FINANCIAL INSTITUTIONS: TAKING GREENHOUSE GASES INTO ACCOUNT

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1. SYNOPSIS

This paper makes a rigorous investigation of the ways that financial institutions in the US, Europe, Japan and Australia have applied regulatory requirements to take environmental considerations, and particularly industrial emissions of greenhouse gases, into account. The paper draws on the principle of precautionary management to outline a set of information requirements and institutional conditions that would permit investing by reference to environmental considerations. Empirical evidence is provided and used to build a theory of environmental investing linking investors' behavioural motivations, behavioural intentions and actual decisions.

Field data are captured using three methods. Investors' motivations to take environmental considerations into account are identified using interviews in the US, Europe, Africa, Asia and Australia and covering the main functions of investment management, namely, fiduciaries of insurance companies and pension schemes, portfolio managers, analysts, information providers, and private equity investors, as well as representatives of the financial media. Investors' intentions and behaviour to take environmental considerations into account are identified using a questionnaire and behavioural experiment administered to another global sample of individuals working in managed investment services and at nongovernmental organizations.

While the demand of diversified investors for company-issued environmental reports is robust, investors' use of such reports is limited. Nearly sixty percent of questionnaire respondents are dissatisfied with the appropriateness, completeness and reliability of company environmental reports for portfolio analysis. For financial institutions investing across a broad universe of securities, such as pension funds and insurance companies, the expected minimum institutional conditions and information required for environmental investing are not present. Interview data suggest that the principal factors impeding greater scale of environmental investing are public policy encouraging reporting and not addressing market structure; isomorphic pressure; unavailability of company-specific environmental data in modes familiar to investment analysts; and absence of professional education.

Investment management style is a partial determinant of investors' use of company environmental reports. Investors that target environmental stocks, such as private equity and energy funds, have little need of company-issued environmental reports. Another group of well-diversified financial institutions using passive, index-driven investment styles are unable, by virtue of that investment mandate, to use company environmental reports for portfolio selection purposes. A third group of active, stock-picking fund managers tend to treat company environmental reports as indicators of management quality, not as inputs to the asset allocation process.

These observations have important implications for regulatory policy issues concerning environmental information, corporate disclosure, fiduciary governance,

and the environmental policy role of financial institutions. All interviewees were dissatisfied with extant policy requirements. A general call is made for policymakers to come to the defence of a conceptualisation of environmental sustainability valued for its own sake and for the relationships it can engender. Accepting that statutory company financial reporting and company sustainability reporting has declining value relevance to investors, we suggest a combination of policies directed at the relationships between financial institutions and the companies that they invest in. Desirable outcomes can be expected if policy measures were introduced that focus on the nature of relationships between trustees, fund managers and investment intermediaries of institutions holding diversified investment portfolios.

Key words: environmental policy, capital markets, fiduciary investing, trust law, portfolio theory, carbon reporting, social ecology.

2. EXECUTIVE SUMMARY

The paper is motivated by the push by regulators and policymakers for the private sector to shoulder environmental responsibilities (King and Lenox, 2000; Haufler, 2001). Recent policy pronouncements from the US, EU, Japan and Australia have been directed at investors' recognition of the ways companies have managed their carbon emissions levels and related environmental impacts, and it is this group of policy pronouncements that the current paper focuses on. Although such policies span different jurisdictions and geographical areas, all have advocated essentially the same approach, being requirement for financial institutions to disclose if they take cognisance of environmental considerations (as conceived by the regulated entities themselves), and if they do so, description of the decision processes involved. Despite the variety of investing styles and practitioners' approaches to environmental issues, regulators have adopted the view that environmental investing is desirable and is best encouraged by requiring that financial institutions disclose how they go about it.

At least four lacunae in the research warrant an in-depth investigation of regulations that require environmental investing. One, connections between company-shareholder relations and investor governance have been theorised using an assumption that investment portfolios commonly hold international assets. However, to now, empirical investigations have been conducted on only a local scale (e.g., Tilt, 1994; Richardson, 2003a, 2003b, 2009a, 2009b; Black and Tolbert, 1994; Roe, 2006; Haigh and Guthrie, 2010; Clark, 2010; Clark et al., 2008).

Two, calls for improved knowledge of the institutional frames surrounding financial markets (e.g., Holland, 2006), the behaviour of financial institutions in market settings (e.g., Holland, 2009) and the regulation of relations between investors and companies (e.g., Clark, 2006; Clark and Hebb, 2005; Clark et al., 2008; Ferreira and Matos, 2008) have not been answered.

Three, arguments for connections between the quality of increasingly transnational corporate governance systems, and the responsiveness of companies towards 'borderless' labour, social and environmental considerations (e.g., Clark and Salo, 2008; Cooper and Owen, 2007) suggest that an empirical investigation of global scope is timely.

Four, research on public policy requiring that investors intervene directly in companies has tended to criticise the mode and content of regulations (e.g., Clark, 2003, 2006; Richardson, 2003a,b; Black and Tolbert, 1994; King and Lenox, 2000; Bumpus and Liverman, 2008; Bäckstrand and Lövbrand, 2007; Richardson, 2009b; Haigh, 2006; Haigh and Guthrie, 2009; Gibson, 1996; Crowther et al., 2001; Farzin and Kort, 2000). Research in the motivations and behaviour of financial institutions relative to such requirements, however, is scant. Attention directed towards investors' use of social and environmental considerations has focused on retail markets where regulatory requirements may not apply (e.g., Holm and Rikhardsson, 2010; Bruyn, 1987; Belkaoui, 1980; Buzby and Falk, 1979; Capon et al., 1996, 1994; Cullis et al., 1992; Freedman and Stagliano, 1991; Haigh, 2008; Harte et al., 1991; Lewis et al., 1998; Lewis, 2001; Marks and Mayo, 1991; Milne and Chan, 1999; Shapira and Venezia, 2001).

Exploratory examinations are conducted to seek insight into three questions:

- Identification of investors' motivations, behavioural intentions and actual behaviour with respect to regulations requiring disclosure of the use of environmental considerations in decision-making processes.
- Identification of connections between the governance of financial institutions and environmental investing.
- Identification of institutional features contextualising environmental investing.

Answers to these questions are provided using two samples of investment professionals working in financial institutions known to be frontrunners in environmental investing. The paper uses three data collection methods. Supplemented by desk research, we use a series of interviews to provide insights into investors' motivations for environmental investing, their investing strategies, and institutional features that shape those strategies. A sample of thirty-three professionals working in financial institutions, service organizations and media organizations located in North America, Europe, Japan and Australia is obtained for the interviews. Secondly, we use an attitude survey to identify the information sources used to inform investors' behavioural intentions with respect to environmental considerations. Thirdly, we use a behavioural experiment to measure the factors that influence investors' actual decisions to allocate funds to environmentally sensitive assets. For the attitude survey and experiment, a separate sample of forty-six respondents is obtained capturing the principal institutional functions in investment management.

The outcomes are unexpected. We identify an absence of a general market momentum towards environmental investing while at the same time strong demand for company reports on environmental matters. Although most questionnaire respondents and interviewees had collected company-issued reports on greenhouse gases emissions levels and environmental management programmes, all were dissatisfied with that information, and none had used it to guide portfolio allocation levels.

A distinction between passive and active investment styles is important in environmental investing[1]. Climate-change researchers may be able to identify new unusual assets with unusual risk and return behaviours likely to emerge in a carbon emissions-restricted world and which may persist over business cycles and longer horizons. This kind of research can provide hints as to where new diversification and value benefits might arise in carbon emissions-restricted investment portfolios, be they diversified portfolios represented in the world's major stock exchanges, or thematic portfolios concentrated on, e.g., sustainable energy stocks.

The behavioural experiment shows that both passive and active investing styles are insensitive to company-issued environmental reports, but for different reasons. Passive, index-driven investors take little cognisance of environmental data (company-issued and otherwise) that do not present as immediate revenue streams. Active, 'green' investors treat company environmental reports as important but do not use them to guide portfolio allocation.

We identify creative dimensions in individuals' decision processes and behavioural strategies. We also identify that creative dimensions of investment management have been stifled due (i) to relevant data being unavailable in familiar formats and (ii) by relaxed policy pronouncements. Policy guidance issued in the US, Europe, Japan and Australia requiring investors to disclose how they recognise environmental considerations has promoted a 'race to the bottom' in terms of the quality of information disclosures. Compliance can consist of a statement that environmental considerations, and that term has not been defined, 'are not taken into account'. This type of regulatory initiative and its predictable behavioural response has attracted criticism which is not repeated here (e.g., Giddens, 2008; Hale, 2010; Haigh and Guthrie, 2009).

