience.
Sustainability	The director has history in sustainability, or environmental matters.
Technology	The director has technology skills/experience.

This table reports the list of skill categories. The skill categories were coded based on the respective skill descriptions, that were obtained from the proxy statements of the annual constituents of the SP500 index, excluding utilities (Standard Industry Classification (SIC) codes 4900-4909) and financial firms (SIC codes 6000-6900), between 2010 and 2018. Summary statistics for skill categories are provided in Table 4.2. The skill clouds and corresponding coding algorithms are provided in Section 4B of the Appendix.

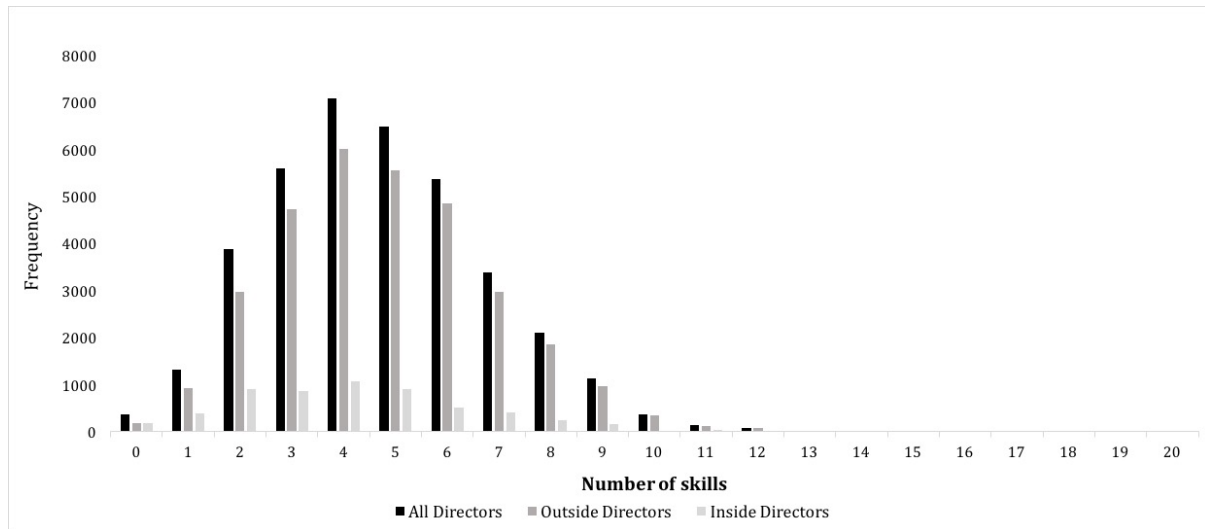
Figure 4.1 shows the number of skills' distribution at the director and at the board level. Panel A exhibits the number of skills per director. The average director in our sample has 4.71 skills. That number is slightly higher for outside (4.82) as opposed to inside directors (4.14). Panel B of Figure 4.1 illustrates the total number of skills per board. The median firm in our sample has a board possessing 14 different skills. 85% of the firms have between 12 and 18 distinct skills present on their board.

Table 4.2 reports summary statistics on average skill possession at the director and at the board level. Several interesting notes are documented with respect to skill composition in terms of uniqueness, director independency, and presence in the boardroom. The most common skills among directors are those of *Finance & Accounting, International, Leadership, and Management*, all of which are acquired by more than 40% of the sample. The least common skills are: *Entrepreneurial, Legal, Scientific and Sustainability*. The latter skills are carried by less than 10% of the directors. The most common skills among inside directors are *Company Business, International, Leadership, Management, and Strategic Planning*, which are carried by more than 30% of the sample. *Entrepreneurial* is the least common skill, carried only by 2.1% of the director pool. As expected, *Company Business* shows the largest difference in possession percentages between inside and outside directors, with 46.6% and 12.2% respectively. On the contrary, *Finance & Accounting* skills are owned by 50.1% of independent directors, compared to just 24.6% possessed by their inside colleagues. Notably, 30.4% of outside directors carry *Governance* skills, whereas only 16.5% of non-independent directors own the respective skill.

Overall, independent board members exceed their non-independent counterparts with respect to skill possession in 14 out of 20 skill categories. *Company Business* is the only skill category that inside directors surpass outside directors by more than 0.05%. *Finance & Accounting, International, Leadership and Management* skills are present in more than 90% of our sample's boardrooms. Conversely, less than 1 out of every 4 boards have a director with either *Entrepreneurial*, or *Scientific* skills. It is worth noting that even though 6.2% of directors have *Legal* skills, almost 1 out 2 SP500 boards have at least one director possessing the corresponding skill. Figure 4.2 displays how skills cluster at the boardroom, and among directors.

Figure 4.1
Number of skills

Panel A: At the director level



Panel B: At the board level

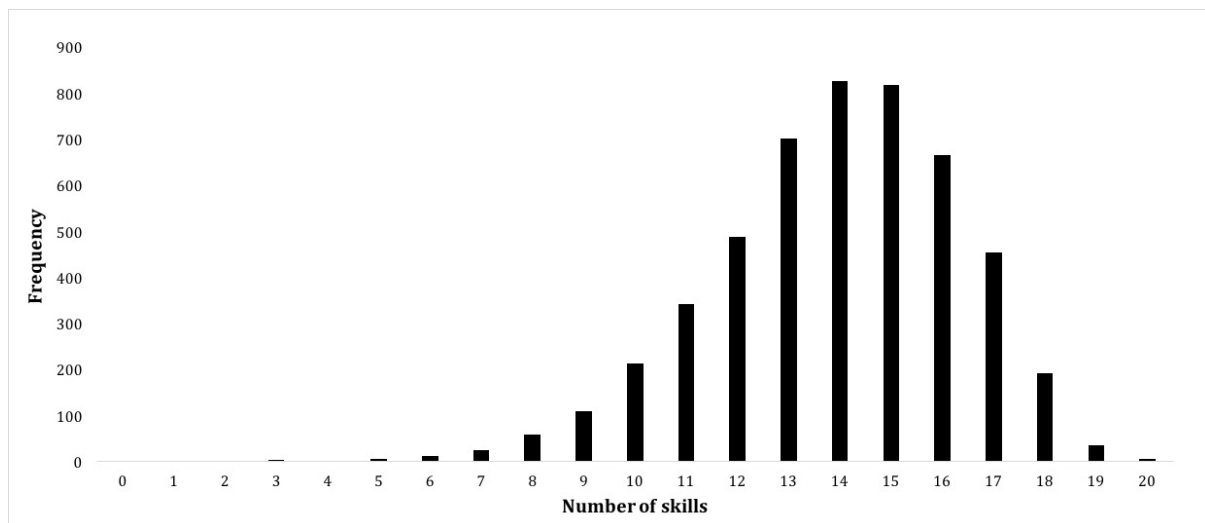


Figure 4.1 exhibits the number of director skills at the individual and board level. Panel A presents the average number of skills for each director in our sample. Panel A is based on 37,332 director-year observations (31,587 outside director-year and 5,745 inside director-year observations). Panel B displays the average number of different skills that are present at the board and is based on 3,244 firm-year observations. Both panels cover all SP500 non-utilities, non-financial firms for the period 2010-2018.

Table 4.2
Average skill possession

Variables	Directors			Diff.	Board
	<i>All</i>	<i>Outside</i>	<i>Inside</i>		
Academic	0.167	0.176	0.115	0.061	0.722
Company Business	0.175	0.122	0.466	-0.344	0.748
Compensation	0.150	0.167	0.060	0.107	0.454
Entrepreneurial	0.026	0.027	0.021	0.006	0.216
Finance & Accounting	0.461	0.501	0.246	0.255	0.998
Governance	0.283	0.304	0.165	0.139	0.819
Government & Policy	0.171	0.181	0.117	0.064	0.723
International	0.573	0.591	0.477	0.114	0.986
Leadership	0.454	0.448	0.488	-0.004	0.930
Legal	0.062	0.062	0.063	-0.001	0.459
Management	0.546	0.556	0.494	0.062	0.984
Manufacturing	0.131	0.134	0.117	0.017	0.604
Marketing	0.188	0.184	0.210	-0.026	0.744
Outside Board	0.296	0.307	0.236	0.071	0.825
Outside Executive	0.259	0.275	0.175	0.100	0.876
Risk Management	0.150	0.161	0.090	0.071	0.587
Scientific	0.024	0.023	0.028	-0.005	0.164
Strategic Planning	0.255	0.246	0.302	-0.056	0.837
Sustainability	0.067	0.070	0.048	0.022	0.328
Technology	0.268	0.277	0.221	0.056	0.839

This table presents descriptive statistics of directors' skills. Data in this table are obtained from the firms' proxy statements and are based on 37,332 director-year observations, covering all SP500 industrial firms, excluding utilities (SIC codes 4900-4949) and financial firms (SIC codes 6000-6900), between 2010 and 2018. I report the means of 20 skills categories at the director and board level. The first column exhibits the percentage of directors having each individual skill. The second and third columns display the average skill possession by outside and inside directors respectively. In the fourth column, I report the difference between outside and inside director percentages per skill category. The fifth column shows the percentage of boards in which the particular skill is present. All skill definitions are provided in Table 4.1. Skill clouds and all respective coding algorithms are provided in Section 4B of the Appendix.

Figure 4.2
Board and director skills

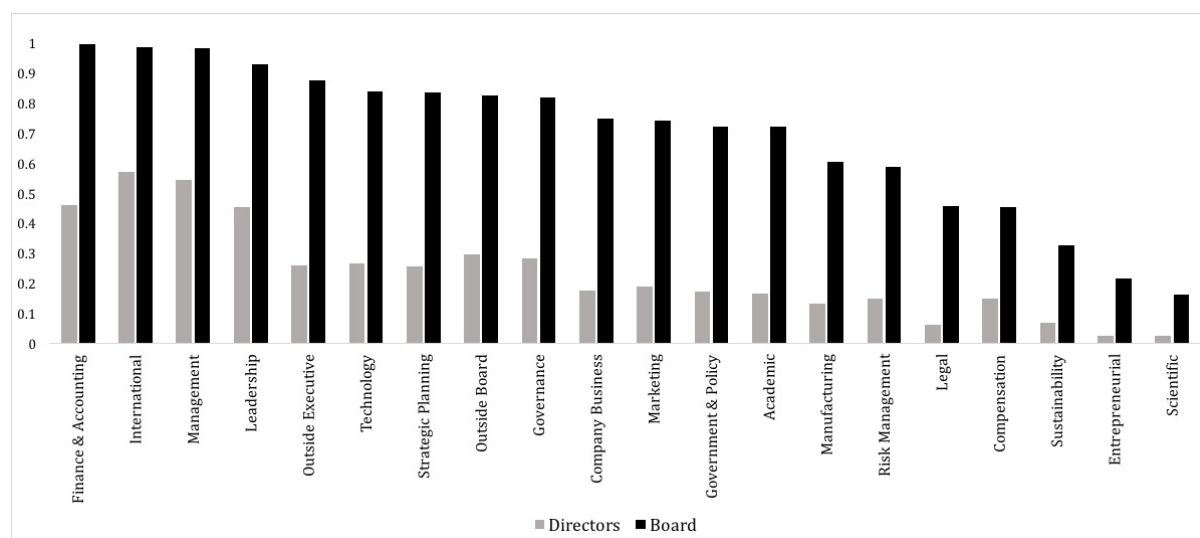


Figure 4.2 exhibits the percentage of skills owned at the director and at the board level. For instance, *Finance & Accounting* skill appears in 99.8% of our sample's boards, while 46.1% of directors possess it. Skills are sorted based on their occurrence in our sample firms' boards. All averages are reported in Table 4.2. Sample comprises 37,332 director-year observations, covering all SP500 non-utilities, non-financial firms for the period 2010-2018.

4.3.4 Descriptive statistics

Table 4.3 reports summary statistics for financial and corporate governance characteristics based on the whole SP500 firm universe between 2010 and 2018. In Panel A, I document firm characteristics at the board level. The median board in the sample has 10 members, 9 of which are independent, and a CEO who is 57 years old. On average, 84% of a board's constituents are outside directors, while the median boardroom has 4 different committees. Out of a maximum of 20 skills available, the median firm's board possesses 14 distinct skills. The median firm in the sample is 30 years old, and its size measured by total assets is 2.7 \$billions. The mean (median) ROA for the sample firms is 15.6% (14.6%), and the mean (median) *Capital Expenditures* are 0.08 (0.04). Mean (median) ROE is 22.1% (17.3%), and mean (median) *Sales Growth* is 6.95% (5.39%). The mean (median) *Tobin's Q* for each firm in our sample is 2.24 (1.85), and the mean (median) *Volatility* is 0.017 (0.016).

Table 4.3
Summary statistics

<i>Panel A: Governance and financial characteristics</i>						
Variables	N	Mean	Median	St. Dev.	Min.	Max.
Board size	3,244	10.492	10	1.912	5	18
Board independence	3,244	9.211	9	1.919	3	19
Board independence (%)	3,244	0.843	0.889	0.092	0.363	1
Board committees	3,143	3.902	4	0.348	1	4
CEO age	3,228	56.795	57	6.421	28	87
Firm age	3,163	36.109	30	24.304	0	93
Number of skills (Board)	3,244	13.838	14	2.382	5	19
Total assets (Log)	3,071	9.547	9.431	1.136	7.493	13.529
Capital expenditures	3,068	0.079	0.038	0.132	0.001	0.820
ROA	3,069	0.156	0.146	0.071	0.001	0.376
ROE	3,071	0.221	0.173	0.312	-0.563	2.022
Sales growth (%)	3,065	6.957	5.393	15.429	-37.825	64.024
Tobin's Q	3,070	2.238	1.851	1.224	0.874	7.059
Volatility	3,128	0.017	0.016	0.006	0.007	0.041
<i>Panel B: Director characteristics</i>						
Variables	N	Mean	Median	St. Dev.	Min.	Max.
Director age	37,332	61.994	62	7.903	28	95
Director tenure	37,332	8.548	7	7.464	0	62
Directorships	37,332	1.43	1	0.685	1	5
Duality	37,332	0.536	1	0.498	0	1
Female directors	8,846	2.105	2	1.169	0	11
Female directors (%)	8,846	0.191	0.181	0.098	0	0.785
Female CEO	188	0.004	0	0.065	0	1
Female Chair	158	0.003	0	0.059	0	1
Number of skills (All)	37,332	4.717	5	2.116	0	14
Number of skills (Outsiders)	31,587	4.821	5	2.072	0	12
Number of skills (Insiders)	5,745	4.147	4	2.257	0	14

This table reports firm and director characteristics of all SP500 firms during the 2010-2018 period, excluding utilities (Standard Industry Classification (SIC) codes 4900-4909) and financial firms (SIC codes 6000-6900). I retrieve the board members' skills descriptions from each firm's respective proxy statements. All financial data are obtained from Compustat. Panel A presents summary statistics for firm characteristics and are based on 3,244 firm-year observations from 546 distinct firms between 2010 and 2018. Panel B contains director-related characteristics and are based on 37,332 firm-year-director observations. All variable definitions are provided in Table 4A of the Appendix.

Panel B reports descriptive statistics for firm characteristics at the director level. The median director is 62 years old, she has 1 outside directorship in another SP500 firm, and a 7-year directorship in her current. On average, 53.6% of the firms in the sample have the same person serving as their CEO and Chairman. Women hold on average 19% of all board member positions, and 0.4% of the CEO positions. The median firm's director brings 5 different skills to the board. On average, independent directors possess more skills (4.82), than dependent directors (4.14). The median outside director brings 5 distinct skills to its board, against 4 of its insider counterpart.

4.4 Empirical results

4.4.1 How skills cluster on boards?

Table 4.4 presents a correlation matrix between the 20 skill categories at the board level. Results suggest that some skills cluster. For instance, the correlation coefficient between *Academic* and *Government & Regulatory* is 0.232, suggesting that firms with the former skill on board are more likely to possess the latter. In like manner, *Academic* skills are strongly correlated with *Scientific* (0.144) and *Technology* skills (0.099). *Compensation* skills are strongly correlated with *Governance* (0.288), and *Government & Policy* are highly correlated with *Legal* skills (0.216).

I follow Adams et al. (2018) in order to examine how skills cluster at the board level. In line with these authors, I use factor analysis to investigate the dimensions of variation between the set of 20 skill categories. Factor analysis is the most commonly used statistical technique for investigating underlying structures in the shared variance of variables (Costello & Osborne, 2005). I attempt to reveal any possible factors that may cause the boards of the sample to co-vary with respect to skills. I exclude *Finance & Accounting*, *International*, *Leadership* and *Management*, as these skills are present by at least one director in every firm, and as such, there is no variation for the aforementioned categories at the board level⁸⁸.

⁸⁸ The exclusion of skill categories that do not vary at the board level was introduced in the study of Adams et. al. (2018).

Table 4.4
Skill correlations

	Academic	Comp. Business	Competition	Entr./ial	Fin. & Acc.	Gov'nce	Govt & Policy	Internal	Lea/ship	Legal	Mngmt	Man/ing	Mark/ing	Outside Board	Risk Executive	Scientific Planning	Sust/ty Techn/gy			
Academic	1.000	0.053***	-0.012	0.074***	-0.025	0.057***	0.232***	-0.009	0.052***	0.017	0.071***	-0.003	0.020	0.070***	-0.001	0.074***	0.144***	0.101***	0.075***	0.099***
Comp. Business	1.000	0.085***	0.042***	0.003	0.096***	0.002	0.067***	0.072***	0.015	0.059***	-0.016	-0.011	0.062***	0.031**	0.046***	0.029*	0.112***	-0.001	-0.012	-0.012
Compensation	1.000	0.010	0.014	0.288***	0.060***	0.034**	0.047***	0.059***	0.034**	0.011	0.084***	0.078***	0.009	0.168***	-0.054***	0.134***	0.097***	-0.007	-0.007	-0.007
Entrepreneurial	1.000	0.021	0.004	0.053***	0.042***	0.048***	0.066***	0.010	-0.083***	0.015	-0.014	0.006	0.015	-0.004	0.001	0.012	0.094***	0.012	0.094***	0.094***
Fin. & Accounting	1.000	-0.004	0.014	0.145***	0.057***	0.037**	0.089***	-0.009	0.016	0.027*	0.090***	0.048***	0.018	0.029*	0.028*	0.029*	0.028*	0.028*	0.028*	0.029*
Governance	1.000	0.076***	0.081***	0.091***	0.087***	0.040***	-0.041***	0.090***	0.072***	0.050***	0.149***	0.015	0.129***	0.100***	-0.018	0.129***	0.100***	-0.018	-0.018	-0.018
Govt & Policy	1.000	0.050***	0.102***	0.216***	0.080***	0.002	0.092***	0.037**	0.003	0.148***	0.056***	0.088***	0.158***	0.070***	0.070***	0.070***	0.158***	0.070***	0.070***	0.070***
International	1.000	0.151***	-0.010	0.067***	0.099***	0.107***	0.047***	0.060***	0.000	0.030**	0.085***	0.026*	0.020	0.020	0.020	0.020	0.026*	0.026*	0.026*	0.020
Leadership	1.000	0.145***	0.109***	0.106***	0.048***	0.031**	0.132***	0.096***	0.127***	0.041***	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Legal	1.000	0.020	-0.114***	-0.044***	0.024	0.009	0.074***	-0.026*	0.043***	0.070***	-0.041***	-0.041***	-0.041***	-0.041***	-0.041***	-0.041***	-0.041***	-0.041***	-0.041***	-0.041***
Management	1.000	0.089***	0.061***	0.107***	0.051***	0.068***	0.055***	0.063***	0.055***	0.055***	0.055***	0.055***	0.055***	0.055***	0.055***	0.055***	0.055***	0.055***	0.055***	0.055***
Manufacturing	1.000	0.092***	-0.039***	-0.011	0.031**	0.131***	0.019	0.078***	0.068***	0.068***	0.068***	0.068***	0.068***	0.068***	0.068***	0.068***	0.068***	0.068***	0.068***	0.068***
Marketing	1.000	0.083***	0.033**	0.046***	0.060***	0.020	0.107***	0.107***	0.107***	0.107***	0.107***	0.107***	0.107***	0.107***	0.107***	0.107***	0.107***	0.107***	0.107***	0.107***
Outside Board	1.000	-0.015	0.022	0.033**	0.085***	0.036**	0.026*	0.026*	0.026*	0.026*	0.026*	0.026*	0.026*	0.026*	0.026*	0.026*	0.026*	0.026*	0.026*	0.026*
Outside Executive	1.000	-0.012	0.034**	0.070***	0.053***	0.045***	0.045***	0.045***	0.045***	0.045***	0.045***	0.045***	0.045***	0.045***	0.045***	0.045***	0.045***	0.045***	0.045***	0.045***
Risk Management	1.000	-0.005	0.119***	0.108***	0.062***	0.062***	0.062***	0.062***	0.062***	0.062***	0.062***	0.062***	0.062***	0.062***	0.062***	0.062***	0.062***	0.062***	0.062***	0.062***
Scientific	1.000	0.089***	0.104***	0.118***	0.118***	0.118***	0.118***	0.118***	0.118***	0.118***	0.118***	0.118***	0.118***	0.118***	0.118***	0.118***	0.118***	0.118***	0.118***	0.118***
Strat. Planning	1.000	0.062***	0.091***	0.091***	0.091***	0.091***	0.091***	0.091***	0.091***	0.091***	0.091***	0.091***	0.091***	0.091***	0.091***	0.091***	0.091***	0.091***	0.091***	0.091***
Sustainability	1.000	0.041***	0.041***	0.041***	0.041***	0.041***	0.041***	0.041***	0.041***	0.041***	0.041***	0.041***	0.041***	0.041***	0.041***	0.041***	0.041***	0.041***	0.041***	0.041***
Technology	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Table 4.4 reports pairwise correlations between the 20 skill categories. Skill data are obtained from 2010-2018 proxy statements, and contain information for all SP500 annual constituents of that period, excluding utilities (SIC codes 4900-4949) and financial firms (SIC codes 6000-6999). Results are based on 37,332 director-year observations. ***, **, and * denote statistical significance levels at the 1%, 5%, and 10% level, respectively. All skill definitions are provided in Table 4.1.

Table 4.5 presents the results of factor analysis. Since there is no consensus on which is the optimal factor extraction method (Fabrigar et al., 1999), I report results from three different factor extraction methods⁸⁹. I perform factor analysis based on a tetrachoric correlation matrix of our 20 skill variables⁹⁰. Eigenvalues greater than one imply validity for the corresponding factor⁹¹. Based on their respective eigenvalues, I focus on the first two factors that capture, on average, 88.03% of the skill variation⁹². I present the eigenvalues of the two factors, the corresponding percentage of explained variation, and the unrotated factor loadings of each factor on all categories. Following Kaplan & Sorensen (2017), I only report factor loadings above 0.15, or below -0.15.

All methods exhibit similar results. The structure of the first factor in all three factor extraction methods is also seen in Adams et al. (2018); it captures most of the variation and it loads positively on most skill categories. According to the PF method, the first factor captures 54.3% of skill variation, and presents positive loadings on all skill variables. Likewise, based on the IPF (ML) method results, the first factor captures 52% (62.1%) of the variation, and loads positively on most skill specifications⁹³. Adams

⁸⁹ I first report results from the Principal Factor model (PF henceforth), estimating the communalities from the squared multiple correlation coefficients. I then employ the Iterated Principal Factor method (IPF henceforth), iterating the initial communalities to produce better estimates. Next, I fit our model using the Maximum Likelihood factor extraction method (ML henceforth), which assumes multivariate normality for our data. The Keiser-Meyer-Olkin (KMO) measure of sampling adequacy in our sample is 0.61, indicating that our skill variables have adequate covariation to warrant factor analysis.

⁹⁰ Factor analysis is more appropriate for continuous data. Tetrachoric correlation is the equivalent of Pearson correlation for binary variables. Factor analysing the matrix of tetrachoric correlations addresses the problem of examining the association of dichotomous variables utilising models which are better suited for continuous ones (Uebersax, 2006). In unreported results, we obtain similar factors by ignoring the aforementioned parameter.

⁹¹ Since retaining factors with eigenvalues greater than one may not be the optimal method for selecting how many factors to retain (Velicer & Jackson, 1990), I perform scree tests for each of the three factor extraction methods that we employ.

⁹² Based on PF extraction method results, we retain the first two factors, that have eigenvalues greater than one. Based on the "eigenvalues greater than one" criterion, we retain the first three factors, when following the IPF method, and in like manner, we retain the first two factors when we follow the ML factor extraction method. All scree tests corroborate the eigenvalue criterion.

⁹³ PF extraction results, exhibit factor loadings that range from 0.039 (*Entrepreneurial*) to 0.564 (*Strategic Planning*). Based on IPF method, factor loadings range from 0.041 (*Entrepreneurial*) to 0.580 (*Government & Policy*), while based on the ML extraction method results, factor loadings range from -0.004 (*Entrepreneurial*) to 0.675 (*Governance*). We should note that in factor analysis, each factor identifies a scale of covariation between variables, and thus the magnitude and sign of each factor loading is not interpretable. One could reverse the signs of each loading, or double their magnitudes, and we would still make the exact same inferences statistically from the results.

et al. (2018) interpret the first factor as a measure of skill diversity. Our results corroborate that finding. SP500 boards appear to vary with respect to the diversity of their skills.

All three factor extraction methods also report a second factor with eigenvalues above one that captures, on average, 32.2% of skill variation⁹⁴. The second factor exhibits two different sets of factor loadings. *Academic, Government & Policy, Manufacturing, Scientific, and Technology* skills load positively in all three factor extraction methods⁹⁵. Conversely, *Compensation and Governance* skills show negative loadings across all methods⁹⁶. General managerial skills (*Company Business, Entrepreneurial, Marketing, Outside Board, Outside Executive, Strategic Planning*) do not seem to co-vary across boards. The second factor appears to sort boards into those with greater technological skills, and those with greater governance skills.

⁹⁴ Based on results of PF extraction method, second factor captures 29.3% of skill variation. Likewise, according to IPF (ML) method, second factor captures 29.3% (37.9%) of the variation.

⁹⁵ Factor loadings range in PF method from 0.202 (*Manufacturing*) to 0.446 (*Scientific*), in IPF from 0.156 (*Manufacturing*) to 0.448 (*Scientific*), and in ML method from 0.151 (*Sustainability*) to 0.564 (*Scientific*).

⁹⁶ *Scientific* skills have the most positive loadings in each of the three factor extraction methods, followed by *Academic* skills in IPF and ML, and *Technology* in PF. The latter skill reports the third more positive loading in IPF and ML. In all methods, *Government & Policy* exhibits the fourth more positive loadings, and is followed by *Manufacturing*. *Compensation and Governance* load strongly on the opposite direction in PF, IPF and ML.

