The CFO's predicament: Between controller and business partner *

Bert de Groot[1], Sander Renes[**1], Rene Segers[1,2], and Philip Hans Franses[1]

[1]Erasmus University Rotterdam
[2]Gibbs Analytics Consulting

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Abstract

Recently, the role of the CFO has shifted towards that of executive manager, but it is unclear how this influences their traditional financial conscience role. To shed light on this issue, we analyze the responses of 263 active CFOs, CEOs and non-executive directors in an interactive survey. The results show a striking difference between expectations about the CFO and CFO choices. Respondents expect the non-executives and the CFOs to be significantly less willing to take corporate risk than the CEOs. As expected, the CEOs demand less return and experience less risk than non-executives for a given investment scenario. Against all expectations, however, CFOs experience less risk and demand a lower return than even the CEOs. Furthermore, discussions with groups of directors show that their role in the board is defined by contrasting it to other boardroom roles. A shift in role of the CFO should, therefore, cause corresponding shifts in the roles of other board members. In our survey, the shift of the CFO appears to be misjudged, which calls into question the shift in other roles. These findings suggest that models on corporate governance should be reviewed in light of the new role of the CFO.

Keywords— Corporate governance, CFO, Non-executive, Survey,

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**Corresponding author, address: Erasmus School of Economics, Erasmus University Rotterdam, PO box 1738, 3000 DR Rotterdam, The Netherlands, *e-mail:* srenes@ese.eur.nl

1 Introduction

As the head of the finance and control departments, the CFO traditionally embodies the financial consciousness of the organization and, as such, is part of board-level controls. Over the last decades, the CFO's role has shifted towards that of a business partner to the CEO. However, most commentators argue that this shift should not cause the CFO to abandon the financial consciousness role (Favaro, 2001; Zorn, 2004; Zoni and Merchant, 2007; Han et al., 2015; PwC global power & utilities, 2015; Deloitte, 2016; Mailliard, 2016; EY, 2016). Following the suggestions of these commentators and combining these dual roles, financial conscience and executive manager, creates a predicament for the CFO. As both part of management and part of board-level controls, he becomes part of the controls on himself. With limited time and mental resources, the CFO is likely to have to choose: should the CFO first facilitate corporate governance and board-level control, or should the CFO first be part of executive management? The non-executives[1], as another board-level control aspect, face a similar uncertainty. To be effective in their governance capacity, they need to know when they can expect to be dealing with the financial conscience CFO, and when they should expect the executive manager CFO(Uhde et al., 2017). In any given situation, the non-executives therefore have to ask themselves: "Is the CFO acting as financial consciousness, or as business partner?"

Both of these CFO roles, financial consciousness and executive manager, are much discussed in the literature. However, very little is known about how actual CFOs deal with conflicts between these roles, and even less about the expectations held by directors about the CFOs' choices. Direct measures of these choices and expectations are needed to open the black box of the boardroom and further this research agenda (Hambrick, 2007; Leblanc and Schwartz, 2007; Priem et al., 1999; DellaVigna, 2009). In this paper, we add to the literature by measuring and comparing the expectations and choice patterns of 263 active directors, CEO's, CFO's and non-executives through an interactive survey. These directors expect little difference between non-executives and CFOs in terms of

[1]We have collected data in the Netherlands, where the two-tier board system is the standard. All non-executive directors are, therefore, supervisory board members and we will use these terms interchangeably.

willingness to take corporate risks, while they expect the CEOs to be much more risk-tolerant than both CFOs and non-executives. Agreement on this ranking is universal, all groups of subjects expect the CFOs to be as careful with risks as the non-executives. These expectations show that, on the boardroom scale of executive manager (CEO) to control (non-executives), the respondents expect CFOs to act as a board-level control, and thus as the financial conscience. However, in realistically sized investment scenarios with sizeable risks, the choices of these same directors show a very different pattern. As expected, CEOs are willing to take more risk than non-executives. However, where all respondents expect the CFO to have similar risk tolerance as non-executives, we find that CFO report to experience less risk and demand lower returns for a given investment than both the non-executives and the CEOs. Against all expectations, their choices place the CFOs on the executive manager end of the boardroom scale.