An observation that no institution participating in the study had formulated a systematic approach to environmental investing carries implications for institutional design and public policy. We identify five factors currently restricting the take-up of environmental investing:

- Policy requirements that do not include sanctions for the regulated nor remedies for parties that might benefit from the regulated disclosures.
- Investor uncertainties surrounding the direction of public policy.
- Absence of standardised frameworks and methodologies that would facilitate calculation, measurement and reporting of companies' management of carbon emissions levels and environmental impacts.
- Absence of appropriate tertiary and professional education provided to investment professionals.

[1] To clarify, a passive investment style describes portfolio construction conforming to the composition of benchmark indices (e.g., the MSCI Thematic and Strategy Indices, and Standard and Poor's equity, bond and thematic indices). An active investment style describes a form of asset selection that may depart from the composition and weighting of the assets comprising benchmark indices. The active-styled portfolio manager will set expected portfolio returns for active investors, not the benchmark index. Sources: http://www.mscibarra.com/products/indices and http://www.standardandpoors.com/indices/main/en/us.

- Tendency of fund managers and investment analysts to focus on revenue-attracting aspects of environmental management such as carbon prices, at the expense of risk-predisposing aspects such as sectoral exposure to the effects of extreme climate events.

The data can be viewed as support to literature that has found that company financial and 'sustainability' reporting has declining value relevance to investors. Accordingly, we suggest a combination of policies directed at the relationships between financial institutions, the institutions with which they interact, and the companies in which they invest. An observation that some high-profile companies and hitherto conservative financial institutions have lobbied regulators for stronger policy measures suggests that a broad-scale market movement towards environmental investing is possible. A call is made to policy-makers and regulatory agencies for clearer signals on the gravity of portfolio exposures to climate change and environmental risks.

Greater uptake of environmental investing is unlikely in the absence of the following measures:

- A legal reconceptualisation of fiduciary requirements that connects asset value and portfolio exposure to environmental and regulatory risks.
- Requirement for financial institutions to disclose how their exposures to environmental risk influence portfolio risk.
- Requirement for financial institutions to demonstrate deployment of environmental considerations in organizational articles of association, and insertion of the same as a contractual requirement for service providers.
- Recommendation from policymakers that professional education programmes delivered to the investment industry cover environmental, social and long-term governance risks.

Of legal and theoretic interest are observations that some investors have identified corporate environmental management programmes as indicating the quality of corporate governance, and as pointing to specific investment risks in industrial sectors. Such purposes are at odds with the prevailing theory of fiduciary portfolio management referencing risk-constrained investment return (Browne, 2004) and market contagion (Goldstein and Pauzner, 2004). If the practices we have observed indicate potential for a broad-scaled market movement across a range of investment styles and investment vehicles, a social-ecologic portfolio theory surely has a place in legal and investment management thinking.

The paper is structured as follows.

In a section immediately below, discussion is made of the scope of relevant policy pronouncements on environmental investing and company environmental reporting. Consideration is given to prevailing theories of investment risk management and a range of portfolio models that might permit pooled investment portfolios to reference environmental considerations.

A following section outlines the methods used to collect and analyse the data. The ways investors have recognised environmental considerations are identified using a

framework that links behavioural motivations, behavioural intentions, and actual behaviour.

The empirical outcomes are presented in three sections corresponding to administration of a questionnaire, a behavioural experiment and a series of interviews. The combined outcomes are used to structure a critique of the prevailing theories of investment risk management. The paper closes with consideration of the policy implications.

3. ENVIRONMENTAL POLICIES APPLICABLE TO FINANCIAL INSTITUTIONS

This section begins by outlining the scope of policy pronouncements issued around the world that encourage financial institutions to recognise environmental considerations. (An appendix includes a listing of relevant pronouncements issued in the United States, the European Union, Japan and Australia.) A review of the literature on investor governance and portfolio management follows. Consideration is given to the theoretical bases and information requirements of passive and active portfolio management styles. Following the interdisciplinary approach of Kysar (2010), insights from economics, finance, accounting, consumer theory, marketing management and cognitive psychology are used to outline a set of minimum information requirements for environmental investing.

In a period of intense concern for the stability of capital markets, the hope of regulators and supervisors has been that by requiring financial institutions such as pension funds and insurance companies to take into account 'environmental' (and 'social' and 'labour') 'considerations' – the regulations are not more specific – those institutions will be better placed to manage investment risks.

Policymakers have combined the latter concern with obligations under existing and nascent environmental legislation. Pronouncements recommending disclosure of shareholder relations with companies on environmental matters have been issued by the EU (e.g., Alexander et al.[2]; Commission of the EC[3]), Denmark, Sweden, Norway, France, the Netherlands, Spain, Sweden and the United Kingdom, as well as from places further afield such as Australia (readers may refer to an appendix). A useful example of the type of policy considered in this paper is provided by Australia.

[2] Alexander, K., Eatwell, J., Persaud, A. and Reoch, R., Report–Financial supervision and crisis management in the EU, IP/A/ECON/IC/2007-069, 2007, Policy Department Economic and Scientific Policy, European Parliament, Strasbourg.

[3] Commission of the EC: 'Communication--Implementing the partnership for growth and jobs: making Europe a pole of excellence on corporate social responsibility', EU High-Level Group on CSR, 22 March 2006, Brussels (available) http://eur-lex.europa.eu/lexuriserv/lexuriserv.do?uri=com:2006:0136:fin:en:pdf (accessed 21 December 2009); Financial Services Policy 2005–2010; Report–Corporate governance in financial institutions and remuneration policies, 2 June 2010, Brussels (available) http://ec.europa.eu/internal_market/company/docs/modern/com2010_284_en.pdf (accessed 21 December 2009).

Australia's programme of regulatory reform culminated in the Australian Financial Services Reform Act (Cth) 2001 (FSRA) effective 2004. Among a raft of reporting and licensing requirements, managers of pooled investments are required to attach certain disclosures to retail financial products in a document known as a product disclosure statement. The regulator, the Australian Securities and Investments Commission, requires that a Product Disclosure Statement consist of information that a "person would reasonably require for the purpose of making a decision, as a retail client, whether to acquire the financial product"[4]. Relevant financial products are consumer financial products issued by managed (mutual) funds, pension (superannuation) funds, and investment life and general insurance corporations.

A section inserted into Australia's Commonwealth's Corporations Act stipulates that a Product Disclosure Statement must disclose the following information:

> [...] if the product has an investment component – the extent to which labour standards or environmental, social or ethical considerations are taken into account in the selection, retention or realisation of the investment.[5]

If product issuers do not have regard to those considerations, an attached regulation requires a statement to that effect.

The Australian requirement applies to a wider range of products than does its precedent, found in an Amendment and Regulation to the British Pensions Act 1995. Since July 2000, trustees of British occupational pension schemes have been required to disclose their policies on social investment in their Statements of Investment Principles. In 2002, France and Germany issued similar regulations. All such pronouncements stipulate that compliance is met if the financial institution discloses that it does (or does not) not take environmental considerations into account. The country to follow suit most recently is Denmark, which in 2009 issued regulations applying to listed and unlisted companies and most types of financial institutions. Denmark requires description of the processes by which financial institutions identify and use environmental considerations. Representing exception to other jurisdictions, Denmark has attempted to define terms such as 'environmental responsibility' rather than leave that to the regulated entities, and has brought in a requirement for independent assurance of pursuant information disclosures.

The type of policy pronouncements considered here are typical of market-based regulatory approaches that neither mandate strict compliance (Montanari, 1999; King and Lenox, 2000) nor offer economic incentives (Helm, 2003; Prakash and Potoski, 2005). Market-based environmental regulation, in particular, has been argued as engendering a 'race to the bottom' (Revesz, 1997, 1992) where responsibility for, e.g., economic externalities is not devolved to the market as intended but instead dissolved in the market.

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[4] Australian Securities & Investments Commission, (PS 168) Disclosure: Product Disclosure Statements (and Other Disclosure Obligations), (2001) Canberra.

[5] Section 1013D(1)(l), Commonwealth of Australia, Corporations Act 2001(Cth), (2001) Commonwealth of Australia, Canberra.

Perhaps unsurprisingly, investor associations have prescribed uniform reporting approaches. The 2004 review of compliance with UK regulation requiring relevant disclosures in Statements of Investment Principles, referred to above, was met by issuance of standard reporting templates by the Association of British Insurers, the Association of Investment Companies, the Investment Management Association and the National Association of Pension Funds. These outcomes have been criticised on the basis that the information disclosures produced have contained little useful information[6]. To turn to Australia once again, (Haigh and Guthrie, 2010) have suggested that the guidelines to its environmental (and labour standards, social and ethical) investing regulation (effective 2004)[7] have not promoted the regulation's objectives of facilitating transparency, comprehensibility and comparability.