Table 4.5
Factor analysis

Factors	PF Method		IPF Method		ML Method	
	1	2	1	2	1	2
Eigenvalue	2.000	1.079	2.088	1.177	1.958	1.195
Percentage Explained	0.543	0.293	0.520	0.293	0.621	0.379
Academic	0.398	0.375	0.398	0.375	0.276	0.513
Company Business					0.167	
Compensation	0.473	-0.462	0.490	-0.507	0.649	-0.359
Entrepreneurial						
Governance	0.526	-0.430	0.551	-0.484	0.675	-0.256
Government & Policy	0.485	0.224	0.580	0.346	0.342	0.356
Legal	0.188	-0.161	0.205		0.182	
Manufacturing		0.202		0.156		0.166
Marketing	0.349		0.334		0.319	
Outside Board	0.297		0.274		0.280	
Outside Executive						
Risk Management	0.440	-0.158	0.431	-0.160	0.458	
Scientific	0.337	0.446	0.339	0.448	0.193	0.564
Strategic Planning	0.564		0.554		0.523	0.215
Sustainability	0.347		0.334		0.293	0.151
Technology	0.264	0.395	0.251	0.350	0.150	0.397

Table 4.5 reports Factor Analysis' results. We follow Adams et al. (2018), excluding from our analysis skill categories that do not vary across boards. Thus, we do not use *Finance & Accounting*, *International*, *Leadership*, and *Management* skills. We present unrotated factor loadings on the first two factors, using PF (columns 1-2), IPF (columns 3-4), and ML (columns 5-6) factor extraction methods. For each factor, we report the eigenvalue and the percentage of variation that it explains. Factor loadings above 0.15 or below -0.15 are set to blank. Skill data are obtained from SEC filings, and contain information for all SP500 annual constituents from 2010 to 2018, excluding utilities (SIC codes 4900-4949) and financial firms (SIC codes 6000-6999). All skill definitions are provided in Table 4.1.

4.4.2 Skill diversity

4.4.2.1 Does the diversity of skills affect firm value?

Factor analysis suggests that corporate boards vary with respect to their skill diversity. The logical next question is whether the aforementioned factor is associated with firm performance. Adams et al. (2018) study a sample of US public firms from 2010 to 2013 and find that the diversity of their boards' skills is negatively related to Tobin's Q, suggesting that skill commonality increases firm performance. Since skills' data were

not available before the 2009's Regulation S-K amendment, no other study has been conducted on the matter. Yet, similar studies on board diversity argue against the value enhancing board homogeneity story. Anderson et al. (2011) create a board heterogeneity index based on a sample of Russell 1000 firms from 2003 and 2005, and find that board heterogeneity is positively associated with firm performance. In that study, board diversity is measured as a mix of age, gender, ethnicity, education, and professional background of directors, and performance is measured by Tobin's Q. The positive relationship between board diversity and firm performance is also supported by Bernile et al. (2018). These authors create their own board heterogeneity index, which considers director differences in: age, gender, ethnicity, education, financial expertise, and number of outside directorships, and find that board diversity is negatively linked to volatility and positively linked to Tobin's Q. The present study revisits the issue of board diversity in a skill setting, and questions its impact on firm performance.

Table 4.6 reports Pooled OLS regression results on skill diversity and firm performance. The structure of the model, and the selection of the control variables follow Adams et al. (2018). I use the first factor from the factor analyses in Table 4.5 as proxy for skill diversity, and Tobin's Q as measure of firm performance. I include a set of control variables, which is standard in corporate governance literature. Specifically, I use the logarithm of total assets as proxy for firm size, the return on assets (ROA) as measure of performance, the standard deviation on the firm's annual stock returns as proxy for volatility. I also include the logarithm of the firm's age, and board size, the percentage of outside directors, the number of board committees, and the CEO's age. All multivariate regressions include year, and two-digit SIC code industry fixed effects. Standard errors are clustered at the firm level to address potential heteroskedasticity concerns (Petersen, 2009). Key explanatory variable in all models is the first factor from the factor analyses of Table 4.5.

The first two columns of Table 4.6 report univariate and multivariate regression results of Tobin's Q on the PF factor and a set of control variables. The estimated coefficient in both models is not statistically significant. I replicate the baseline OLS regression model, using the first factor from IPF (ML) factor extraction methods. Consistent with Adams et al. (2018), univariate results in both specifications are

negative and statistically significant. However, we find no significant relationship between Tobin's Q and IPF (ML) factor when we control for the set of financial and corporate governance characteristics. Overall, results suggest that skill commonality does not appear to affect firm performance.

Table 4.6
Skill diversity and firm value

Variables	PF Method		IPF Method		ML Method	
	(1)	(2)	(3)	(4)	(5)	(6)
Factor 1	-0.262 (0.106)	0.004 (0.973)	-0.255* (0.094)	0.045 (0.690)	-0.314** (0.042)	-0.091 (0.424)
Log of total assets		-0.195*** (0.000)		-0.196*** (0.000)		-0.196*** (0.000)
ROA		8.944*** (0.000)		8.955*** (0.000)		8.915*** (0.000)
Capital expenditures		-0.003 (0.993)		-0.008 (0.982)		0.008 (0.981)
Log of firm age		-0.015 (0.712)		-0.016 (0.698)		-0.014 (0.726)
Volatility		0.138 (0.985)		0.217 (0.976)		0.028 (0.997)
Log of board size		-0.402** (0.030)		-0.422** (0.024)		-0.366* (0.050)
Board independence (%)		-0.787** (0.043)		-0.803** (0.040)		-0.751* (0.053)
Board committees		-0.078 (0.439)		-0.078 (0.435)		-0.076 (0.458)
CEO age		-0.009* (0.095)		-0.009* (0.096)		-0.009* (0.090)
Constant	2.543*** (0.000)	4.703*** (0.000)	2.529*** (0.000)	4.711*** (0.000)	2.570*** (0.000)	4.727*** (0.000)
Year FE	No	Yes	No	Yes	No	Yes
Industry FE	No	Yes	No	Yes	No	Yes
Observations	3070	2889	3070	2889	3070	2889
Adjusted R-squared	0.004	0.543	0.005	0.543	0.007	0.543

Table 4.6 reports results of Tobin's Q regressions on the first factor of the three factor extraction methods. I follow Adams et al. (2018), interpreting the first factor as measure of skill diversity. Columns 1 and 2 present univariate and multivariate Pooled OLS regression results respectively, based on the first factor of the PF method. Columns 3 and 4 (5 and 6) replicate this process for the IPF (ML) factor results. Tobin's Q is the dependent variable in all regressions. Specifications 2, 4 and 6 include year dummies and industry dummies based on two-digit SIC codes. Standard errors are clustered at the firm level in all models. All quantitative variables are winsorised at the 1% and 99% levels. P-values are shown in parentheses. ***, **, and * denote statistical significance levels at the 1%, 5%, and 10% level, respectively. All variable definitions are provided in Table 4A of the Appendix.

With respect to the other control variables, they mostly enter with the predicted signs, corroborating past corporate governance literature findings. As in Mehran (1995), we find our proxy of firm size to be negative and significant, confirming the association of small firms with high growth opportunities. In like manner, ROA is a positive and significant predictor of Tobin's Q (Adams et al., 2018; Drobetz et al., 2018). Board size in all specifications is negative and significant, corroborating the adverse effects of larger boards on firm value (Cheng, 2008; Yermack, 1996; Jensen, 1993). Consistent with (Agrawal & Knoeber, 1996), we find that the percentage of independent directors is negatively related to Tobin's Q. We also confirm Cline & Yore (2016) on the negative association between CEO's age and firm value.

4.4.2.2. Skill diversity and operating performance

Even though Tobin's Q has been widely employed as proxy of firm performance in corporate governance literature (Bhagat & Bolton, 2008; Morck, Shleifer & Vishny, 1998; Barnhart & Rosenstein, 1998), its real-life use as performance indicator is hampered by computational controversies (Chung & Pruitt, 1994) and endogeneity concerns (Dybvig & Warachka, 2015). A more accurate depiction of Tobin's Q acknowledges the aforementioned metric as firm valuation measure. Thus, many empirical studies on corporate performance augment their models with operational efficiency measures (Brown & Caylor, 2009). Since the regression results up to this point contrast those of Adams et al. (2018), I investigate the relationship between skill diversity and firm performance in more depth. The diversity of skills may not predict a firm's growth opportunities, but it may be associated with firm's realised performance. In that context, I follow the seminal paper of Gompers et al. (2003), adding three additional measures of operating performance to the baseline OLS model. Specifically, I employ the regression model of Table 4.6, using return on assets (ROA), return on equity (ROE), and one year sales growth as the model's dependent variables.

Table 4.7 reports Pooled OLS results from multivariate regressions on skill diversity and operating performance. Key explanatory variable in all models is the first factor from PF, IPF and ML factor extraction methods respectively. All specifications

follow the set of controls from Adams et al. (2018)⁹⁷. In Panel A of Table 4.7, I use *ROA* as the model's dependent variable. The estimated PF, IPF and ML factors are not statistically significant. Panel B replicates regressions of Panel A, using *ROE* as dependent variable. The estimated coefficients of the first factor in all methods is positive and statistically significant, suggesting that skill diversity is positively associated with *ROE*. Based on results of Panel C, *Sales Growth* is not linked with skill diversity.

Overall, I find no evidence that skill diversity is negatively related to either firm value or firm performance, and some evidence that firms with more diverse boards in terms of skill presence have better operating performance.

4.4.3 Technological aptitude

4.4.3.1 *Are corporate boards getting more technical? And does it matter?*

Factor analysis in Table 4.5 of sub-section 4.4.1 reports that Factor 2 has eigenvalue above one⁹⁸, suggesting that the displayed factor loadings explain a significant part of board skill variation in the sample. In decreasing order, the second factor loads positively on *Scientific, Technology, Academic, Government & Policy* and *Manufacturing* skills. Conversely, *Governance* and *Compensation* load negatively. Anderson et al. (2011) provide a conceptual distinction of their board heterogeneity measure, to occupational and social heterogeneity. The current study attempts to provide a similar setting. Intuitively, Factor 2 appears to sort boards into those with greater technological skills versus those with greater governance qualifications. A distinction of that sort is not without an explanation.

⁹⁷ I report only the first factor from PF, IPF and ML factor extraction methods for brevity.

⁹⁸ Eigenvalue of Factor 2 is greater than one in all three factor extraction methods; PF, IPF, and ML method. Based on suggestions from Costello & Osborne (2005), I augment the "eigenvalue above one" criterion with scree tests, all of which corroborate the importance of Factor 2 in the sample's skill variation.

Table 4.7
Skill diversity and financial performance

<i>Panel A: ROA</i>			
Variables	PF Model	IPF Model	ML Model
Factor 1	-0.011 (0.210)	-0.011 (0.161)	-0.011 (0.151)
Controls	YES	YES	YES
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
N	2,889	2,889	2,889
Adjusted R-squared	0.328	0.328	0.329
<i>Panel B: ROE</i>			
Variables	PF Model	IPF Model	ML Model
Factor 1	0.062** (0.027)	0.073*** (0.007)	0.060** (0.022)
Controls	YES	YES	YES
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
N	2,889	2,889	2,889
Adjusted R-squared	0.328	0.328	0.329
<i>Panel C: Sales Growth</i>			
Variables	PF Model	IPF Model	ML Model
Factor 1	-0.394 (0.757)	-0.471 (0.687)	0.026 (0.982)
Controls	YES	YES	YES
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
N	2,883	2,883	2,883
Adjusted R-squared	0.328	0.328	0.329

Table 4.7 reports results of Pooled OLS regressions that show whether skill diversity affects firm performance. Panel A replicates the multivariate regressions of Table 4.6 on *Tobin's Q* and the first factor of each factor extraction method, using *ROA* as dependent variable. Panel B reports regression results of *ROE* on the baseline model. In Panel C, the dependent variable of the model is *Sales Growth*. The key explanatory variable of each regression is the first factor from the factor analyses of Table 4.5. The first column of each Panel presents OLS results based on the PF factor extraction method. The second and third columns report results which are based on the IPF and ML methods respectively. I omit all other variables for brevity. Control factors in all regression models are: the logarithm of total assets, *ROA* (I exclude *ROA* from regressions of Panel A due to multicollinearity), capital expenditures, logarithm of firm's age, volatility, logarithm of board's size, percentage of independent directors, number of board committees, and CEO's age. All specifications include year and two-digit SIC codes dummies. Standard errors are clustered at the firm level to address potential heteroskedasticity issues. All quantitative variables are winsorised at the 1% and 99% levels. P-values are shown in parentheses. ***, **, and * denote statistical significance levels at the 1%, 5%, and 10% level, respectively. All variable definitions are provided in the Appendix of this chapter.

Technological aptitude as desired director qualification has been gaining momentum in recent years (Kark, 2019). An increasing number of studies, argue that the rapidly evolving technology, creates a need for directors to adapt by expanding their breadth of expertise (Sarrazin & Willmott, 2016). Rickards & Grossman (2017) suggest that boards are gradually recognising the needs for "hybrid" directors, moving away from traditional qualifications, like prior CEO or board experience⁹⁹, and focusing more on tech-savvy individuals with versatile skill-sets. A study by Deloitte (2017) shows that the percentage of US public companies that appointed a director because of her technology background has increased from 10.1% to 17.4% during the 2010-2016 period. More interestingly, authors find that this figure doubles for firms that outperform the SP500 Index, suggesting that technology expertise is gradually turning into competitive advantage for firms that decide to invest in it.¹⁰⁰ I test this intuition within the boundaries of our sample.

Figure 4.3 exhibits summary statistics for the presence of *Technology* skill on corporate boards. Panel A shows that the percentage of SP500 boards, possessing at least one director with technological skills, has increased from 79.9% in 2010 to 86.3% in 2018. Panel B presents the percentage of directors with *Technology* skills on boards. Throughout the 2010-2018 period, high-performing SP500 firms have, on average, more technology intensive boards than their low-performing counterparts¹⁰¹. Overall, summary results corroborate the anecdotal evidence for a positive relationship of

⁹⁹ Over the last 15 years, the percentage of active CEOs that have being appointed as directors in SP500 firms, has dropped by 54%, from 33% of all new director appointments in 2004 to 15% in 2019 (Spencer Board index, 2014; Spencer Board index, 2019).

¹⁰⁰ The Deloitte study is based on 221,000 director-year observations for 4,139 US public companies. Data are extracted from BoardEx and phone interviews. Authors define as technology experts, directors whose professional background includes one of the following positions: Chief Information Officer, Chief Technology Officer, Chief Science Officer, Senior Vice President, or Vice President - Technology, or Director serving in Technology committee. The percentage of high-performing firms (firms that outperform the SP500 Index) with technology-expert directors increases from 17.2% in 2010 to 31.3% in 2016.

¹⁰¹ I define high-performing (low-performing) firms, as those with Tobin's Q above (below) median. Technology intensity is the percentage of directors with *Technology* skills divided by the number of directors for each board. For example, if a firm has 10 board members, 3 of which have technological skills, the technology intensity of that board is 0.3. I focus on technology intensity instead of technology presence as more than 80% of boards have at least one director with technology-related skills. Data are based on 37,332 director-year observations, covering all SP500 non-utilities, non-financial firms for the period 2010-2018.

Technology with director demand and firm performance. Linck et al. (2008) use factor analysis to create a measure of a firm's operational & financial complexity, finding that outside directors become more valuable for their firms as the latter become more complex. Applying a similar factor analysis setting to describe boards' technological capacity, I conjecture that directors may add more value to their firms, as the boards become more technologically proficient. In that context, I test the effect of Factor 2 on firm performance, following the model proposed by Adams et al. (2018) on skill diversity.

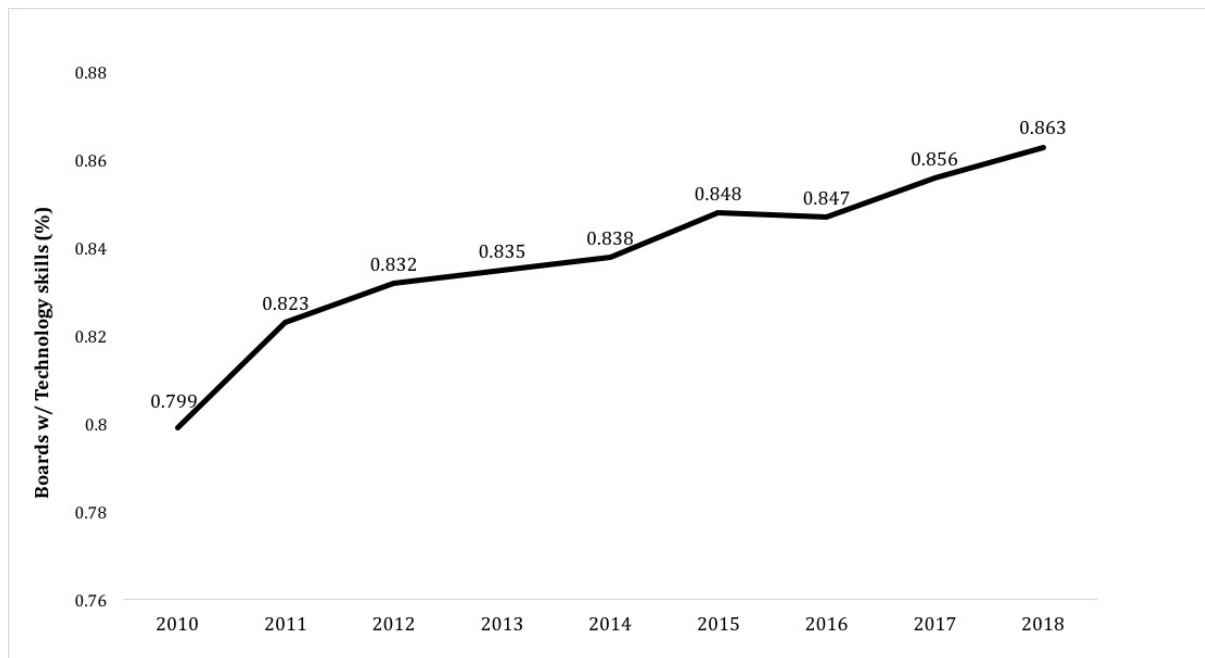
Table 4.8 reports Pooled OLS univariate and multivariate regression results on firm performance and board's technological capacity. I follow the study of Adams et al. (2018), using the second factor from the factor analyses in Table 4.5 as proxy for board's technology aptitude, and Tobin's Q as measure of firm performance. Control variables, industry and year dummies follow the regression models of Table 4.6. I correct standard errors to account for heteroskedasticity, clustering at the firm level. Key explanatory variable in all models is the second factor from the factor analyses of Table 4.5. Dependent variable is Tobin's Q in all specifications.

Findings show that the estimated coefficient of board's technological capacity in all models is positive and statistically significant. The first two columns present results of the second factor, based on the PF factor extraction method. The coefficient enters with a positive sign, and is statistically significant at the 5% and 1% level, in univariate and multivariate setting respectively. I replicate the baseline OLS regression using the second factor from IPF (ML) factor extraction methods. Univariate and multivariate results confirm the findings of the PF method. Factor 2 in multivariate regressions ranges from 0.339 (IPF method) to 0.363 (PF method). Overall, results indicate that firms who score higher on *Scientific, Technology, Academic, Government & Policy*, and *Manufacturing* skills are associated with higher firm valuation.

All control variables enter with the predicted signs, confirming results of Table 4.6. Our proxy of firm size is negative and significant. ROA is a positive and significant, while board size, board independence, and CEO age are negative and significant in all specifications.

Figure 4.3
Technology skills on board

Panel A: Percentage of boards with at least one technology-skilled director



Panel B: Technology intensity and firm performance

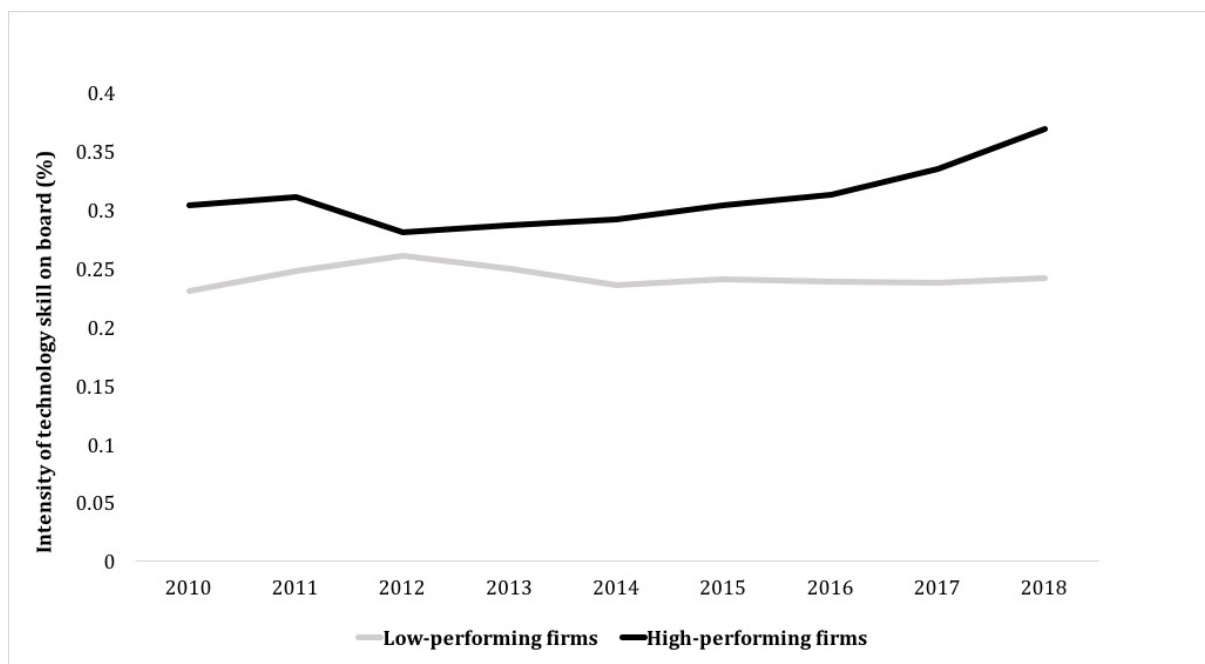


Figure 4.3 exhibits descriptive statistics of *Technology* skill on boards. Panel A shows the percentage of boards that have at least one director who possesses technological skills. Panel B presents the percentage of technology intensity in a firm's board. The higher the percentage of that metric, the more technology-intensive is the respective board of directors. I assign firms as high (low) performing for a given year, if the corresponding Tobin's Q is above (below) median. Both Panels are based on 37,332 director-year observations, covering all SP500 non-utilities, non-financial firms for the period 2010-2018. All skill definitions are provided in Table 4.1.

Table 4.8
Board's technological aptitude and firm value

Variables	PF Method		IPF Method		ML Method	
	(1)	(2)	(3)	(4)	(5)	(6)
Factor 2	0.436** (0.019)	0.363*** (0.007)	0.337** (0.048)	0.339*** (0.005)	0.348* (0.051)	0.347*** (0.007)
Log of total assets		-0.210*** (0.000)		-0.212*** (0.000)		-0.210*** (0.000)
ROA		8.845*** (0.000)		8.864*** (0.000)		8.877*** (0.000)
Capital expenditures		0.006 (0.986)		0.001 (0.997)		-0.040 (0.907)
Log of firm age		-0.015 (0.710)		-0.017 (0.673)		-0.013 (0.748)
Volatility		-0.412 (0.954)		0.058 (0.994)		-0.068 (0.993)
Log of board size		-0.464** (0.017)		-0.465** (0.016)		-0.513*** (0.008)
Board independence (%)		-0.777** (0.047)		-0.772** (0.049)		-0.783** (0.045)
Board committees		-0.070 (0.509)		-0.070 (0.510)		-0.070 (0.507)
CEO age		-0.009* (0.085)		-0.009* (0.080)		-0.009* (0.084)
Constant	2.187*** (0.000)	5.021*** (0.000)	2.215*** (0.000)	5.051*** (0.000)	2.086*** (0.000)	5.004*** (0.000)
Year FE	No	Yes	No	Yes	No	Yes
Industry FE	No	Yes	No	Yes	No	Yes
Observations	3070	2889	3070	2889	3070	2889
Adjusted R-squared	0.011	0.550	0.008	0.550	0.007	0.549

Table 4.8 report results of Tobin's Q regressions on the second factor of PF, IPF, and ML factor extraction methods. I interpret the second factor as measure of board's technological aptitude. Columns 1 and 2 present univariate and multivariate Pooled OLS regression results respectively, based on the second factor of the PF method. Columns 3 and 4 (5 and 6) replicate this process for the IPF (ML) factor results. Tobin's Q is the dependent variable in all regressions. Specifications 2, 4 and 6 include year and two-digit SIC codes dummies. Standard errors are clustered at the firm level in all models. All quantitative variables are winsorised at the 1% and 99% levels. P-values are shown in parentheses. ***, **, and * denote statistical significance levels at the 1%, 5%, and 10% level, respectively. All variable definitions are provided in the Appendix of this chapter.

I then investigate the relationship between board's technological aptitude and firm operating performance. I apply the regression model of Table 4.6, using return on assets (ROA), return on equity (ROE), and one year sales growth as our dependent variables. Table 4.9 reports results from multivariate OLS regressions. Key explanatory variable in all models is the second factor from PF, IPF and ML factor extraction

methods respectively. All specifications follow the set of controls from Adams et al. (2018)¹⁰². In Panel A of Table 4.9, I use *ROA* as the model's dependent variable. The estimated PF, IPF and ML factors are not statistically significant. Panels B and C replicate regressions of Panel A, using *ROE* and *Sales Growth* as dependent variables respectively. The estimated coefficients of Factor 2 in all methods are not statistically significant, suggesting that a board's technological aptitude is not linked with firm's operating performance. Overall, I find evidence that a board that combines *Technology*, *Scientific*, *Academic*, *Government & Policy*, and *Manufacturing* skills appears to add significantly to the growth opportunities of the firm, but not to its operating performance.

4.4.4 Individual skills

Factor analysis is informative about the sign and significance of the factor's effect on the dependent variable, but not about the factor's economic magnitude. OLS regression results of Table 4.8 imply that a set of five skills has positive impact on firm value. From an economic perspective, it would be beneficial to investigate the economic impact, if any, of these skills. Thus, I examine the 20 skill categories individually, and I test their association with Tobin's Q.

The empirical analysis proceeds in two steps. First, I test whether the presence of an individual skill affects firm value. Adams et al. (2018) find that directors are multidimensional, and as such, rather than individual skills, they bring sets of skills to the board. Based on descriptive statistics in Table 4.3 of Section 4.3.3, the median director brings 4 skills to the board, and the median board has 15 distinct skills. It could therefore be asserted that the positive (negative) effect of a single skill on firm value would be counterbalanced by negative (positive) effects of other skills on the board. For that reason, I proceed to the logical next step of testing whether the intensity of an individual skill is associated with firm value. I conjecture that as the number of directors with a certain skill increases, the effect of that skill on firm value may become more discernible.

