

Corporate Water Risk: Investor Tolerance of the Status Quo

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Abstract

This paper considers corporate water risk disclosure from the perspective of professional investors. An empirical study, it draws on findings from detailed interviews conducted with Chief Investment Officers and other senior investment professionals at fund management firms in Australia, South Africa, the UK and the USA. It establishes that investors generally regard extant corporate water risk disclosure as unfit for purpose, and explains why investors nonetheless tolerate the status quo. The study draws on a conceptual framework of stakeholder salience, myopia and proximity to describe a ‘predictability discount’ that exists in terms of investor decision making behaviour in the face of actual or perceived water risk. The extent of this discount is shaped by four temporal conditions: the near past; the distant past; the near future; and the distant future. The research also finds that investors assume companies are more cognisant of water risk than their disclosure implies.

Keywords: water risk, stakeholder theory, myopia, proximity, chief investment officer, investor, tolerance

1. Introduction

Investors appear to care more about water risk in their portfolio companies now than at any time in the past. According to the CDP, whose global water report has become a benchmark of corporate water risk disclosure, the number of investor signatories has almost quadrupled in the four years since the programme began, and is now issued on behalf of 530 investors representing US\$57 trillion in assets (CDP, 2013). The CDP’s publicity literature claims that investors are “requesting companies to disclose business critical water-related information to inform their decision making processes and drive strategic investment” (ibid). However, while there is a growing body of both academic and practitioner literature on the topic of corporate water risk (for a sample, see Larson et al., 2012; Hepworth, 2012; Sarni, 2011; Barton, 2010) there is almost no publically available information that suggests how investors actually use corporate water risk disclosure to inform decision making or drive strategic investment.

This paper seeks to understand whether investors perceive that a gap exists between quantum of information that even the best-in-class companies disclose on water risk; and the value of this information to investors in evaluating this risk. And if there is a perceived gap, why does it exist?

A conceptual framework of stakeholder salience has been used to position the dynamic of engagement between company and shareholder, drawing particularly on the typology developed by Mitchell, Agle and Wood (1997). It has been combined with scholarship on proximity and myopia to hypothesise a temporal relationship in the predictability of investor behaviour, in response to probabilistic events. This is then explored empirically through the lens of corporate water risk. Data has been gathered through a series of telephone interviews, primarily with the Chief Investment Officer (CIO) at fund management firms based in the UK, the USA, South Africa and Australia.

1.1 Stakeholder Theory

Given what is today one of the dominant approaches for analysing the normative obligations of those engaged in business (Hasnas, 2013), there is a remarkable lack of consensus as to what stakeholder theory is, or isn’t. R. Edward Freeman (1984) has provided one of the most widely cited definitions in the literature, proposing that a stakeholder is “any group or individual who can affect or is affected by the achievement of the organisation’s objectives” (Freeman, 1984, p. 46) although many scholars have since sought to challenge the value and validity of a definition so broad that it would be “bewilderingly complex” (Mitchell, Agle, & Wood, 1997, p. 857) for

managers to apply. Narrower definitions have abounded, including Clarkson's proposal that stakeholders are voluntary or involuntary risk-bearers: "without the element of risk, there is no stake" (Clarkson, 1994, p. 5). Other definitions place stakeholders in the context of a firm's survival (e.g., Bowie, 1988), or in terms of their contractual or exchange relationships with the firm (Cornell & Shapiro, 1987; Hill & Jones, 1992; Thompson, Wartick, & Smith, 1991). This paper does not set out to challenge extant definitions of stakeholder theory; rather, it takes a generic position that stakeholder theory concerns the nature of the relationships between organisations and their respective stakeholders, and the processes and outcomes of these relationships for organisations and their stakeholders (Jones & Wicks, 1999).

In their 1997 paper Mitchell, Agle and Wood ('MAW'), contribute to a theory of stakeholder identification and salience that eschews definitions based on 'narrow' and 'broad' categorisation. Instead, they classify stakeholders on the basis of their possession of one or more of the following attributes: 1) the stakeholder's power to influence the firm, 2) the legitimacy of the stakeholder's relationship with the firm, and 3) the urgency of the stakeholder's claim on the firm. The theory produces a typology (Figure 2) that normatively defines stakeholders as those to whom managers should pay attention; and dynamically identifies the combination of specific circumstances and managerial behaviour that establishes the salience of that stakeholder. MAW's typological framework relies on a dynamic relationship between stakeholders and a firm's managers which they summarise thus: 1) Stakeholder attributes are variable, not steady state. 2) Stakeholder attributes are socially constructed, not objective, reality. 3) Consciousness and wilful exercise may or may not be present.

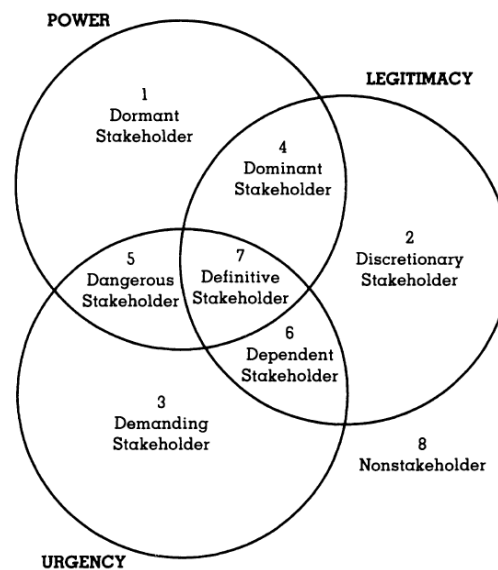


Figure 2. MAW stakeholder typology (one, two, or three attributes present)

MAW propose that stakeholder salience will be positively related to the cumulative number of stakeholder attributes—power, legitimacy, and urgency—that are perceived by managers to be present. Where the perception is that just one attribute is present, salience will be low. Where two are perceived to be present, salience will be moderate. Where it is all three, salience will be high. The typology classifies stakeholders on this basis, with eight categories of stakeholder (including non-stakeholder) identified.