To shed more light on the difference between the choices and expectations of these directors, and in particular on how these expectations were formed, we organized discussion meetings, one with CFOs and one with non-executives (with executive experience). The discussions confirm that the difference between expectations and choices was a surprise to the directors. In both groups, the discussion indicated that directors' roles are defined by dividing tasks within the shared responsibility of managing the company. This makes the expectations directors have about each other even more important. If non-executives expect the CFO to be the financial control, they are likely to spend less attention on that control task in favor of other tasks. Making expectations explicit, as we did in this survey, can therefore help define the distribution of tasks within the board.

We designed our study to meet three, difficult to combine objectives, we want to study: (1) relevant actors, (2) that make relevant choices, (3) while maintaining exogenous variation. Active directors are notoriously difficult to approach for participation in research. To maximize participation, we approached participants through the networks of the master and post-initial educational programs on our university, and asked the network administrators to cosign the invitation. We extensively beta-tested initial versions of the survey to reduce the probability of loosing participants. Furthermore, we provided

feedback to all participants through individualized reports. Each report showed the participant both their own responses and the distribution of responses of their peers. These reports allowed them a unique opportunity to reflect on how they compared to their peers outside of their organizations. The combination of these measures resulted in a response rate of 35% (see section 3 for more details).

The second and third objective let us to incorporate some experimental tools in the survey. To get relevant choices, we looked for conflict between the roles of financial conscience and business executive. This conflict is particularly likely to occur with corporate investments and Mergers and Acquisitions, where financial risks could prime the financial conscience role, and the desire to grow the business could prime the executive manager role. However, asking participants about corporate investments in their (recent) past, is likely to trigger recollection biases and potential reputational concerns. Furthermore, previous investment choices are highly endogenous to the professional position, background, and experience of the participants, all of which are variables of interest. With both endogeneity issues and reporting biases, observational or standard survey data would not allow us to do any causal inference (Gow et al., 2016; Floyd and List, 2016). Building on earlier work in survey experiments (e.g. Kuziemko et al., 2015), we therefore created a survey tool with dynamic elements that allows exogeneous variation in customized questions. To maintain relevance, the survey uses the answers given in the first part of the survey to make the investment scenarios resemble typical decisions taken by the participant. To create exogeneous variation, the survey randomly selected scale, investment type and success rate of each scenario. By comparing over several of these scenarios, we can identify the effects we are after: differences between CEOs, CFOs and non-executives in terms of perceived risk and willingness to invest for an exogenously given investment.

As part of our survey, we collected demographic information about our participants to test previously discussed relationships between demographics and risk tolerance (e.g. Hambrick, 2007; Plöckinger et al., 2016) using the individual choices of our directors. We find that age, experience and functional background of the individual directors correlates with the decisions made, but effects are weak. Participants with greater experience

appear more cautious in required return, but also report to experience less risk. Against expectations, younger respondents tend to require a higher return. We cannot replicate the e ect of gender, but this is likely caused by the low number of female board members.

The comparison between expectations and behavior of active CEOs, CFOs and non-executives has direct relevance for practice. Corporate directors are not perfectly rational, their judgment and decision making is in uenced by their personalities, frames of reference, and style (Plöckinger et al., 2016; Ge et al., 2011), as well as the environment and task they involved in (Bonner, 1999; Krische, 2011). Expectations are an important, but often implicit, aspect of the frame of reference, while a large part of a director's environment is determined by the other directors (Uhde et al., 2017). Furthermore, the nding that the CFOs' predicament might cause them to switch from nancial conscience to executive manager - perhaps even during a meeting could imply expectations have to be reconsidered by practitioners and researcher alike. Making expectations about tasks and behavior explicit, like in our survey experiment, is a relatively simple exercise to implement in boards (or any other team for that matter) to ensure mutual understanding. In our discussion meetings, the non-executives noted that making these expectations explicit and checking them was a useful exercise.