¹⁰² I report only the second factor from PF, IPF and ML factor extraction methods for brevity.

Table 4.9

Board's technological aptitude and financial performance

<i>Panel A: ROA</i>			
Variables	PF Model	IPF Model	ML Model
Factor 2	0.012 (0.183)	0.008 (0.302)	0.008 (0.329)
Controls	YES	YES	YES
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
N	2889	2889	2889
Adjusted R-squared	0.328	0.328	0.327
<i>Panel B: ROE</i>			
Variables	PF Model	IPF Model	ML Model
Factor 2	-0.036 (0.306)	-0.020 (0.491)	-0.029 (0.418)
Controls	YES	YES	YES
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
N	2889	2889	2889
Adjusted R-squared	0.334	0.334	0.334
<i>Panel C: Sales Growth</i>			
Variables	PF Model	IPF Model	ML Model
Factor 2	-0.493 (0.686)	-0.570 (0.606)	-0.447 (0.707)
Controls	YES	YES	YES
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
N	2883	2883	2883
Adjusted R-squared	0.150	0.150	0.150

Table 4.9 reports results of Pooled OLS regressions that show whether board's technological capacity affects firm performance. In Panel A we replicate the multivariate regressions of Table 4.8 on *Tobin's Q* and the second factor of each factor extraction method, using *ROA* as dependent variable. Panel B reports regression results of *ROE* on the baseline model. In Panel C, the dependent variable of our model is *Sales Growth*. The key explanatory variable of each regression is the second factor from the factor analyses of Table 4.5. The first column of each Panel presents OLS results based on the PF factor extraction method. The second and third columns report results which are based on the IPF and ML methods respectively. I omit all other variables for brevity. Control factors in all regression models are: the logarithm of total assets, *ROA* (we exclude *ROA* from regressions of Panel A due to multicollinearity), capital expenditures, logarithm of firm's age, volatility, logarithm of board's size, percentage of independent directors, number of board committees, and CEO's age. All specifications include year and two-digit SIC codes dummies. Standard errors are clustered at the firm level to address potential heteroskedasticity issues. All quantitative variables are winsorised at the 1% and 99% levels. P-values are shown in parentheses. ***, **, and * denote statistical significance levels at the 1%, 5%, and 10% level, respectively. All variable definitions are provided in Table 4A of the Appendix.

Table 4.10
Individual Skills Regressions

Variables	Skill Presence		Skill Intensity	
	(1)	(2)	(3)	(4)
Academic	0.075	0.140**	0.201	0.187
Company Business	-0.037	-0.016	0.371	0.158
Compensation	-0.085	-0.017	0.119	0.382*
Entrepreneurial	0.189*	0.101	2.090**	0.558
Finance & Accounting	-1.901***	-0.312	-0.258	0.055
Governance	-0.177*	-0.061	-0.299*	-0.313**
Government & Policy	-0.119	0.143*	-0.069	0.533**
International	-0.695**	-0.189	-0.509**	-0.271*
Leadership	-0.124	-0.054	-0.015	0.221
Legal	-0.235***	-0.105	-1.066**	-0.913**
Management	-0.168	-0.234	-0.619***	-0.473***
Manufacturing	-0.102	-0.025	-0.262	-0.091
Marketing	-0.106	0.047	0.215	0.120
Outside Board	-0.005	0.041	0.200	0.148
Outside Executive	-0.191	-0.033	-0.402*	-0.125
Risk Management	-0.094	-0.062	-0.171	0.159
Scientific	0.066	0.125	1.496*	0.616
Strategic Planning	-0.063	-0.077	-0.231	-0.165
Sustainability	-0.235***	-0.111	-0.963***	-0.480**
Technology	-0.077	0.063	0.587**	0.668***
Controls	No	Yes	No	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	3070	2889	3070	2889
Adjusted R-squared	0.257	0.555	0.257	0.580

Table 4.10 reports regressions of individual skills. Dependent variable in all models is Tobin's Q. Key explanatory variables are the 20 skill categories. In the first two columns, each skill category represents a dummy which is equal to one if the respective skill appears on a firm's board, and zero otherwise. In columns 3 and 4, each skill category is the percentage of the respective skill to the firm's board. Control factors in the second and fourth specifications are: the logarithm of total assets, ROA, capital expenditures, the logarithm of the firm's age, volatility, the logarithm of the board's size, the percentage of independent directors, the number of board committees, and the CEO's age. We omit reporting control variables for brevity. All specifications include year and two-digit SIC codes dummies. In all models, standard errors are clustered at the firm level to address potential heteroskedasticity issues. All quantitative variables are winsorised at the 1% and 99% levels. P-values are shown in parentheses. ***, **, and * denote statistical significance levels at the 1%, 5%, and 10% level, respectively. All variable definitions are provided in the Appendix of this chapter. Skill definitions are provided in Table 4.1 of Section 4.3.2.

Table 4.10 reports univariate and multivariate Pooled OLS regression results on firm value and individual skills. I structure the model based on Adams et al. (2018). Dependent variable in all specifications is Tobin's Q. All control variables in the multivariate specifications are omitted for brevity¹⁰³. In the first two columns, key explanatory variables are the 20 skill categories dummies. Several skills, like *Finance & Accounting*, *International*, *Legal*, and *Sustainability*, are negative and significant in univariate results, but this relation is not robust to controlling for the set of financial and governance characteristics. In columns 3 and 4, key explanatory variables are the percentages of each of the 20 skill categories to the firms' boards. Based on univariate regressions, *Entrepreneurial* and *Scientific* skills appear to have a positive, significant and economically impactful relationship with Tobin's Q, but the link is not robust to our set of controls. Univariate and multivariate models report negative, and statistically significant coefficients for *Governance*, *International*, *Legal*, *Management*, and *Sustainability* skill categories. The coefficient of *Technology* is positive and statistically significant.

The OLS results complement those from factor analysis of sub-section 4.4.3.1, further distinguishing *Technology* as a beneficial skill for the firm's valuation. The positive association between technology and financial performance is consistent with Premuroso and Bhattacharya (2007). Results suggest that increasing the percentage of technology expert directors on a firm's board is associated with an increase in its Tobin's Q. Likewise, regression results on *Governance* confirm findings from the factor analysis of sub-section 4.4.3.1. Studies on CSR and firm performance, range from findings of positive, negative, or no relationship between the two variables (Margolis et al., 2007). Seen from skills' perspective, I find that the presence of CSR-related skills (i.e., *Governance & Sustainability*) on a firm's board has no effect on its valuation, but an increase in the number of directors with the aforementioned qualifications may have negative impact on its growth opportunities. Also, OLS results on lawyers-directors are consistent with anecdotal evidence, corroborating the problematic nature of lawyers'

¹⁰³ All multivariate regressions include as control variables: the logarithm of total assets, return on assets, and standard deviation on the firm's annual stock returns. We also control for the firm's age, and board size, the percentage of outside directors, the number of board committees, and the CEO's age. All specifications include year, and two-digit SIC code industry fixed effects. Standard errors are clustered at the firm level to address heteroskedasticity problems.

appointments on corporate boards (Harvard Law School, 2020). I find that the presence of directors with legal skills to a firm's board has no effect on its value, but increasing the number of those directors, may carry value-destroying consequences.

4.5 Robustness Checks

4.5.1 Are firms disclosing information in the skill descriptions of their directors?

Item 401(e) of Regulation S-K requires firms to disclose the reasons for nominating each director to the board. Specifically, it states: "*For each director or person nominated or chosen to become a director, briefly discuss the specific experience, qualifications, attributes or skills that led to the conclusion that the person should serve as a director for the registrant at the time that the disclosure is made, in light of the registrant's business and structure.*" Even though the aforementioned amendment can potentially become of great benefit to corporate governance by providing a primary source of data coming directly from the boardroom, the novel nature of the input can pose righteous concerns with respect to its informational value. I follow Adams et al. (2018) to examine whether our skills dataset can be regarded as a valid source of information.

First, I examine how directors' skills correlate with outside directorships. For our data to be informative, we would expect directors who serve on more boards to exhibit larger number of disclosed skills. I test that by calculating the correlation between directors' skills and outside board memberships. I exclude *Outside Board* skill from the sample as it would be correlated with the number of outside directorships by construction. As shown in Panel A of Table 4.11, the correlation between the number of directors' skills and the number of directors' outside board memberships is positive (0.116) and significant, indicating that our skills' sample carries valid information.

Table 4.11
Correlations

Panel A: Number of skills - Outside directorships correlations

Outside directorships	Number of skills 0.116***
-----------------------	------------------------------

Panel B: Committee - Skills correlation matrix

Skill variables	Nominating	Governance	Compensation	Audit
Academic	0.044***	0.040***	-0.012**	-0.025***
Company Business	-0.098***	-0.099***	-0.099***	-0.146***
Compensation	0.061***	0.055***	0.222***	-0.029***
Entrepreneurial	0.017***	0.018***	0.010*	0.010*
Finance & Accounting	-0.012**	-0.018***	-0.027***	0.281***
Governance	0.176***	0.184***	0.065***	0.009*
Government & Policy	0.058***	0.057***	-0.007	-0.044***
International	-0.002	0.002	0.022***	0.035***
Leadership	-0.008	-0.005	0.026***	-0.052***
Legal	0.061***	0.057***	-0.018***	-0.034***
Management	0.002	0.003	0.030***	0.039***
Manufacturing	0.015**	0.014***	0.021***	0.040***
Marketing	-0.001	0.004	0.043***	-0.058***
Outside Board	0.036***	0.037***	0.047***	-0.006
Outside Executive	0.010	0.014***	0.060***	0.022***
Risk Management	-0.020***	-0.017***	-0.020***	0.118***
Scientific	0.020	0.019***	-0.020***	-0.040***
Strategic Planning	-0.024***	-0.019***	-0.005	-0.017***
Sustainability	0.003	0.003	0.001	-0.026***
Technology	-0.009	-0.008	-0.009*	-0.001

Table 4.11 reports various skills correlations. Panel A presents the correlation between directors' number of skills and their outside directorships. When calculating the number of skills for each director, we exclude the *Outside Board* skill category, as it would be correlated by construction with the number of the director's outside directorships. Panel B reports pairwise correlations between the 20 skill categories and directors' committee memberships. Data on committee assignments are obtained by ISS (formerly RiskMetrics), and are supplemented with additional information from Thomson Reuters EIKON. Skill data are obtained from 2010-2018 proxy statements, and contain information for all SP500 annual constituents of that period, excluding utilities (SIC codes 4900-4949) and financial firms (SIC codes 6000-6999). Results are based on 37,332 director-year observations. ***, **, and * denote statistical significance levels at the 1%, 5%, and 10% level, respectively.

I then examine whether skills are correlated with corresponding committee assignments. If the extracted skills have any informational value, we would expect firms to assign directors to relevant board committees. I calculate the correlations of our 20 director skills' list with the four different committee types from ISS database: *Nominating*, *Governance*, *Compensation* and *Audit*. Panel B of Table 4.11 exhibits the committee-skill correlation matrix. As expected, *Nominating* and *Governance* committees are highly correlated with *Governance* skills (coefficients are 0.176 and 0.184 respectively). Likewise, *Compensation* committee assignments are strongly correlated with the corresponding skill (0.222), while *Audit* committee is correlated with *Finance & Accounting* (0.281) and *Risk Management* (0.118) skills. No other committee-skill pair exhibits correlation higher than 0.1. Correlations seem to be stronger as the relevance between skill category and committee type increases, indicating that our skills' collection encloses credible information.

4.5.2 Are director skills providing already acquired information?

Since Regulation S-K's adoption, firms use skills' descriptions as supplementary justification for the election of their directors. A legitimate concern is that the motive of the firms' skills disclosure may distort the validity of the latter. Firms may not provide additional information regarding their board members (i.e., their distinct skills and attributes), but rather feature already acquired knowledge. I conduct four tests to examine whether the extracted skill descriptions provide novel information. First, I examine whether directors' skills descriptions mirror their already accessible biographical information. If firms simply copy their directors' curricula vitae, directors serving on different boards would exhibit the same skills. Firms are required to disclose the skills that make each director an ideal fit to their board. For our dataset to provide new information, we would expect the skills' descriptions of directors with multiple directorships to go beyond their résumés, thus having substantial differences between them. However, if different firms report totally different skills for the same directors, then our sample would be nothing more than an idiosyncratic collection of directors' skills descriptions. Thus, for our dataset to be informative, we would expect skill heterogeneity for directors on different boards to be moderate.

To assess skills' descriptions for directors with multiple directorships, I follow Adams et al. (2018), creating a "clarity score" for each director. Assume director A has 3 directorships and in 2/3 she is reported with the *Academic* skill, in 1/3 with *Compensation* and in 2/3 with *Entrepreneurial*. Director A's clarity score will be the mean of the 3 ratios. Clarity score is positive and takes values from zero to one, the latter indicating a total match of skills' descriptions between the three firms. I exclude *Company Business* skill in the calculations, as that category would differ among boards by definition. There are 1,521 unique directors with multiple directorships in the sample (ranging from 2 to 5 outside directorships). The average number of outside directorships for these directors is 2.303. The average clarity score is 0.633¹⁰⁴. Skills' descriptions seem to reflect a substantial portion of directors' biographical information, but firms do not simply copy directors' résumés.

I then examine whether our data provide information that could be drawn just by checking the respective directors' committee assignments. If firms assign their board members to committees based solely on the formers' skills, then committee assignments would mirror directors' skills. For example, a director being assigned to the *Governance* committee would provide equivalent information to that of her being attributed with *Governance* skills. Thus, for our dataset to be informative, we would expect to find substantial differences between directors' skill categories and their committees' analogues. To investigate the relationship between committee assignments and directors' skills, I introduce a match ratio between the two variables. I match directors' skills with the list of committee types from ISS database¹⁰⁵. I then calculate the percentage of directors who have committee assignments with matching skill descriptions.

¹⁰⁴ If we exclude from our sample inside directors, clarity score does not change (0.632). In their study, Adams et. al. (2018) find a similar clarity score in the overall sample (0.624), and in the non-inside directors' sample (0.632).

¹⁰⁵ ISS database provides information on only 4 committees: *Nominating*, *Governance*, *Compensation* and *Audit*. On the other hand, Thomson Reuters EIKON has 10 different types of committees, and BoardEx has 35 committee categories. Using any of the latter two databases would require ambiguous manipulations with respect to matching committee types with skill categories. ISS provides the most standardised information on committee assignments and thus minimal matching requirements. For that reason, we utilise ISS, and we supplement with Thomson Reuters EIKON.

Table 4.12

Clarity score & match ratios

<i>Panel A: Clarity score</i>				
Variable	N	Mean	Median	Std. Dev.
Clarity Score	12,326	0.633	0.625	0.136
<i>Panel B: Committee skill match ratio</i>				
Committee	Skill	Directors w/Committee Assignments & Matching Skills	Number of Directors w/Committee Assignments	Match Ratio
Nominating	Governance	5,093	13,154	0.387
Governance	Governance	5,032	13,637	0.388
Compensation	Compensation	3,290	12,859	0.255
Audit	Finance	8,602	13,422	0.640
Committee skill match ratio				0.417

This table reports clarity score results and committee-skill match ratios. Panel A reports descriptive statistics of clarity score. Clarity score is the mean of the board-skill matching percentage for all directors with more than one outside directorship. Results are based on 12,326 outside director-year observations from 1,521 unique directors. By construction, clarity score is positive, and takes values from zero to one, zero illustrating no match between the reported skills of the same director on different boards, and one implying perfect match. Clarity score is further described in Section 4.5.2. Panel B exhibits descriptive statistics on match ratios between committee types and skill categories. The first column reports the number of committee members that are assigned with matched skills. For example, I report the number of directors who are assigned to *Governance* committee and possess *Governance* skills. The second column displays the total number of committee members for each committee type (i.e., the sum of directors who serve on *Governance* committees). In the third column, I divide column 1 by column 2, showing the percentage of committee members with matched skills to the number of directors with the respective committee assignments. The Committee-skill match ratio is the average of the match ratios from the four committee-skill combinations. Data on committee assignments are obtained by ISS (formerly RiskMetrics), and are supplemented with additional information from Thomson Reuters EIKON. Skill data are obtained from 2010-2018 proxy statements, and contain information for all SP500 annual constituents of that period, excluding utilities (SIC codes 4900-4949) and financial firms (SIC codes 6000-6999). Skill definitions are provided in Table 4.1 of Section 4.3.2.

Table 4.12 shows the ratios of committee members with matched skills for each committee type. *Governance* and *Compensation* committee types have matched skill categories. On average, 38.8% of directors serving on *Governance* committees are also attributed with corresponding *Governance* skills. *Compensation* skills are assigned to 25.5% of directors serving on *Compensation* committees. Committee types that do not have a matching skill category are paired with the closest skill categories, based on their correlations from Table 4.4. I calculate the match ratio of the *Nominating* committee with *Governance* skill category and *Audit* committee with *Finance & Accounting*. The average match ratio for all committee sample is 41.7%.

Since the most common committee types - *Nominating* and *Audit*¹⁰⁶ - have no direct matching skill, I also check their match ratios with the 20 skill categories. All combinations of match ratios are below 64%, ranging from 0.01% to 64%. Furthermore, as the committee-skill pairing becomes less intuitive the match ratio between the respective pairs drops accordingly. The match ratio for *Audit* committee drops from 64% if paired with *Finance & Accounting* skill, to 19.8% if matched with *Risk Management*, to 1.7% if matching is applied to members of the *Audit* committee with *Scientific* skills. In the calculations, I do not take into account board members that have matching skill but are not members of the respective committee (i.e., directors with *Governance* skills who are not members of *Governance* committee). If we calculate the ratio of committee members with matched skills to the sum of directors with the respective skill, the average match ratio of the sample becomes 51.6%. Overall results indicate that committee assignments are associated with directors' skills but do not mirror them directly.

4.5.3 Endogeneity concerns

The empirical analysis so far, provides some evidence that skill diversity is positively correlated with firm operating performance. Moreover, it appears that a set of skills, related to technological aptitude, correlates positively with firm value. However, as with most corporate governance phenomena, the causation argument is far from given. High performing firms may attract the most talented directors, and thus augment basic managerial skills of their board with other, most sophisticated categories. At the same time, low (high) performing firms may pay less (more) attention to matters like board diversity, or technological aptitude. I attempt to address concerns arising from endogeneity by applying a set of robustness tests.

Table 4.13 reports results of OLS regressions on the first two factors and firm performance. In the first three columns of each panel, I re-run the baseline model of Table 4.6, but I lag all explanatory variables. In like manner, in the last three columns

¹⁰⁶ *Nominating* and *Audit* account for 83.2% of all committee assignments in our sample (21,930 of 26,344 committee-year observations).

of each Panel, I replicate the baseline OLS model, but as dependent variable, I employ the respective means from years t , $t+1$, and $t+2$. I report the coefficients of Factor 1 and Factor 2, based on PF, IPF, and ML extraction methods. All controls are omitted for brevity. The dependent variable in Panel A is *Tobin's Q*, and in Panel B is *ROA*. The dependent variables in Panels C and D are *ROE* and *Sales Growth* respectively.

All results corroborate the findings from the main study. In accordance with our results from Table 4.6, Factor 1 is not significant in any specification of Panel A, validating that skill commonality does not appear to affect firm value. Factor 1 is positive and significant in all specifications of Panel C, confirming that our proxy of skill diversity is correlated with ROE. Following the results of Table 4.8, Factor 2 is positive and significant in all models of Panel A, suggesting that our measure of technological aptitude appears to correlate with Tobin's Q.

4.5.4 Factor 2 idiosyncrasy concerns

The novelty of the dataset undermines the plausibility of our factor analyses' results. Adams et al. (2018), which is the only study until today that delves into directors' skills, identifies and interprets the first factor of Table 4.5 as measure of skill diversity. I thus, follow their example in the current study. However, that is not possible in the newly identified Factor 2. Columns 2, 4 and 6 of Table 4.5 report factor loadings on a set of 5 skill categories. In descending order, Factor 2 co-varies with *Scientific*, *Technology*, *Academic*, *Government & Policy*, and *Manufacturing* skills.

The main study provides evidence that an increase in this set of skills increases Tobin's Q. To further investigate whether the 5 skills are in any way associated with firm value, I re-run the baseline OLS model, but I replace Factor 2 with a "Technology Aptitude" dummy. Specifically, I create a dummy which takes the value of one, if the firm has *Scientific*, *Technology*, *Academic*, *Government & Policy*, and *Manufacturing* skills on its board, and zero otherwise. I then follow their factor loadings' order, and re-run the model recursively, eliminating each time the least dominating factor. I thus, provide four different versions of the "Technology Aptitude" dummy.

Table 4.13

Factors 1 & 2 and firm performance

<i>Panel A: Tobin's Q</i>						
Variables	Tobin's Q_{t+1}			Tobin's $Q_{3\text{-year}}$		
	PF Model	IPF Model	ML Model	PF Model	IPF Model	ML Model
Factor 1	-0.004 (0.977)	0.036 (0.759)	-0.095 (0.426)	-0.014 (0.911)	0.023 (0.848)	-0.091 (0.456)
Factor 2	0.360** -0.012	0.334*** -0.01	0.337** -0.014	0.311** -0.03	0.289** -0.025	0.293** -0.032
<i>Panel B: ROA</i>						
Variables	ROA $_{t+1}$			ROA $_{3\text{-year}}$		
	PF Model	IPF Model	ML Model	PF Model	IPF Model	ML Model
Factor 1	-0.008 (0.353)	-0.008 (0.305)	-0.009 (0.290)	-0.012 (0.180)	-0.012 (0.146)	-0.012 (0.139)
Factor 2	0.009 -0.335	0.006 -0.458	0.006 -0.511	0.012 -0.244	0.009 -0.341	0.007 -0.434
<i>Panel C: ROE</i>						
Variables	ROE $_{t+1}$			ROE $_{3\text{-year}}$		
	PF Model	IPF Model	ML Model	PF Model	IPF Model	ML Model
Factor 1	0.049* (0.095)	0.059** (0.035)	0.049* (0.067)	0.061 (0.110)	0.077** (0.034)	0.065* (0.065)
Factor 2	-0.032 -0.363	-0.02 -0.49	-0.029 -0.425	-0.059 -0.183	-0.038 -0.294	-0.056 -0.213
<i>Panel D: Sales Growth</i>						
Variables	Sales Growth $_{t+1}$			Sales Growth $_{3\text{-year}}$		
	PF Model	IPF Model	ML Model	PF Model	IPF Model	ML Model
Factor 1	-0.535 (0.673)	-0.353 (0.761)	-0.475 (0.679)	-1.844* (0.050)	-1.477* (0.094)	-2.010** (0.023)
Factor 2	0.651 -0.586	0.527 -0.63	0.504 -0.671	2.007** -0.031	1.819** -0.032	1.351 -0.159

Table 4.13 reports results of Pooled OLS regressions on the first two factors and firm performance. Panel A complements the multivariate regressions of Table 4.6 on *Tobin's Q* and the first factor of each factor extraction method. The first three columns of Panel A modify the baseline regression model of Table 4.6 by lagging all explanatory variables. The following three columns replicate the baseline regression, using the arithmetic mean of *Tobin's Q* from years t , $t+1$ and $t+2$ as dependent variable. Panel B uses *ROA* as dependent variable. Panel C reports regression results of *ROE* on the baseline model. In Panel D, the dependent variable of the model is *Sales Growth*. In the last three columns of Panel D, I calculate the dependent variable as the geometric mean of *Sales Growth* from years t , $t+1$ and $t+2$. The key explanatory variable of each regression is the first factor from PF, IPF, and ML factor extraction methods respectively. All other variables are omitted for brevity. Control factors in all models are: the logarithm of total assets, *ROA* (*ROA* is excluded from regressions of Panel C due to multicollinearity), capital expenditures, logarithm of firm's age, volatility, logarithm of board's size, percentage of independent directors, number of board committees, and CEO's age. All specifications include year and two-digit SIC codes dummies. Standard errors are clustered at the firm level in all models. All quantitative variables are winsorised at the 1% and 99% levels. P-values are shown in parentheses. ***, **, and * denote statistical significance levels at the 1%, 5%, and 10% level, respectively. All variable definitions are provided in the Appendix of this chapter.

Table 4.14
Technological aptitude dummies

Variables	Tobin's Q			
	(1)	(2)	(3)	(4)
Technological aptitude	0.290*	0.361***	0.292***	0.177*
	(0.089)	(0.007)	(0.007)	(0.076)
Log of total assets	-0.199***	-0.201***	-0.200***	-0.198***
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	8.940***	8.882***	8.925***	8.934***
	(0.000)	(0.000)	(0.000)	(0.000)
Capital Expenditures	-0.036	-0.040	-0.016	-0.006
	(0.916)	(0.906)	(0.961)	(0.987)
Log of firm age	-0.014	-0.009	-0.005	-0.009
	(0.729)	(0.828)	(0.902)	(0.828)
Volatility	-0.517	-0.770	-0.592	-0.237
	(0.942)	(0.914)	(0.934)	(0.974)
Board size	-0.472**	-0.503**	-0.484**	-0.453**
	(0.019)	(0.010)	(0.013)	(0.019)
Board Independence	-0.788**	-0.735*	-0.758**	-0.758*
	(0.044)	(0.058)	(0.050)	(0.050)
Board Committees	-0.091	-0.096	-0.087	-0.086
	(0.361)	(0.339)	(0.390)	(0.394)
CEO age	-0.009*	-0.010*	-0.010*	-0.009*
	(0.088)	(0.069)	(0.070)	(0.081)
Constant	4.910***	4.996***	4.914***	4.829***
	(0.000)	(0.000)	(0.000)	(0.000)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	2889	2889	2889	2889
Adjusted R-squared	0.547	0.550	0.549	0.545

Table 4.14 reports Pooled OLS regressions on technological aptitude and firm value. Dependent variable in all models is *Tobin's Q*. Key explanatory variable is the *Technological aptitude* dummy. In the first specification, dummy is one if *Scientific, Technology, Academic, Government & Policy, and Manufacturing* skills are present in a firm's board, and zero otherwise. In the second column, the *Technological aptitude* dummy is one if board has *Scientific, Technology, Academic, and Government & Policy* skills, and zero otherwise. In the third column, boards that have *Scientific, Technology, and Academic* skills are assigned with the *Technological aptitude* dummy, and in the last specification, *Technological aptitude* is one if board has *Scientific, and Technology* skills, and zero otherwise. Control factors in all models are: the logarithm of total assets, ROA, capital expenditures, logarithm of firm's age, volatility, logarithm of board's size, percentage of independent directors, number of board committees, and CEO's age. All specifications include year and two-digit SIC codes dummies. Standard errors are clustered at the firm level in all models. All quantitative variables are winsorised at the 1% and 99% levels. P-values are shown in parentheses. ***, **, and * denote statistical significance levels at the 1%, 5%, and 10% level, respectively. All variable definitions are provided in Table 4A of the Appendix.