MAW's theory has since received empirical support from various researchers (e.g., Agle, Mitchell, & Sonnenfeld, 1999; Eesley & Lenox, 2006; Knox & Gruar, 2007; Magness, 2008; Parent & Deephouse, 2007), several of whom have sought to refine the approach, although it has been suggested (Neville, Bell, & Whitwell, 2011) that overall, development has been relatively limited. There are four aspects of MAW's stakeholder typology that make it particularly appealing as a conceptual framework to anchor interviews with investors, which is the empirical basis of this paper. They are: i) distinct attributes that accommodate a shareholder centric approach, ii) the absence of an explicit 'normative core' in defining stakeholder legitimacy, iii) the impermanence of relationships between variables, and iv) attributes that allow for intra-stakeholder heterogeneity.

- i) *Distinct attributes.* This paper is principally interested in the shareholder—firm relationship, albeit within a broader stakeholder context. While it has been proposed that having more than three attributes would enhance the theory (Driscoll & Starik, 2004), the typology captures the nature and dynamics of the relationship between shareholders and managers effectively and parsimoniously.
- ii) *No normative core.* While many scholars emphasise ethical or moral dimensions to stakeholder theory (Jones & Wicks, 1999; e.g., Phillips, Freeman, & Wicks, 2003), MAW do not offer a normative core in their typology, merely acknowledging its significance (Magness, 2008). While some see this as a limitation in their approach, it supports structural simplicity and cohesion within the conceptual framework.
- iii) *Impermanence of relationships.* At the heart of MAW's typology are the dynamics within and between the three attributes. Power, legitimacy and urgency can all be lost as well as acquired. Relative shifts in salience have been variously explored in the literature (Jawahar & McLaughlin, 2001; e.g., Jones, Felps, & Bigley, 2007; Pfarrer, Decelles, Smith, & Taylor, 2008): moreover the intrinsic impermanence of the status quo is recognisable within 'real world' scenarios and is a feature of the empirical data in this paper.
- iv) *Stakeholder heterogeneity.* The typology accommodates the simplification of shareholders as a discrete and wholly fungible stakeholder class. For example, this paper assumes no distinction between different shareholders' time horizons, fiduciary responsibilities, investment objectives and so forth.

In summary, stakeholder theory is a helpful if malleable construct for providing context to engagement between shareholders and firms. As an essentially contested concept, its interpretation is subjective, and while the approach taken by MAW provides a constructive typology to frame the empirical analysis, this paper accepts the intrinsic limitations of using a theory whose application lacks consensus within the academic literature. In part to compensate for this limitation, but also to amplify the importance of context, the theoretical lenses of myopia and proximity are also used to complement the framework.

1.2 Proximity

This research has corporate water risk as its empiric focus, and it has been proposed that the three attributes conceptualised by MAW fail to give the natural environment its due status. For example, Driscoll and Starik (2004) propose that the attributes are "inadequate for incorporating the near and the far, the short- and the long term, and the actual and the potential" (Driscoll & Starik, 2004, p. 61). They are advocates of instead giving the natural environment primary stakeholder status, within an 'eco-sustainability paradigm' that places less emphasis on social theory, and more on the relationships among nature, society and economy. The authors argue that the inclusion of additional criteria 'might further help in developing a stakeholder salience model that considers the non-human natural environment to be one or more key stakeholders of the firm' (ibid. p. 63). Driscoll and Starik proffer proximity as a particularly applicable criterion, theorising that the greater the proximity, the greater the development of stakeholder relationships, *ceteris paribus*.

The function of proximity has been variously explored by economic and financial geographers. Research suggests that in the US, approximately 10% of companies in a fund manager's portfolio are chosen because they are located in the same city as the fund manager (Coval & Moskowitz, 1999). This relationship with proximity, or 'home bias', has also been shown to apply to foreign stocks in countries that are closer in terms of physical distance, travel cost or adjacency (Wojcik, 2009). Citing evidence that home bias contributes to greater price discovery and investment outperformance (Anand, Gatchev, Madureira, Pirinsky, & Underwood, 2011; Coval & Moskowitz, 2001; Hau, 2001; Malloy, 2005; see also Shukla & Van Inwegen, 1995), Wojcik concludes that geographical proximity has significant implications for investors, companies, communities and policy makers. This interpretation is consistent with the importance Driscoll and Stark accord to proximity within their stakeholder salience model.

While most studies of home bias have emphasised geographical distance, proximity can also have cognitive, social, organisational and institutional dimensions (Boschma, 2005). Together, these contribute to 'tacit knowledge' (Gertler, 2003) which is difficult to codify, but may nonetheless influence relationships between shareholders and firms. This is distinct from the idea of business relatedness (Fan & Lang, 2000; Tsai, 2000), where for example companies in the same industry sector will have interconnected stakeholder relationships. Instead it relates to the multi-dimensional aspects of proximity that influence what Wojcik (2009) refers to as 'soft information'. While he defines this as "information that cannot be transferred over distance" (ibid. p. 10); with a little imagination soft information can be construed to mean information that is not transferred via formal disclosure. In the context of corporate water risk, soft information and stakeholder engagement, proximity becomes an interesting attribute.