A peculiarity of all the pronouncements considered in the current paper is that they allow product issuers to determine the content and format of the required disclosures. (Moreover, with the exception of Denmark, organizations can choose not to have the information disclosures verified.) Product issuers in Europe, Australia and New Zealand need only, to use the wording of the Australian regulation, disclose the following:

> '[...] how adherence [to the regulation] will be [...] reviewed, or a statement that you have no set approach to [...] review'.[8]

By contrast, securities legislation, which like the type of disclosure requirements examined here is aimed at improving accountability for financial consumers and facilitating capital flows, requires that audit opinions be attached to company-supplied financial reports. It should be noted that market focuses on earnings announcements and the existence of renewable contracts struck between investment intermediaries and fiduciaries (see, Fisch, 2010; Stoughton et al., 2009) can both be expected to prune the application of environmental policy in the capital markets.

Further, information disclosures that can consist merely of 'boilerplate' statements that, e.g., "environmental considerations are taken into account to the extent they are judged to be material" cannot be expected to promote a useful exchange of information between companies, investors and their beneficiaries. A requirement that environmental considerations be taken into account is paradoxical if the regulatory agency mandating the requirement does not specify the meanings of 'environmental considerations'. The logic of the phrasing used amounts to an empty statement that environmental considerations (made by whom?) must be considered ('taken into account'). The universal category of 'environmental considerations' univeralises concern but is indifferent as to what content is placed under it -- an insight that Laclau (2005) refers to as the empty signifier. It is open to financial institutions and companies competing with each other in a market setting to get their contents

[6] Reports -- 'Do UK pension funds invest responsibly?' (2002); and 'Will UK pension funds become more responsible?' (2004), Just Pensions, London (available) http://www.justpensions.org (both accessed 21 July 2010).

[7] Australian Securities & Investments Commission, Section 1013DA Disclosure Guidelines, (2003) Canberra.

[8] Australian Securities & Investments Commission, Section 1013DA Disclosure Guidelines, (2003) Canberra.

accepted as the 'true' contents of a given universal signifier like 'environmental considerations'.

Turning to the material signifier of climate change, the UK's Climate Change Act of 2008 provides for certain measures and requirements to be placed on financial institutions and companies. The overriding purpose of this legislation is to limit levels of industrial greenhouse gas emissions using carbon trading and other financial schemes. From 2012, certain information disclosures from UK-domiciled companies and UK-domiciled subsidiaries of foreign companies will be required for accounting purposes linked to some of these schemes. Under Section 85 of the Climate Change Act, the Secretary of State is required to make regulations under the UK's Companies Act 2006 requiring the directors' report of a company to contain such information as may be specified in the regulations about emissions of greenhouse gases from activities for which the company is responsible. The form and content of the information to be provided by companies had not been determined at the time of writing. It can be expected that an outcome of the Act is provision of standardised company-issued reports of emissions of greenhouse gases and matters relating to companies' environmental management programmes.

Barth et al. (2004) suggest that government policies encouraging corporate control by the private sector and emphasising accurate disclosure of information may be associated with greater stability and, hence, lower levels of portfolio risk over long-term investment horizons. Empirical support for these arguments has not surfaced. Even so, environmental investing has the potential to challenge the theory of portfolio management, and policy encouraging a broader scale of environmental investing hence deserves consideration. How an investor might identify and take the characteristics of 'carbon-sensitive' assets into account deserves particular consideration.

Investor governance refers to the relationships between beneficiaries and members of pooled investment funds; directors, governors and fiduciary trustees responsible for protecting their interests; investment managers and advisors engaged in the furtherance of that purpose; and invested companies themselves (Clark, 2006, 2010; Cunningham, 2002). The Tobin-Markowitz portfolio theory on which capital markets are based conceives of investor governance as consisting of the satisfaction of short-term investment yield targets, and requiring little involvement with invested companies provided that certain minimum information requirements are met. Indeed, argument can be made that fiduciary obligations are predicated on attention to short-term considerations[9]. Such a conceptualisation implies that financial institutions are

[9] The pension fund trustee is required to pay attention to three categories of member, namely: those currently active in contributing to the scheme; those who have left the employ of the sponsor but look forward to a deferred pension; and those who are currently in payment as pensioners. The scope of this obligation may be frustrated by certain institutional features, e.g.: the actuarial thrice-yearly assessment of the employer's ability and willingness to meet future pension liabilities as and when they fall due rarely looks out beyond three years; accounting standards (e.g., FRS 17/IAS 19) requiring that a scheme's surplus or deficit is calculated by comparing the current market valuation of assets to the future discounted liabilities of pension obligations; information supplied to members from investment managers which, despite protestations to the effect that historic performance is no indicator of future performance, relies on historic short-term data; and considerable levels of information asymmetry between trustees, their professional advisors (auditors and actuaries), fund managers, security custodians and brokerages (Priddy, personal interview).

interested in the governance of individual companies only to the extent of compliance with applicable laws and codes (Edwards, 1954). Given the prevalence of index-driven investing approaches in financial markets, a short-term approach to investor governance, while perhaps far from ideal, accurately describes current practice.

Given the above, the following is expected to represent an investor's minimum information requirements:

- Each company should disclose adequate information so that investors can calculate the risk, return and value of each potential and actual investment asset.
- The investor needs to have enough information to assess how the company risk and return makes a marginal contribution to the risk and return of the portfolio.
- The investor needs enough information on all assets to calculate the risk and return of the overall portfolio, and to assess if full diversification benefits have been achieved.
- This information should be sufficient to allow the investor to assess if the risk and return and hence value of the portfolio matches or exceeds that of average portfolio values, the latter being measured by that attainable in a benchmark portfolio.

It should be stated that the information requirements outlined above would not be sufficient for all types of investors. The information needs of investors that adopt 'active' management styles, which would include 'value' investors looking for undervalued stocks, private equity investors, and investors taking cognisance of 'environmental considerations', would be quite different to those permitted in the conventional Tobin-Markowitz portfolio model. Active-styled investors can be expected to direct attention to attributes of individual stocks, such as qualitative information about companies and their management and business models, including information on company environmental programmes and how companies address identify and address environmental and reputational risks (Holland, 2006). These types of information items form the content of nascent reporting frameworks of global scope developed by private-sector organizations including the Climate Disclosure Standards Board, Accounting for Sustainability, and the Global Reporting Initiative[10].

The current study identifies the institutional features that would both promote and mitigate against a theory of portfolio management that incorporates ecological considerations and, hence, environmental information items. To appreciate the novelty represented by a decision to allocate assets according to 'environmental considerations', the reader is invited to refer to Figure 1, which outlines the conventional theories of consumer utility and portfolio investment.

[10] Respectively, http://www.cdsb-global.org/reporting-framework; http://www.accountingforsustainability.org/files/pdf/Connected%20Reporting.pdf; http://www.globalreporting.org/ReportingFramework/G3Guidelines.

Figure 1: Rational expectations theory & portfolio valuation

The theory of rational (investment) choice is the economic theory of consumers' decision-making, which is predicated on assumptions of economic rationality and the validity of models based on those assumptions. Arrow assumed that a consequence of a choice fully describes an agent's values "so that he (sic) will be indifferent between two actions which yield the same consequence for each state of the world" (Arrow, 1971, p. 45). Selfish interests are held to wholly direct behavior at all times; the social meanings of private choices are ignored or assumed not to exist. Expected utility theory was founded on Markowitz's analysis of risk and expected return (1952), which conforms to the rational expectations approach developed by Friedman and Savage (1948). Markowitz's analysis is formally built into the Tobin-Markowitz portfolio theory (Markowitz, 1952, 1971) on which capital markets are based.

The central assumption of the Tobin-Markowitz theory is that Markowitz's theoretical relationship of the variance of returns on an investment relative to the mean or expected returns on that investment holds valid under all conditions.

The latter leads to consideration of two further assumptions relevant for investment approaches that reference environmental considerations:

1) There is a fundamental relation between investment return and investment risk such that a representative rational investor can reduce financial risk by spreading it over a number of different assets. By implication, the investor is held to be concerned with the performance of any particular stock to the extent that that performance affects the expected covariance of returns in the portfolio; with diversification, this is expected to be minimal.

2) The systematic risk of an asset is defined by beta, the sensitivity of that asset's rate of return to movements in the entire market. This conception of risk implies that investment intentions are based solely on investor beliefs regarding the future expected return and variance of returns of combinations of assets.

The tenets set out in Figure 1 above do not capture the spectrum of values that might be expected to influence investment managers' intentions to take into account environmental risks (contrast, e.g., Etzioni, 1999, 1988). It is fair to claim that the neo-classical economic model of rational behaviour is unable to describe the spectrum of actions taken by active-styled investors. Beginning perhaps with Lease et al. (1974), scholars have noted that active-styled mutual fund investors seeking to identify 'mis-priced' valuations of companies employ a range of decision criteria wider than the information requirements of portfolio risk and investment return.