Table 4.14 reports results of Pooled OLS regressions on Tobin's Q and the *Technological aptitude* dummy. The key explanatory variable in all specifications is positive and significant, corroborating the findings from the main study. The coefficient of *Technological aptitude* in the first column is 0.290, and is statistically significant at the 10% level, suggesting that the presence of Factor's 2 skill loadings increases Tobin's Q. In the second column, the *Technological aptitude* dummy is 0.361, indicating that eliminating *Manufacturing* from the set of skills that need to be present in the board, increases the magnitude and significance of its positive effect on firm value. In the third column, key explanatory variable is a dummy which is one if firm has *Scientific*, *Technology*, and *Academic* skills on its board, and zero otherwise. Coefficient remains positive, and statistically significant at 1% level. In the fourth column, I drop *Academic* from the aforementioned set, and replicate the OLS model. Coefficient of *Technological aptitude* lowers in magnitude and significance, but remains positive, and statistically significant at the 10% level, suggesting that the set of *Scientific* and *Technology* skills may have value enhancing effects for the firm¹⁰⁷.

Overall, results indicate that the cluster of 5 skills that we reported in the main study appears to create value for the firm¹⁰⁸.

4.6 Conclusions

This study analyses director skills and measures their effect on firm performance. Using a novel, hand-collected dataset of 37,332 skill descriptions from the directors of all SP500 constituents during the 2010-2018 period, I provide some evidence for positive association between the range of available board skills and ROE. I also find that a set of 5 technology-related skills, appears to create value for the firm. The

¹⁰⁷ In further robustness checks that are omitted for brevity, results survive the set of tests from Table 4.13 in all specifications.

¹⁰⁸ In unreported results, I investigate the factor loadings from Table 4.5 that entered with a negative sign. Following the robustness check of section 4.5.4, I create a dummy which is equal to one if the firm's board has *Governance* and *Compensation* skills, and zero otherwise, and I re-run the OLS models of Table 4.14. The coefficient of the key explanatory variable in all specifications is not statistically significant, suggesting that the presence of *Governance* and *Compensation* skills to the board is not associated with firm value.

informational value of the dataset, and the robustness of the findings, survive a series of tests.

The difference of this study with Adams et al. (2018) boils down on two themes; on the difference of our results with respect to Factor 1 (labelled by them as skill diversity), and on the introduction, from our part, of Factor 2. Both matters pose some interesting questions for further research. First, these authors studied a sample of 1500 US public firms from 2010 to 2013, providing evidence that skill commonality in corporate boards has been the main contributor of firm value. Based on our results, that finding does not seem to apply if we focus our attention on the SP500 firms, and if we extend the period of analysis. At first, it appears that the source of that inconsistency is a twofold investigation. In unreported results, I replicate the current study by limiting our sample in the 2010-2013 period. All results remain unchanged, suggesting that time period does not appear to drive the findings.

Based on the fact that we cannot test the "firm size" hypothesis, a series of intriguing queries arise. Could it be that larger firms have more diverse boards in terms of skills, which in turn could increase their performance? In unreported regressions, I follow Anderson et al. (2011) to examine the drivers of skill diversity, finding that larger, and more independent boards are associated with more diverse skillsets. If skill diversity proves to be an unaccounted factor behind two of the most studied corporate governance variables like board size, and board independence, it could very well be linked with a series of phenomena as well. A strong body of literature suggests that treating corporate governance variables homogeneously does not produce significant outcomes (Duchin et al., 2010; Bhagat & Black, 2002; Klein; 1998). Nguyen et al. (2010) suggest that independent directors are more valuable when the functions they undertake are more crucial. Likewise, Linck et al. (2008) find that outside directors become more valuable as firms become more complex. Following the same line of reasoning could lead us to seek whether that is the case as well with skill diversity. As firms increase in size, or complexity, the range of available skills on the board may matter more.

Secondly, apart from skill diversity, a significant part of SP500 firms appear to fill their boards with technology-related skills. A 2011 survey from McKinsey reports that

46% of directors characterise their attention to IT topics as insufficient, viewing it as the most misaligned board matter with respect to its importance versus to its actual address from the company (Bloch et al., 2012).¹⁰⁹ That sort of misalignment is even more pronounced in a 2017 survey from Russell Reynolds, in which the percentage of directors who report discussions of IT effects as their boards' highest prioritised matter is 63%, while those who report that IT discussions are sufficient are at 27% (Augustson et al., 2017). A 2016 Global CIO Survey from Deloitte reports that 34% of corporate directors do not sufficiently/or at all understand their company's annual IT budget. However, IT spending has been increasing for years, gradually turning into one of the largest parts of corporate budgets (Curran, 2016). A more recent empirical analysis by Deloitte, suggests that firms who address the increasing technological needs in the boardroom by appointing tech-savvy directors are associated with higher Tobin's Q (Deloitte, 2017). Could it be that some firms have located the problem first, appointing more tech-savvy directors as an answer? And if so, does that give these firms an edge in the allocation of their IT resources?

Our analysis provides a starting point for these answers. Either the intensity of technological skills on the board, or as part of a wider set of tech-related qualifications, technology seems to be positively related with firm value. Firms are gradually diversifying their board composition with directors that embrace the digital needs of their stakeholders (Graham, 2018). A recent article in Harvard Business Review urges firms to seek for "tech-savvy directors with Millennial mindset." Authors argue that the transition of brick-and-mortar firms to fully digitalised organisations must be reflected to the boardroom, with directors who combine technological astuteness with non-traditional director traits (Rickards & Grossman, 2017). The post-pandemic era of corporate boards will surely accelerate, and embrace such transitions. Our set of 5 skills could be a start of a new, more ambitious research in the optimal skillsets for the next generation of directors.

¹⁰⁹ In this survey, 53% of executives answer that discussion for future technology effects must be the board's first priority, and 23% of respondents think that it is, forming the widest misalignment of all surveyed board matters.

One way or another, it seems that heterogeneity in the boardroom plays a vital role for larger firms. I provide evidence that people's constant yearning to acquire skills does not appear to go in vain. At least not from a shareholder's perspective. Now, if those skills could be more directed towards technology? Well, that could be even better...

5. Director skills and M&As

5.1 Introduction

*"What a horse they are losing, because,
for lack of skill and courage, they cannot manage him!"*

- Plutarch, Life of Alexander, Book VII, page 239¹⁰⁰.

Thousands of years after a young Alexander the Great would urge his father to let him use his prowess on the legendary untamed horse, Bucephalas, skills continue to prognosticate a person's individual, social, and professional growth. In the post-pandemic era, we experience the emergence of new skills in unprecedented speeds (Saliola & Islam, 2020; Li & Lalani, 2020). Meanwhile, proper re-skilling of the workforce at the global level, is developing into crucial factor of economic recovery (Enders et al., 2020; Agrawal et al., 2020). Despite their pivotal role in almost the entire spectrum of human activity though, skills are only scarcely examined in the upper echelons of the corporate world. I exploit a recent regulation amendment in order to fill that gap. In this chapter, I study skills inside the boardroom, asking whether the skills of directors contribute to shareholder wealth through mergers and acquisitions (M&As henceforth).

I pick M&As as focal point of our research for several reasons. 2002's Sarbanes-Oxley Act, and 2010's Dodd-Frank Act, led to sui generis regulatory reforms, corporate governance advancements, and value creation for shareholders through different routes¹⁰¹. M&As have been on the receiving end of a vast majority of these regulations, hence creating a fruitful path for new insights (Dahya et al., 2019). Studying a sample of US listed firms from 1990 to 2015, Alexandridis et al. (2017) find that for the first time,

¹⁰⁰ As seen in (Dryden & Clough, 2004).

¹⁰¹ See for example Toscano (2020), Bhagat and Bolton (2017), Brunarski et al. (2015), Cohen et al. (2013), Kang et al. (2010), Barger et al. (2010), Litvak (2007), Wintocki (2007), Zhang (2007), Rockness and Rockness (2005) among others.

public acquisitions post-2009 create value for the shareholders of acquirers. During the same period, the global value of M&As has experienced a 10-fold increase, surging from \$397 billion in 1991 to \$3.7 trillion in 2019 (Szmigiera, 2020). Figure 5.1 shows the distribution of deals in the US from 1990 to 2018. M&A volume declined after the dot-com bubble and the financial crisis of 2008, but both times recovered over a period of three to six years. The upturn was more pronounced in terms of deal value, and especially after the end of the sixth merger wave (Alexandridis et al., 2012), rising from \$377 billion in 2008 to an all-time high of \$928 billion in 2018. Goldman Sachs (2020), in its Global M&A Outlook for 2020, contends that Covid-19 accelerated a third such downturn, arguing that a new wave of M&As is imminent. The strategic decisions taken by corporate boards during that period will be consequential (Herndon & Bender, 2020).

Figure 5.1
Deals distribution

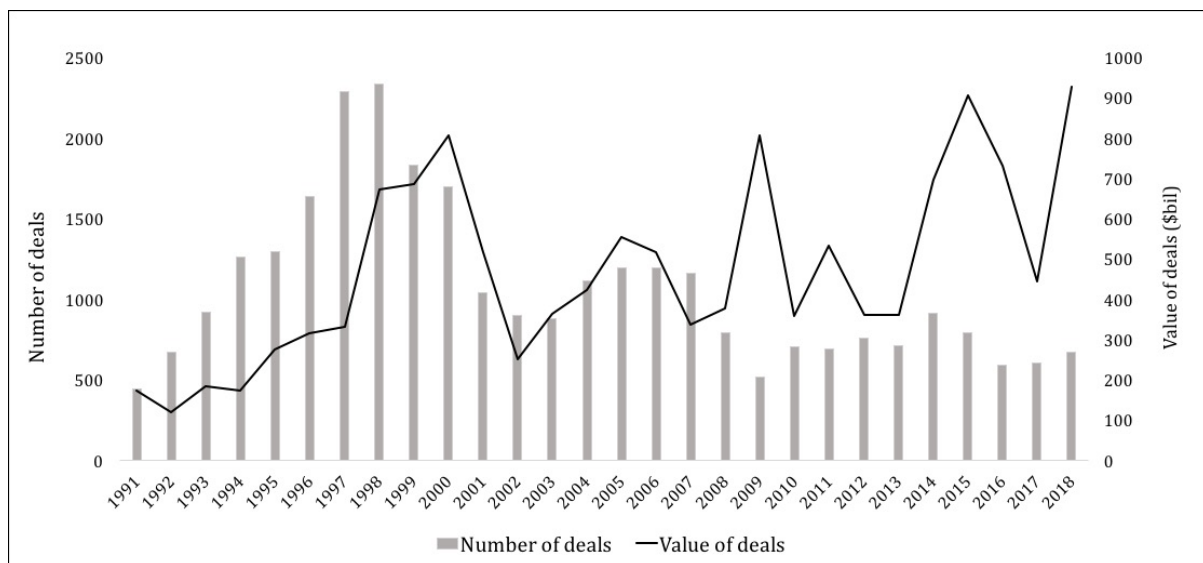


Figure 5.1 exhibits annual number and aggregate value (in \$mil) of deals. Sample employs information from SDC database and includes all "Completed" and "Withdrawn" deals of US firms listed on NYSE, AMEX, or NASDAQ from 1991 to 2018. From our sample, I exclude: repurchases, self-tenders, recapitalisations, exchange offers, minority-stake purchases, acquisitions of remaining interest, and intra-corporate restructurings. I also exclude deals with value less than \$1 million. Acquirers must own less than 20% before the transaction and more than 50% following its completion. Targets are either public or private firms. All values are inflation adjusted (base year is 1982). CPI data are provided by the U.S Department of Labor Bureau of Labor Statistics.

(<https://www.usinflationcalculator.com/inflation/consumer-price-index-and-annual-percent-changes-from-1913-to-2008/>).

The coronavirus pandemic en masse, has shaped a profoundly volatile economic environment and strategic M&As are expected to be at the epicentre of its aftermath (PwC, 2021; Hirsch, 2020). A 2020 Deloitte survey for Future M&A Trends - conducted on 1,000 directors of US firms¹¹² - reports that 61% of respondents expect M&A activity to rebound to pre-Covid-19 levels before the end of 2021, while 60% profess "more appetite" to pursuit M&As relative to the pre-pandemic levels¹¹³ (Thompson et al., 2020). Based on data from S&P Global Market Intelligence (2020), even though worldwide M&A activity declined by 35% in the second quarter of 2020 (first wave of the pandemic) compared to Q1, M&As surged by 533% in the telecommunications industry, by 196% in materials, and by 179% in health care¹¹⁴. Covid-19's impact is even more pronounced in the pharmaceutical industry¹¹⁵ (McGrail, 2020). During the first six months of 2020, Nasdaq biotech index has been at an all-time high¹¹⁶, while some of the biggest deals of that period involve companies of the biotechnology sector¹¹⁷ (Plieth & Elmhirst, 2020). At the announcement of a \$500 million initiative for investment in biotech companies, John Young, Chief Business Officer of Pfizer, said: "*There has never been a more important moment to pursue new collaborations in our industry*" (Pfizer, 2020).

¹¹² Survey was conducted on 750 US-based corporations, and 250 US private equity firms. 29% of the respondents work on US firms with more than \$1 billion revenues, and 17% with less than \$250 million. All participants work in firms with more than \$10 million in revenue.

¹¹³ The surveyed question was: "*Since March 2020, how has deal-making been impacted in terms of your company's pursuit of new deals?*" 43% of respondents answered that they would be "more focused" on new deals, 17% replied "way more focused," and 16% claimed they would be "less focused."

¹¹⁴ Data are from 4/1/2020 to 6/30/2020 and include only closed transactions. We report YoY percentile change of transaction value.

¹¹⁵ As part of Operation Warp Speed project, which was established in response to the coronavirus pandemic, start-up pharmaceuticals in the US, have received a record-breaking \$9.7 billion in government funding. During that time, biotechnology firm, ModeRNA has gained \$14 billion in market cap, and has doubled its share. Likewise, Regeneron's valuation has increased by \$16 billion in the second quarter of 2020.

¹¹⁶ Nasdaq biotech index has increased by 17% during the period January-July 2020.

¹¹⁷ Gilead Sciences acquired Immunomedics for \$21 billion (Lombardo, 2020), Forty Seven for \$4.9 billion (Elmhirst & Brown, 2020), and Pionyr for \$1.7 billion; Alexion Pharmaceuticals bought Portola for \$1.4 billion; Novo Nordisk acquired Corvidia for \$2.1 billion; Merck acquired Austrian vaccine manufacturing firm, Themis (BsbusinessWire, 2020); Novavax acquired Czech manufacturer, Praha Vaccines for \$167 million (Hargreaves, 2020), while Pfizer partnered with German BioNTech, and ModeRNA with Spanish ROVI (Plieth & Elmhirst, 2020) among others.

Meanwhile, on account of massive corporate governance collapses of recent years¹¹⁸, corporate environment has been in the midst of an on-going plea for increased transparency, diversity, and corporate accountability. As result, major regulatory reforms over the past two decades, have been re-shaping corporate boards in size, composition, and structure (Ghosh et al., 2010; Linck et al., 2008). For example, Sarbanes-Oxley Act's (SOX) requirement for the appointment of financial expert directors on audit committees, has led to an increase in the number of finance expert directors en bloc (Güner et al., 2018). Drobetz et al. (2018) report that after NYSE's and Nasdaq's calls for more independent directors, the percentage of inside directors on a firm's board between 2000 and 2010 decreased by 29%, while the share of their independent counterparts increased by 25%. Meanwhile, governance reforms aiming in enhancing board diversity, have resulted in higher female (Adams & Ferreira, 2009), foreign (Estélyi & Nisar, 2016), and cultural representation (Frinjs et al., 2016) on corporate boards.

The present study builds on these regulatory developments, in order to narrow down the scope of board research into its most foundational pieces; the skills of its directors. To that end, it exploits SEC's 2009 amendment of Regulation S-K, in order to create a novel dataset of directors' skills. Item 401(e) of Regulation S-K requires all US publicly listed firms to disclose the specific attributes, skills, and qualifications that each nominated board member is expected to bring to their board. Thus, starting from 2010, each director is accredited with the full skillset that led to her board nomination. I manually extract the skill-related part of each board member from the proxy statements of all SP500 constituents between 2010 and 2018, hence creating a hand-collected dataset of 46,417 skill descriptions from 7,540 directors.

Using a sample of 1,062 M&A deals announced by SP500 constituents between 2010 and 2018, this study tests whether directors' skills create shareholder wealth through value enhancing M&As¹¹⁹. To our knowledge, Adams et al. (2018) is the only

¹¹⁸ See in Siano et al. (2017) for the Volkswagen scandal; McDonald and Robinson (2009) for Lehman Brothers; Healy and Palepu (2003) for Enron; Bandler and Hechinger (2002) for Xerox, among others.

¹¹⁹ As the Regulation S-K amendment was announced on December 16, 2009, fiscal year 2010 is the first year of which there are published skills data.

study utilising Regulation S-K's amendment for skills-related research. These authors show that boards cluster among the diversity of their directors' skills, thereupon providing evidence that the commonality of skills on a firm's board is positively associated with Tobin's Q. I use these findings as starting point of the current study.

First, I examine how skills of acquiring firms cluster at the board level. Our findings corroborate Adams et al. (2018). The main dimension among which acquiring boards cluster is the diversity of their skills. I then examine whether the documented skill diversity is associated with M&A performance. For consistency with the study of Adams et al. (2018), I use their proxy of skill diversity; the first factor from factor analysis. I find that skill diversity is negatively related with acquirer CARs, suggesting that boards with more shared skills create shareholder value through acquisitions.

However, since factor analysis is not ideal with respect to the economic interpretation of its coefficients, or the applicability of its results for robustness testing, I follow Adams et al. (2018), employing the number of skills at the board level as a more intuitive measure of skill diversity. I find that the number of skills at a firm's board is negatively related to acquirer CARs, corroborating the positive association of skill commonality with acquisition performance. I address endogeneity concerns performing a series of tests. I control for past performance, and industry shocks (Drobetz et al., 2018), I run Instrumental Variable regressions (Adams et al., 2018), and Heckman Selection tests (Alexandridis et al., 2017). All specifications confirm the results of the main study.

The scope of the study is then turned from the board to the director level. Trying to keep our model as intuitive as possible, I employ the most straightforward metric of individual skills that one could think of; their number. I find that directors with more skills are associated with worse acquisition performance. The result survives the robustness tests of the baseline model. Since we would expect more skilled directors to be linked with more value enhancing deals, I narrow down our scope even further. I test whether the number of CEO's skills are associated with acquirer returns. Results provide evidence of the same pattern. I find that CEOs with more skills are related with worse acquisition performance. Overall findings survive the whole spectrum of robustness tests.

I consider two main explanations that could throw light upon the negative association between the number of skills and M&A performance; overconfidence and window-dressing. To test for the presence of overconfident CEOs, I employ the widely-used overconfidence measure proposed by Malmendier and Tate (2005). Results do not support the notion that the negative link between number of skills and acquisition performance is caused by value-destroying, overconfident CEOs. The number of skills' coefficient remains negative and significant in director and CEO regressions, after its interaction with the CEO overconfidence variable. The window-dressing intuition is based on the fact that firms self-report the skills of their directors. Thus, I examine whether the documented negative acquirer CARs from higher skilled individuals stems from lower quality boards. To test that, I employ the management quality Entrenchment index (E-Index hereafter) from Bebchuk et al. (2009). I find that the coefficient of the number of skills, both in the director and in the CEO regressions, is negative and statistically significant only for boards with above median values of the index. Results suggest that firms with low quality corporate governance may use Item 401(e) to window-dress the skills of their directors.

5.2 Related literature

The current study adds to several strands of corporate governance literature. First, it contributes to research of board heterogeneity. White et al. (2014) use the heterogeneous outcomes in value creation, stemming from academic directors of different specialisations, to outline the importance of recognising director heterogeneity at the board level. Anderson et al. (2011) examine director heterogeneity in occupational and in social context, showing that shareholders value heterogeneous boards at a premium in complex firms, but at a discount as the complexity of the firm falls. Bernile et al. (2018) construct a board diversity index considering six director characteristics: a person's age, gender, and ethnicity (demographic heterogeneity), as well as that individual's college of education, financial expertise, and previous board experience (cognitive heterogeneity). These authors find that greater board diversity (measured by these factors) is associated with lower risk and higher firm performance.

Kor and Sundaramurthy (2009) study director experience heterogeneity, finding that outside memberships, industry experience, and firm-specific experience are positive predictors of firm growth. Carter et al. (2003) define board diversity as the percentage of female, African, American, Asian, and Hispanic directors, providing evidence that board heterogeneity is positively related with firm value. Gender diversity at the board level is also studied extensively with respect to its effects on firm performance and corporate governance (Adams & Ferreira, 2009), share buybacks (Evgeniou & Vermaelen, 2017), dividend payouts (Ye et al., 2019), and environmental violations (Liu, 2018)¹²⁰. The effect of director heterogeneity on firm performance has also been studied in terms of cultural (Frinjs et al., 2016; Fiordelisi & Ricci, 2014), nationality (Estélyi & Nisar, 2016), and political ideology diversity among board members (Rockey & Zakir, 2020; Kim et al., 2013)¹²¹.

The study also contributes to the strand of literature that examines the impact of directors' skills on firm performance and corporate governance. Fedaseyeu et al. (2018) collect each director's lifetime experience in finance & accounting, law, management, academia, consulting, politics, and military, and show that more qualified directors perform more board functions and receive higher pay. Individual qualifications like academic (Chen et al., 2019; Francis et al., 2015) and investment banking prior experience (Jagannathan et al., 2020), political network (Goldman et al., 2009), financial (Güner et al., 2008; DeFond et al., 2005), and industry expertise

¹²⁰ Adams and Ferreira (2009) find that gender diversity is negatively (positively) related with firm performance for companies with fewer (more) takeover defences. Authors of this study also provide evidence that higher women representation on the board is positively associated with several corporate governance matters; CEO turnover sensitivity and CEO monitoring among others. Liu (2018) find that firms with higher female board presence are linked with fewer environmental violations. Ye et al. (2019) show that gender diversity is positively related with dividend payouts, and Evgeniou and Vermaelen (2017) find an increased likelihood for share buyback announcements for firms with more female directors on the board.

¹²¹ Frinjs et al. (2016) create an index of cultural board diversity and find that cultural heterogeneity at the board level is negatively related to firm performance, measured by Tobin's Q and ROA. Estélyi and Nisar (2016) examine directors' nationalities and find that nationality board diversity is positively related to firm's operating performance. Kim et al. (2013) study board diversity from a political ideology's standpoint, providing evidence that more diverse boards in terms of political ideology are associated with better firm performance, and lower agency costs. Rockey and Zakir (2020) revisit the issue, showing that even though board political diversity and firm performance are positively correlated, causation between the two variables is negative. Fiordelisi and Ricci (2014) find that CEO change is more probable in the presence of competition- and creation-oriented board cultures.

(Drobetz et al., 2018; Wang et al., 2015) are positively associated with firm value. In like manner, investment banking (Golubov et al., 2012), political connections (Ferris et al., 2016), and acquisition experience (Field & Mkrtchyan, 2017) are also found to be positive predictors of subsequent acquisition performance. Nguen et al. (2015) study a sample of US banks, providing evidence that director's age, education, and work experience create wealth for shareholders. Manager's style (Bertrand & Schoar, 2003), personality (Hambrick, 2007), early-life experiences (Malmendier et al., 2011), and identity (Akerlof & Kranton, 2000) have been found to affect financial decisions. Employing a unique sample of 7225 female pairs and 6338 male pairs of twins in Sweden, Cesarini et al. (2010) show that genetic variation explains approximately 25% of individual portfolio risk variation, while personal attributes (Hillier et al., 2015), and IQ (Grinblatt et al., 2012) are also found to affect investor performance.

Literature close to ours is also the strand that studies attributes, and qualifications of CEOs. Brockman et al. (2016) study the skills of CEOs, finding that "generalist" attributes (a set of experiences and skills that is easier to be transferred between industries) are valued at a premium, compared to "specialist" qualifications (skills that are tailored for a specific industry), while Mishra (2014) shows that the better job prospects of CEOs with the former set of skills makes them more prone to risk-taking behaviour, against shareholders' interest. Studying CEO characteristics, Kaplan et al. (2012) show that attributes leaning towards general ability and execution-related skills are associated positively with firm performance. Falato et al. (2015) code reputation, career, and educational credentials for a sample of CEOs from all SP1500 firms, and find that CEO credentials are positively related with firm performance. Studies of CEO ability evince that it is positively related with firm performance (Cheung et al., 2017; King et al., 2016; Demerjian et al., 2012; Chang et al., 2010), acquisition performance (Custódio & Metzger, 2013; Jaffe et al., 2013), and better earning forecasts (Baik et al., 2011), while Hu and Liu (2015) show that CEOs with more diverse prior work experience are linked with better corporate investment decisions. Custódio and Metzger (2014) find that firms with financial expert CEOs are linked with more share buybacks, less investment-cash flow sensitivity, while holding less cash and more debt. In M&As, attributes like CEO's age (Yim, 2013), home town (Jiang et al., 2019), and

educational background (Wang & Yin, 2018) are found to impact acquisitions target selection.

The present study is also related to research of CEO overconfidence. Seminal papers of the respective literature come from Malmendier and Tate. In their 2005 study, authors show that overconfident CEOs tend to overestimate the returns of their investments, as well as the costs of external funds, thus overinvesting when their firm possesses excess internal funds, and underinvesting when their firm requires external financing. The same authors in their 2008 paper, further evince the negative market reaction at M&A announcement when acquirer CEO is labelled as overconfident, compared to the case that acquirer CEO is marked as non-overconfident. Overall, even though literature on managerial (Huang & Kisgen, 2013), and especially CEO overconfidence has mostly provided evidence of its negative association with firm performance (Malmendier & Tate, 2009), more recent studies have been revealing a positive link between the two variables (Chakravarty & Hegde, 2019; Banerjee et al., 2015). In the middle ground on the issue stands Campbell et al. (2011), who theorise that there is an optimum level of value maximising CEO overconfidence, that firms eventually recognise and select for their board (Campbell et al., 2014). Inserting the role of boards to the equation, Kolasinski and Li (2013) argue that overconfident CEOs make better acquisitions when aided by the presence of a strong and independent board. Overconfident CEOs are also associated with greater innovation (Hirshleifer et al., 2012), shorter debt maturities (Huang et al., 2016), higher value of corporate cash holdings (Aktas et al., 2019), and lower bank loan spreads (Lin et al., 2020).