For example, one could hypothesise that an investor based in a relatively water scarce country such as South Africa, would exhibit a greater awareness of the relative significance of corporate water risk within her domestic portfolio; when compared to an investor based in a relatively water abundant country such as the UK, who invests in South African stocks as part of his international portfolio. This would be consistent with the home bias benefit of having access to superior soft information.

This idea is in fact tested empirically within this paper, and at least on the basis of the evidence gathered here, the outputs suggest that—in contrast to the emphasis placed on physical proximity within the extant literature—it is dimensions of proximity other than geographical distance that provide the best extrapolative fit.

1.3 Myopia

While it is fairly straightforward to proffer conceptual definitions of corporate water risk, any empirical assessment required a more nuanced interpretation. The approach this paper takes is to frame corporate water risk in terms of probabilistic events that affect the shareholder value of a company. There are limitations to this approach, not least that shareholder value is hardly an all-encompassing benchmark for defining stakeholder relationships. Nonetheless it is a useful reference point to anchor interviews with investors.

One of the objectives in these interviews was to better understand the impact of myopia in investors' decision making behaviour; in association with uncertain, probabilistic events. This is an area of growing interest in the academic literature, from modelling catastrophe risk (Froot, 2001; Kunreuther, 2002; Patel, 2005; e.g., Posner, 2004) through to understanding the causes and consequences of financial crises (Barrell & Davis, 2008; G. L. Clark, 2011; Dallas, 2011; Lee, Clark, Pollard, & Leysnon, 2009).

The disaster myopia hypothesis was originally proposed by Guttentag and Herring in 1984, and subsequently developed by them in a series of papers. It was offered as an explanation of the tendency of the financial system to become increasingly vulnerable to major shocks during long periods when no such shocks appear (Guttentag & Herring, 1984, 1986). Their work is being cited more than two decades later by senior central bank officials (e.g., Haldane, 2009) amongst others, mainly because of two heuristics they incorporate; which, they argue, characterise human behaviour with regard to low-probability, high risk hazards.

First, the availability heuristic refers to the tendency for decision makers to respond more strongly to risks when instances of those risks are more available to them from memory or imagination. The heuristic was originally described in the literature some forty years ago (Tversky & Kahneman, 1973), and popularised by the outputs from various experiments which consistently showed that even where probabilities could be objectively determined, subjects tended to employ the availability heuristic (Browne & Hoyt, 2000; Cohen, Etner, & Jeleva, 2007; Cortner, Gardner, & Taylor, 1990; e.g., Kahneman, Slovic, & Tversky, 1982). In short, the heuristic is it work when decisions are made using information that more easily captures their attention, rather than baseline data (G. L. Clark, Duran-Fernandez, & Strauss, 2009).

Second, the threshold heuristic (Simon, 1978) is an implicit rule whereby where managers allocate their attention—a scarce resource—on the basis that when the probability of an event reaches some critically low level, it is treated as if the probability is in fact zero. Guttentag and Herring combine the availability heuristic with the threshold heuristic to define disaster myopia as the tendency to underestimate shock probabilities. The probability of a shock event is inversely correlated to the length of time that has elapsed since the previous shock event, and at some critical point is treated as if it was zero (Guttentag & Herring, 1986).

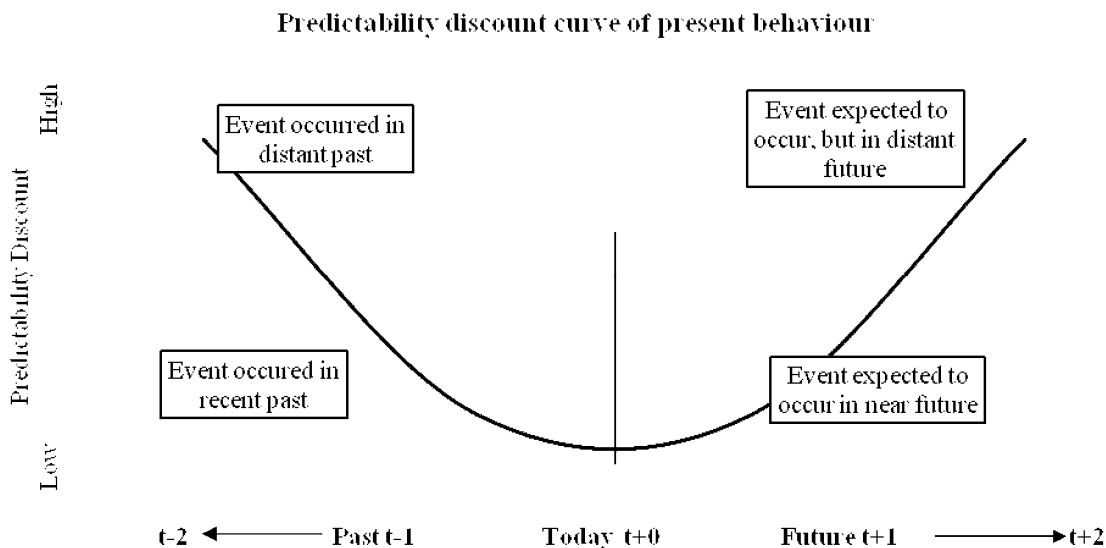
Other scholarship considers myopia in terms of future rather than past events. As Clark observes, people have steep discount functions such that they value the present and near future much more than the distant future (G. L. Clark, 2011), and are not receptive to inter-temporal tradeoffs (Ainslie & Haslam, 1992a) where an equivalence in value is applied between the present and the future. That people discount the future, i.e., they prefer a smaller reward now to a bigger reward later is a widely accepted predisposition. However, attempts have also been made to give shape to people's future expectations, including Ainslie and Haslam who propose hyperbolic discount functions where people value the immediate future, sharply discount the intermediate future, but give more weight to the long term over the intermediate future (Ainslie & Haslam, 1992b). However, this is inconsistent with experimental evidence on the shape of people's discount functions (see e.g., G L Clark, Caerlewy-Smith, & Marshall, 2006) and indeed most empirical data points to individuals' inability or unwillingness to conceptualise their long term interests or to act consistently over time.