Dozens of studies since have challenged the assumption that a passive-styled investor's sole objective is to achieve an appropriately balanced investment risk/return profile (e.g., Cochrane, 2000; Ferreira and Matos, 2008). Behavioural research has shown that consumer attitudes about social issues and moral beliefs influence behavior in ways contradicting the existence of the classic mean-variance optimizers of Markowitz (1952). Kahneman and Snell (1990) and Haslett (1990), for

instance, distinguish five types of utility for an economically rational decision-maker. Slovic (2000) and Statman (1999) observe that individuals' economic decision-making is sensitive to numerous contextual and value-expressive factors. Brennan (1995) measures differences in investors' knowledge, beliefs and tastes to conclude that the representative investor paradigm is not always justified[11].

INFORMATION REQUIREMENTS AND ENVIRONMENTAL REGULATION. It is instructive to interpret active-styled investment management styles that reference environmental considerations within relevant institutional, social and political constructs. Three perspectives on the twinning of managed investment with environmental policies are considered briefly here: the politics of power; social capital; and a socialised conception of investor utility. This material is followed by a statement of the minimum institutional conditions and information requirements expected for a portfolio manager taking into account environmental considerations.

A political perspective of environmental investing is that regulations taking account of social pressures for companies to be more responsible for their ecological impacts are unattractive politically to the extent they are aimed at reductions of economic activity within energy-intensive sectors (Giddens, 2008). At the same time, such regulations seek to promote stable outcomes and the chances for market survival (Fligstein, 2001, p. 10). The carbon emissions data disclosure process can impact policy decisions on a number of levels. Voluntary disclosure by a firm has reputation effects on firm environmental performance but it is not associated with firm value (Clarkson et al., 2010). The economic impact of voluntary disclosures will arise, thus, when public perceptions are sufficiently correlated with investors' concerns about firm value, or put another way, when public perceptions about emissions data are no different than investors' perceptions. Rather than simply wait for this to occur, policies mandating disclosures of carbon emissions data might mediate the shift, providing a legitimate measurement for assessing emissions reductions, and bridging the two forms of information valued by investors: firm-specific and non-firm-specific information.

Multi-nation coordination to deal with large-scale emissions of greenhouse gases faces formidable challenges. National leaders represent their countries at the regional or global level while simultaneously hoping to score political capital at home from constituents (Putnam, 1988). Although some writers have sought alternatives to an international regime approach (e.g., Okereke et al., 2009), we rely on the assumption that investment flows directed at reductions in the volumes of greenhouse gases require coordination across the national and multinational levels.

Power relations in networks are, perhaps, nowhere more salient than in the capital markets (Morgan, 2008; Roberts et al., 2006). A stream of interdisciplinary research has found that the ways financial institutions discharge their fiduciary responsibilities are shaped by institutional features such as analysts' recommendations made on the bases of companies' quarterly profit announcements, and the decision-brokering of

[11] Also, Kahneman 1994, 2000; Kahneman and Riepe, 1998; Kahneman et al., 2000; Kahneman and Snell, 1990; Kahneman and Tversky, 2000; Keene and Raiffa, 1976; Shafir et al., 2000; Slovic, 2000, 1972; de Bondt 1998; Thaler and Barberis, 2002; Thaler, 2000, 1999, 1980; Bazerman, 2001; Barberis et al., 1998.

intermediary agents used in capital markets (see, Holland, 2009; Ali and Gold, 2002; Krishnan and Booker, 2002; Morgan, 2008). Roberts et al. (2006) show that at the private meetings held regularly between financial institutions and companies, company financial directors and investor relations managers consistently represent their companies in terms thought meaningful to financial institutions. External power in such settings is internalised subjectively. The type of public policy considered in this paper also produces a certain subjectivity of power. Policy that permits the regulated (financial institutions) to decide the form and manner of their regulation promotes a subjective conception that responsibility for environmental protection belongs naturally to the market. Criticism might be raised that such policy is excessively passive in terms of the likely systemic changes or environmental outcomes that it might produce. The complexities of the governance of financial institutions might displace attention from outcomes. E.g., some policymakers have used a 'journey' metaphor to legitimise environmental sustainability in the business sector (see, Milne et al., 2009).

Turning to social capital and investor utility, it is reasonable to expect that models of utility and consumer choice that extend the concept of economic rationality (e.g., Hargreaves Heap et al., 1992, p. 309; Kuran, 1990; Etzioni, 1988, p. 63) will usefully inform public policy promoting environmentally desirable outcomes. If institutional financial flows are to promote desirable social objectives of inter alia social development (Friel et al., 2008), it is worthwhile to specify the nature of the objectives and how they (might) affect economic behavior. A practical dilemma for fund managers can be expected where sets of socially-directed strategic objectives dictate one set of investment choices while purely economic objectives might offer a vastly different set of choices. At issue for decision-modelling is that preferences for moral considerations such as climate justice (Lohmann, 2008; Butler, 2008) strain mainstream notions of utility by introducing an attribute that does not allow simple ordering or quantification. Kahneman et al. (2000) argue that consumer theory which holds that people value environmental goods in terms of their willingness to pay cannot apply to the valuation of public goods. According to the latter authors, non-utility measures should be developed to value issues of even latent concern such as the continued existence of natural species and sustainability of the natural environment. An assessment of economic decision-making models is, accordingly, warranted at this point.

Prospect theory, to the extent it can describe investors' diverse motivations, might be used to predict the take-up of public policies promoting environmental investing. As developed by Tversky and Kahneman (1986), prospect theory is said to be able to replace the concept of utility maximisation under risk (e.g., Markowitz, 1952) with judgment under uncertainty. Using mostly experimental research, prospect theory has sought to show the conditions in which people's decisions systematically depart from models of (selfish) rational choice. Prospect theory postulates that investors arrive at decisions by first determining probabilities and then using them as decision weights. Individuals are expected to behave as though maximising expected utility, but with decision weights substituted for probabilities.

Slovic (2000), among others, has suggested that the frequency with which experimental subjects reverse their preference poses a question over investors' use of optimisation principles when allocating portfolios. In certain sets of circumstances,

the format of information, including the context in which the information is presented, determines choice. Slovic's finding brings an implication for the content and format of environmental information disclosures.

Lastly, Shiller and Pound (1989) propose a 'contagion' model of financial markets as informally developed and disseminated in popular media, business networks, and through word-of-mouth connections. A contagion model might prove useful to understand the ways in which financial institutions gather and process environmental data.

Such accounts of economic behavior are significantly more sophisticated than those offered by neoclassical financial economics and bear relevance for environmental investing approaches that, necessarily, take a spectrum of values into account. The preceding discussion leads to a search for a type of utility relevant for investment decisions which take into account context-dependent features such as public policy pronouncements, market contagion, information-processing effects and environmental considerations.

After consideration of several models, we use the multi-attribute model offered in Capon et al. (1996) as a conceptual basis for our data collection approach. Capon et al. (1996) studied a group of 3,386 retail investors in mutual funds offered in continental US in 1991, seeking to determine the sources of information and the criteria that investors used to select between mutual funds. The model offered in Capon et al. (1996) handles multi-dimensional behavioural motivations and diverse inputs to decision-making, making it useful for the present study. In an initial information-gathering phase, consumers source internal information sources (memory) and external information sources (impersonal and personal) so as to construct a number of product and service attributes that they rank as important when assessing alternative product offerings. These information sources are referred to as selection criteria.

The multi-attribute model of investment management deriving from Capon et al. (1996), coupled with the fiduciary principle of precautionary management, brings certain expected information requirements. The following information requirements are expected for environmentally themed investing. They combine the minimum information requirements of Sharpe (1992); the multi-attribute cognitive model of Capon et al. (1996); and the environmental accounting requirements set out in Schaltegger and Burritt (2000, pp. 52, 55, 211, 357, 361).

- The investor needs to have enough information to assess how company sustainable development and environmental protection programmes are operationalised in company business models.
- Each company should provide purpose-oriented information on sustainable development and eco-efficiency so that investors can integrate economic and environmental performance indicators.
- This information should be sufficient to allow the investor to develop eco-efficiency indicators which can be used to determine the exposure of the environmental component of an investor's overall portfolio to movements in their portfolio returns.

- This information, in turn, can be used to determine the investor's overall effective asset mix. By referring to one or more benchmark asset mixes, this allows determination of how effectively individual fund managers have performed their functions and the extent (if any) to which value has been added through active management.

4. RESEARCH METHODS

A questionnaire is used to identify behavioural intentions toward environmental investing. An experiment is used to identify and measure actual investing practices. Interviews are used to inform on investors' motivations including rationales for investment decisions taken and not taken in relation to environmental considerations, the nature of institutional pressures in that regard, and strategies adopted for handling those pressures.