Finally, the current work contributes to literature of corporate governance, and more specifically of research related to anti-takeover provisions. Constructing a Governance Index from 24 governance provisions (GIM), Gompers et al. (2003) find that the strength of shareholder rights is positively related with firm value, profits, sales growth, and negatively related with capital expenditures. Bebchuk et al. (2009) provide similar findings after identifying the 6 most impactful provisions of the GIM model. In the field of M&As, Masulis et al. (2007) provide evidence that acquirers' anti-takeover provisions are negatively associated with acquisition performance, suggesting that the reason for the documented value destruction is the loss of shareholder power over the

board. Harford et al. (2012) further examine the value destructive forces of anti-takeover provisions through M&As, showing that entrenched directors tend to avoid private targets and all-equity offers, as well as to resort to overpaying and to low synergy target selection. Challenging academic consensus on the negative relationship between governance provisions and firm value, Sokolyk (2011) argue that while individual provisions impact takeover outcomes, the GIM index cannot capture the anti-takeover provision heterogeneity, while Straska and Waller (2010) find that the negative association between the number of anti-takeover provisions and shareholder wealth does not apply to all firms.

The rest of the paper is organised as follows. Section 5.3 describes data and methodology of the study. In Section 5.4, I present empirical results. Section 5.5 reports robustness tests. In Section 5.6, I conclude.

5.3 Data and methodology

5.3.1 Hypotheses development

Despite the fact that SEC's 2009 regulation requirements with respect to directors' skills highlight the importance of the latter, research on skills is extremely limited. Adams et al. (2018) study a sample of US public firms from 2010 to 2013 and show that boards vary with respect to the diversity of their directors' skills. Authors use factor analysis to create a proxy of skill diversity, and find that their measure of skill diversity is negatively related to Tobin's Q. Their results suggest that the commonality of skills increases firm performance. I posit that M&As provide a more direct setting to examine how director skills contribute to shareholder wealth.

To our knowledge, the work of Adams et al. (2018) is the only study that exploits the Regulation S-K amendment's new corporate governance information on director skills. However, even though authors establish an association between skills and firm value, they do not examine whether skills create value for shareholders through M&As. I attempt to work on that gap in literature. I use the study from Adams et al. (2018) as a natural starting point for our research. If the skill commonality hypothesis is extended

to corporate acquirers, we would expect boards with more (less) overlapping skills, to generate higher (lower) returns for their shareholders through acquisitions. Panel A of Figure 5.2 shows that mean and median CARs for boards whose range of skills is below (above) median, are notably higher (lower), implying that the variety of skills on the boardroom appears to be negatively correlated with acquisition performance.

Based on the above, it would be of value to investigate whether acquirers with more heterogeneous skills at the board level exhibit higher announcement returns. Based on the results of Adams et al. (2018), I conjecture that the positive relationship of skill commonality with firm value will withstand the transition to the M&A setting. If firms whose boards exhibit more commonality in the skills of their directors, are associated with better growth opportunities, we would expect these firms to engage in correspondingly better performing M&As.

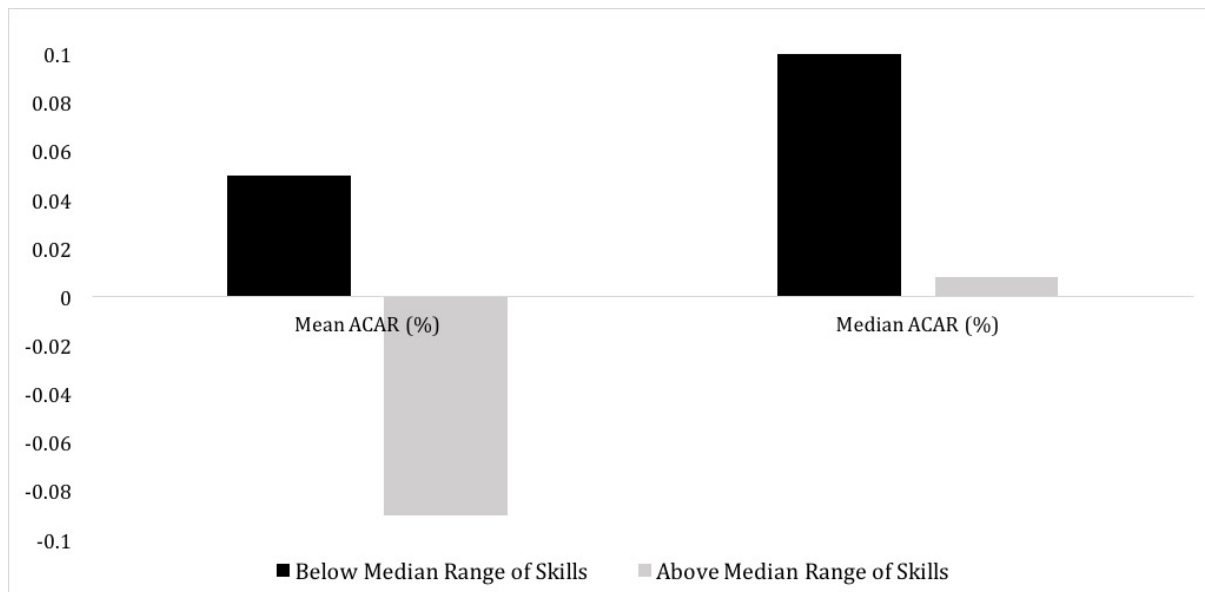
Hypothesis 1: Boards with more shared skills are more likely to create value for shareholders through value enhancing acquisitions.

In order to investigate the link between skills and value creation through M&As in more depth, we could narrow down our research to the effect of each individual skill on acquirer returns. I opt to avoid that path despite its potential for corporate governance research. The intuition behind this decision is twofold. First, disentangling the impact of each skill would face serious challenges in terms of endogeneity at the board level. Every skill category could have heterogeneous impact on firm performance, depending on the created synergies between the skills of the director¹²². Skill analysis at the individual level could also produce unsatisfying results in terms of implementation. If positive and negative associations of individual skills were to be discovered, the same director could bring both "value enhancing" and "value destroying" skills, the integration of which could potentially face the challenge of producing spurious results.

¹²² For example, imagine that two directors of a Tech firm have *Academic* skills. Director A combines them with *Technology* skills, and Director B with *Scientific*. The integration of *Academic* and *Technology* skills may forge synergies that create value for the firm. However, the asymmetric dominance of Director A's impact compared to B's will not have been documented. If the synergistic effect is not properly captured, the perceived impact of *Academic* skills will be biased upwards for both directors, leading to the false conclusion that simply adding an *Academic* director to the board is enough to create value for the firm.

Figure 5.2
Range and number of skills and acquirer returns

Panel A: Range of skills on board



Panel B: Number of skills per director

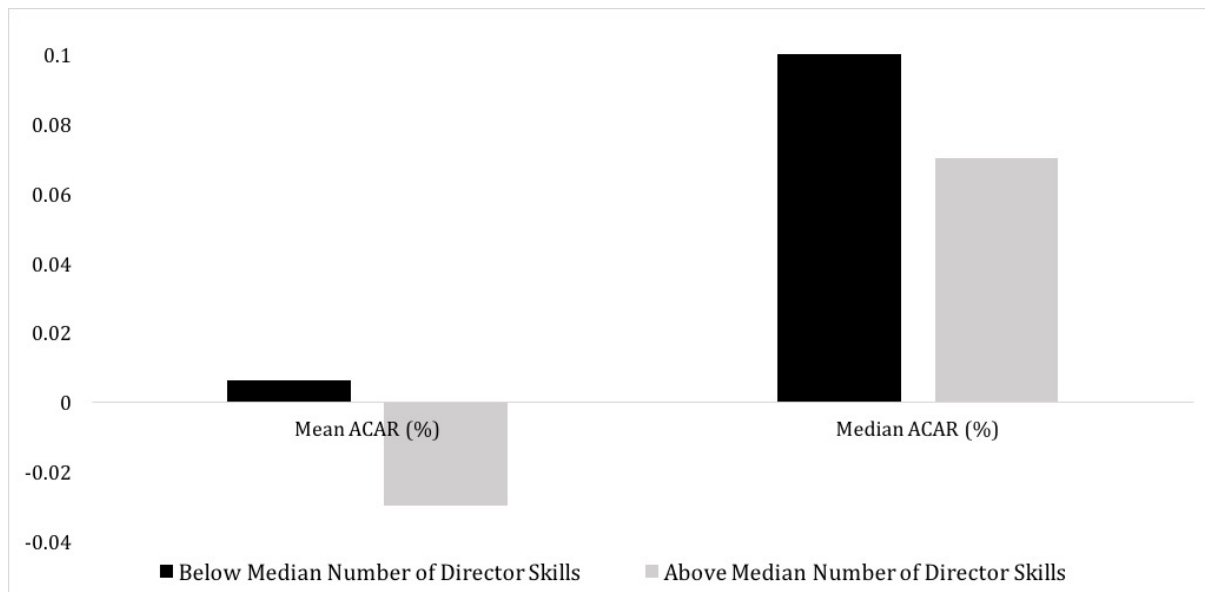


Figure 5.2 exhibits number of skills and acquirer CARs. In Panel A, we present the mean and median acquirer returns for boards with above (below) median range of skills. Panel B displays mean (median) CARs for firms whose directors have above (below) median number of skills. I report the 20-skill list of categories in Table 5.1. Results are based on 1,282 observations of acquiring firms, covering all SP500 constituents, excluding utilities (SIC codes 4900-4949) and financial firms (SIC codes 6000-6900) from 2010 to 2018. Data on individual skills are hand-collected from DEF 14A annual proxy statements, and are based on 8,276 director skill descriptions. All variable definitions are provided in Table 5A of the Appendix.

The approach that is followed in the present study circumvents these concerns. Instead of narrowing down our scope - examining skills at the individual level - I do the opposite; I aggregate them. In order to establish the path through which skills contribute to value creation, I look no further than their most simple aggregate measure; their number. Skills have long been established as value enhancing determinants for the firm (Cheung et al., 2017; Bhattacharya et al., 2005). Hence, we would expect boards of corporate acquirers with more (less) skilled directors, to generate higher (lower) returns for their shareholders.

To that end, Panel B of Figure 5.2, divides the sample's boards into those whose directors have above median number of skills, and boards whose directors have below median skill number. Conversely to what we would expect, the mean and median CARs are lower (higher) for firms whose directors have above (below) median skills. The puzzling relationship between the number of skills which are carried by each board member and the value creation through M&As requires further research. Our second hypothesis is based on the intuition that since directors' skills create value for the firm individually (Huang et al., 2014; Junni & Sarala, 2014; Golubov et al., 2012; Guner et al., 2008), we would expect more skilled board members to contribute positively in value creation. To test that, I employ our M&A sample.

Hypothesis 2: We posit that directors and CEOs with more (less) skills will be associated with value enhancing (destroying) acquisitions.

5.3.2 Sample selection

I first identify all SP500 constituents between 2010 and 2018 from the Center for Research in Security Prices (CRSP). The Regulation S-K amendment of 2009, requires all firms to add the skill descriptions of their director nominees in their annual proxy statements. I assess each proxy statement manually, extracting the skill-related part for each director. This process yields an initial, novel sample of 46,417 skill descriptions for 7,540 directors. I eliminate 12,073 director-year observations for utilities and financial firms (two-digit SIC codes 49 and 60-69).

Information on M&As is obtained from Thomson Securities Data Company (SDC) database. The sample of this study includes acquisitions of US private, or public targets, announced by SP500 public acquirers between 2010 and 2018. I exclude buybacks, recapitalisations, exchange offers, spinoffs, self-tenders, minority stake purchases, acquisitions of remaining interest, and intra-corporate restructurings. Multiple deals announced at the same day by a firm are also excluded. I require that the minimum deal value is \$1 million, and that the acquirer owns less than 50% of the target before the acquisition announcement and 100% after the transaction.

I exploit the hand-collected proxy statements to obtain board and director information. I retrieve full name, age, gender, employment history, tenure, and independency of the sample's directors from the respective proxies. I employ ISS (formerly RiskMetrics) to extract committee assignment information, and I supplement where needed with hand-collected information from Thomson Reuters EIKON. All accounting data are extracted from Compustat.

The final sample comprises 8,276 director-year observations, which correspond to 3,266 distinct directors of 301 US public firms, that consummated 1,062 acquisitions during the period 2010-2018.

5.3.3 Variable construction

The financial crisis of 2008 marked the culmination of years of shareholders' concerns with regard to corporate accountability. As a response, on December 16, 2009, the Securities and Exchange Commission (SEC henceforth) adopted a set of amendments to Regulation S-K, increasing the corporate governance-related information that is being provided to shareholders. One of these new rules - Item 401(e) - requires all US public firms to disclose the specific skills that make each director nominee ideal to serve on its board, by stating the specific skills, attributes and qualifications that make them adequate to serve to that position. To give an instance, Cisco's 2018 proxy statement now reports: "*[Dr. Kristina Johnson] brings to the Board of Directors an engineering background as well as expertise in science, technology, business, education and government. In addition, she has leadership and management experience,*

both in an academic context as provost and dean of nationally recognized academic institutions and in a corporate context as a board member of public technology companies."

In this study, I exploit Item 401(e) in order to extract the skill descriptions of directors. I hand-collect the relevant skill-related part for each director in the sample from the SEC EDGAR filings. Then, I follow Adams et al. (2018) in order to determine the respective skill categories¹²³. Each skill category is then assigned a set of related keywords and phrases, and a corresponding algorithm is implemented on the raw skill descriptions. The output skill category variable is a dummy, which is one if the keyword is present in the respective skill description, and zero otherwise. To ensure consistency with Adams et al. (2018), I code skills in the same way. Table 5.1 reports the 20-skill classification that is employed throughout this study.

5.3.4 Descriptive statistics

Table 5.2 reports summary statistics of skill ownership at the board level. The first three columns, present the percentage of boards that have at least one director possessing the skill of the respective category. The last three columns show the mean presence of each skill category from all directors of a firm's board. As expected, almost every board has at least one director with either *Finance & Accounting*, *International*, *Leadership*, or *Management* skills, as these skills are present in more than 95% of corporate boards. The aforementioned categories also correspond to the most common skills in the boardroom, as they are carried by more than 45% of all members of a board (45%, 60.6%, 46.9% and 55.2% respectively). Conversely, *Entrepreneurial*, *Scientific*, and *Sustainability* are the rarer skills, as they are present in less than 30% of corporate boards, while being possessed by less than one director per board.

¹²³ Authors of this study utilise a 20-skill list, which was provided by Conference Board to 30 Dow Jones firms on 2009 as a guideline for the forthcoming amendment.

Table 5.1
Skill classification

Variables	Description
Academic	The director is from academia or has a Ph.D.
Company Business	The director has experience in the firm's business or respective industry.
Compensation	The director has compensation skills.
Entrepreneurial	The director has entrepreneurial business history.
Finance & Accounting	The director has experience in banking, finance, accounting, or economics related activities.
Governance	The director has corporate governance experience.
Government & Policy	The director has governmental, policy, or regulatory experience.
International	The director has international experience.
Leadership	The director has leadership experience.
Legal	The director has legal expertise.
Management	The director has management skills.
Manufacturing	The director has manufacturing experience.
Marketing	The director has marketing and/or sales experience.
Outside Board	The director has outside board experience.
Outside Executive	The director is an executive in another company.
Risk Management	The director has risk management experience.
Scientific	The director has research & development, or scientific experience.
Strategic Planning	The director has strategy skills, or strategic planning experience.
Sustainability	The director has history in sustainability, or environmental matters.
Technology	The director has technology skills/experience.

Table 5.1 reports skill classification. This study employs the 20-skill classification of Adams et al. (2018). These authors replicate the 20-skill classification of Conference Board (2010). I code the 20 skill categories based on the respective skill descriptions for all directors in our sample. Skill descriptions are hand-collected from DEF 14A filings of SEC EDGAR database. Each skill category is a dummy, which is equal to one if an attached keyword appears in her skill description, and zero otherwise. The keyword clouds that were applied, are reported in the Appendix of this chapter. Further information on the skill identification process is provided in Section 5.3.2. Descriptive statistics on individual skill categories are presented in Table 5.2.

Acquiring firms exhibit some notable features compared to their non-acquiring counterparts. *Government & Policy* appears to be present by at least one director in 4.4% more boards of acquirers against boards of non-acquirers. Likewise, even though *Leadership* is present in almost every SP500 firm's board, acquiring firms seem to state this skill as reason for nominating their directors more than their non-acquiring equivalents (*Leadership* is possessed by 95.7% of acquirers against 92.4% of non-acquirers). Moreover, *Scientific* and *Technology* skills appear more frequently in acquiring than in non-acquiring firms (*Scientific* skills are present, on average, in 5.4% more acquiring than non-acquiring boards, and *Technology* appears as a board skill in 3.6% more acquirers than non-acquirers). Conversely, *Governance* and *Sustainability* skills are seen more frequently in non-acquiring instead of acquiring boards (the means of the aforementioned skills in non-acquiring boards exceeds those in acquiring boards by 2.8% and 3.8% respectively).

Skill intensity results also exhibit some notable patterns. *Leadership* is more prevalent on the boards of acquirers than of non-acquirers (48.6% of acquirer directors seem to be assigned with *Leadership* skills, against 43.4% of non-acquirer directors of the same skill category). In like manner, there are more (less) directors with *Scientific* (*Sustainability*) skills in boards of acquiring firms, than there are in non-acquirers' boards. It is also worth stating, that even though in terms of presence on the board by at least one member, *Academic*, *International* and *Manufacturing* skills are spread evenly between acquirers and non-acquirers, in terms of intensity, the aforementioned skills are carried by more directors on the boards of the former group. Conversely, non-acquiring boards bring a largest share of directors with *Outside Executive* qualifications compared to acquiring boards. Finally, *Technology* is the most significant difference between the boards of acquiring and non-acquiring firms, as the former have almost one more tech-savvy director than the latter. Overall, summary statistics of skill possession suggest that acquiring firms feature some common characteristics in the skillsets of their boards.

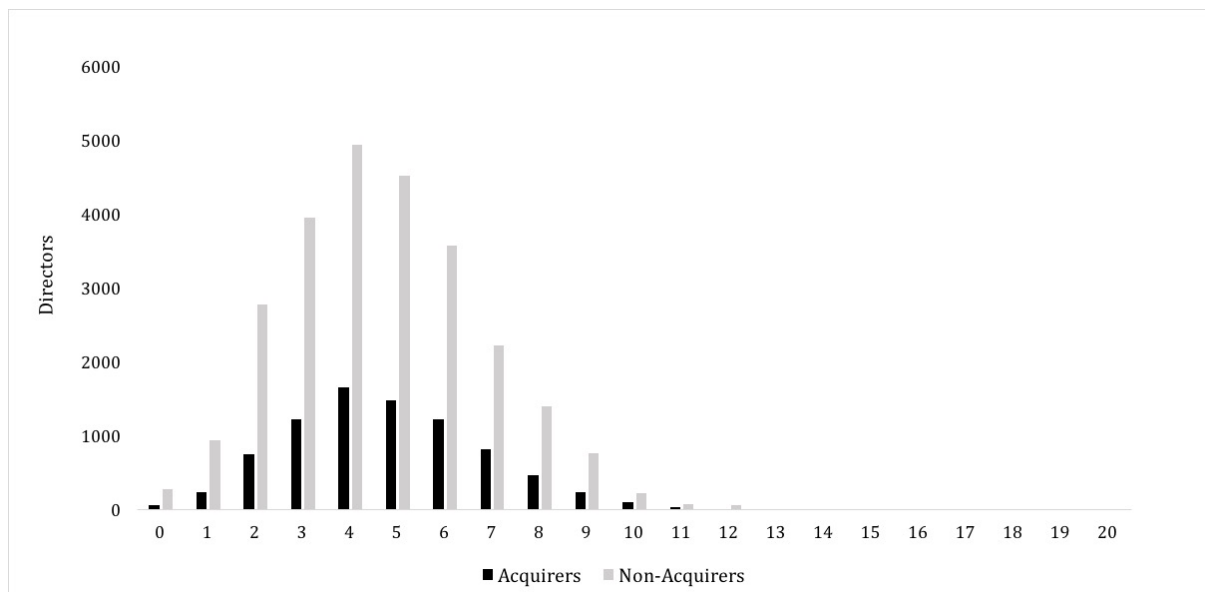
Table 5.2
Skill possession

	Skill capacity			Skill intensity		
	Acquirers	Non-Acquirers	<i>Diff.</i>	Acquirers	Non-Acquirers	<i>Diff.</i>
Academic	0.723	0.702	0.021	0.176	0.154	0.022***
Company business	0.735	0.736	-0.001	0.169	0.171	-0.002
Compensation	0.440	0.449	-0.009	0.096	0.103	-0.006
Entrepreneurial	0.200	0.215	-0.015	0.025	0.025	-0.001
Finance & accounting	0.999	0.998	0.001	0.450	0.458	-0.008
Governance	0.779	0.807	-0.028*	0.280	0.292	-0.012
Government & policy	0.715	0.671	0.044**	0.172	0.149	0.023
International	0.996	0.994	0.002	0.606	0.583	0.023**
Leadership	0.957	0.924	0.033***	0.469	0.435	0.034***
Legal	0.415	0.419	-0.015	0.058	0.058	-0.001
Management	0.982	0.985	-0.003	0.552	0.530	0.022**
Manufacturing	0.623	0.634	-0.011	0.143	0.129	0.014**
Marketing	0.772	0.771	0.001	0.188	0.194	-0.006
Outside board	0.835	0.819	0.016	0.303	0.297	0.006
Outside executive	0.889	0.881	0.008	0.243	0.268	-0.025***
Risk management	0.543	0.514	-0.029	0.139	0.132	0.007
Scientific	0.222	0.168	0.054***	0.028	0.022	0.006***
Strategic planning	0.850	0.843	0.007	0.250	0.254	0.004
Sustainability	0.298	0.337	-0.038**	0.052	0.060	-0.008*
Technology	0.882	0.846	0.036**	0.330	0.262	0.068***

Table 5.2 reports skill possession means. The first two columns present the percentage of acquiring and non-acquiring boards respectively, that have at least one director possessing each of the 20 skill categories. Third column subtracts non-acquirer mean from that of the acquirer. 4th and 5th column display results on skill intensity; the percentage of the board carrying each skill. Last column reports the difference. Data are obtained from SEC EDGAR filings and are based on 33,972 director-year observations (8,276 acquiring and 25,696 non-acquiring observations). Sample covers all SP500 industrial firms, excluding utilities (SIC codes 4900-4949) and financial firms (SIC codes 6000-6900) between 2010 and 2018. Mean differences are based on t-tests. ***, **, and * denote statistical significance levels at the 1%, 5%, and 10% level, respectively. Skill definitions are provided in Table 5.1.

Figure 5.3
Number of skills distribution

Panel A: Number of skills per director



Panel B: Number of skills per board

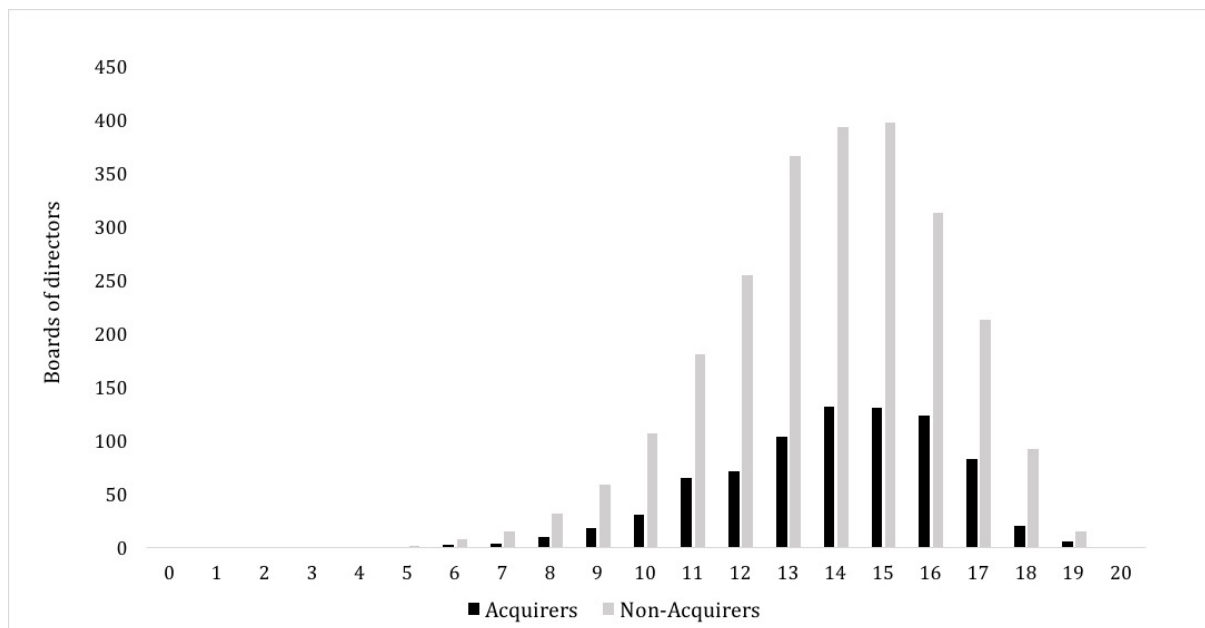


Figure 5.3 displays the distribution of the number of skills. Panel A presents the mean number of skills that each director brings to the board. Panel B exhibits the average number of distinct skills that each board possesses. The 20-skill categories list is provided in Table 5.1. Results are based on 1,282 observations of acquiring and 2,360 observations of non-acquiring firms, covering all SP500 constituents, excluding utilities (SIC codes 4900-4949) and financial firms (SIC codes 6000-6900) from 2010 to 2018. Data on individual skills are hand-collected from DEF 14A annual proxy statements, and are based on 33,972 director skill descriptions (8,276 from acquiring and 25,696 from non-acquiring firms). Table 5.1 complements the individual skill descriptions. All variable definitions are provided in Table 5A of the Appendix section of this thesis.

Figure 5.3 shows the distribution of the number of skills at the board and at the director level. Panel A displays the average number of skills per director, indicating that most directors in the sample bring 4 distinct skills to their board. Correspondingly, Panel B shows the average range of skills that is available at the board. The mean board in our sample has 14 different skills (with a maximum of 20). These figures are essentially the same for acquiring and non-acquiring firms. More than 85% of directors bring between 4 and 7 individual skills to their boards. On average, 80% of boards possess more than 12, and less than 17 different skills.