2. Method

This paper draws on the literature of stakeholder theory, proximity and myopia to propose that an asymmetric “predictability discount curve” exists: where an investor's behaviour *today* in response to a probabilistic event

that will affect shareholder value becomes more unpredictable the further into the past (or future) that a comparable event occurred (or was expected to occur) (Figure 3).

The proposed predictability discount curve incorporates four hypotheses. First, that where a risk event has occurred in the recent past, investor behaviour is relatively predictable: even though the behaviour itself is afflicted by the ‘gambler’s fallacy’ of underestimating the probability of a repetition (Cortner et al., 1990; Winter & Fried, 2000). Second, that where a risk event is anticipated to occur within the near future, investor behaviour is also relatively predictable: although rare events may be overweighted when prior probabilities are explicitly specified, due to salience and availability heuristic (Cutler & Zeckhauser, 2004). Third, that where a risk event occurred the distant past, investors apply the threshold heuristic and allocate no attention to its antecedents. Investor behaviour in anticipation of this event is not predictable, as the literature on experience-based choice attests (see e.g., Rakow & Newell, 2010). Fourth, where a new risk event is expected to occur, but not in the near future, investors apply a form of the threshold heuristic and behaviour is again unpredictable. Although small probability events are often underweighted (Hertwig & Erev, 2009), salience may be increased by, for example, films featuring a post-apocalyptic future, such as *Avatar* (2009). Critically, no temporal dimension defines an explicit time period; these vary depending on the salience of specific issues.



In summary, it is hypothesised that investor behaviour is predictable when risk events have occurred in the recent past or are expected to occur in the near future. However, investors underweight the risk of events in the recent past recurring, and overweight the risk of events occurring in the near future. For risk events that last occurred in the distant past, or are only expected to occur beyond the near future, investor behaviour is unpredictable, even where there is a high confidence that the event will occur at some point, and that its impact would be material. However, uncertainties associated with the timing of future risk means that the curve is shaped less by temporal discounting and more by salience and the availability heuristic. Meanwhile the threshold heuristic contributes to myopia in present behaviour.

The rest of this paper attempts to test the conceptual validity of this predictability discount curve empirically, based on interviews with professional investors, on the subject of corporate water risk. Uncertainties associated with this topic are particularly high due to complex permutations in terms of cause and consequence. Baseline data such as demographics, changing consumption patterns, climate variability and so on have contributed to a consensus that such risks exist, but there is little agreement on when these risks will impact shareholder value, or the magnitude of the impact (see e.g., Crawford & Seidel, 2013).

Some 75% of the interviewees are Chief Investment Officers (CIOs), with more than 10 years' of experience in their current or similar role. By targeting CIOs rather than, for example, Socially Responsible Investment (SRI) personnel, the paper seeks to extend beyond the territories typically occupied by academic studies in this area.

3. Approach

The sample was screened to include only those fund management firms that were signatories to *both* the UN Principles for Responsible Investment (UNPRI), and the Carbon Disclosure Project's Water Disclosure (CDPW) report. As such, they could be considered 'exemplar' investors from the perspective of engagement with corporate water risk. At the time of analysis (June 2012) there were approximately 980 investment manager and asset owner signatories to the UNPRI worldwide, and some 470 comparable signatories to the CDPW. Asset owners were excluded on the basis that the management of these assets was often contracted out, and a further geographical screen was applied to the signatory lists. Only qualifying firms based in Australia, South Africa, the UK and the USA were approached. This filter was applied to make the administration of telephone interviews more manageable in terms of common language, volume of respondents and timeframes. The choice of countries was also deliberate to facilitate comparisons. Based on these screening criteria, a total of 60 investment managers were identified, of which 12 were based in Australia, 6 in South Africa, 24 in the UK and 18 in the USA.

Interviews were conducted between June and August 2012 via Skype during the respondents' local business hours, recorded as digital audio files, and transcribed thereafter. A series of semi structured questions was developed for the calls. It was made clear when contacting investors that all responses would be gathered on an anonymous and non-attributable basis, and that any requests for additional confidentiality would be observed. In total, responses were received from 20 of the institutions contacted, and telephone interviews were completed with 12 investment managers. The response rate varied markedly by country, with Australia at 33%, South Africa at 50%, the UK at 8% and the USA at 17%. Each interview lasted an average of 19 minutes, so while the sample size is small, the extent of individual engagement was meaningful. The respondents were generally highly experienced, with 75% stating they had held an equivalent position for at least ten years. They represent firms of various size, with 50% running investment teams of 5–20 professionals, 42% running teams of more than 20 professionals, and the remainder, between 1–4 professionals.

The questionnaire covered six topics: perceptions towards corporate water risk disclosure; engagement with their portfolio companies; internal processes and decision making; the relevance of proximity; a self-assessment of their salience as stakeholders; and future priorities. All respondents were invited to comment on any other aspects of the topic that they wished to.

4. Discussion

The discussion frames investors' individual responses within the four temporal dimensions that shape the predictability discount curve. These are the near past; the distant past; the near future and the distant future. For each dimension, drivers of the predictability discount in investors' present behaviour are identified (Figure 4). These drivers are then discussed in the context of investor responses. It is important to re-state that no dimension covers a specific time period; what constitutes the near and distant past (or future) entirely depends on the salience of the specific issue.