Secondary data are sourced to inform on the data obtained in the questionnaire/experiment and the interviews. Sources include Hansards, public news archives, organizational reports issued to members and unit holders, statutory returns to regulators (annual financial reports and other reports), public Internet websites, and other material supplied by the participants. The next three sections are used to describe the design of the questionnaire, behavioural experiment and interviews, respectively.

4.1 QUESTIONNAIRE

The questionnaire instrument used is modelled on Capon et al. (1994, 1996). Four constructs are used, as follows:

- Motivation and intentions to take company carbon reports into account in the investment decision.
- Actual use of carbon reports in the investment decision.
- Information sources and evaluation criteria used in the investment decision.
- Information asymmetries experienced in the investment decision.

These constructs are used to inform questions seeking data on the following institutional features and behavioural phenomena:

- The relation between investment function (asset owner, investment manager, investment advisor or other functionary) and perceived importance of company carbon reports;
- The relative importance of specified sources of company carbon reports in different types of investment mandates.
- The salience of differences between regional sets of environmental regulations.
- Perceptions of the quality of company carbon reports.

It is expected that investors might experience any or all of the following three information-processing problems: insufficient quantity of information for purpose;

insufficient credibility of information for purpose; and information too complex to evaluate properly. This paper defines any of the information-processing conditions as information asymmetry conditions.

Two information propositions, referred to as P1 and P2, are used to test the expected relationships.

P1 states that information asymmetries are present between corporate reporters and interested investors.

P2 states that information asymmetries are negatively associated with investors' use of company carbon reports.

4.2 EXPERIMENT

The final item in the questionnaire instrument (a copy is included in an appendix) contains an experimental treatment.

Each respondent was presented with one of two fictional investment scenarios. The scenarios are identical with the exception of the investment mandate presented. One mandate depicts a conservative, defensive portfolio management style typical in financial institutions such as insurance companies and pension funds. The other mandate describes an active management style typical in tailored investment offerings themed on environmental concerns. By using two contrasting investment scenarios, evidence is gathered on the causal links between financial institutions' use of company-issued carbon reports and investment decisions.

The final version of the questionnaire instrument was administered on a dedicated Internet web site over the period May 1 to July 31, 2010. The domain was designed so when anyone visited the nominated website, an algorithm first read which of the two questionnaires was answered most recently, then redirected the current user to the alternate survey. In each scenario, subjects were asked to read an investment mandate and instructed they were responsible for the 'major investment decisions' about that mandate. Experimental subjects rated the importance of seven items with regards to their notional decisions about the mandate presented. Importance rankings were used as a proxy for the actual use of these items in investment decisions (Fishbein and Ajzen, 1975).

By carbon price we mean an 'effective' carbon price that can be cumulatively generated by price and quantity instruments and schemes (Pizer, 2002)[12]. Nominated carbon price ranges are informed from the following sources: a certain World Bank report on carbon financing mechanisms, issued 2010; International Emissions Trading Association price assessments current April 26, 2010; Lord Stern's report on the economic effects of climate change, tabled at the British Parliament in 2006; and

[12] The Stern Report of 2006 outlines expected effects of a range of carbon prices on global carbon emissions levels, (available) http://webarchive.nationalarchives.gov.uk/+/http:/www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm (accessed 26 April 2010).

over-the-counter (privately traded) carbon price assessments provided by Point Carbon™ on April 26, 2010[13].

The sample for the questionnaire is taken from three sources: one, advertisements placed in selected media outlets and investment networks operating in North America, Europe, Asia and Australasia in the months of May, June and July 2010[14]; two, individuals approached directly by the first-named author in April through July 2010 using a personal professional network and a Global Investor 100 listing of asset managers issued December 30, 2009[15]; and three, single-sheet copies of both versions of the questionnaire distributed to 120 delegates at a certain investor conference on the topic of climate change, held in Paris in June 2010. Both versions of the instrument were allocated systematically to delegates such that exactly one-half of the total respondents received one treatment and the other half the second treatment.

Using these methods and sources, a sample population of forty-six individuals was obtained. The response rate is not calculated. An heuristic estimate based on the proportion of individuals who completed a printed version of the questionnaire administered at meetings and conferences is a fourteen percent response rate. The sample obtained includes organizations and individuals located in the UK, Netherlands, Denmark, Norway, Sweden, Belgium, France, Australia, China, Canada, the US and South Africa.

4.3 INTERVIEWS

Thirty interviews were conducted by the first-named author in May through August of 2010 with chief executives and heads of investment functions in selected managed investment institutions. The organizations represented are located in the US, Japan, Australia, UK, Italy, Germany, France, Norway and Denmark. By design, the sample captures the following types of organizations and markets:

1. The main investment markets in which investors have been known to express interest in company-supplied carbon data, namely, Asia, North America and Europe;

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[13] *World Development Report 2010: Development and Climate Change*, issued by The International Bank for Reconstruction and Development, Washington DC (available) http://siteresources.worldbank.org/intwdr2010/resources/5287678-1226014527953/wdr10-full-text.pdf (accessed 26 April 2010).

[14] Advertisements were placed over the months of April and May, 2010, at Ethical Investment Research Services (EIRIS) Ltd (UK); the *Responsible Investor* journal (publishers, Response Global Media Ltd); Australian Council of Superannuation Investors; European Federation of Financial Analysts Societies; Society of Investment Professionals in Germany; World Wildlife Fund; the World Resources Institute; Investor Group on Climate Change Australia/New Zealand; the Institutional Investors Group on Climate Change (Europe-based); Investor Network on Climate Risk (US-based); asset owner and portfolio manager signatories to the United Nations Principles for Responsible Investment organization, numbering 349 as at January 31, 2010; and a 24-member 'climate-risk' interest group attaching to a pressure group known as the Network for Sustainable Financial Markets.

[15] (Available) http://www.riskcenter.com.tr/risknews/risknewsfiles/assetmanagementdunyasiralamasi.pdf (accessed 17 December 2009).

2. Large investors (over US$500 million funds under management and over 100 employees) and smaller investors;
3. Public-sector and private-sector pension funds, and insurance companies, private equity firms, mutual funds, and consulting companies;
4. Principal functions in investment decision processes, viz., fiduciary asset owners, investment portfolio managers, investment analysts and governance advisory;
5. Experienced users of company-supplied environmental data (ten or more years of experience (Krishnan and Booker, 2002) and novice users.

The sample is constructed using professional networks of the first-named author and tertiary direction. The latter consists of contacts found following administration of the questionnaire instrument, and suggestions from staffers at industry conferences held in Europe, US and Australia attended by the first-named author.

Interviewees were contacted in the first instance using email and telephone. Arrangements were made for sixteen face-to-face interviews at the offices of organizations represented by interviewees and at various investment conferences. Some of the personal interviews were supplemented by e-mail correspondence and telephone calls. The other interviews were made by telephone and supplemented as necessary using e-mail correspondence. Refer to an appendix for the interview guide used.

Multiple approaches are used to ensuring quality of the interview data. One, understanding of the issues of relevance to the participants was gained prior to interview. Understanding was obtained from the first-named author's prior research and personal professional networks. Two, multiple methods of data collection are deployed in order to check accuracy of interviewee statements. Observational data found in written material issued by the represented organizations are combined with interview data. Interviews were gained with different people within a social setting in order to gain multiple viewpoints. Finally, ensuring authentic input and access to full participation for all participants in all aspects of research process and representation of findings is achieved with member checking. Transcripts and summaries of the interviews were given to interviewees before the data were analysed, and draft reports of subsequent analyses were given to interviewees before reports were released to research sponsors.

The data are analysed using a sequential, reiterative process. The authors followed the approach independently of each other. Within-interview notes, interview recordings and post-interview notes were listened to and read together. Interview recordings considered as most informative to the research questions were transcribed. The selected transcriptions and associated notes were read while thematic labels were written in the margin. A coding process was used to cluster similar topics in the data together. Themes were refined, discarded, and reformulated by iterative processes of comparison and pattern-searching (repetition). The authors compared their outcomes from this latter step, which served to validate the derived interview themes.

The following section uses three subsections to present the results of the questionnaire survey, the behavioural experiment, and the interviews, respectively.

5. FINDINGS

5.1 INVESTORS' ATTITUDES TOWARDS ENVIRONMENTAL REPORTS

Tests of relation were conducted and guided by the study's objectives to identify investors' perceptions of the quality of company-supplied carbon reports, and associations between perceptions of information quality, contextual items and investors' actual investment decisions. The procedures used address three relationships:

- Area of professional responsibility and use of company reports. The purpose of this test is to gather evidence on the extent to which fiduciary investors recognise climate change-related and environmental risks.
- Information sources and satisfaction with company reports. The purpose of this test is to gather evidence on the associations between investors' perceptions of information quality and their level of usage of company carbon reports.
- A directional test of association between investment mandate, information satisfaction and investment decision. This test is devised for two purposes: one, to gather evidence on the factors influencing investors' intentions to use data captured in company carbon reports; and two, to gather evidence on the influence of investment mandates on those behavioural intentions.