Table 5.3 reports descriptive statistics for all firms in our sample from 2010 to 2018. The median firm in the sample has market capitalisation of \$19.2 billion, 11% ROA, 0.011 Book-to-market ratio, and 0.016 volatility. Median age of our sample's firm is 32 years old. Mean leverage is 0.388, and mean capital expenditures are 0.035. The median firm has 4 anti-takeover provisions, and 4 board committees. The median CEO in our sample is 57 years old, while the median firm has 10 members on its board, 9 of which are independent, and 2 of which are female. In 58% of boards, the positions of CEO and Chairman are held by the same person. Median director is 63 years of age, she has a 7-year tenure on the current board, while holding 1 directorship in another SP500 firm. Median director in our sample brings 5 different skills to the board, while median board possesses a range of 14 different skills, and median CEO carries 4 individual skills. On average, 36.7% of CEOs in our sample exhibit managerial hubris¹²⁴. The average (median) deal size is \$2,390 (417) million. On average, 24% of the deals are public, 1.4% are hostile, 25.8% are diversified, and 27.4% are cross-border. The mean number of bidders for all deals in our sample is 1.02. On average, 70.9% of deals are completed by firms which had previously consummated at least 3 more deals within 5 years from the current M&A event, and 49.2% of deals the deals in our sample are all-cash. The average (median) cumulative abnormal return of the acquirer in our sample for a 3-day announcement window (Acquirer CAR [-1:1] henceforth) is 0.1% (0.2%).

¹²⁴ Our characterisation of managerial hubris is based on the seminal paper from Malmendier and Tate (2005). I label a CEO in our sample as overconfident, by assigning the respective dummy (Holder 67) which is one if the CEO has failed to exercise her stock options twice in the last 5 years while being at least 67% in-the-money, and zero otherwise. Based on 1,054 unique CEO observations between 2010-2018, I find that 36.7% of the CEOs in our sample are overconfident.

Table 5.3
Descriptive statistics

Variables	N	Mean	Median	Std. Dev.	Min.	Max.
Panel A: Firm characteristics						
Firm size	1,051	47811.5	19,221.8	64,252.3	1,800.6	304,774.8
Firm age	1,061	37.514	32	24.164	0	93
ROA	1,057	0.116	0.110	0.064	-0.075	0.339
Book to market	1,051	0.037	0.011	0.067	0	0.610
Leverage	1,057	0.388	0.354	0.243	0	1.443
Capital expenditures	1,056	0.035	0.024	0.036	0.002	0.224
Volatility	1,054	0.016	0.015	0.005	0.007	0.041
Panel B: Board characteristics						
Board size	1,062	10.417	10	1.908	5	18
Board independence	8,276	0.858	9	0.348	0	1
Board tenure	8,276	8.496	7	7,169	0	59
Female	8,276	0.195	2	0.396	0	1
Board committees	1,059	3.925	4	0.299	2	4
CEO age	1,057	56.504	57	6.238	28	79
Duality	1,062	0.581	1	0.493	0	1
Panel C: Director characteristics						
Age	8,276	61.942	63	7,658	28	95
# of skills per director	8,276	4.807	5	2.059	0	13
# of skills on board	1282	13.866	14	2.405	6	19
# of CEO skills	1,062	4.588	4	2.324	0	13
Directorships	8,276	1.477	1	0.715	1	5
Panel D: Deal Characteristics						
Deal size	1,062	2,390.3	417.2	8,944.2	1.3	133,942.1
Relative size	1,051	0.077	0.018	1.174	0.001	1.973
Public	1,062	0.241	0	0.427	0	1
Hostile	1,062	0.014	0	0.118	0	1
Diversifying	1,062	0.258	0	0.438	0	1
Cross-border	1,062	0.274	0	0.446	0	1
Serial acquirers	1,062	0.709	1	0.454	0	1
All cash	1,062	0.492	0	0.500	0	1
E-Index	1,055	3.943	4	0.812	1	6
Holder 67	1,054	0.367	0	0.482	0	1
Competition	1,062	1.025	1	0.174	1	3
Acquirer CAR [-1:1]	1,062	0.001	0.002	0.034	-0.109	0.099

Table 5.3 reports summary statistics (sample size, means, medians, standard deviations, minimum and maximum values) for a number of firm, board, director, and deal characteristics. Data are based on 8,276 director-year observations from 301 acquiring firms. Sample covers all SP500 constituents, excluding utilities (SIC codes 4900-4949) and financial firms (SIC codes 6000-6900) between 2010 and 2018. All variable definitions are provided in Table 5A of the Appendix.

5.4 Empirical results

5.4.1 Skill diversity and acquisition performance

In the first part of the empirical analysis, I mostly follow the work of Adams et al. (2018). I start by examining whether directors' skills appear on corporate boards in clusters. In unreported results, I find that some individual skills' categories cluster. For instance, boards that have at least one director with *Government & Policy* skills are more likely to have a board member with *Legal* skills. Likewise, *Leadership* skills appear more frequently with *Strategic Planning* and less frequently with *Legal* skills. Adams et al. (2018) provide similar evidence. Hence, they use factor analysis to identify the main dimensions of skill variation among boards. I do the same. I apply factor analysis in our sample, in order to examine whether the skillsets of acquiring firms exhibit analogous patterns with their study¹²⁵. Following their instance, I exclude *Finance & Accounting*, *International*, *Leadership*, and *Management* as there is no variation in these skills among boards.

Table 5.4 reports factor analyses' results. I present eigenvalues, percentage of explained variation, and unrotated factor loadings on the skill categories from four different factor extraction methods; Principal Factor (PF), Iterated Principal Factor (IPF), Principal Component Factor (PCF), and Maximum Likelihood (ML). Factor analysis is based on tetrachoric correlation matrix of skill variables¹²⁶. As in Kaplan & Sorensen (2017), I omit factor loadings below 0.15, or above -0.15. An eigenvalue more than one indicates that the respective factor captures a significant part of the shared variation of the variables. Only the first factor from each of the four extraction methods is reported for brevity.

¹²⁵ Exploratory factor analysis is standard statistical tool for the identification of underlying patterns in the shared variance of variables (Costello & Osborne, 2005).

¹²⁶ Since factor analysis is more common in continuous variables, I follow Adams et al. (2018) factor analysing the matrix of tetrachoric correlations of our binary skill variables (Uebersax, 2006). We obtain similar results when we omit this parameter.

Table 5.4
Factor analysis

	PF Method (1)	IPF Method (2)	PCF Method (3)	ML Method (4)
Eigenvalue	2.479	2.435	3.080	1.997
Percentage explained	0.441	0.536	0.192	0.194
Academic	0.397	0.376	0.432	0.444
Company Business	0.228	0.260	0.266	
Compensation	0.451	0.483	0.490	0.150
Entrepreneurial	0.291	0.188	0.224	0.370
Governance	0.575	0.609	0.630	0.284
Government & Policy	0.584	0.551	0.607	0.241
Legal	0.306	0.288	0.362	
Manufacturing			-0.180	
Marketing	0.314	0.301	0.362	0.228
Outside Board	0.455	0.452	0.531	0.186
Outside Executive				
Risk Management	0.321	0.334	0.392	
Scientific	0.402	0.384	0.460	0.580
Strategic Planning	0.594	0.608	0.671	0.404
Sustainability	0.299	0.287	0.355	0.283
Technology	0.450	0.401	0.476	0.888

Table 5.4 reports results from factor analysis. As in Adams et al. (2018), we exclude *Finance & Accounting*, *International*, *Leadership*, and *Management* skill categories. I present eigenvalues, percentages of explained variation, and unrotated factor loadings of the first factor on the 16-skill specification list. I set factor loadings with absolute value greater than 0.15 to blank. I omit all factors other than the first for brevity. I show results based on Principal Factor (PF), Iterated Principal Factor (IPF), and Maximum Likelihood factor (ML). Data are based on 8,276 skill descriptions from 3,266 distinct directors. I obtain skill descriptions' information from firms' annual proxy statements, which are hand-collected from SEC EDGAR database. The sample includes all SP500 firms (excluding utilities and financials firms, two-digit SIC coded 49, and 60-69 respectively) that have completed at least one acquisition during 2010-2018. Skill definitions are provided in Table 5.1.

Factor analyses' results corroborate the findings of Adams et al. (2018). The first factor in all extraction methods explains a significant part of shared variation, and loads positively on almost all skill categories. Consistent with their study, the eigenvalue of the first factor is more than double the value of the second, thus driving our focus solely on the first factor. Authors' interpretation of that factor is skill diversity. I follow their intuition. Corporate boards of acquiring firms appear to vary along the diversity of their directors' skills.

If some boards have more diverse skillsets than others, the logical next step is to test whether this board characteristic is of any value to shareholders. Gompers et al. (2016) study board homophily in the shape of common ethnic, educational, and employment backgrounds of venture capitalists, and find that this trait is negatively related to the probability of investment success. Ishii & et al. (2014), provide evidence that social connections between acquirers and targets lower acquisition announcement abnormal returns. Contrary to these findings, Adams et al. (2018) - who provide the only study which examines board homophily in a skills' format - show that boards with more common skillsets increase firm value, measured by Tobin's Q. Intuitively, one would have to check whether board homophily in a skills' setting creates value to shareholders through acquisitions.

Table 5.5 reports results of our skill homophily measure on acquisition performance. Dependent variable in all specifications is the acquirer's cumulative abnormal return (CAR) over a three-day window between the announcement date of the event¹²⁷. The previously calculated measure of skill diversity is the key explanatory variable in all models. As in Adams et al. (2018), I extract the first factor from our factor analyses' results of Table 5.4, and I employ it as proxy for skill diversity.

In all models, I control for standard deal, firm, and corporate governance characteristics found in influential M&A studies. With respect to deals' controls, I include a *Public* dummy to account for the documented negative association between acquirer returns and public acquisition targets (Capron & Shen, 2007; Draper & Paudyal, 2006; Fuller et al., 2002). In like manner, I add an *All cash* dummy to control for the positive relationship between CARs and cash acquisitions (Faccio & Masulis, 2005; Wansley et al., 1983). I also consider the negative effect of acquirer size on acquisition performance (Moeller et al., 2004), I account for the relative size between target and acquirer (Alexandridis et al., 2013), and I control for the extrapolation of bidders' past performance (Rau & Vermaelen, 1998). I add the corresponding dummies to account for the documented negative relationship between acquirer returns and: competition (Bradley et al., 1988), hostile takeovers (Schwert, 2000), and diversifying

¹²⁷ For the calculations of the 3-day CAR [-1:1], I use the standard market model of Brown & Warner (1985).

acquisitions (Morck et al., 1990). Dummies are also included to control for the positive link between acquirer returns and cross-border acquisitions (Erel et al., 2012; Shimizu et al., 2004), and for the negative link between acquisition performance and multiple bidders (Laamanen & Keli, 2008). I also account for the positive effect of leverage on acquirer CARs (Maloney et al., 1993).

With respect to firm and corporate governance characteristics, I follow the set of controls from Adams et al. (2018). Thus, I include as control variables in all models: the acquirer's ROA, capital expenditures, and idiosyncratic volatility, the size of the firm's board, the percentage of its independent directors, the number of committees on board, as well as the firm's and the CEO's age. I also account for the negative link between the length of directors' tenure and firm performance (Chen & Keefe, 2020; Vafeas, 2003), and for the negative documented association between acquirer returns and the decision of a firm to have the same person serving both as its CEO and Chairman (Krause et al., 2014; Dey et al., 2011; Masulis et al., 2007; Brickley et al., 1997). Finally, all specifications include industry and year dummies to control for unobserved industry, or year effects. In all models, standard errors are clustered at the firm level, in order to address potential heteroskedasticity concerns.

Column 1 of Table 5.5 shows that when using the PF factor extraction method, the coefficient of Factor 1 is negative and statistically significant at the 10% level. Result suggests that, after controlling for other known acquirer, deal and corporate governance determinants, skill diversity appears to be negatively related with acquisition performance. This relationship is robust to the use of IPF and PCF extraction methods, as can be seen in Columns 2 and 3 respectively. Factor 1 remains negative, but fails to exhibit statistical significance if extracted using ML factor extraction method (Column 4). Control variables are consistent with past literature. I corroborate the negative impact of public firms' acquisitions on acquirer returns (Faccio et al., 2006), and the positive association of cash deals with acquisition performance (Fuller et al., 2002). Overall, findings are generally consistent with Adams et al. (2018), providing further evidence that skill commonality is a value enhancing board trait. Acquirer boards that exhibit commonality in the skills of their directors appear to generate higher acquisition returns.

Table 5.5
Skill diversity and acquirer returns

Dependent variable	Acquirer CAR [-1:1]			
	PF	IPF	PCF	ML
Factor extraction method	(1)	(2)	(3)	(4)
Factor 1	-0.007* (0.070)	-0.006* (0.067)	-0.006* (0.061)	-0.005 (0.227)
Firm and deal characteristics:				
Public	-0.008**	-0.008**	-0.008**	-0.008**
All cash	0.005**	0.005**	0.005**	0.005**
Market Cap	-0.001	-0.001	-0.001	-0.001
Relative size	0.003	0.003	0.003	0.003
Book to Market	0.047	0.047	0.047	0.046
Competition	-0.001	-0.001	-0.001	-0.001
Hostile	0.002	0.002	0.002	0.002
Diversifying	0.001	0.001	0.001	0.001
Cross border	-0.004	-0.004	-0.004	-0.003
Serial acquirer	0.001	0.001	0.001	0.001
Leverage	0.001	0.001	0.001	0.001
ROA	-0.015	-0.015	-0.015	-0.016
Capital expenditures	-0.079	-0.079	-0.078	-0.073
Volatility	0.227	0.230	0.223	0.251
Corporate governance characteristics:				
Board size	0.005	0.005	0.005	0.004
Board independence	0.027	0.027	0.026	0.028
Board Committees	0.011***	0.011***	0.011***	0.011***
Board tenure	-0.002	-0.002	-0.002	-0.003
Firm age	0.001	0.001	0.001	0.001
CEO age	0.003	0.003	0.003	0.003
Duality	-0.002	-0.002	-0.003	-0.002
Constant	-0.062	-0.076	-0.073	-0.078
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	1,034	1,034	1,034	1,034
Adjusted R-squared	0.035	0.035	0.035	0.034

Table 5.5 reports results of acquirer returns' regressions on the first factor of four factor extraction methods. As in Adams et al. (2018), the first factor is interpreted as proxy for skill diversity. Columns 1-4 present Pooled OLS regressions. Key explanatory variable in all specifications is the first factor from Principal Factor (PF), Iterated Principal Factor (IPF), Principal Component Factor (PCF), and Maximum Likelihood (ML) factor extraction methods respectively. In all regressions, dependent variable is acquirer's cumulative abnormal returns (CAR) over a three-day window. All specifications include year dummies and industry dummies based on the Fama French 48 industry specification. Standard errors are clustered at the firm level in all models. All quantitative variables are winsorised at the 1% and 99% levels. P-values are shown in parentheses. ***, **, and * denote statistical significance levels at the 1%, 5%, and 10% level, respectively. All variable definitions are provided in the Appendix of this chapter.

5.4.2 Range of skills and acquisition performance

The results thus far provide some initial support to the argument that skill commonality creates value for shareholders through acquisitions. The previous section shows that acquiring firms with directors who possess more shared skills, appear to generate higher acquisition returns. However, there is a twofold concern on the matter. First, factor analysis is not ideal in terms of intuition, or ease of use. The coefficient of Factor 1 from Table 5.5 cannot be easily assessed in terms of its actual economic impact on acquiring firms. Furthermore, the skill diversity coefficients from PF, IPF, and PCF specifications are statistically significant only at the 10% level, whereas the coefficient from the ML method fails to provide statistical significance. Both matters call for further investigation on whether the commonality of directors' skills is the main path for value creation through acquisitions.

To that end, Adams et al. (2018) employ the range of skills as another proxy for skill diversity. In unreported results, I find that the correlation coefficient between the number of available skills on a firm's board and the first factor from factor analyses' results of Table 5.5 is 81.6%¹²⁸, suggesting that the range of skills captures a large part of Factor 1 variation. Thus, I move forward investigating whether the documented negative relationship between skills' range and firm value is corroborated in the M&As' setting. Based on the factor analyses' results of Table 5.5, I conjecture that the range of skills on a firm's board will be negatively associated with acquirer returns.

In Table 5.6, I examine whether the number of distinct skills on a firm's board is associated with acquisition performance. Column 1 employs the Pooled OLS baseline regression model of Table 5.5. Dependent variable is acquirer's CAR, and main explanatory variable is the range of skills. All firm, deal, and corporate governance controls are the same as in Table 5.5. I include industry and year dummies to account for unobserved industry and year effects, and I cluster standard errors to correct for heteroskedasticity. I find that the coefficient of range of skills is negative and statistically significant at the 5% level. Specifically, the estimated coefficient for our

¹²⁸ The correlation coefficient is 90.01% based on the PF factor extraction method, 87.9% based on IPF, 92.64% based on PCF, and 56.19% based on ML. Adams et al. (2018) report only IPF and ML methods (correlation coefficients are 92.1% and 96.7% respectively).

proxy of skill diversity is -0.013, implying that the range of distinct skills on a board is associated negatively with acquisition performance. Result is consistent with the value enhancing theory of skill commonality from Adams et al. (2018). The commonality of directors' skills on a firm's board appears to be associated with value enhancing acquisitions.

Even though the number of skills appears to be negatively correlated with acquisition performance, we can not rule out the possibility that endogeneity is the main driver of these results. In specifications 2-5, I address these issues. One of the main concerns, regarding this study is reverse causality. A small (wide) range of skills may not predict better (worse) acquisition performance, but rather bad (good) performance may be a call for more (less) skills on the board. I test this hypothesis by investigating whether past acquisition performance (lagged CAR) explains the change in the range of skills on a firm's board (Cremers et al. (2017)). Column 2 reports OLS results, in which dependent variable is the change of skills' range from year $t-1$ to year t . The estimated coefficient of lagged CARs in our specification is not statistically significant, suggesting that past acquisition performance does not appear to have an effect on the change in the range of board skills.

Next, I consider whether investors value certain skills more during specific time periods within specific industries. Column 3 follows Drobetz et al. (2018) and replicates the baseline OLS regression from Column 1, but replaces industry and year fixed effects with industry x year dummies. Results remain essentially unchanged. The estimated coefficient of the range of skills under this specification is negative and significant at the 1% level, suggesting that increased attention during certain time periods does not drive our results.

Finally, I consider the possibility that a firm's decision to increase the range of skills on its board is endogenously driven by some other omitted variable. For example, maybe firms appoint directors as response to concerns for lack of diversity on their board (Landaw, 2020; Geletkanycz et al., 2018). To address this issue, I employ a Heckman selection model. Heckman is the de facto technique to test for potential sample selection bias (Heckman, 1979). Columns 4 and 5 report results of such model in our study. Column 4 presents the first step probit regression, using as dependent

variable a dummy which is one if the range of skills on the board at time t increased compared to time $t-1$, and zero otherwise. Column 5 shows the second stage OLS regression, in which acquirer CARs are regressed on the range of skills, the full set of control variables from the baseline regression of Column 1, and the inverse Mills ratio from the first stage regression. The coefficient of range of skills is negative and statistically significant, with a magnitude that is almost unchanged compared to the baseline model (-0.015). The inverse Mills ratio is not statistically significant, suggesting that our results are not driven by self-selection¹²⁹. Overall, results provide evidence that the range of skills is negatively related with acquisition performance; boards with more shared skills appear to create value for their shareholders through value-enhancing acquisitions.

¹²⁹ In unreported results, I follow Adams et al. (2018) employing their Instrumental Variable specification. Authors use the distance of each firm's headquarters from the closest airport hub as time invariant instrument. The logic behind it is that firms which are headquartered closer to airport hubs may attract more skilled directors. To replicate their analysis, I use "<https://www.distance.to/>" to manually collect the distances of each firm in our sample with the closest airport hub, and I assign a dummy which is one if the distance between a firm's headquarters and the closest airport hub is less than 70 miles, and zero otherwise. The list of airport hubs employed in the study, can be accessed in the following address: "https://www.faa.gov/airports/planning_capacity/profiles/". Then, I conduct Durbin and Wu-Hausman tests for endogeneity. In both tests, I fail to reject the null that the range of skills from the main OLS model is exogenous. P-values of Durbin and Wu-Hausman tests are 0.61 and 0.62 respectively. Results suggest that the variable under consideration (the range of skills) can be treated as exogenous, essentially confirming the findings from the main study. However, this result should be treated with caution as the respective instrument is only weakly correlated with the potentially endogenous regressor (the Cragg-Donald Wald F statistic is 0.861, which is above the 25% Stock-Yogo maximal IV size), potentially leading to biased IV estimates. Since the "cure" could be worse than the "disease" (Bound et al., 1995), I opt to report this result as supplementary to the main endogeneity tests.

Table 5.6
Range of skills regressions

Estimator	OLS		Heckman model		
	ACAR	Δ Range of skills	ACAR	Range of skills incr.	ACAR
Dependent variable	(1)	(2)	(3)	(4)	(5)
Range of skills	-0.013** (0.029)	0.059*** (0.001)	-0.021*** (0.001)		-0.015** (0.014)
Lagged CAR		-0.086 (0.331)			
Inverse Mills Ratio					-0.031 (0.287)
Firm and deal characteristics					
Public	-0.008**	-0.009	-0.005	0.017	-0.008**
All Cash	0.005**	-0.000	0.003	0.044	0.003
Market Cap	-0.001	0.000	-0.002	-0.031	-0.000
Relative Size	0.003	0.001	0.002	-0.208	0.008
Book to Market	0.046	0.048	0.057*	1.193	0.033
Competition	-0.001	-0.054**	-0.010	-0.165	0.003
Hostile	0.003	0.051*	-0.009	1.305**	-0.025
Diversifying	0.001	0.004	0.002	0.21	-0.003
Cross Border	-0.004	-0.005	-0.004	-0.122	-0.001
Serial Acquirer	0.001	-0.006	0.000	-0.572***	0.014
Leverage	0.000	0.005	0.000	0.271	-0.005
ROA	-0.016	0.027	-0.001	1.549	-0.046
Capital expenditures	-0.075	-0.089	-0.023	-6.245**	0.061
Volatility	0.231	-0.581	0.178	4.909	0.209
Corporate governance characteristics					
Board size	0.006	0.015	0.004	0.551	-0.006
Board Independence	0.029	0.002	0.014	2.196**	-0.026
Board Committees	0.011***	-0.009	0.015***	-0.151	0.016***
Board Tenure	-0.002	0.019**	-0.004	0.162	-0.006
Firm age	0.001	-0.014***	0.001	-0.257**	0.006
CEO age	0.003	-0.009	0.013	0.405	-0.004
Duality	-0.003	-0.001	-0.002	-0.286*	0.003
Constant	-0.053	-0.014	-0.046	-3.984	0.043
Industry FE	Yes	Yes	No	Yes	Yes
Year FE	Yes	Yes	No	Yes	Yes
Industry x Year FE	No	No	Yes	No	No
Observations	1,034	719	1,034	691	1,000
Adjusted R-squared	0.036	0.045	0.102	-	0.038

Table 5.6 reports results of acquirer returns' regressions on the range of skills. Columns 1-3 present Pooled OLS regressions, in which key explanatory variable is the number of skills on a firm's board. Dependent variable in Columns 1, and 3 is acquirer CARs. In Column 2, dependent variable is the Change in the number of skills from year t-1 to t. Columns 4 and 5 report results of Heckman selection model. Specifically, Column 4 presents results from the first step Probit regression, in which dependent variable is a dummy which is equal to one if the number of skills on a firm's board increased compared to the previous year, and zero otherwise. Column 5 reports results from the second stage of the Heckman selection model, in which dependent variable is acquirer CAR. All specifications include the full set of controls from the baseline regression in Column 1 of Table 5.5. Models 1, 2, 4, and 5 include year dummies and industry dummies, based on the FF48 industry classification. In Column 3, industry and year dummies are replaced by industry x year dummies. Standard errors are clustered at the firm level in all models. P-values are shown in parentheses. ***, **, and * denote statistical significance levels at the 1%, 5%, and 10% level, respectively. All variable definitions are provided in Table 5A of the Appendix.

5.4.3 Number of skills and acquisition performance

So far, we have studied skills at the board level. The number of a board's skills appears to matter in acquisitions. It is the logical next step to narrow down the scope of our investigation to the constituents of a board; namely, to its directors and CEO. Studied individually, several director qualifications, such as academic experience (White et al., 2014), financial acumen (Guner et al., 2008), leadership (Junni & Sarala, 2014), investment banking employment (Huang et al., 2014; Golubov et al., 2012), or general managerial skills (Demerjian et al., 2012) are found to be positively associated with value creation. In like manner, Jaffe et al. (2013) provide evidence that in M&As the skills of CEOs are even more important than the skills of the board. Cheung et al. (2017) show that CEO ability increases firm performance. We would expect that the combination of different qualities from the same individual would create value for the firm. I exploit our M&A sample to test that intuition. I posit that directors and CEOs with more (less) skills will be associated with value enhancing (destroying) acquisitions.

Panel A of Table 5.7 examines whether the number of skills at the director level is associated with acquisition performance. Column 1 employs the OLS model of Table 5.6, using acquirer CARs as dependent variable. Main explanatory variable in this specification is the number of skills per director. The coefficient of number of skills is negative and statistically significant at the 10% level, suggesting that there is negative relationship between the number of directors' skills and acquisition performance. In Columns 2-4, I re-run the robustness tests of Table 5.6³⁰. Results from all specifications, corroborate the findings of the main model. Boards with less (more) skilled directors appear to be associated with value enhancing (destroying) acquisitions.

³⁰ Column 2 uses the change in the number of skills compared to previous year as dependent variable. Column 3 replicates the OLS model of Column 1, replacing industry and year fixed effects with industry x year dummies. Column 4 reports second stage OLS regressions from Heckman selection model. I omit first stage probit regression results for brevity.

Table 5.7
Number of skills

<i>Panel A: Number of skills at the director level</i>				
Dependent variable	ACAR	Δ Number of skills	ACAR	ACAR
	(1)	(2)	(3)	(4)
Number of skills (Director)	-0.007*	0.020**	-0.010**	-0.007*
	(0.064)	(0.044)	(0.013)	(0.062)
Lagged CAR		0.017		
		(0.845)		
Inverse Mills Ratio				-0.048
				(0.284)
Firm & deal controls	Yes	Yes	Yes	Yes
Corporate governance controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	No	Yes
Year FE	Yes	Yes	No	Yes
Industry x Year FE	No	No	Yes	No
Observations	1,034	719	1,034	1,013
Adjusted R-squared	0.035	0.019	0.099	0.034
<i>Panel B: Number of skills at the CEO level</i>				
Dependent variable	ACAR	Δ Number of skills	ACAR	ACAR
	(1)	(2)	(3)	(4)
Number of skills (CEO)	-0.001**	0.108***	-0.001*	-0.001**
	(0.032)	(0.001)	(0.060)	(0.023)
Lagged CAR		0.948		
		(0.475)		
Inverse Mills Ratio				0.006
				(0.718)
Firm & deal controls	Yes	Yes	Yes	Yes
Corporate governance controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	No	Yes
Year FE	Yes	Yes	No	Yes
Industry x Year FE	No	No	Yes	No
Observations	1,034	719	1,034	750
Adjusted R-squared	0.036	0.060	0.097	0.037

Table 5.7 report results of acquirer returns' regressions on the number of skills. Both Panels replicate the models of Table 5.6. In Columns 1, 3, and 4, the dependent variable is acquirer CARs. In Column 2, dependent variable is the change in the number of directors' skills. Key explanatory variable in all specifications is the number of skills of each director. Column 3 replaces industry and year dummies with industry x year dummies. Column 4 reports the second stage OLS regression of a Heckman selection model. Panel B replicates the analysis of Panel A, using the number of CEO skills as main explanatory variable. I omit reporting control variables and Heckman's first stage probit regressions in both Panels for brevity. Standard errors are clustered at the firm level in all models. P-values are shown in parentheses. ***, **, and * denote statistical significance levels at the 1%, 5%, and 10% level, respectively. All variable definitions are provided in Table 5A of the Appendix.