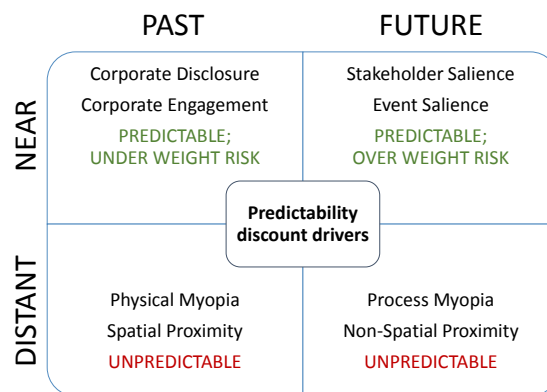


Figure 4. Predictability of Investor Behaviour

Near Past

It is proposed that the predictability of investor behaviour in response to risk events in the near past is shaped by corporate disclosure and engagement. Over the last five years, a status quo appears have developed around perceived best practice in corporate water risk disclosure. Money (2013) argues that this is being shaped by companies' resource dependence within their supply chain, and mimetic process by their peers. Legitimacy is being accorded to formats of disclosure that emphasise, for example, improvements in water efficiency, or political engagement and collaboration. Moreover, much of the extant corporate water risk disclosure appears to have been shaped by institutionalised normative processes that involve the corporate social responsibility (CSR) functions within a company determining the form and content of disclosure (Money, 2013).

In the study, the interview commenced by respondents being asked their views on the CDP Water Disclosure Report (CDP, 2012), the de facto bellwether for water risk disclosure to investors. Strikingly, only 58% of respondents were aware of the existence of this report, let alone that their own firm were signatories to it. Respondents were then asked whether their firm reviewed corporate disclosure against the Global Reporting Initiative (GRI) indicators. Just 17% of respondents claimed to evaluate disclosure of GRI data. Indeed, only 25% of respondents cited company disclosure as their primary source of information when evaluating corporate water risk.

Interviews with CIO's pointed to scepticism—verging on cynicism—of the value of water risk disclosure within CSR reports. At its most benign, it was regarded as of possible descriptive interest, but unlikely to meaningfully affect perceptions of shareholder value. Less benign comments included several observations that disclosure was increasingly focused on “managing what is measured”, rather than “managing what is meaningful”, and that materiality of risk did not appear to be an applied criterion. Among the most hostile responses were from investors who regarded the entire approach by corporates to water risk disclosure as little more than a public relations exercise.

In terms of corporate engagement, many respondents expressed frustration at the classification—by companies, asset owners, consultancies and others—of water risk as an ESG issue. Current approaches were described as “a triumph of heat over light”, with shareholder value often being squandered by corporates paying for consultancy services where the outputs were at best derivative and ambiguous. Third party initiatives to provide water risk assessment tools were considered well-meaning but ultimately ineffectual. Several respondents took the view that until water risk was somehow embedded within financial reporting disclosure, corporate engagement on the topic was not going to be taken particularly seriously by investment managers.

The generally dismissive view taken by CIO's on corporate water risk disclosure appears to exist despite – or perhaps because of—their awareness of risk events in the recent past. As one investor put it, “I cannot begin to tell you how many times I've heard someone tell me that the floods in Thailand cost Dell millions of dollars. So what? It doesn't mean it is going to be an annual event.” Indeed, a few anecdotal narratives have achieved a high velocity of circulation. Other examples included the classification of water supply crises as a top 5 global risk by the World Economic Forum (Forum, 2011); and the McKinsey report that warns of a 40% gap between water supply and water demand by 2030 under business as usual (2030 Water Resources Group, 2010).

The publicity associated with these narratives undoubtedly increases their salience, but respondents commented that the drivers of the publicity were often the consultancies or agencies who were selling an ESG-related service. As a result, investors appeared to apply a discount to the veracity of the narrative (i.e. “well they are bound to say that”) which combined with the gambler's fallacy effect, meant that investors possibly underestimate the probability of a recent water risk event recurring.

These findings are supportive of the assertion that shareholders in companies that are exposed to corporate water risk appear to accept the structural inadequacies of the prevailing disclosure regime, because they perceive their salience on this topic to be low. The assertion is also consistent with MAW's dynamic relationship between stakeholders and a firm's managers, in which stakeholder attributes are variable, not steady state. Moreover the attributes are socially constructed reality, where it is perception rather than objectivity that matters. It is also important to note MAW's observation that consciousness and wilful exercise may or may not be present. So shareholders may exhibit a passive acceptance of the status quo in terms of lack of salience without having consciously considered the implications with regard to a structurally inadequate disclosure regime

Based on the responses from this study at least, investor behaviour in response to corporate disclosure and ESG engagement is generally predictable. Investors widely regard current disclosure as generally unfit for purpose, and—inasmuch as the subject is raised at all—would be exhorting companies to focus on materiality in their disclosure, and to step away from descriptive, qualitative CSR content (“fewer glossy photos of poor kids

playing next to sprinklers please”) in favour of data that can be quantitatively evaluated, meaningfully. Arguably the increase in the number of investor signatories to the CDP Water Disclosure Report is symptomatic of this predictive behaviour. However, a degree of cynicism is evident amongst some CIO’s regarding even these initiatives.

Near Future

It is proposed that the predictability of investor behaviour in anticipation of risk events in the near future is shaped by perceptions of relative salience. This is best understood in terms of stakeholder salience; and event salience.