After the spectacular failures of internal governance and risk controls in the 2008 crisis, governance structures and the organizational design of risk control have come under renewed scrutiny (see e.g. Adams and Ferreira, 2007; Hopwood, 2009; Brown et al., 2011; Van der Stede, 2011). The CFO holds an important position in traditional models of governance, but it is unclear how e ective the executive manager CFO can be in governance tasks. Since the board members de ne their own task by contrasting it with the tasks of the other board members, a shift of the tasks of the CFO is likely to cause changes to other roles as well. The traditional models of boardroom control and corporate governance will, therefore, likely need to be revised to ensure they meet current needs and expectations. By involving active directors in this research, we can increase the relevance of this research (DellaVigna, 2009) and spread the research ndings more e ectively to this important audience.

In Section 2 we discuss the the background and research questions. The interactive survey and other data collection is described in Section 3, followed by the results. Section 5 concludes. An example of the survey instrument, description of data, and some relevant quotes from the semi-structured interviews can be found in the appendix

2 Background and research questions

Practitioners and academics alike are clearly interested in the role of the CFO in the board. The practitioner consensus appears to be that CFOs are transforming from bean counters towards strategic managers (PwC global power & utilities, 2015; Deloitte, 2016; EY, 2016; Mailliard, 2016). A similar conclusion is appearing in the academic literature, with many authors stating that the CFO's role is becoming more and more strategic and operational (e.g. Favaro, 2001; Zorn, 2004; Zoni and Merchant, 2007; Han et al., 2015). However, none of these authors suggest that the nance function, nor the CFO as head of nance, should completely abandon the traditional duties of controller and steward. In fact, most commentators still place these traditional duties at the top of the list of CFO tasks, creating the dual role of ' nancial consciousness - executive manager'. Some commentators go even further, suggesting that it is undesirable for the CFO or his controllers to become too tied up in management (e.g. Indjejikian and Matejka, 2006; Zoni and Merchant, 2007; CIMA, 2016) as this could risk governance functions in the organization. However, several studies have found that the performance of rms, and even the control function within rms, can be improved by allowing controllers and the CFO to be involved in the rm's strategic decision-making (Maas and Matejka, 2009; Han et al., 2015). This implies that complete separation between (executive) management, and the control and governance aspects of the rm is unlikely to be optimal. This is also the gist of section 302 of the Sarbanes-Oxley Act[2], which requires that the CEO and CFO together give assurances about the control situation in the company.

The dual role, and divergent advice place CFOs in a predicament. Like all others, CFOs have a limited amount of time, energy and focus, so they will often have to choose

[2]The Sarbanes Oxley Act of 2002, Public Law 107 204, 116 Stat. 745

what to do rst: focus on control, or focus on strategic management. Since the CFO's role is complex and multi-faceted, this makes his behavior more di cult to predict. This prediction is, however, quite important for the other directors. The primary focus of the CFO, will impact the responses required of the non-executives in both their supervisory and advisory roles. If it is di cult for non-executives to predict the CFOs focus, it will be di cult for them to e ectively act in their corporate governance function.

Uhde et al. (2017) recently provided a very interesting overview on the literature studying the relation between CFO and supervisory board. They note that relatively little is known about the CFO and the link between the CFO and the board, and outline an agenda and framework for future research. The present paper adds to this research agenda by studying several inputs of the boardroom process, and the relationship between the CFO and the board by measuring and contrasting the individual expectations and investment choices of the board members. Furthermore, by comparing the investment decisions made by CEOs, CFOs and non-executives, we directly answer one of the research questions posed by Uhde et al. (2017). We nd that in investments, CEOs and CFOs are likely to work as a team rather than as counteracting forces.

2.1 Research on the functioning of the board

The cognitive bases and values, or the heuristics of individuals in the top management team, are di cult to observe as we usually lack the required level of access. Hambrick and Mason (1984) and Hambrick (2007) suggest using a methodology inspired by marketing studies, where demographic variables and background characteristics are used as proxies for the cognitive bases, values and perceptions of upper level managers. These demographic variables are more easily observed, allowing researchers to relate observable board characteristics to measurable corporate decisions and outcomes. A similar body of literature in behavioral nance addresses overcon dence and optimism of executives, see e.g. Graham et al. (2013) and references therein. Our survey allows us to test the relations between perceptions and cognitive bases suggested by the upper echelon literature on more direct measures of the relevant constructs and individual choices. This provides

strong complementary evidence on the relationships found.