Panel B of Table 5.7 examines the number of skills at the CEO level. Columns 1-4 replicate the analysis of Panel A, utilising the number of CEO skills as variable of interest. Column 1 shows that the estimated coefficient of our number of CEO skills' measure is negative and statistically significant at the 5% level, suggesting that CEOs with higher (lower) number of skills are associated with worse (better) acquisition performance. Robustness tests in Columns 2-4 corroborate that finding. Control variables in both panels are omitted for brevity. Overall, results provide evidence that the number of skills, for directors and CEOs, is negatively linked with acquisition gains.

5.4.4 Overconfident CEOs or window-dressing boards?

The examination that was conducted in the previous section leads one to infer that directors and CEOs with more (less) skills are associated with value destroying (enhancing) acquisitions. This result is counterintuitive. Directors are paid more for the qualifications they bring to the board (Fedaseyeu et al., 2018; Brookman & Thistle, 2013). Likewise, CEOs with skills that have gathered during their lifetime receive higher pay (Custodio et al., 2013; Kaplan et al., 2012). Firms paying value-destroying individuals would be an irrational waste of resources. This section attempts to elucidate this number of skills' conundrum with respect to their effect on M&As.

The first explanation that I consider is overconfidence. Miller and Ross (1975) have shown that individuals tend to overestimate their own abilities, hence creating a biased perception of success attribution. This self-serving attribution bias has been consistently appearing as overconfidence initiator in corporate finance literature (Statman et al., 2006; Scheinkman & Xiong, 2003; Barber & Odean, 2000). In M&As, Doukas and Petmezas (2007) show that self-serving attribution leads to overconfident managers and consequently to lower acquirer CARs and poorer long-term performance. Studying CEOs, Billet and Qian (2008) identify the same pattern of value-destroying acquisitions stemming from overconfident individuals. Malmendier and Tate (2005) illustrate how overconfident CEOs overestimate their own abilities, hence being prompted to excessive investing, while the same authors demonstrate the effects of this channel in M&As (Malmendier and Tate, 2008). I posit that the phenomenon of more

(less) skilled directors and CEOs being associated with value destroying (enhancing) acquisitions may also be result of overconfidence.

To test that intuition, I identify overconfident CEOs in our sample and examine for possible interactions with the main explanatory variable (the number of skills). To measure overconfidence, I follow the seminal paper from Malmendier and Tate (2005). For each CEO in the sample, I assign a dummy, which is equal to one if at least twice, the CEO does not exercise her unexercised exercisable options, with five years remaining before expiration, despite being at least 67% in-the-money (the stock price having at least 67% increase since the grant date), and zero otherwise³¹. Then, I test for its interaction with the main explanatory variable from our baseline OLS model of Table 5.6.

Table 5.8 reports results of OLS regressions on the number of skills and our measure of overconfidence. Column 1 replicates the baseline model of Table 5.6, using acquirer CARs as dependent variable, and the number of each director's skills as variable of interest. The coefficient of the number of skills is negative and statistically significant at the 10% level, after controlling for the presence of overconfident CEOs. The overconfidence dummy (*Holder67*), as well as the interaction term are not statistically significant, suggesting that the overconfidence of CEOs does not drive our results. Column 2 replicates this analysis, using the number of CEOs' skills as main explanatory variable. The coefficient of the number of CEOs' skills remains negative and statistically significant at the 5% level, while *Holder67* fails to display statistical significance. Overall, results suggest that the negative association between number of skills and acquisition performance is not driven by the presence of overconfident CEOs on the firm's board.

Adams et al. (2018) provide another possible explanation for the skills' number/firm value puzzle; window-dressing. Lower valued firms may over-state the skills of their directors, and vice versa. In this study, I do not find evidence of reverse causality between the number of skills and acquisition performance. However, window-

³¹ I follow Malmendier and Tate (2005), requiring that the CEO fails to exercise her unexercised exercisable options twice in the five-year period, as we identify "habitually" overconfident individuals. Once the *Overconfident* label is assigned to a CEO, it is retained for the rest of her sample years.

window-dressing could still be disguised as a distorting factor of management competence. Bebchuk et al. (2009) show that some boards use a series of provisions to protect themselves. The number of reported skills could act as one more means of such protection, creating a biased perception as regards the prospective of management performance. If that would be the case, the acquisition event would act correctively to that bias, thus generating negative returns for the acquirer.

I test that intuition and I present the results in Table 5.8. To measure management quality, I use the Entrenchment Index (E-Index henceforth) of Bebchuk et al. (2009). E-Index is a corporate governance measure, which comprises the six most important anti-takeover provisions¹³². Each firm in our sample is assigned an E-Index score, ranging from zero to six, according to the number of its annual provisions. Columns 3-6 of Table 5.8 split the sample in firms that have above (*Low* management quality) and firms that have below median E-Index (*High* management quality), and examine for differences in the negative relationship between acquirer CARs and number of skills. All specifications employ the baseline OLS model of Table 5.6.

Columns 3-4 report that the coefficient of the number of directors' skills is negative and statistically significant at the 5% level for firms of the *Low* management quality group. Coefficient is negative but fails to exhibit statistical significance for the *High* management quality group. Columns 5-6 replicate the analysis of the previous two columns, using the number of CEO's skills as variable of interest. Coefficient of number of CEO's skills is negative and statistically significant at the 5% level for firms of the *Low* management quality group, while failing to show statistical significance for the *High* management quality equivalent. Overall, results provide evidence that the negative relationship between number of skills and acquisition performance is mainly displayed in firms with *Low* management quality, suggesting that Regulation S-K may occasionally act as a window-dressing tool for less competent managements.

¹³² The six provisions of the E-Index of Bebchuk et al. (2009) are: staggered boards, limitation on amending bylaws, limitation on amending the charter, supermajority to approve a merger, golden parachute, and poison pill. The first four provisions limit the voting power of the shareholders against the current management, while the last two provisions limit the management's defence against a hostile takeover. The importance of that set is based on its economic relevance, compared with the 24-provisions set that was used by IRR (the Investor Responsibility Research Center).

Table 5.8
Overconfidence and corporate governance quality regressions

Dependent variable Sample	Acquirer CAR [-1:1]					
	Directors		CEOs		CEOs	
	Corporate Governance Quality					
			<i>High</i>	<i>Low</i>	<i>High</i>	<i>Low</i>
	(1)	(2)	(3)	(4)	(5)	(6)
Number of skills	-0.009* (0.086)	-0.001** (0.041)	-0.018 (0.118)	-0.009** (0.042)	-0.001 (0.355)	-0.001** (0.044)
Holder67	-0.004 (0.736)	-0.003 (0.625)				
Num. of skills x Holder67	0.003 (0.661)	0.001 (0.408)				
Firm and deal characteristics						
Public	-0.008**	-0.008**	0.001	-0.011***	0.001	-0.011***
All Cash	0.005**	0.005**	-0.003	0.006**	-0.002	0.006**
Market Cap	-0.001	-0.001	0.003	-0.003	0.003	-0.003
Relative Size	0.006	0.007	-0.015	0.006	-0.012	0.007
Book to Market	0.041	0.045	-0.039	0.061*	-0.037	0.067*
Competition	-0.001	0.000	-0.013	0.003	-0.012	0.003
Hostile	0.000	0.000	-0.040**	0.006	-0.041**	0.006
Diversifying	0.001	0.001	0.002	0.001	0.002	0.001
Cross Border	-0.004	-0.004	-0.006	-0.003	-0.007	-0.003
Serial Acquirer	0.001	0.001	0.000	0.001	-0.000	0.001
Leverage	0.002	0.001	0.004	-0.004	0.008	-0.005
ROA	-0.019	-0.017	-0.066*	-0.004	-0.063	0.000
Capital expenditures	-0.088*	-0.090*	-0.296***	-0.107	-0.271**	-0.106
Volatility	0.157	0.119	0.117	0.355	0.096	0.350
Corporate governance characteristics						
Board size	0.001	0.002	0.018	0.000	0.016	0.002
Board Independence	0.032*	0.030*	0.069**	0.015	0.071**	0.012
Board Committees	0.011***	0.011***	0.011	0.012**	0.011	0.012**
Board tenure	-0.002	-0.002	-0.009	-0.002	-0.008	-0.003
Firm age	0.000	0.000	0.001	0.001	0.000	0.001
CEO age	0.004	0.004	-0.003	0.002	-0.004	0.001
Duality	-0.003	-0.002	-0.013*	0.001	-0.011*	0.002
Constant	-0.070	-0.073	-0.128	-0.039	-0.145*	-0.045
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,030	1,030	275	759	275	759
Adjusted R-squared	0.032	0.033	0.130	0.042	0.125	0.042

Table 5.8 reports results on overconfidence and corporate governance quality regressions. The first two columns examine overconfidence. In Column 1, dependent variable is acquirer CARs, and main explanatory variable is the number of each director's skills. This specification employs the baseline OLS model of Table 5.6, using the overconfidence variable *Holder67* as additional control factor. Column 2 replicates the analysis that we conduct in Column 1, using the number of CEO's skills as key explanatory variable. Columns 3-6 show results of corporate governance quality regressions. Sample is split in two sub-samples; above median E-Index (*Low* corporate governance quality), and below median E-Index (*High* corporate governance quality). All specifications follow the baseline OLS model of Table 5.6. Columns 3-4 use the number of each director's skills as key explanatory variable, while in Columns 5-6, variable of interest is the number of CEO's skills. P-values are shown in parentheses. ***, **, and * denote statistical significance levels at the 1%, 5%, and 10% level, respectively. All variable definitions are provided in Table 5A of the Appendix.

5.5 Robustness tests

As robustness test to the validity of the dataset, I extract each DEF 14A filing from SEC EDGAR, and save it in .txt format. Since data in DEF 14A filings are unstructured, directors' skill descriptions vary in their position (they can be either incorporated in the director's biographical information, or placed separately elsewhere), as well as in their form (skills can be displayed either in text, in "skill matrices," or in respective skill images). Thus, I create a dataset of 4,734 DEF 14A filings, and I write a Python program that replicates the skill identification method from the main study. I check for keywords and phrases of each skill category and I count the number of occurrences of the latter. For example, if I want to determine whether *Academic* is present in a firm-year, I check the number of occurrences for the words *academia*, *academic*, *dean*, *doctorate*, *education*, *faculty*, *graduate*, *masters*, *Ph.D*, *PhD*, *professor*, and *school environment* in the corresponding proxy statement. Then, I set the respective skill dummy equal to one if any of the assigned keywords appear more than once in the proxy, and zero otherwise. Finally, I compare the result of the hand-collected sample with that of the Python extracted equivalent. The matching percentage between the two samples is 78.7%¹³³.

To establish the robustness of the dataset with respect to its informational value, I replicate the tests from Adams et al. (2018)¹³⁴. First, I examine the correlation between number of skills and outside directorships. If extracted skills are informative, we would expect directors with more outside memberships to have more documented skills. In unreported results, I find that the correlation coefficient between the number of skills per director and outside directorships (0.116) is positive and significant at the 1% level, suggesting that the reported skills convey valid information.

¹³³ *Compensation*, *Governance*, *International*, *Leadership*, *Management*, *Marketing*, *Risk Management*, and *Strategic Planning* skill categories are excluded from the sample for two reasons. First, the keywords of the aforementioned categories would produce ambiguous results because of their commonality in a firm's proxy statement, thus producing higher matching percentages. For example, the keyword "leadership" to identify whether a firm has a director with *Leadership* skills, may be present in several areas of a proxy statement that are not related to her election on the board. Also, more than 98% of boards have at least one director with certain skill qualifications (*International*, *Leadership*, *Management*), hence making the matching process for the corresponding skill categories unnecessary.

¹³⁴ I omit presenting the tables from all robustness tests for brevity. All tables are available upon request.

Next, I study how skill categories are correlated with directors' committee assignments. If our collected information on directors' skills is sound, we would expect directors with certain skills to be assigned to committees that would be more relevant to their skills. For example, we would expect directors who are nominated for their *Finance & Accounting* skills to be more correlated with the *Audit* committee. To test that, I calculate correlations between the 20 skill categories with the four committee types from ISS¹³⁵. Results show that correlations are stronger when the relevance between the skill category and the committee assignment is larger, indicating that our dataset encompasses substantial information. However, one could argue that if the correlation between skills and committee types is too strong, then skills could be nothing more than proxies of the respective committees. Hence, for our dataset to deliver original information, we would expect to see solid differences between the 20 skill categories and their committee analogues. Hence, I follow Adams et al. (2018), introducing a Committee-Skill match ratio. In unreported results, I find that the overall match ratio of all director observations is 41.7%, indicating that skill categories are correlated with the respective committee assignments, but do not act as proxies of the latter¹³⁶.

¹³⁵ I obtain data on committee assignments from ISS database (formerly RiskMetrics) for the period 2010-2016. I favour this database as it requires minimal matching challenges due to the small number of committee types' segmentation (e.g., BoardEx has 40 different committee types, which would make the skill-committee matching's output ambiguous). I supplement with information from Thomson Reuters EIKON for years 2017-2018 (Thomson Reuters EIKON has 10 committee types). Correlations are calculated based on the four committee types of ISS (i.e., *Nominating*, *Governance*, *Compensation*, and *Audit*). Results show that *Nominating* and *Governance* committees are strongly correlated with *Governance* skills; coefficients are positive and significant (0.176 and 0.184 respectively). Correlation between *Compensation* skill and respective committee is positive (0.222) and significant at the 1% level, while *Audit* is highly correlated with *Finance & Accounting* and *Risk Management* skill categories (correlation coefficients are 0.281 and 0.118 respectively). No other correlation coefficient exceeds the 0.1 threshold.

¹³⁶ I calculate the *Committee-Skill match* ratio as the percentage of directors with a certain committee assignment and a matching skill category. For example, the match ratio for the *Compensation* Committee-Skill category is measured as the number of directors assigned to serve on the *Compensation* committee who have *Compensation* skills divided by the number of directors serving on the *Compensation* committee who do not have *Compensation* skills. All committee data are obtained by ISS (formerly RiskMetrics), and are supplemented by data from Thomson Reuters EIKON. *Nominating* and *Governance* committees are matched with *Governance* skills (match ratio is 38.7% and 38.8% respectively), *Compensation* committee is matched with *Compensation* skills (match ratio is 25.5%), and *Audit* committee is matched with *Finance & Accounting* skills (match ratio is 64.4%).

Finally, I consider whether firms simply copy their directors' biographical information. If that would be the case, our skills' dataset would simply mirror information that would be easily accessible from other available sources, like directors' curricula vitae. I address these concerns by testing whether directors exhibit the same skillsets across multiple directorships. Since the reasons of nominating the same director may vary between firms, for our dataset to provide novel information, we would expect to find differences in the reported skills of directors who serve in different boards. To test that, I follow Adams et al. (2018), calculating a *Clarity Score* for each board member with multiple directorships. Results show that, on average, the skillset of the same director serving on multiple boards differs by 37.7%, suggesting that firms do not simply replicate their directors' résumés¹³⁷.

5.6 Conclusions

This study analyses whether the skills of a board matter in M&As. To that end, it takes advantage of a recent regulation amendment requiring firms to disclose the skills of their directors. I hand-collect the skill descriptions from the directors of all SP500 constituents from 2010 (year of the regulation reform) until 2018. Next, I follow the skill identification process of the only published study on this matter, in order to create a novel dataset on directors' skillsets. Then, I study our skills' sample at the board, director, and CEO level, asking whether skills generate shareholder wealth through value enhancing acquisitions.

Consistent with the idea that boards with more shared skills create value for the firm, I find that skill commonality on a firm's board is positively related with acquisition performance. Extending the investigation at the director and at the CEO level, I provide evidence that directors and CEOs with less (more) skills generate higher (lower)

¹³⁷ *Clarity score* is measured by calculating the average matched percentage of a director's skills among her outside memberships. For example, if director A has three directorships, and she is reported with *Marketing* skills in one of the three boards that she is member of, with *Scientific* in two out of three, and with *Technology* in two out of three, then her *Clarity score* would be the mean of the three ratios. In our sample, we have 1,521 directors with more than one outside memberships (directorships range from two to five). The mean *Clarity score* of these directors is 0.633.

abnormal returns for the acquirers. Since we would expect acquisition performance to be a monotonically increasing function of skills' number, I examine two possible explanations for these findings; overconfidence and window-dressing. Our results give support to the latter. The negative association between the number of skills and acquirer returns appears to stem from boards with above median number of anti-takeover provisions.

Findings of this study initiate two main conversations with regard to board research, the first of which is the firms' attitude towards board diversity. There is a long-standing position that increasing diversity among individuals can have negative effects in terms of cooperation, communication and social capital (Putnam, 2007). Numerous studies, measuring diversity in various forms, have been consistently providing evidence that board heterogeneity has either no (Farrell & Hersch, 2005), or has negative relationship with firm performance (Frinjs et al., 2016; Anderson et al., 2011; Adams & Ferreira, 2009). However, at the same time, the impact of board diversity on a firm's corporate governance appears to be almost unequivocally positive (Liu, 2018; Bear et al., 2010; Miller & Triana, 2009). Ideally, corporate boards would want a financially beneficial advancement towards greater diversity. This study provides the pathway for that. Shared skillsets may be the missing link tying a diverse group of directors together, hence creating shareholder value. If that would be the case, an even more diligent analysis of directors' skills, at the individual level, would be a natural next step of skill research.

The analysis of this study also has implications for corporate governance. Pursuant to Fixing America's Surface Transportation Act (FAST Act), SEC adopted two new sets of amendments to Regulation S-K¹³⁸ between 2018 and 2019. Both amendments were implemented in order to enhance the clarity of the SEC filings, as well as to dissuade firms from reporting immaterial or repetitious information (Newell & Procter, 2019). With respect to Item 401, the new rules were limited to an updated instruction,

¹³⁸ On August 17, 2018, SEC adopted the "Disclosure Update and Simplification" amendment, which became effective on November 5, 2018. The full report is available online at the following address: "<https://www.sec.gov/rules/final/2018/33-10532.pdf>". The "FAST Act Mordernization and Simplification of Regulation S-K" amendment was adopted by SEC on March 20, 2019, and became effective on May 2, 2019. Full report can be found here: "<https://www.sec.gov/rules/final/2019/33-10618.pdf>".

requiring firms to discard potential duplicate executive officer information disclosure in their 10-K reports and DEF 14A filings. Findings of this study provide evidence of a more critical mishandling of the original SEC's 2009 reform; lower management quality firms appear to over-report the skills of their board members. This study detects that bias through the M&A correction of such firms, portraying a shareholder concern that may needs to be addressed in future amendments of the respective regulation. Possible standardisation, or some form of external audit on the skill-related part of firms' shareholder reports, could be a start to that end. Overall, findings further validate the idea that, in the aggregate, skills matter on corporate boards. Yet, a more elaborate approach of skill disclosure, would better insulate shareholder wealth from value-destroying acquisitions.

Alexander turned Bucephalas towards the sun so that he could no longer be distressed of its own shadow in order to tame him, but had it not been Plutarch's accurate historical description, our perception of Alexander's skills could be biased. The same appears to be the case in corporate boards.

6. Conclusions

6.1 Summary of findings of the thesis

As public interest is, now more than ever, stimulated by the societal impact of issues like climate change, inequality and populism, the value-enhancing propositions of corporate governance have been steadily occupying the centre stage among the firm's long-term strategic decisions. The spectrum of corporate spending has widened vastly in recent years. From charitable activities, to social change issues, to direct political contributions, firms today are employing their arsenal of initiatives to symbolise their active engagement in the challenges of the modern world. In that context, all related parties are proactively adapting to these needs from their own sphere of influence. Directors and CEOs try to build long-term, sustainable strategies whilst minimising agency-stemmed risks. Fund managers and financial analysts now consider, *inter alia*, the social profile of firms before making recommendations, or proceeding to investment decisions. Individual and institutional investors treat firms' social performance as contributing factor in risk and growth potential assessments. Employees, consumers, and local communities expect firms to publicly endorse societal pursuits and practices, while policy makers around the globe adjust the regulatory frameworks to advance the corporate transition towards more inclusive, sustainable business models. In that regard, academics see in corporate governance a multidimensional subject with tremendous economic and societal implications.

The *raison d'être* of this thesis is to attend on key debates of corporate governance. It employs two novel, hand-collected datasets, in order to investigate niche territories of the existing CG literature, which are plagued by lack of data and hence have been scarcely explored by academic research. To that end, it lays stress on the field of corporate social responsibility (CSR), and more specifically on the rapidly growing area of socially responsible investing (SRI), examining investor demand for funds that are self-labelled as socially responsible. It then, throws light on the impact of corporate boards on firm value. First, it looks into aggregate and individual effects of the skills of

directors on firm performance, and then, it investigates whether skills create value for shareholders through M&As. The three empirical chapters aim to throw light on modern issues of corporate governance, and to provide new insights on strands of corporate finance literature that have practical implications for corporations and stakeholders alike.

Chapter 3 looks into the link between investor demand and socially responsible (SRI) funds. It employs the rarely attempted methodology of determining a fund's CSR score through the social performance of its portfolio holdings. For the needs of that, it utilises a manually collected sample of holdings' reports for 1,609 US equity mutual funds from 2003 to 2012. A novel categorisation of the fund universe is then employed, based on two dimensions: a fund's self-reported "SRI label," and the fund's calculated CSR score. The flows of the assets under management between the four categories are then investigated. The main findings show that SRI-labelled funds are positively associated with the CSR scores of their portfolio holdings, suggesting that the holdings of the self-proclaimed "socially responsible" funds have, on average, higher CSR scores than the holdings of conventional funds. However, this relationship is weak and statistically significant only at the 10% level. In fact, replacing the aggregate CSR score with its *CSR Strengths* equivalent makes the link between CSR fund score and SRI label insignificant. To put it differently; funds that claim to apply CSR screens in their portfolios, do not appear to invest in firms that undertake more CSR-related initiatives, than funds that make no such "ethical" claims.

Since the results of the first part, imply that SRI funds may be associated with the application of window-dressing strategies in the formation of their portfolios, focus is brought on how investors respond to that. It appears that funds that are labelled as "socially responsible" but have holdings that do not support this characterisation (*GreenWashers*) are linked with lower assets under management (AUM) than funds of every other fund category in the sample (*Neoclassicals*, *Quiet Samaritans*, and *True ESGs*). The two-dimensional analysis of the demand of US mutual funds indicates that a change of a fund's identity from *GreenWashers* to any of the other three groups is associated with an increase in its AUMs. In other words, investors appear to recognise the "window-dressing" attempts of the SRI funds that opt to employ them. Further

analysis extends the AUM investigation to the direction of flows between categories. The sample's size does not allow for conclusive results in that respect. However, descriptive statistics provide an indication that investors do not appear to respond positively when SRI-labelled funds increase their ethical considerations. Additional analyses on flow persistence corroborate this finding; fund flow persistence is found to be negatively associated with a fund's CSR score.

Overall, findings of this chapter provide insights on existing debates of the CSR literature, as well as on new niche areas that have not been explored. First, by employing the time-demanding methodology of holdings' analysis, it establishes that the self-reported SRI label of mutual funds is accompanied by more "ethical" portfolio constituents. However, the modest strength of the CSR score/SRI label association, and especially the insignificance of the SRI label on *CSR Strengths* scores, connote possible application of window-dressing strategies from the fund managers of SRI-labelled mutual funds. This chapter also utilises a novel categorisation scheme of the US fund universe, in order to examine the demand for SRI funds. The finding that investors seem to be able to identify and penalise funds that do not deliver in terms of their advertised "ethical" considerations is not documented in the existing literature. What is even more interesting, and as such requires further investigation, is that fund loyalty is found to be negatively associated with fund CSR intensity, suggesting that even though investors appear to favour SRI-labelled funds that act up to their "ethical" obligations against funds that do not, their loyalty decreases as the CSR constraints of the fund increase. In other words, the decision of an SRI fund to offer what it says is good for asset attraction, but can not guarantee investor loyalty.

The following empirical chapter turns its attention to corporate boards, and specifically to the skills of directors. It exploits a recent regulation amendment to manually extract 37,332 skill descriptions from all directors of the SP500 constituents during the 2010-2018 period. It then, creates a taxonomy of skills at the board and at the director level and investigates their impact on a firm's financial performance. The output of factor analysis indicates that the main dimension that corporate boards vary is the diversity of their directors' skills. Series of OLS regressions are then applied to establish whether skill diversity has an impact on firm performance. Results provide

evidence of a positive association between skill diversity and ROE, but fail to show significance in every other measure. However, it appears that a set of skills (specifically the group of *Scientific, Technology, Academic, Government & Policy, and Manufacturing* skills) is positively associated with firm value, as measured by Tobin's Q.

Series of additional analyses investigate the impact of individual skills on firm value. Results show that the presence of an individual skill on a firm's board fails to exhibit statistically significant relationship with Tobin's Q. The most reasonable explanation for this finding is the fact that directors bring sets of skills rather than individual skills on the board. Thus, depending on the created synergies with the other skills that are present in the boardroom, the same skill category could have heterogeneous impact on firm value. For that reason, this chapter also examines skill intensity. Findings show that the intensity of technological skills in the boardroom is positively linked with firm's Tobin's Q. Further results evince that the intensity of *Sustainability, Governance, Legal, and Management* skills is negatively associated with firm value.

In a nutshell, this chapter makes several contributions to literature. First, it shows that some boards vary in the skillsets of their directors. Adams et al (2018), which is the only existing paper in the related literature, study a sample of SP1500 firms from 2010 to 2013, and find that skill commonality is positively linked with Tobin's Q. Results of Chapter 4 fail to provide support to this finding; skill commonality does not appear to be associated with Tobin's Q. In fact, it appears that skill commonality in a firm's board is negatively related with its ROE, providing some evidence that the diversity of skills in the boardroom is positively associated with a firm's operating performance. The difference in findings could either stem from the different time period between the two studies, or from the different sample of the examined firms. Robustness tests give support to the latter. In addition, it is found that a specific set of technology-related skills (*Scientific, Technology, Academic, Government & Policy, and Manufacturing*) is positively related with Tobin's Q, while analyses of individual skills evince a positive relationship between the intensity of *Technology* skills in the boardroom and firm value. The latter findings provide support to anecdotal claims about the value-creating capabilities of board technological expertise (Deloitte, 2017), and provide a potential

explanation for the growing trend of appointing tech-savvy directors on corporate boards (Rickards & Grossman, 2017).