First, in terms of stakeholder salience, only 25% of respondents believed that shareholder interests should be the top priority for companies when managing water risk; while 75% of respondents believed that consumers or regulators should be the top priority:

“Our clients are obviously our priority and similarly for our portfolio companies it might be consumers, or local communities, or maybe government, depending. But the top priority is unlikely to be shareholders.” SA06

“Water regulators in every country know the issues better than anyone. They're working on these things day in and day out. They know much more than investors in London. We're bringing power to the table but not much else. For example, if I want to know about water issues in Mongolia it is easier for me to get a water expert at Coke to talk about them than it is to get the Mongolian regulator. As far as the Mongolian regulator is concerned, my query is not that important. But for Coke, I am powerful [as a shareholder], so they will talk to me, even if they're not the best qualified to answer my questions.” US09

“Our clients say they want us to do ESG stuff and engage with companies in changing behaviour, but in truth they don't want us to spend much of their money doing it. So our mandate is perhaps weaker than it could or probably should be, given our position as shareholders and our belief in sustainable behaviours. There isn't much follow up, and I think a lot of our competitors who claim otherwise are doing some quite cynical green-labelling.” AU08

Investor behaviour is likely to be sensitive to perceptions of changes in regulatory activity or consumer behaviour in the near future, and indeed this is intuitive. However this also suggests a passive role for investors, who apparently perceive their long term interests as beneficial owners of the company to be better served by effective non-involvement in the company’s decisions on management of water risk. Certainly this is not a universally held position (Hayek, 2013) and stands apart from the momentum that has built behind increased shareholder activism in recent years (see e.g., Rock, 2013 for a summary). But it is nonetheless consistent with emergent literature that proposes normative arguments for managing shareholder interventions, and rolling back some of the power that activist shareholders have gained (Bainbridge, 2013).

In reality, these relationships are probably more nuanced. Perceptions of relative salience may contribute to investors effectively abrogating their sense of responsibility in influencing corporate behaviour on water risk, while simultaneously taking a more activist position on issues where they regard their relative salience to be much higher, such executive remuneration. It would also help explain the why the status quo has endured for corporate water risk disclosure that is unfit for purpose (Money, 2014). Separately, whether or not it results in investors over-weighting a probable risk event as the literature suggests, has not been tested empirically in this paper. It is rare for prior probabilities of a water risk event to be specified explicitly, and so the significance of the availability heuristic may be diminished in the decision making process.

MAW described stakeholders in possession of all three attributes of power, legitimacy and urgency as ‘definitive’, with the highest salience. Based on this exercise in self-perception, it would be difficult to describe shareholders as definite stakeholders, when it comes to water risk. They see their power as moderate; their legitimacy as ambiguous, and exhibit an apparent lack of urgency, both within their own investment decision making process, and in terms of their expectations of the company. Combining individual attributes does not appear to increase salience.

Second, in terms of event salience, it is proposed that investors typically regard water as a derivative risk, associated with either actual or anticipated events in the near future. That is, corporate water risk is generally secondary to the event itself. An example of such an event would be hydraulic fracturing (fracking) in order to retrieve shale gas:

“We are keenly aware that water is a key resource and increasingly short in supply, but we don't have an overarching view on water. Water comes up not as a top down issue but will be raised informally as a bit of a

chat when discussing a topic e.g. shale gas, or the beverage sector. We talk about water risk a lot but don't think it is changing our views." AU10

"We have seen [from the US] that fracking has the potential to dramatically reduce gas prices, so companies engaging in these activities are obviously of interest to us as investors. But the jury is still out in terms of the implications for water quality and supply. The extractive sector is a concrete example of where we would look to understand water risk." UK20

In the case of event salience, the relevance of the availability heuristic in framing investor behaviour is likely to be significant. The heuristic is at work when decision makers base judgments on information that more easily captures their attention (Vasiljevic, Weick, Taylor-Gooby, Abrams, & Hopthrow, 2013). The risks associated with fracking would almost certainly be capturing more of this attention now than say, a decade ago, despite the fact that the process has been commercial use for more than half a century (Montgomery & Smith, 2010). The subject has garnered exposure in high profile academic journals (e.g., Howarth, Ingraffea, & Engelder, 2011) as well in popular media, which can fuel the availability bias (Maguire & Albright, 2005). When unlikely events are explicitly stated—such as flammable methane escaping from household water taps (e.g., Mooney, 2011)—the outcomes become salient. Events that elicit a strong emotional reaction may be given too much weight relative to their probability (Viscusi, Magat, & Huber, 1987). Investors, responding to media coverage of risks to ground water as a consequence of fracking, may overweight this risk relative to its probability within their decision making process.

Taking stakeholder salience and event salience together, it is proposed here that the predictability of investor behaviour in anticipation of corporate water risk events in the near future is relatively high, and that as a consequence of the availability heuristic, investors overweight these risks in their decision making process.

Distant Past

It is proposed that the predictability of investor behaviour in response to risk events in the distant past is shaped by physical myopia and spatial proximity. Physical myopia is defined here as associated with the threshold heuristic, where the probability of a shock event is inversely correlated to the length of time that has elapsed since the previous shock event, and at some critical point is treated as if it was zero (Guttentag & Herring, 1986). The timeframes vary depending on the issue, and respondents' answers suggest that for weather-related events, for example, the threshold heuristic applies after even relatively short periods have elapsed.