In their survey of the upper echelon literature in accounting, Plöckinger et al. (2016) nd that age, tenure, experience and education seem to reduce risk tolerance in nancial reporting, similar e ects are found in other directors (e.g. MacCrimmon and Wehrung, 1990; McClelland et al., 2012; Berger et al., 2013). Consistent with these earlier ndings, we expect that age will decrease the risk tolerance of our participants. Similarly, tenure has been found to diminish the appetite for risks among most decision-makers (Finkelstein and Hambrick, 1990; Hambrick and Fukutomi, 1991; Wiersema and Bantel, 1992; Sanders, 2001). As we have cross-sectional data, it is impossible to disentangle tenure and age e ects through time variation. However, we do observe di erences in previous exposure to risky investment decisions. Since previous exposure to risk can change how one perceives new risky choices, this is exposure is likely one of the drivers of the relation between tenure and risk appetite. We therefore expect that previous experience with risky projects will decrease the appetite for risk. Similarly, we expect that participants who have previous experience with larger investments will be more risk-averse.

The roles of di erent actors in the boardroom have been discussed in several professional fora, as well as in a small number of academic papers. Traditionally, the non-executive board members are considered as gate-keepers (e.g. Mace, 1972), the CFO a bean counter, and the CEO a leader or entrepreneur. However, over time the role of the CFO has expanded and became more strategic (see e.g. Farag et al., 2011; Hiebl, 2013; PAIB Committee, 2013). Since the CFO has more than one task, and individual choices and expectations can depend on the task and circumstances, it is di cult to predict how the CFO will compare to the other board members in a given situation. As the literature review of Menz (2012) shows, research into the CFO focuses mainly on the consequences of CFO turnover and incentives, so that it gives little guidance in this matter. Rather than developing an independent theory about expectations and relative risk tolerance, we structured this study as an exploratory endeavor. We asked our respondents to indicate what they expected of each other. This allows us to show and compare insiders' expectations and with relevant, insider choices.

3 Methodology

Twenty years after the original upper echelon article, Hambrick (2007) summarized the literature that followed it, along with a review of strengths and weakness of the methodology. Any upper level manager will only be presented with those choices he was selected for. The background characteristics, values and cognitive bases of the individual are exactly what brought the individual to the position they are in. Identi cation on observed behavior will therefore always have to be concerned with endogeneity and reverse causality. In this paper we add to literature by studying investment choices and perceived risks of several groups of directors in a setting with exogenous variation. This approach strongly complements the literature, as it involves the relevant decision makers in a controlled manner, thus combining some of the strengths of surveys and experiments.

Designs that change the questions, or information on respondents' screen based on their responses is fairly new in research. An early methodological example is Kuziemko et al. (2015) whose appendix provides a useful overview of design considerations. A branching method of selecting questions was used by Bodnar et al. (2011) to study risk management practices. This type of interactive surveys are relatively new, so they are not yet in methodological overviews like Harrison and List (2004); Bloom eld et al. (2016); Floyd and List (2016). In terms of the Bloom eld et al. (2016) terminology, our study has similar properties to laboratory studies, as we control the data-generating setting. However we do not randomize the boardroom position of participants (manipulate independent variables). In the terminology of Harrison and List (2004) and Floyd and List (2016) our methodology is closest to framed eld experiments. We take the population that is ultimately relevant, corporate directors, and introduce a setting that mirrors the eld setting, but in our case without incentives.

In this study, we isolate the decision makers from their normal environment, their normal team, and their normal discussions to identify speci c e ects, much like one would in a lab experiment. Like a lab in the eld, or framed eld experiment study, we are dealing with a non-standard subject pool, active corporate directors. Whenever corporate directors are asked to make a decision in an experiment or study, they bring

part of who they are with them. As we are ultimately interested in the decisions of these relevant actors, allowing us to study these decision in isolation is a big advantage of this approach.

3.1 Survey

Data was collected through a web-based survey. The translated survey instrument can be found in the online appendix. Each respondent received a hyperlink with a unique token that allowed the respondents to start, pause and continue the survey at their own convenience. The token in the hyperlink also allowed us to use the information gained early in the survey to tailor later questions to the speci c participant.