Figure 2 below summarises questionnaire respondents by location and responsibility area[16].

Figure 2: Questionnaire sample by location & responsibility area

	North America	Europe	Asia / Aust.	Global	Percentage
Fiduciary	0	0	2	3	11.1
Advisory	1	3	1	7	26.7
Funds management	2	4	2	15	51.1
Governance	0	0	1	2	6.7
Other	0	1	0	1	4.4
Total (45)	3	8	6	28	
Percentage	6.7	17.8	13.3	62.2	100.0

Participants are located in Australia (13.3 percent), US/Canada (6.7 percent), and Europe (17.8 percent). 62.2 percent of respondents either focus on all three regions or claim a global focus. Professional responsibility is dominated by fund managers (51.1 percent), independent investment advisors (26.7 percent) and fiduciaries (trustees and (in the US) fund managers) at 11.1 percent. 6.7 percent of respondents have

[16] All statistics are produced using the STATA 10 software package.

governance responsibilities. The remaining 4.4 percent do not fall into any stipulated category of professional responsibility. Gender data have not been collected.

Figure 3: Investment responsibility area by usage of carbon emissions data

Note: The vertical x-axis indicates the level of usage of carbon emissions data: never (1), rarely (2), occasionally (3), very often (4), always (5); y-axis is density of responses.

Presented graphically in Figure 3 above, the results of chi-squared tests indicate statistically insignificant differences between respondents' professional responsibility and the frequency with which carbon emissions data are used. Exceptions are the use of company earnings and sustainability reports (respectively, (X^2(16, N = 41) = 19.87, p insignificant, Cramer's V = 0.35; and X^2(12, N = 41) = 17.48, p insignificant, Cramer's V = 0.38).

The latter results provide weak evidence that fiduciaries (e.g., boards of governors and trustees of pension schemes) accept fiduciary responsibilities with respect to climate change-related risk assessments.

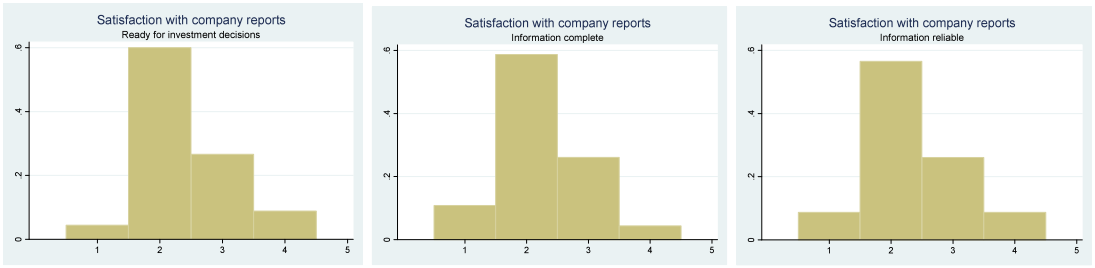
Regarding usage of the stipulated information items, the items (i) company carbon emissions data, (ii) Carbon Disclosure Project-based data, and (iii) subscriptions-based data are used in a varied pattern across all five categories of professional responsibilities. No pattern of use is detected between the designated responsibility categories.

With respect to company earnings reports and sustainability reports, usage is most infrequent in the fiduciary and "other" professional categories. Fund managers use company earnings reports and sustainability reports according to a normally distributed frequency. Investment advisors and governance professionals use company earnings reports frequently.

The patterns and non-patterns of information usage described above provide some evidence that fiduciaries and their agents (e.g., fund managers) are motivated by fiduciary responsibilities to perform climate change-related risk assessments.

Figures 4-8 below present the result of the tests of Proposition 1 (information asymmetries) and Proposition 2 (information asymmetries are negatively associated with use of company carbon reports).

Figure 4: Information satisfaction



Note: Vertical x-axis responses correspond with very dissatisfied (1), dissatisfied (2), indifferent (3), satisfied (4), very satisfied (5); y-axis is density.

Figure 4 above indicates that respondents are dissatisfied with company carbon reports. Approximately seven, 4.5, and nine percent of respondents are satisfied with the categories investment readiness, completeness, and reliability (the information asymmetry criteria), respectively. No respondents are "very satisfied" with company carbon reports. Approximately five percent, 11.5 percent and nine percent of respondents are very dissatisfied with decision usefulness, information completeness, and information reliability, respectively.

These results suggest significant information asymmetries. P1, which states that information asymmetries would arise between corporate reporters and interested investors, is confirmed.

Figure 5: Correlation matrix of information source & information satisfaction

	CDP	Subscrip.	Company earnings report	Company carbon report	Readiness	Complete	Reliable
CDP	1.000						
Subscrip.	0.0431	1.000					
Earning	0.2122	0.0708	1.000				
Sustain	0.3171*	0.0063	0.6291*	1.000			
Readiness	0.0799	-0.0359	-0.1155	-0.0377	1.000		
Complete	-0.1232	-0.1212	-0.0774	-0.0904	0.7395*	1.000	
Reliable	-0.1135	-0.0351	-0.0962	-0.0397	0.5502*	0.6628*	1.000

* p<0.05. Spearman's rank correlation coefficients are shown.

Figure 5 above displays the results of a correlation between information sources and information satisfaction. There is no statistically significant correlation between the use of company carbon reports, and satisfaction with those reports in terms of their claimed use. This is the case for all four information sources (Carbon Disclosure Project, subscriptions-based data, company earnings data, and sustainability reports) and all three measures of information satisfaction (decision-useful, complete, reliable).

P2, which states that information asymmetries would be negatively associated with use of company carbon reports, is weakly disconfirmed. It was expected that as information asymmetries became stronger, investors would become less interested in using company carbon reports. Contrary to expectations, the data indicate that information asymmetries do not influence the importance of company carbon reports for investment decisions.

This is a surprising finding. Investors claim to use company carbon reports regardless of their adjudged fitness for purpose. A decision-making process that starts with consumer search and leads to information-processing purchasing intentions and ultimately behaviour is based on conventional principles of supply and demand. Observed inelasticity of demand for price-sensitive assets, however, departs from consumer theory (see, Davis, 1994) and expected investment behaviour (see, Callingham and Baker, 2001).

Because information asymmetries are not associated with information usage, it is interesting to determine if investors use company carbon reports at all. Nearly sixty percent of respondents are dissatisfied with the appropriateness, completeness and reliability of company carbon reports for portfolio analysis. Where respondents are satisfied with information sources (we note that none are "very satisfied"), it consistently represents no more than ten percent of the sample.

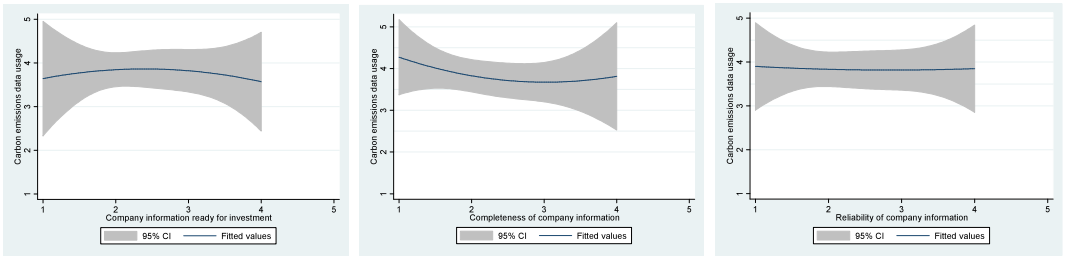
If considered with the results presented in Figure 5 above, we have another surprising finding. Investors examined in this study claim to use company carbon reports despite being dissatisfied with those reports. Indeed, company carbon reporting is used with substantial frequency, particularly Carbon Disclosure Project reports (which derive

from company responses to questionnaires), information from companies' earnings reports, and company sustainability reports.

These findings further disconfirm P2. The results suggest robust investor demand for corporate environmental reporting. Demand for high standards of company environmental reporting could, if has not already, outpace its availability, at least for the information sources considered here.

Additional tests confirm weakly significant associations between certain data sources and information satisfaction. There are significant relationships between the frequency of Carbon Disclosure Project data usage and decision-usefulness; between Carbon Disclosure Project data usage and information completeness; and between Carbon Disclosure Project data usage and information reliability.