Interviews were conducted between June and August 2012, and investors in Australia wryly observed that if questions regarding water risk had been asked two years previously, when the country was exposed to severe drought, responses would likely have been more exercised, as water insecurity "was something of a national obsession". However once the drought ended it rapidly receded as a topic of discussion during investment review meetings. Meanwhile in South Africa, respondents cited the unusually cold winter at the time of the interviews, with rare snowfalls in Johannesburg, as probable evidence of the impact of climate change, and the impact this could likely have on water insecurity. Investors in the UK said that the very wet summer could be indicative of changing weather patterns under anthropogenic influence. And investors in the USA observed that the wild fires in California and drought conditions states such as Arizona had placed issues of climate change and water insecurity "right back on the agenda" in American society and politics.

This arguably implies a myopic focus on current or recent weather patterns in shaping the predictability of investor behaviour in evaluating water risk. Weather patterns of the "distant past"—a timeframe that might be no more than three or four years in this case—are not forgotten, but the attention allocated by investors to evaluating consequential water risk based on this history, effectively moves towards zero. One respondent's definition of "climate is what you expect; weather is what you get" is an apt, if slightly glib, characterisation of this. Where observed weather is at odds with climate expectations, probabilistic risk evaluation is jettisoned in preference for decision making that is influenced by physical myopia. As a consequence, the predictability of their behaviour based on baseline information from the perceived distant past, is low.

Physical myopia as conceptualised here is distinct from construal level theory, which proposes that temporal distance changes the way people mentally represent events (Trope & Liberman, 2003). Specifically, the notion of "high level construals"—abstract features that capture the perceived essence of the event—that are more likely to be present the greater the temporal distance, does not form part of the conception. Trope and Liberman suggest the informational and evaluative implications of high-level construals have more impact on responses to distant-future events than near-future events. However, responses from investors provided no empirical evidence that perceptions of change in climate—a high level construal—played a part in the decision-making process for investment; whereas responses suggested that weather—a low level construal—had some salience in the process.

Also, the significance of distance; be it temporal, spatial or societal, which is a defining element of construal level theory (Yaacov Trope & Liberman, 2010), is less relevant in physical myopia. For example the weather three years ago appears to have no greater impact on the investment decision making process than the weather ten years ago.

Academic research on “home bias” (Ahearne, Grier, & Warnock, 2004; e.g., French & Poterba, 1991) has focused on the perceived information advantage for local investors, and implicitly assumes a degree of information immobility as knowledge somehow becomes domestically embedded. In this study, investor responses were also contextualised by their physical proximity to water scarcity. Investors based in Australia and South Africa were considered to be more proximate to water scarcity, while investors based in the UK and the USA were considered to be less proximate. Respondents from the USA were based on the East Coast.

The majority of respondents (83%) agreed that where they lived affected their perceptions, as an investor, of corporate water risk. However, their responses to the question of how this influenced their investment process were ambiguous. For example an investor in South Africa pointed out that while he had first-hand exposure to water insecurity and recognised it as an investment risk, he was constrained by his mandate to invest in domestic stocks and made no conscious adjustments to his portfolio as a result. Meanwhile an investor in the UK said that although she had no exposure to water insecurity as part of her domestic arrangements, her job called on her to travel extensively to regions that experienced water stress. Herewith a flavour of the verbatim responses in response to a question on whether they perceived where they lived to affect their evaluation of water risk:

“I own a rural property 100 acres NW of Sydney. All the farmers care about is fire and water. Australia is the most urbanised country in the world so city folks and politicians don't understand importance of water to the country.” AU02

“I live by the sea, in Cape Town. There are lots of dams but summers are hot and dry and the municipality says you cannot water gardens before 6pm, and only twice a week. Lower rainfall and falling rivers means we cannot use water the way we like. Municipalities have been encouraging households to think about how they use water to promote efficiency, which is good.” SA03

“I was visiting a friend in Cape Cod and they are recycling the rain water as wells are so expensive. I go to holiday in the Caribbean where I see them recycling water. I have a condo in Maine and because water is too expensive they don't have hydrants in the street. And I have seen wildfires in Colorado and California this year. It all seems interrelated.” US17

“From a UK perspective we are not used to worrying about water, but I have spent time in the Hebrides and even there in the summer there are limitations. Generally there is more of an awareness now than say 10-15 years ago, when the mantra was all about free water. From a UK perspective this is down to the marginal supply cost.” UK20

Nearly all investors in South Africa and Australia said that while they felt that *they* understood these issues well, their view was that other domestic investors did not. It was, they thought, therefore largely ignored, and they felt there was no investment advantage to them in applying a premium or discount to local companies variously affected by water risk. They supported this by suggesting that other domestic issues loomed much larger amongst local investors—such as labour relations, energy availability and government policy—such that any adjustments based on water risk would be eclipsed by these bigger considerations.

While the small sample size of interviewees precludes a meaningful interpolation of responses, it is proposed that the further investors become embedded within their domestic environment, the more that they discount their relative proximity to historic and persistent water scarcity (a risk since the distant past) as a factor in evaluating corporate water risk. This may be a result of conditioning to a water scarce environment, where supply disruptions and a heavy emphasis on recycling are part of the norm. Conversely for investors conditioned to a water abundant environment since the distant past, their awareness of the contrast in conditions as a result of travelling to water scarce regions translates to a comparative advantage in knowledge and information. Perhaps in these circumstances, home bias actually results in investment under-performance, as non-domestic investors find themselves better able to evaluate corporate water risk in regions where that risk is material. Of course this contention cannot be substantiated by the findings here, and in any event, attributing relative investment performance on the basis of water risk evaluation would be a fiendishly complex exercise. However, the relationship between time and spatial proximity to water risk is complex. Where this length of time is perceived—by the investor—to extend into the distant past, the predictability of their behaviour in response to water risk events diminishes, as other considerations increase in influence.