The survey rst elicits some basic information from the respondents about their job and experience. We ask for their position within the company, the approximate size of the company revenues (with ve choice options, ranging from `below €50 million' to more than `€1 billion'), the company's industry and the number of employees (ranging from `less than 50' to `more than 10.000'). We then ask the respondents to indicate the number and size of investments they have decided upon in the last 15 years, for each of ve categories (new market expansion, expansion of production capacity, R&D projects, IT projects, and mergers and acquisitions).

The dynamic elements in the survey use the answers to questions about typical investments in the past to tailor hypothetical investment scenarios to the participant. The procedure is similar to the branching described in Bodnar et al. (2011), but allows more exibility in the individual questions. Respondents who have experience with a category of investments are asked to evaluate two scenarios with investment possibilities in this familiar category (except for M&A that was believed too di erent during the prototype tests). The investment possibilities contain three parameters that are varied exogenously: an estimated probability success, a non-recoverable investment, and a short description of the type of investment. The size of the investment depends on the typical investment decisions made by the respondents (derived from the rst part of the survey) multiplied with a random factor (0.5 or 1.25) to obtain relatively small and large investments within

a familiar range. From beta-tests and discussion prior to the survey, we found that most proposal discussed in the board had high estimated success rates, therefore success rates where either either 0.80 or 0.95. For each scenario, respondents are asked to indicate the minimum Net Present Value (NPV) they require before they can give their approval to this investment. We chose the NPV because it summarizes all information of the return in a single number and it is theoretically the best measure of pro tability of an investment. It is also a measure that is widely understood and taught in business schools and economic curricula, as well as used in practice. The survey xes the probabilities and the initial investment so that each participant is essentially asked when he believes the expected return is high enough to compensate for the risk. A more careful or more risk averse individuals should therefore indicate a higher required NPV. After they provided an NPV, our respondents were asked to self-re ect and to indicate how much risk they experienced from this investment on a 7-point scale.

As we are interested in the roles played by the participants, we make the role of the individual participant salient in our survey. A CFO, for example, would be asked:
"What should be the minimum net present value (the value of the revenues after deduction of the investment discounted back to today) of this expansion be, so that you, in your role asCFO, agree with this investment?"
The central part of our survey thus asks participants to judge corporate investment scenarios, that resemble the investment decisions they make for their company - but are constructed using identi able random shocks- while being reminded of their role in their company.

After this central part of the survey, we ask our respondents to rate how they perceive the willingness to take risks of i) themselves in general, ii) themselves in their professional role, iii) the average CEO, iv) the average CFO, and v) the average non-executive. All these ratings are given on the same 11-point scale ranging from `Not willing to take any risk' (0) to `Very willing to take risks' (10). These questions are based on a question developed and tested in Dohmen et al. (2011). We then ask the respondents about demographic information, like gender and age as further controls.

The novelty in the survey is in the amount of individualization of the investment scenarios. Through these individualized questions, the interactive part of the survey automates aspects of a structured interview without actually requiring the direct time and logistical investment of interviews. It allows us to ask respondents about relevant aspects of their experience without breaking the guarantee of anonymity or having to bring large groups of respondents together at any one point in time. Similarly, this approach allows us to apply methodological aspects of experimental economics, most importantly randomization, pre-structured interaction, and exogenously imposed variation in the survey. Unlike normal survey data about risky investments, our measures do not su er from recollection biases, or biased reporting by the respondents. Furthermore, illusion of control, commitment to good outcomes cannot skew the results in this one-shot survey, such that we avoid some of the normal methodological issues(Gow et al., 2016; Floyd and List, 2016). The survey thus makes it possible to compare realistically sized investment scenarios both within and between subjects using variation generated by the researchers.

We created and tested several prototypes of our survey to make sure questions were clear and achieved the required e ect. The rst tests were conducted on people within academia that had some boardroom experience, later tests were with a small group of directors. In these tests we were able to ask post-survey questions to nd out whether the manipulation of the investment sizes used and the way of presenting the questions had the desired e ects.