Figure 6: Histogram of information satisfaction & investment intention



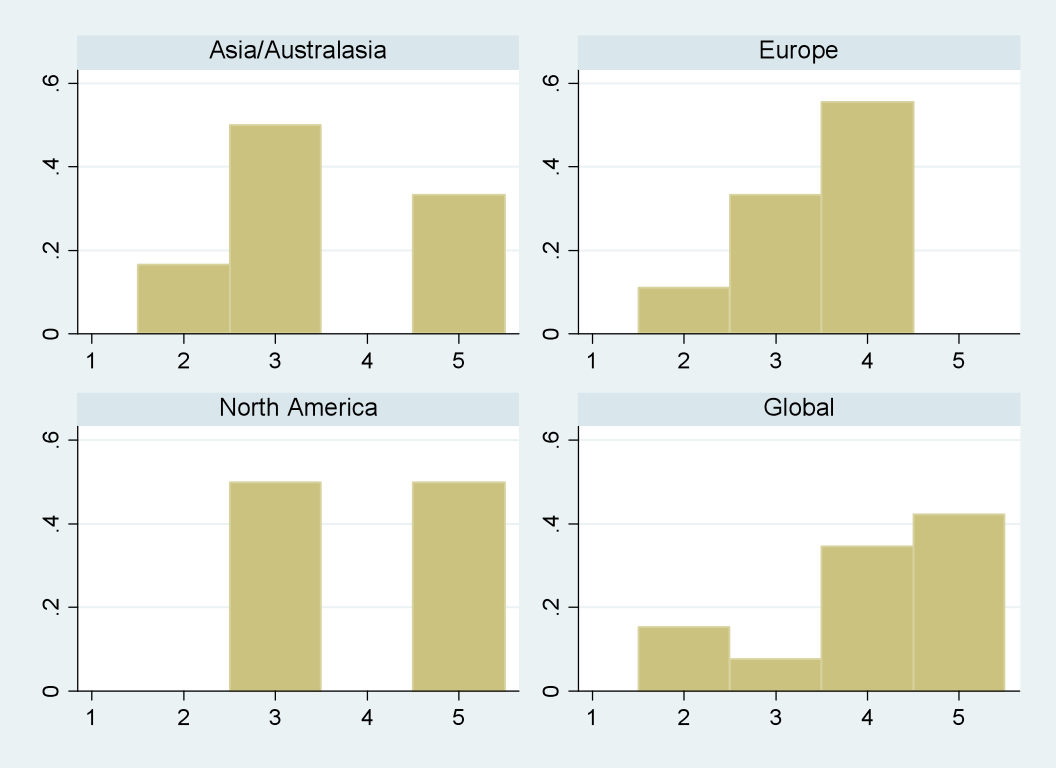
Note: Values are fitted using a 95 percent confidence interval.

Fitted plots with 95 percent confidence intervals, shown in Figure 6 above, indicate an insignificant relationship between information satisfaction and investment intention. (Intention is measured by the frequency of use of carbon emissions data.)

The latter finding provides additional disconfirmation of P2. Information asymmetries are unrelated to investors' usage of company carbon reports.

In Figures 7 and 8 below, a moderately statistically significant relationship appears among geographical regions (and their affiliated environmental policy areas) and investors' use of company carbon reports ($X^2(9, N = 43) = 14.45$; $p<0.10$, Cramer's V = 0.33).

Figure 7: Regulatory policy & use of environmental data in the investment decision



Note: Vertical x-axis responses correspond with never (1), rarely (2), occasionally (3), very often (4), always (5) using carbon emissions data; y-axis is density.

Figure 8: Correlation of policy & usage of environmental data

	Never	Rarely	Occas.	Very often	Always	Total	
Asia/ Australasia	0	1	3	0	2	6	(frequency)
	0.00	16.67	50.00	0.00	33.33	100.00	(row percentage)
	0.00	16.67	33.33	0.00	14.29	13.95	(col. percentage)
Europe	0	1	3	5	0	9	(frequency)
	0.00	11.11	33.33	55.56	0.00	100.00	(row percentage)
	0.00	16.67	33.33	35.71	0.00	20.93	(col. percentage)
North America	0	0	1	0	1	2	(frequency)
	0.00	0.00	50.00	0.00	50.00	100.00	(row percentage)
	0.00	0.00	11.11	0.00	7.14	4.65	(col. percentage)
Global	0	4	2	9	11	26	(frequency)
	0.00	15.37	7.68	34.62	42.31	100.00	(row percentage)
	0.00	66.67	22.22	64.29	78.57	60.47	(col. percentage)
Total	0	6	9	14	14	43	(frequency)
	0.00	13.95	20.93	32.56	32.56	100.00	(row percentage)
	0.00	100.00	100.00	100.00	100.00	100.00	(col. percentage)

One in two respondents use company carbon reports regularly. Respondents focusing on the European region use company carbon reports with greater frequency, and more than three quarters of respondents claiming a global focus use company carbon reports very often or always.

Figures 7 and 8 above suggest that usage of environmental data in the investment decision may be predicted by geographical foci. Distinct differences in usage of carbon emission data appear between region-centric and globally-focused investors. One might claim that this is the result of multilateral accords (e.g., the Kyoto Protocol and the EU Emissions Trading System) and investors' expectations about the effectiveness of such accords. It might also be attributed to attempts by global-oriented investors to deal with multiple policy orientations simultaneously, requiring greater attention to data on industrial carbon emissions levels.

A global focus of the investment mandate is associated with size of funds under management: the larger the financial institution, the more likely its investment focus will extend across jurisdictions and regions. A size effect with respect to investors' usage of environmental data (untabulated) is weakly confirmed. We explore the role of investors' geographical focus in a section below that examines interview data.

A similar pattern emerges between frequency of use of (i) Carbon Disclosure Project data and (ii) subscription-based data (respectively, $X^2(20, N = 46) = 29.72$, $p<0.05$; and $X^2(20, N = 45) = 25.10$, $p<0.10$). Four respondents focusing on the European region had never used Carbon Disclosure Project data. Subscription-based data (commercial databases) are used even less. Two of the European region-oriented respondents and five of the tri-region-oriented respondents had never used subscription-based data.

Geographic differences also appear between information satisfaction and investment intention. Global-oriented investors consider information from firms is less readily available, less complete and less reliable than do single nation-oriented investors (respectively, $t(43) = 2.11$, p significant at the 5 percent level; and $t(44) = 2.09$, p significant at the 5 percent level; $t(44) = 1.92$, p significant at the 5 percent level).

Differences with regard to frequency of data usage and views about company information reports are even more marked between geographic focus by single country and global/tri-national foci. Global-oriented investors use Carbon Disclosure Project data significantly more frequently than do single country investors (respectively, $t(41) = -1.59$, p significant at the 10 percent level; and $t(44) = -2.11$, p significant at the 5 percent level).

Consistent with the data shown above in Figure 8, there are no significant differences between regions with regard to usage of subscription-based data and company annual report data.

In light of the evidence that globally-focused investors place higher values on company carbon reports than do single-nation-focused investors, it is clear that there are costs involved for global investors if cross-country data reporting standards are weak and/or inconsistent. No attempt at modelling these costs has been made.

5.2 INVESTORS' USAGE OF ENVIRONMENTAL REPORTS

The questionnaire respondents were prompted for an assessment of the relative importance of various sources of information. These were presented as an investment scenario which differed between two groups: a conventional, index-hugging, passive-styled investor; or a 'green', active-styled investor with an express mandate to make investments in companies and projects seeking to mitigate levels of industrial carbon emissions. Given the framing of the investment scenarios, we can assume that respondents use 'importance' as a proxy of their usage of stipulated information items.

Figure 9 below presents the means for usage of information sources for investment decisions. The procedure and display follows that set out in Holm and Rikhardsson (2008).

Figure 9: Usage of information items by investment mandate

Evaluation criteria	Index Mandate Mean (s.d.)	Green Mandate Mean (s.d.)
Carbon price $20-50/ton	3.96 (0.735)*	3.52 (0.814)*
Carbon price $50-100/ton	4.24 (0.723)*	3.81 (0.981)*
Carbon price > $100/ton	4.48 (0.770)	4.04 (1.12)
Carbon taxes	4.13 (0.694)	4.15 (0.602)
Company projects	4.13 (0.869)	4.15 (0.688)
Company-provided info	4.08 (0.909)	4.04 (0.669)
Subsidies	4.30 (0.703)	4.14 (0.793)

*A *t*-test shows statistically significant different means at $p<0.05$. Note: Means are based on a 5-point Likert score ranging from not at all important (1) to very important (5).

We note from Figure 9 above that the largest differences between mandates relate to the importance investors placed on carbon prices. When carbon prices are between USD 20 and USD 50 per tonne, the average score assigned by the index investor is 3.96 (5-point Likert scale, 5 'very important') compared to an average score for 'green' investors at 3.52.

A pattern also emerges in the category of carbon prices between USD 50 and USD 100 per tonne. Index investors rank the importance of carbon prices between USD 50 and USD 100 at 4.24 while the average for 'green' investors is 3.81.

The results of *t*-tests presented in Figure 9 above indicate significant differences at the 5 percent level relating to the given carbon price measures ($t(44) = 1.91$, $p<0.05$ and $t(44) = 1.71$, $p<0.05$, respectively). A two-way analysis of variance for both groups between the seven information sources was statistically significant with all three given carbon price ranges, and statistically insignificant with the other information sources.