Chapter 5 further looks whether the skills of directors have an impact on firm value, by extending the investigation to the area of M&As. Specifically, it examines if and how directors' skills create value for the shareholders of acquirers through value-enhancing acquisitions. The fact that board (Masulis et al., 2007), director (Field & Mkrtychyan, 2017; Ferris et al., 2016; Golubov et al., 2012), and CEO characteristics (Custódio & Metzger, 2013; Jaffe et al., 2013; Malmendier & Tate, 2008) have been repeatedly found to be important determinants of acquisition performance, paired with the reality that lack of skill-relevant data prohibited any research in this area until today, makes the skill-M&A investigation that unfolds in this chapter a challenging, but academically fruitful task. Once more, the database of hand-collected skill descriptions from the SEC EDGAR proxy statements is employed. In particular, this chapter utilises 8,276 director/year skill descriptions from 3,266 unique directors of all SP500 constituents that have consummated at least one acquisition during the 2010-2018 period.

A series of analyses is then conducted. First, as was expected from the previous chapter's results, it appears that the boards of acquirers vary in the diversity of their directors' skills. It would be the logical next step to examine whether skill diversity creates value for shareholders through M&As. Using factor analysis, OLS, as well as a plethora of robustness tests, including Heckman selection model, IV regression models and a set of different proxies for the variable of interest, this chapter provides evidence that the diversity of skills on a firm's board is negatively related to acquirer cumulative abnormal returns (CAR). Stated differently, results suggest that the commonality of directors' skills is positively associated with acquisition performance. To provide further insights on the link between skills and M&As, this chapter extends the investigation of skills from the board level to the director and to the CEO level. Specifically, it examines whether the number of skills of directors and CEOs is associated with acquisition performance. Results from all model specifications show that the coefficient of number of skills, both for directors and CEOs, is negative and statistically significant, suggesting that more skilled board members are negatively related with acquisition performance.

Two explanations are then explored for this counterintuitive discovery; CEO overconfidence and window-dressing of skills. The results of the performed analyses give support to the latter. The number of skills of directors and CEOs appears to be negatively related to acquisition performance only for firms with low management quality.

The findings of this chapter have important theoretical and practical implications. Firstly, it establishes that skill commonality at the board level is positively associated with firm value. Existing literature has been consistently providing evidence that increasing diversity on a firm's board has either no, or has negative impact on firm performance (Frinjs et al., 2016; Adams & Ferreira, 2009). Meanwhile, the effects of board heterogeneity on corporate governance are almost unambiguously positive (Liu, 2018; Bear et al., 2010). This study provides a path for an economically profitable progression of corporate boards towards greater diversity. Moreover, results of this chapter provide insights that may be of interest to regulators. The documented negative link between the number of directors' and CEOs' skills and acquisition performance appears to stem from boards with above median number of anti-takeover provisions. Possible over-reporting of skills from boards with low management quality would constitute evidence of mishandling of the SEC's 2009 regulation amendment from the respective firms, and an area of concern that regulators may have to address in the future.

6.2 Suggestions for future research

Studies on corporate governance and firm value will not cease to exist. The dynamic nature of the subject, along with its wide spectrum of related segments, yields unparalleled potential for theoretical and empirical research. Outside of the methodological and data collection contributions, this thesis touches three areas of corporate finance literature: it examines the demand for socially responsible mutual funds, it looks at the impact of directors' skills on firm performance, and it investigates whether skills create shareholder value through M&As. Future research could potentially extend towards either of these three distinct strands in a variety of ways.

Chapter 3 opens a discussion that socially responsible mutual funds can be a viable pool of "window-dressing" arena, attempting to attract the increasingly more common group of "ethical" investors. This chapter shows that demand for funds that do not apply the social screens that their SRI label warrants, is significantly lower than other fund categories. The reasons behind this finding though, are still open for research. "Ethical" investors are shown to exhibit certain characteristics (Benson and Humphrey, 2008). Could this be that investors who look for "ethical" funds are more informed than their counterparts, and as such they drive their assets away from funds for which they detect the application of "window-dressing" strategies? Sample limitations did not allow this chapter to OLS test the changes in flows between the four fund categories. However, extending the time period of the analysis beyond 2012 would address this problem, potentially providing a sample size of annual mutual fund observations that would enable the use of the whole arsenal of estimation models, and hence provide a better view of the interpretation that the investor base gives to the "loosening" or "tightening" of a fund's CSR obligations. Lastly, perhaps the biggest contribution of this chapter is the novel categorisation of the mutual fund universe in two dimensions. This technique could be applied to the investigation of several other strands of the CSR literature. The assessment of funds in this chapter focuses solely on their assets under management. Further analysis may reveal more notable differences between the fund categories that have not yet been detected.

Findings of Chapter 4 could be cut down in two main themes: the difference of the results compared to previous studies, and the insertion of a new set of skill categories that appears to create value for the firm. Both issues justify further research. With respect to the first theme, this chapter shows that skill commonality is not associated with firm value. Adams et al. (2018), which is the only study in literature dealing with this matter, study a sample of SP1500 firms from 2010 to 2013, providing evidence that skill commonality is positively linked with Tobin's Q. Given that, in unreported results this chapter replicates the analysis for the 2010-2013 period, a series of researchable questions arise. If firm size plays a role in the skill commonality effect of Adams et al. (2018), could it be that larger firms require boards with more diverse skillsets? In unreported results, board size and board independence are identified as the

main drivers of skill diversity. If skill diversity is linked with two of the most widely used board characteristics of corporate finance, it could be linked with a number of other phenomena as well.

With regard to the second main finding of this chapter, it appears that SP500 boards with an abundance of technology-expert directors are linked with higher Tobin's Q. Meanwhile, anecdotal evidence shows that technology-related skills are among the most sought qualifications for new appointments of corporate directors (Spencer Board Index, 2019), IT spending constitutes one of the largest parts of corporate budgets (Curran, 2016), and firms that address the increasing technological needs in the boardroom are associated with higher Tobin's Q (Deloitte, 2017). In a nutshell, the growing need for technology expertise in corporate boards has been identified, but not yet investigated from existing literature. This chapter provides a starting point for that. However, more research needs to be done in order to establish the connection (if any) between technology expert directors and firm performance. Could it be that some firms have identified the value-enhancing qualities of appointing tech-savvy directors on their boards, hence having an advantage in the allocation of their IT resources? Could technology skills act even better when combined with certain other skills? Answering these questions would provide insights on a phenomenon that has gained momentum over the last decade among corporate boards.

Lastly, two intriguing conversations on corporate governance research emerge from the findings of Chapter 5. Based on the results of this chapter, it appears that skill commonality at the board level generates shareholder wealth through value-enhancing acquisitions. Simply put, shared skillsets inside the boardroom stem as a previously unaccounted, value-creating mechanism for the firm. The natural next step for future researchers could be to further analyse the skillsets of directors. Conceptually, certain skills could create better synergies if combined in certain ways. For example, *Technology* skills may be better integrated with *Academic* skills and worse with *Sustainability* skills. Moreover, the integration of specific skills might be more impactful in specific industries. By way of illustration, 2016's \$63 billion acquisition of Monsanto by the German pharmaceutical giant, Bayer AG, is widely considered as one of the worst corporate deals in recent history, mainly because of an underestimation by the latter

company of the legal claims against the former (Financial Times, 2019)¹³⁹. Intuition suggests that the presence of directors with *Legal*, or *Sustainability* skills on Bayer AG's board might have played a role in the outcome of the M&A. From an academic perspective, there is no existing literature on skill integration at the board level. Thus, a comprehensive research of optimal skillsets on corporate boards would provide useful insights on the impact of certain sets of skills on firm value.

One of the main findings of this chapter is that more skilled directors appear to be associated with worse acquisition performance. Given that literature and logic alike would argue for the opposite, the explanations of CEO overconfidence and of corporate governance quality were considered and investigated with regard to this counterintuitive result. However, future researchers could provide different interpretations of the skill number conundrum. In that case, more research could be conducted to better explain the issue. On the other hand, if the corporate governance quality argument of this chapter is found to stay robust to all other potential explanations, SEC would have a concerning matter of "over-reporting of skills" in its hands. Since the sample that is utilised for this thesis includes only SP500 firms, it could be argued that the phenomenon would be even more prevalent between smaller, not as "high-profile," firms and board members. For that reason, and in view of the fact that there is no other study on the effects of the 2009 Regulation S-K amendment on firm disclosure, proper emphasis should be given to the reasons behind the "over-reporting" attempts. Thus, academic research could look, inter alia, for potential motives among firms, and even investigate for further links between these firms and other value-destructing corporate tactics.

¹³⁹ Agrochemical company Monsanto was acquired in 2016 by Bayer AG, in a \$66 billion, all-cash deal. Monsanto's herbicide RoundUp was linked with the alleged carcinogenic ingredient, glyphosate, resulting in hundred thousand lawsuits against the company (Bender, 2019). By December 2020, Bayer AG has paid more than \$10 billion in legal settlements for Monsanto's products (Weiss & Burger, 2020), while its stock has lost more than 50% of its pre-acquisition value (Meyer, 2019). In response to the Monsanto-related incidents, Bayer AG's board of directors lost the shareholders' vote of confidence at the 2019 general meeting, for the first time in the German corporate history (Financial Times, 2019).

6.3 Epilogue

This thesis introduces three issues that are of growing interest in corporate governance literature. Conceptual, methodological and dataset novelties were employed, sparing no expense to the time that was required to implement them. The underlying idea that fuelled the whole endeavour was to exploit primary sources of data, and try to enhance our insights on different applications of corporate governance. However, the dynamic nature of the corporate environment dictates a constant update of the inputs and a relentless pursuit of novel information. Our knowledge on the issues that were presented in this thesis could be benefitted from that. For example, investor demand, and the investigation of "window-dressing" strategies from socially responsible mutual funds could be more accurately identified with a sample that includes fund observations that extend beyond 2012. In like manner, an even more ambitious project in skill research would entail a generous expansion of the sample of skill descriptions from the directors of SP500 firms to a sample that covers the directors of all SP1500 constituents. Such advancement, albeit extremely time-demanding, would significantly improve the scope of the prospective study, hence setting the stage for the first full-scale examination of the impact of directors' skills on a wide spectrum of corporate phenomena. In a nutshell, this thesis sets a starting point for the discussion on the aforementioned matters, hoping to aid in the never-ending journey towards a better alignment of interests between firms and society.

Some say we are not factful enough of the positive evolvments around us¹⁴⁰. This study makes an argument that the emergence of corporate governance is surely one them.

¹⁴⁰ The term "Factfulness" is employed by Rosling et al. (2018) in order to demonstrate people's tendency to consistently ignore positive facts about life, by focusing only on the most negative events, thus creating a negative bias in their inferred worldview.

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Appendix to Chapter 4

4A. Variable definitions

Table 4A
Variable definitions

Variables	Variable definitions
Board committees	The number of board committees as reported from Thomson Reuters EIKON.
Board independence	The number of independent directors on a firm's board.
Board independence (%)	The percentage of independent directors to the sum of directors serving on a firm's board.
Board size	The number of directors serving on a firm's board.
Capital expenditures	The ratio of a firm's capital expenditures on sales (#capx/#sale).
CEO age	The age of the firm's CEO at the time of the proxy statement.
Clarity score	The percentage of matched skills in different boards, for directors with more than one directorships ¹⁴¹ .
Committee-skill match ratio	The percentage of committee-skill matches, based on four committee assignments.
Director age	The age of the firm's director at the time of the proxy statement.
Director tenure	The number of years a director has served on the firm's board at the time of the proxy statement.
Directorships	The number of SP500 boards that a director serves other than the current.
Duality	A dummy which is one if CEO and Chairman positions are held by the same person, and zero otherwise.
Female CEO	A dummy which is one if CEO is female, and zero otherwise.
Female Chair	A dummy which is one if Chair is female, and zero otherwise.
Female directors	A dummy variable which is equal to one if the director is female, and zero otherwise.
Female directors (%)	The number of female directors divided by the sum of directors serving on a firm's board.

¹⁴¹ *Clarity score* is further analysed in sub-section 4.5.2 of the main study.

Firm age	The number of years since the firm's listing as reported from CRSP.
Independent director	A dummy variable which is equal to one if the director is independent and zero otherwise.
Market value of equity	The number of outstanding shares (#csho) multiplied by stock price (#prcc_f).
Number of skills	The total number of different skills that are present on a firm's board (from 1 to 20).
Number of skills (All)	The average number of skills per director
Number of skills (Outside)	The average number of skills per independent director
Number of skills (Inside)	The average number of skills per inside director
ROA	Operating income before depreciation (#oibdp) divided by total assets (#at).
ROE	Net income (#ni) divided by shareholder equity (#seq)
Sales growth (%)	Net sales of current period (#sale) minus net sales of previous period, divided by the net sales of previous period, and multiplied by 100.
Skill intensity	The number of directors possessing each skill category (out of 20) divided by the sum of directors serving on a firm's board.
Skill presence	A dummy which is equal to one if the respective skill appears on the firm's board, and zero otherwise.
Technological aptitude	A dummy which is one if <i>Scientific, Technology, Academic, Government & Policy</i> , and <i>Manufacturing</i> skills appear on a firm's board, and zero otherwise ¹⁴² .
Tobin's Q	The sum of total assets (#at) and market value of equity less book equity (#ceq), divided by total assets (#at).
Total assets (Log)	The log of a firm's total net assets (#at).
Volatility	Standard deviation of a firm's daily returns (annualised).

This table presents the definitions of all the variables that are used in the current study.

¹⁴² I present the version of *Technological aptitude* dummy that appears in column 1 of Table 4.14 for brevity. In column 2, *Technological aptitude* is a dummy which is one if *Scientific, Technology, Academic*, and *Government & Policy* skills appear on a firm's board, and zero otherwise. In column 3, *Technological aptitude* is a dummy which is one if *Scientific, Technology*, and *Academic* skills appear on a firm's board, and zero otherwise, and in column 4 of Table 4.14, *Technological aptitude* is a dummy which is one if *Scientific*, and *Technology* skills appear on a firm's board, and zero otherwise.

4B. Skill identification

Table 4B

Skill identification

Skills	Keywords and phrases
Academic	academia, academic, dean, doctorate, education, faculty, graduate, masters, Ph.D, PhD, professor, school environment
Company Business	all aspects of our industry, our company's, chief executive officer of our, chief executive officer of the company, company's business, executive of our, executive of the company, experience with the company, historical insight, historical knowledge, history of the operation, history with our company, in-depth knowledge of, industry-specific perspective, industry experience, industry knowledge, inner workings, insider's perspective, internal operation, knowledge of all aspects of the company, knowledge of the, knowledge of the history, officer of our, officer of the company, president of our, president of the company, the company's chief, understanding of our business, working with the company
Compensation	compensation
Entrepreneurial	entrepreneur, entrepreneurial, entrepreneurship, evaluating business, innovative idea
Finance & Accounting	accountant, accounting and, accounting experience, accounting principles, and accounting, auditing, banking, capital markets, capital structure, corporate finance, experience in accounting, experience in finance, expertise in finance, finance experience, finance industry, finance matters, financial accounting, financial acumen, financial background, financial experience, financial expert, financial expertise, financial field, financial foundation, financial management, financial matters, financial reporting, financial services, investment, securities, understanding of finance
Governance	governance
Government & Policy	government, policy, politics, regulatory
International	global, international, multinational, worldwide
Leadership	leadership
Legal	attorney, lawyer, legal
Management	experience in leading, experience in managing, management
Manufacturing	industrial, manufactured, manufacturing

Marketing	marketing
Outside Board	board experience, board of other, board practices of other, boards of companies, boards of other, boards of several other, boards of various, director of other, director of several other, member of the board of, numerous boards, on the boards of, other company boards, prior service as a director, several corporate boards, several other corporate boards, varied
Outside Executive	as the chairman of a, business career, chief executive officer of a, executive experience, experience as a chief, experience as an executive officer of, experience as a senior, former executive of a, officer of a public, officer of other, officer of several companies, officer of numerous companies, president of a, senior-level executive, senior executive, senior management positions, serving as the CEO of a
Risk Management	risk
Scientific	research and development, scientific expertise
Strategic Planning	business planning, decision-making, problem-solving, strategic, strategies
Sustainability	environmental, safety, sustainability, sustainable
Technology	technological, technology

This table presents the skills' dictionary. I identify each skill by employing the set of words and phrases on the skills' descriptions dataset. The coding process is further explained in Section 4C. The list of 20 skill categories is described in Table 4.1 of Section 4.3.3, as well as in Table 5.1 of Section 5.3.3.

4C. Skill coding process

The process of skill identification is plain; I assign a set of keywords and phrases to each skill category and I implement an algorithm to the respective skills' descriptions.

Extracting skills' descriptions from SEC EDGAR filings is challenging for several reasons. Firms disclose the additional director information, as required since the adoption of Regulation S-K amendment, in the proxy statements which are sent to their shareholders. SEC publishes these proxy disclosures annually, in the form of DEF 14A. Unlike the 10-K, 10-Q and 8-K reports which are provided in XBRL form, the DEF 14A filings are based in the SGML language. SGML offers portability when dealing with unstructured data, but poses formidable challenge when approached for research purposes.

Firms use the DEF 14A proxy statements to share all types of information that their shareholders can vote on in the forthcoming shareholder meeting. Thus, apart from board history and qualifications information, the DEF 14A filings include reports on director and executive compensation and securities ownership, on board committees and board leadership structure, on corporate governance and sustainability matters, on director, executive and employee stock plans, on performance awards and corporate transactions, on tax and audit reports, possible mergers and acquisitions details, as well as any other issue that may be of interest to the shareholders. As a result, no proxy statement is structured in the same way as another. The arrangement of information inside a DEF 14A filing differs: among firms, and among years for the same firm.

Even though since Regulation S-K's amendment the disclosure of skills' descriptions is a prerequisite for every public firm, the format of the corresponding information is allowed to vary. Firms are required to provide the specific skills that lead them to nominate the director who carries them, but are allowed to decide on the structure of the output. Hence, the skill descriptions of each director are placed in numerous positions of the DEF 14A file. Firms provide the descriptions as a separate paragraph under her biographical information. The skill paragraph can also be incorporated in the body of the director's résumé. In the latter case, it can be placed

either at the beginning, or the end of the résumé. In several cases, the skill paragraph can be embodied in the biographic section. The skill text paragraph can also be placed away from the section of directors' personal biographies. In that case, its position is subject to the editor of the proxy statement.

It is at the firm's discretion to decide whether it will provide the skill descriptions in paragraph form inside the DEF 14A filing. Skills can be provided in bullets form, either close to directors' biographies, or in separate section of the proxy report. Firms can further display the skills of their directors in skill matrices, or skill tables. For more parsimonious presentation, skills can also be exhibited as icons. Skill definition of each icon is provided in certain position of the proxy statement, and respective icons are then attached to skill owners. The latter option is increasingly being used by firms for years after 2015.

To ensure consistency, I collect 50,071 skill descriptions from 4,734 unique SEC EDGAR filings manually. First, I identify the firm constituents of the SP500 index from 2010 (the year of Item 401's adoption) to 2018 from the Center for Research in Security Prices (CRSP). Then, I use the firms' tickers to assess the respective DEF 14A company filings for the 2010-2018 period. Missing filings are identified through their Central Index Key (CIK) code, or their full names. From each DEF 14A report, I locate and extract the director skills section and the biography part, as well as basic director identification information: full name, age, gender, position, independency and tenure. I create a hand-collected dataset of the aforementioned variables.

In order to derive distinct skills from our sample of director skill descriptions I employ a set of keywords and phrases assigned to each skill category. To determine the list categories, I follow Adams et al. (2018), which is the only study until today in related literature. These authors adopted the 20-skill list of the Conference Board report, which was provided to 30 Dow Jones firms as a guideline for Regulation S-K's amendments. Authors of the aforementioned study considered one skill category from the Conference Board's list as too common (*Operations*), and another as too rare (*Philanthropic*), and thus replaced them with *Management* and *Outside Executive* experience skills respectively. I implement our skill coding scheme by assigning a skill dummy for each category, setting it to one if the keyword or phrase appears in the respective skill

description, and to zero otherwise. An overview of our skill dictionary is presented in Table 4B.

I establish replicability of this work by extracting each assessed DEF 14A filing in txt format. The process outputs the proxy statement in unstructured form, but strips it from the redundant SGML elements, attributes and comments. Thus, I create a txt-based dataset, comprised of all 4,734 DEF 14A filings that were used in the main study. I write a Python program to check for keywords and phrases that are assigned to each skill category and I output the number of occurrences in the proxy statement. I also exclude from any calculations skill categories that would have no informative value¹⁴³. For example, in order to examine the presence of the *Academic* skill on the board, I check the number of occurrences for the words *academia, academic, dean, doctorate, education, faculty, graduate, masters, Ph.D, PhD, professor, and school environment* in the respective proxy filing. Then, I assign the corresponding skill dummy to each firm-year, if the keyword/phrase occurrences are more than one¹⁴⁴. I compare the result with our hand-collected dataset and I calculate a matching percentage between the two samples. The matching percentage between the two samples for all coded skills is 78.7%. All matching results are shown in Table 4C.

¹⁴³ I exclude *Compensation, Governance, International, Leadership, Management, Marketing, Risk Management, and Strategic Planning* skill categories on two bases; first, on the fact that certain categories would produce ambiguous results due to the nature of their keywords, and second on the fact that certain categories would produce a matching percentage close to 100% due to their hand-collected percentage being close to 100% already. As an example of the first instance, searching the keyword "Governance" to verify the presence of *Governance* skills on a board, would not provide accurate results, as the respective word appears in a proxy statement numerous times for unrelated reasons. As example of the second instance, trying to calculate the presence of *International* skills on a board would produce a matching ratio close to 100% by definition, as several skills appear in more than 90% of corporate boards. In Table 4C, I present the *Finance & Accounting* Skill-match ratio as an example of the latter reasoning (the overall Skill-match ratio without *Finance & Accounting* is 76.8%).

¹⁴⁴ For the keywords and phrases of the skills: *Academic, Legal, and Sustainability* I require that the number of word occurrences in the proxy statement is more than two, assuming that one word occurrence would be insufficient in providing justification of the respective skills' presence.

Table 4C
Skill matching ratios

Skill	Skill match ratio (%)
Academic	76.2
Company Business	76.1
Entrepreneurial	88.8
Finance & Accounting	99.8
Government & Policy	74.5
Legal	48.7
Manufacturing	81.2
Outside Board	80.6
Outside Executive	86.6
Scientific	83.5
Sustainability	61.0
Technology	87.7

This table presents skill matching ratios for 12 skill categories. For each skill category, I report the percentage of firm-year observations that the hand-collected and the Python-processed samples match, with respect to the presence (or not) of each skill to the firms' boards. For instance, as regards the presence (or not) of the *Academic* skill on the firms' boards, the manually collected and the python-assessed analogue match in 76.2% of the firm-year observations. Data are based in 2,397 firm-year observations from 2010 to 2018. The mean match ratio of the skill categories displayed on this table is 78.7%. Matching process is further described in Section 4C of Appendix for Chapter 4. Skill categories are illustrated in Table 4.1 of Section 4.3.3 and in Table 5.1 of Section 5.3.3.

Appendix for Chapter 5

5A. Variable definitions

Table 5A
Variable definitions

Variables	Variable definitions
Acquirer CAR [-1:1]	Cumulative abnormal returns over a 3-day window [-1:1] around the announcement date of the M&A event.
Age	The age of the firm's director at the time of the proxy statement.
Airport hub proximity	Dummy which is one if the distance between firm's headquarters and the closest airport hub is less than 70 miles, and zero otherwise. The full list of airport hubs is available at: https://www.faa.gov/airports/planning_capacity/profiles/ .
All cash	The percentage of deals that we paid in cash.
Board committees	The number of board committees as reported from ISS (formerly RiskMetrics), and complemented by Thomson Reuters EIKON.
Board independence	The percentage of independent directors on a firm's board.
Board size	The number of directors serving on a firm's board.
Board tenure	The number of years a director serves in the current board.
Book-to-market	Acquirer's book value of equity to market capitalisation at the end of fiscal year t-1.
Capital expenditures	The ratio of a firm's capital expenditures on sales ($\#capx/\#sale$).
CEO age	The age of the firm's CEO at the time of the proxy statement.
Clarity score	The percentage of matched skills in different boards, for directors with more than one directorships ¹⁴⁵ .
Committee-skill match ratio	The percentage of committee-skill matches, based on the four-committee specification of ISS (formerly RiskMetrics).
Competition	Number of bidders for the target firm.
Cross-border	Dummy which is one if the country of target firm is not in US, and zero otherwise.
Deal size	Deal value in \$ million.

¹⁴⁵ *Clarity score* is further analysed in sub-section 4.5.2 of the main study.

Directorships	The number of SP500 boards that a director serves other than the current.
Diversifying	Dummy which is one if the 2-digit SIC codes of acquirer and target firm are not the same, and zero otherwise.
Duality	A dummy which is one if CEO and Chairman positions are held by the same person, and zero otherwise.
E-index	The number of a board's anti-takeover provisions. See Bebchuk et al. (2009).
Female	The percentage of female directors on a firm's board.
Firm age	The number of years since the firm's listing as reported from CRSP.
Firm size	Acquirer's total assets (#at) in \$ million.
Holder 67	Dummy which is one if CEO has not exercised her 67% in-the-money options twice during the last 5 years, and zero otherwise ¹⁴⁶ . See Malmendier and Tate (2005).
Hostile	Dummy which is one if deal is labelled as hostile, and zero otherwise.
Independent director	Dummy which is equal to one if the director is independent, and zero otherwise.
Leverage	Acquirer's debt (long- and short-term) to its total assets, at the end of fiscal year t-1.
Market cap	Log of firm's market capitalisation at the end of fiscal year t-1.
Range of skills	The number of distinct skill categories that are present on a firm's board (between 1 and 20).
Number of skills (Director)	The average number of skills per director.
Number of skills (CEO)	The average number of CEO's skills.
Public	Dummy which is one if the target firm is a publicly listed company, and zero otherwise.
Relative size	Deal value to acquirer's market capitalisation, one month prior to the announcement date of the M&A.
ROA	Operating income before depreciation (#oibdp) divided by total assets (#at).
Serial acquirer	Dummy which is one if the acquirer has consummated at least 3 deals in the last 5 years, and zero otherwise.

¹⁴⁶ *Holder 67* is further analysed in Section 5.5.4 of the main study.

Skill intensity	The number of directors possessing each skill category (out of 20) divided by the sum of directors serving on a firm's board.
Skill capacity	A dummy which is equal to one if the respective skill appears on the firm's board, and zero otherwise.
Volatility	Standard deviation of a firm's daily returns (annualised).

This table presents the definitions of all the variables that are used in the current study.