Distant Future

It is proposed that the predictability of investor behaviour in response to risk events in the distant future is shaped by process myopia and non-spatial proximity. Process myopia is defined here as the unconscious unwillingness of investors to adapt their process of risk evaluation in response to changes in baseline information. It is related to hindsight bias, where after an event, investors believe they knew the outcome of that event before it actually happened (Roese & Olson, 1996). This provides a false sense of being able to predict the future. Investors who succumb to hindsight bias overestimate their capacity to predict and manage risks (Christensen-Szalanski & Willham, 1991). As a consequence they did not adapt their investment process to incorporate improved baseline information as they 'know it better'. While laboratory research suggests (Hertwig, Fanselow, & Hoffrage, 2003) that the more experience or expertise individuals have, the smaller the hindsight bias, field experiments (Golden, 1992) show that education and years spent with an organisation—a proxy for experience—did not influence recall (Cassar & Craig, 2009). This is supportive of the argument that process myopia can become institutionally embedded within investment management firms. And because the risk event is, or is at least perceived to be, in the distant future, the instances in which these hindsight biases face direct scrutiny may be few and far between.

Investors were asked what proportion of their portfolio companies had proactively engaged them in a discussion about water risk. All respondents said less than one third of companies had engaged, and a heavy majority stated that no company had ever engaged them on the topic. Meanwhile only 25% of respondents claimed to discuss water risk as part of their internal investment process, at least monthly. Of the 58% who said it featured at least quarterly, none claimed a regular, explicit discussion of corporate water risk within their decision making framework.

"People tend to sit round saying water is the next big risk, but a lot of the research shows that corporate risk looms less large than we perceived to start with. Citigroup did a piece surveying mining projects around the world; which ones were at risk due to water scarcity, and it found that very few are. I send my analysts to meet companies and the management of one ASX 20 says that water is the last thing that keeps him awake at night. This is what I often hear. There is a gap between perception and reality in corporate water risk which is at odds with the social side." AU12

"We take a rifle rather than shotgun approach to our investing, and look at companies on a bottom-up basis. So while water risk will matter more or less for some companies in our portfolio, I just don't see it as some big thing that will suddenly lay waste to valuations. We just need to factor it in on a case by case basis." AU10

Process myopia also appears to become embedded because investors assume, when it comes to risks anticipated over the distant future, that companies are better prepared than their disclosure implies. This assumption does not appear to be empirically substantiated, however. The argument offered is that companies (and by implication their management), are 'nearer to the coal face' of water risk, and are better positioned to see, anticipate and respond to water risks. Their actions companies take may not feature in their disclosure, according to investors, because it may be competitively sensitive, or more likely may be socially or culturally incompatible with the company's initiatives in community development. This may seem a somewhat cynical assessment, but is based on a view—evidently held by many CEO's—that legitimate distinctions exist between what a company does and what it discloses when it comes to the husbandry of scarce resources such as water, with the attendant rights and obligations that are associated with their use. It is however, almost impossible to comprehensively test the veracity of this view, given the difficulty in establishing the counterfactual, i.e. how can one test *ex ante* whether a company's actions over the distant future are distinct from its disclosure.

It was previously proposed that the predictability of investor behaviour in response to risk events in the distant past is shaped by spatial proximity. When it comes to risk events in the distant future, investor behaviour appears to be associated with other, non-geographic forms of proximity. For example, respondents from firms where CIO's took an active part in the investment decision-making process and would frequently travel around the world to visit investee company operations would typically have a more common view on water risk than other respondents who might be geographically proximate, but travel less. It suggests that investors at global institutions which share proximate cultures, values and process may collectively exhibit a greater awareness of local issues such as water risk, and may do relatively more to incorporate that risk within their investment process, than domestic investors who have more experience of the local issues, but whose collective cultures, values and process results in their doing relatively less to incorporate the risk associated with those issues, within their investment process. This paper does not offer substantive empirical evidence to test this hypothesis, and nor indeed was that part of the research question. But it is a potentially fruitful area for further research, particularly

if it results in a better understanding of how the cognitive, social, institutional and organisational dimensions of proximity can be extended from Boschma's (2005) work on learning and innovation. In particular, further examination of institutional proximity (Kirat & Lung, 1999), organisational proximity (Meister & Werker, 2004), cultural proximity (Gill & Butler, 2003), social proximity (Bradshaw, 2001) and technological proximity (Greunz, 2003) may event point to patterns of predictability in the future that have not been identified in this research. However, the connections between institutions on this scale remain difficult to make in the context of evaluating water risk, based on the information available.

5. Conclusion

This paper attempts to reconcile investors' tolerance of corporate water risk disclosure that appears to be unfit for purpose, with the fact that their salience of water risk as an investment issue is greater now than at any time in the past. It has argued, through the application of stakeholder theory that the dynamics that drive relationships between companies and investors are predicated by the attributes of power, legitimacy and urgency. This paper proposes that an asymmetric "predictability discount curve" exists: where an investor's behaviour today in response to a probabilistic event that will affect shareholder value becomes more unpredictable the further into the past (or future) that a comparable event occurred (or was expected to occur). The temporal framework can be further broken out into the near past; near future; distant past; and distant future, while the drivers of predictability in investors' decision making process have been proposed for each quadrant, based in part on responses from Chief Investment Officers to semi-structured interview questions. Limitations of this study include a small sample size, but the paper primarily sets itself out to build, rather than test theory. Specifically, it offers a description of the process employed by leading institutional investors in evaluating corporate water risk in their portfolios, and perhaps most importantly, provides a working explanation of investors' tolerance of the status quo. It also begs the question as to whether a framework can be developed by which the disclosure of corporate water risk can be meaningfully evaluated by investors and other stakeholders, and this is a subject of ongoing research.

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