3.2 Respondents

The respondents of the survey are CEOs, CFOs, non-executives and a reference group consisting of (non-executive) managers, consultants and analysts. The respondents work for Netherlands-based national, international or multinational companies, both listed and unlisted, in a range of industries. All participants report to have experience in making investment decisions for their company. Our database contains personal data and is therefor protected, participants are treated anonymously in this study.

All our respondents work for a company based in The Netherlands, so they operate in

a two-tier board. The Top Management Team (TMT) forms the executive board and the non-executives form a supervisory board. This European model re ects the division of duties in management and governance as advocated by Fama and Jensen (1983). Although this structure could have a di erent in uence on the board processes than the one-tier board, the task of the complete board (TMT and non-executives together) remains the same. That is, the directors jointly manage the company. In both one- and two-tier boards there is a big di erence between theory and practice of governance (Mace, 1972; Roberts et al., 2005). Empirically, there are many similarities between boards in di erent countries (Demb et al., 1992). Given that all boards share the common task of managing the company, and the fact that we isolate our participants from confounding group e ects, we feel con dent that our results can be applied to one-tier boards as well.

3.2.1 Survey logistics

We sent an invitation to participate in our survey to Dutch business professionals who once showed their interest in our school's activities, in particular post-initial (executive) education. To increase the response rate we implemented several measures in line with suggestions made by Bednar and Westphal (2006). All directors were invited through the network they were part of. Invitations included a cover letter (co-)signed by the administrator of the network and a professor of the University, which should increase the legitimacy and authority attached to the survey. Respondents were promised an individualized report which increased the response rate by a factor 2.5 in (Bednar and Westphal, 2006). For these reports we contrast the answers the director gave to those of the peer group. This allows the participants to compare themselves to a larger group of their peers, a rare opportunity for many directors. This comparison becomes more valuable if the answers given are more accurate. Few of the survey questions had a socially desirable answer, so we believe the comparison provided an incentive to answer accurately.

In total, 894 invitations were sent out between 2011 and 2019, and 52% of the sample responded favorably. 345 (35%) Respondents completed the entire survey. Another 159

(16%) respondents did not answer all the questions, but we can still use their answers for part of the analysis. We removed 20 (2%) respondents from the data prior to analysis, because of invalid data entry.

3.3 Semi-structured interviews

Our survey only allows us to identify if certain di erences between board members exist, but it gives very little insight in why these di erences exist or where they come from. To place the statistical ndings in clearer context, we presented our initial results in several executive education programs at our school. We furthermore invited a group of 6 CFOs and a separate group of 6 non-executives with executive experience for more in dept discussions. The later group also included a current CEO and all of them had experience as CEO. We summarized the set-up of the experiment and analysis and then asked them open questions that can be summarized as: How do you de ne your role in the board? and How are the other board roles de ned? and How does that relate to the decisions in our survey? and more importantly What do you thing about the mismatch between expectations and behavior?. During the resulting discussion we tried to summarize their opinions and verify our interpretations of their answers with the directors that were present[3].

4 Results

Table 1 Panel a gives some summary statistics of the variables used in our main regressions and their distribution over the board positions. In Panel b we display the distribution of age and gender in the wider population of board-members listed in the Capital IQ - Professional dataset (data obtained on on November 23, 2016).

To see how our subsample of CEOs, CFOs and non-executives compares to the relevant population, we compare our sample to the sample of directors in the Capital IQ - Professional dataset. From the Capital IQ data, we selected all individuals who were reg-

[3] The online appendix shows the translation of the relevant notes taken during the discussions.

TABLE 1
Selected Summary Statistics and comparison to Capital IQ database

(a) Respondent Characteristics

			Respondent				
			CEO	CFO	Non-Exec	Other	Total
		Number of responses	86	195	46	139	466
		Complete cases	61	177	25	62	325
		Professional willingenss to take risk	7.15	6.42	5.84	6.85	6.59
		(11-point Likert scale)	(1.58)	(1.63)	(1.72)	(1.62)	(1.66)
		Male	0.84	0.88	0.80	0.87	0.86
			(0.37)	(0.32)	(0.41)	(0.34)	(0.34)
		Average age (in years)	50.83	47.33	57.45	44.70	48.26
			(7.55)	(6.05)	(5.95)	(10.00)	(7.91)
Professional background	(dummy, 1 if equals)	Entrepreneur	0.30	0.03	0.28	0.13	0.12
			(0.46)	(0.18)	(0.46)	(0.34)	(0.33)
		Finance	0.21	0.93	0.56	0.60	0.70
			(0.41)	(0.26)	(0.51)	(0.49)	(0.46)
		Marketing / Sales	0.13	0.00	0.04	0.13	0.05
			(0.34)	(0.00)	(0.20)	(0.34)	(0.22)
		Operations	0.10	0.00	0.00	0.06	0.03
			(0.30)	(0.00)	(0.00)	(0.25)	(0.17)
		Otherwise	0.26	0.04	0.12	0.08	0.10
			(0.44)	(0.20)	(0.33)	(0.27)	(0.29)
Investment experience, last 15 years	Number of decisions	Expansion to new market	8.80	8.15	7.64	7.91	8.19
			(4.60)	(3.98)	(3.80)	(4.20)	(4.13)
		Expansion production capacity	9.07	8.09	7.90	7.65	8.17
			(5.01)	(5.19)	(4.41)	(4.83)	(5.03)
		R&D and innovation	11.07	8.75	8.48	8.52	9.12
			(6.18)	(4.98)	(5.26)	(5.64)	(5.43)
		IT	10.42	10.30	8.26	8.61	9.84
			(5.33)	(5.56)	(4.16)	(5.84)	(5.52)
	Size, % turnover	Expansion to new market	13.11	8.25	12.68	8.95	9.64
			(17.01)	(10.92)	(12.76)	(15.38)	(13.38)
		Expansion production capacity	13.97	8.19	11.24	7.55	9.39
			(18.59)	(11.61)	(15.19)	(15.76)	(14.38)
		R&D and innovation	9.15	5.29	6.44	5.12	6.07
			(14.52)	(8.98)	(9.07)	(10.92)	(10.66)
		IT	6.17	4.73	3.88	5.65	5.11
			(7.53)	(5.89)	(5.27)	(13.80)	(8.23)

(b) Capital IQ board members

Variable	Capital IQ, Professional dataset					
	Netherlands			Western Europe		
	CEO	CFO	Non-exec. Director	CEO	CFO	Non-exec. Director
N	114	27	1116	1063	134	5176
Gender (male)	0.97	0.85	0.88	0.94	0.93	0.87
	(0.19)	(0.36)	(0.32)	(0.23)	(0.26)	(0.34)
Average age	56.01	50.41	60.83	56.54	51.96	59.03
	(8.24)	(6.65)	(9.36)	(8.64)	(7.67)	(9.91)

Notes: Cells display the mean value (standard deviation) of relevant variables in each of the samples. The survey sample reports the means for complete cases. Investment experience was measured on discrete scales, each answer was then converted to the mid-point of the range corresponding to each answer. E.g. we register a value of 3 for each participant that answers 1 to 5 times the appendix contains further details.

istered as a board member on November 23, 2016. For each individual we only used the their primary a liation. An individual whose job title contains `Chief Executive O cer' is considered a CEO. An individual whose job title contains `Chief Financial O cers' is listed as CFO. Individuals with titles containing `supervisory board', or `non-executive' are considered to be non-executives. The Capital IQ data does not specify gender. To obtain a reliable proxy for gender, we joined the rst names of all directors in the Capital IQ with a database of rst names and gender, as administered by the Sociale Verzekeringsbank (SVB).[4] Individuals with a rst name that is both used by males and females were removed from the sample.

The Capital IQ data has relatively few CFOs and relatively many non-executives. On average, our respondents are about 3 5 years younger and slightly more likely to be female than the average director in the Capital IQ data set. These di erences are most likely due to the fact that we approached alumni of (post-initial) educational programs of the Erasmus University, which attract relatively young directors. Beyond these di erences, our respondents compare reasonably well to the more general population. The modal board member appears to be a middle-aged male; the CFOs are the youngest, the CEOs are slightly older, and the non-executives are the oldest group. To check the robustness of our ndings to possible selection e ects, we control for demographic variables in later analysis.

Table 2 shows the correlation between the independent variables measured in the survey. The correlation between the exogenously varied size multipliers and success probability is close to zero by construction and thus not reported. The strongest correlations found are between the dummies for di erent roles and di erent backgrounds. As these dummies are mutually exclusive, this is not a surprise. Age and the role dummies are also strongly related, showing that the non-executives are older on average. Interestingly, the male dummy is positively correlated to reported willingness to take risk, a common nding in the literature on overcon dence (e.g. Malmendier and Tate, 2005).

[4] SVB is the organization that implements national insurance schemes in The Netherlands.

TABLE 2
Correlation between the independent variables measured in the survey.

	Gender (male)	Age	Role: Non-executive director	Role: CEO	Role: CFO	Role: Other	Background: Entrepreneur	Background: Finance	Background: Marketing / Sales	Background: Operations	Background: Other	Typical size of previous investments	Maximum number of previous investments	Self-reported professional willingness to take risk professionally
Gender (male)	1,00													
Age	0,00	1,00												
Role: Non-executive director	-0,03	0,32	1,00											
Role: CEO	-0,05	0,18	-0,16	1,00										
Role: CFO	0,06	-0,05	-0,28	-0,40	1,00									
Role: Other	0,00	-0,31	-0,22	-0,31	-0,55	1,00								
Background: Entrepreneur	0,08	0,22	0,07	0,20	-0,18	-0,03	1,00							
Background: Finance	0,13	-0,16	-0,13	-0,35	0,55	-0,21	-0,33	1,00						
Background: Marketing / Sales	0,03	-0,15	-0,03	0,13	-0,17	0,09	-0,06	-0,21	1,00					
Background: Operations	-0,03	-0,01	-0,06	0,12	-0,14	0,09	-0,05	-0,18	-0,03	1,00				
Background: Other	-0,19	0,13	0,12	0,15	-0,36	0,18	-0,22	-0,72	-0,14	-0,12	1,00			
Typical size of previous investments	0,03	0,06	0,06	0,14	-0,07	-0,09	0,24	-0,09	-0,02	0,01	-0,05	1,00		
Maximum number of previous investments	0,06	0,04	0,00	0,12	0,07	-0,18	0,03	0,02	0,00	-0,02	-0,03	0,05	1,00	
Perceived willingness to take risk professionally	0,21	0,00	-0,14	0,14	-0,11	0,09	0,15	-0,09	0,09	-0,01	-0,08	0,05	-0,02	1,00

4.1 Self- and cross-perceptions

Before turning to the analysis of the investment decisions, we rst discuss the respondents' self-reported and perceived willingness to take risk, followed by the cross-perceptions. Results of t-tests comparing the averages are shown for each comparison. To save space, we do not present the answers given by analysts, managers and consultants in this subsection.

The self-reported willingness to take risks in private (Figure 1a) only shows a di erent between CEOs and CFOs, with the CFOs reporting a slightly higher willingness to take risks. However, over all board roles the distributions are close. In their professional roles, CEOs report a higher willingness to take risks than CFOs and non-executives, as can be seen in Figure 1b. We only nd no signi cant di erences between the reported professional risk tolerance of CFOs and non-executives. Figure 2 displays the cross-perceptions of

FIGURE 1: Self-perceptions on the willingness to take risk.

	(a) Private			(b) Professional		
	Non-exec.	CEO	CFO	Non-exec.	CEO	CFO
Willingness to take risk*						

Notes: Average self-reported willingness to take risk in private and professional setting of non-executives, CEOs and CFOs. Responses are on an 11-point Likert-scale, where 0 denotes: `Not at all willing to take risk' and 10 denotes: `Very willing to take risk.' Results of two-sided t-tests are shown next to the arrows. The vertical runs from top to bottom to increase comparability with Figure 3.

the willingness to take risks of the di erent groups of board members, grouped by the professional role of the respondent. There appear to be small di erences in the level of the average answer given by the di erent groups of directors, but the comparisons within the responses of the di erent board roles is consistent and in line with the self-perceptions