Figure 10 below presents a ranking of usage of the given information items according to investment mandate.

Figure 10: Information items by investment mandate

Ranking	Index Mandate Group	Green Mandate Group
1	Carbon price > USD100/ton (4.48)	Company projects (4.15)
2	Subsidies (4.3)	Carbon taxes (4.15)
3	Carbon price USD50-100/ton (4.24)	Subsidies (4.14)
4	Company projects (4.13)	Company-provided info (4.04)
5	Carbon taxes (4.13)	Carbon price > USD100/ton (4.04)
6	Company-provided info (4.08)	Carbon price USD50-100/ton (3.81)
7	Carbon price USD20-50/ton (3.96)	Carbon price USD20-50/ton (3.52)

Figure 10 above shows that the index-hugging, passive-styled investor places significantly more importance than does the 'green' investor on three items: carbon prices greater than 100 US dollars per tonne; carbon prices between 50 and 100 US dollars per tonne; and availability of subsidies for energy use. A carbon price threshold emerges for the index investor group. Index investors rank carbon prices between 20 and 50 US dollars per tonne lowest among the given information items.

To better identify the significance of the differences between the two groups, we have created two indices based on two information characteristics: (i) by associating information items with revenue-generating activities; (ii) by associating information items with the degree of firm control over the activity to which information items relate.

Two of the seven information items are under the direct control of the firm and are not directly related to revenue generation. They are company projects with a goal of decreasing carbon emissions; and information supplied by companies on their carbon emissions levels.

The remaining information items are categorised as outside the direct control of the firm and are associated with revenue-generating activities. They are the three carbon price ranges, carbon taxes, and subsidies for company usage of renewable energy sources.

Figure 11: Usage of information items by investment mandate & firm control

Variable	Index Mandate Importance	Green Mandate Importance
	Mean (s.d.)	Mean (s.d.)
Firm-specific information	4.06 (0.164)	4.09 (0.131)
Non-firm-specific information	4.24 (0.116)*	3.93 (0.123)*

* A *t*-test shows statistically significant different means at $p<0.05$. Note: Means are based on a 5-point Likert score ranging from not at all important (1) to very important (5).

Figure 11 above shows differences between index and 'green' investors' use of revenue-related information items outside the firm's direct control ($t(44) = 1.59$, p significant at the 5 percent level). Non-revenue-related information items that are under the firm's direct control are not used differently between index and 'green' investors. Differences are not significant ($t(44) = -0.16$).

The test results in Figure 11 indicate that index investors use (place significantly more importance on) revenue-related information items than do 'green' investors. This finding is consistent with those presented in Figure 10 above that the index group pursues revenue opportunities associated with companies' environmental programmes more so than the 'green' group.

Turning now to investors' geographic focus, Figure 12 below delineates regions by single country and global foci.

Figure 12: Usage of information items by investment mandate & firm control & regional focus

	Index Mandate Importance	Green Mandate Importance	Index Mandate Importance	Green Mandate Importance
	Single-country focus		Global focus	
	Mean (s.d.)	Mean (s.d.)	Mean (s.d.)	Mean (s.d.)
Firm-specific information	4.15 (0.130)	4.06 (0.220)	4.00 (0.263)	4.11 (0.171)
Non-firm-specific information	4.19 (0.175)	4.01 (0.183)	4.21 (0.160)*	3.88 (0.169)*

* A *t*-test shows statistically significant different means at $p<0.10$. Note: Means are based on a 5-point Likert score ranging from not at all important (1) to very important (5).

The single significant result in Figure 12 above is a test of usage of non-firm-specific information. Global investors from the index mandate group (n=15) use non-firm-specific information (e.g., carbon prices) significantly more than does the green mandate group (n=13) ($t(26) = 1.44$, p significant at the 10 percent level).

The latter finding supports the findings presented in Figures 9, 10 and 11 above. Specifically, the index-hugging group places more importance on non-firm-specific information regardless of geographical orientation. Two-way ANOVA tests did not reveal statistically significant geographic focus differences between the index mandate and the green mandate groups.

Finally, to better understand how professional responsibility interacts with usage of firm-specific and non-firm-specific information, we have grouped fiduciaries and investment portfolio managers. (The fiduciary/portfolio manager group is distinct from other types of investor-related professions as members of this group are required to consider the risks associated with investing.)

The expanded fiduciary group following the index mandate places significantly more importance on non-firm-specific information than does the expanded fiduciary group following the green mandate ($t(26) = 1.70$, p significant at the 5 percent level). No other significant interactions are noted between professional responsibility and information usage.

In summary, the analysis of the experiment suggests that the scale of investment activity around climate change specifically and environmental management more broadly is dependent on investment styles which, in turn, are informed by the investment mandate. The scale of investment activity around carbon emissions reductions and climate change is less related to company-issued reports of ‘environmental performance’, environmental management programmes, carbon emissions volumes and the like.

Detailed results of the tests performed in this section are available on request. The following section presents the interview analysis.

5.3 MOTIVATIONS FOR ENVIRONMENTAL INVESTING

A sample of thirty-two interviewees was obtained. Figure 13 below lists the organizations represented by the interviewees.

Figure 13: Organizations represented in interview by location

Organization	Location
Industry Funds Management	Australia
Local Government Superannuation Scheme Pty Ltd	Australia
Non-Government Schools Superannuation Fund Pty Ltd	Australia
ATP	Denmark
Institutional Investors Group on Climate Change	Denmark
Aviva Investors Global Services Limited	England
F&C Asset Management plc	England
Henderson Global Investors Limited	England
The EIRIS Foundation and Ethical Investment Research Services	England
CDC Climat (Caisse des Dépôts)	France
Responsible Investor (Response Global Media Limited)	France
DVFA GmbH Society of Investment Professionals in Germany	Germany
Banca d'Italia	Italy
Bloomberg LP	Japan
KLP Asset Managers (Kommunal Landspensjonskasse)	Norway
Norfund (Statens Investeringsfond for Næringsvirksomhet i Utviklingsland)	Norway
ADA Investment Management LLC	USA
Blue Wolf Investments LLC	USA
California State Teachers' Retirement System	USA
CERES	USA
Council of Institutional Investors	USA
Essex Investment Management, LLC	USA
Pax World Management LLC	USA
Teachers Insurance & Annuity Assoc. of America - College Retirement Equities Fund	USA
The California Public Employees' Retirement System	USA

Figure 14 below lists the interviewees by organizational function and location.

Figure 14: Interviewees by organizational function & location

Organizational function	No.	Percentage
Research provider, information provider, media	11	34%
Fiduciary -- trustee/director	9	28%
Fund manager	7	22%
Policy organization	2	6%
Professional body	2	6%
Private equity	1	3%

Location	No.	Percentage
USA	11	34%
UK	10	31%
Australia	3	9%
France	2	6%
Norway	2	6%
Denmark	1	3%
Germany	1	3%
Italy	1	3%
Japan	1	3%

One in three interviewees (34 percent) was a provider of research on investment asset classes. The next two largest groups are fiduciaries (directors of pension schemes and insurance companies holding pension schemes) (28 percent) and fund managers (22 percent). Remaining interviewees represented professional bodies, policy organizations, and a private equity company.

Interviewees were located in Europe (53 percent), US (34 percent) and Australia (9 percent). One interviewee was located in Japan. Gender division is 31 percent female.

Following a data-filtering process outlined above, one hundred and five interview extracts are selected as a representative database. The extracts are selected on the basis of their relation to the research questions, the importance that interviewees accorded to the statements, and their closeness to the motivations – intentions – behaviour theory of investing used in this paper.

The selected extracts are allocated to themes that emerged from the coding process. Three themes emerged from this process. The themes have been named ENVIRONMENTAL PUBLIC POLICY, SENSE-MAKING and DECISION-MAKING. Figure 15 below shows a classification of the selected extracts according to theme and interviewee's organizational function.

Figure 15: Interview extracts by theme & organizational function

Function	No.	%	POLICY	%	LEGIT	%	SENSE	%	DECISIONS	%
Researcher provider	11	34%	6	33%	5	21%	10	28%	5	19%
Fund manager	9	28%	1	6%	8	33%	7	19%	8	30%
Fiduciary	7	22%	9	50%	10	42%	17	47%	12	44%
Professional body	2	6%	1	6%	1	4%	0	0%	1	4%
Policy organization	2	6%	1	6%	0	0%	1	3%	0	0%
Private equity	1	3%	0	0%	0	0%	1	3%	1	4%
Total	32	100%	18	100%	24	100%	36	100%	27	100%

A visual correlation in Figure 15 above shows that environmental investing policy pronouncements and practices concern fiduciaries more so than other roles in the capital markets.

In terms of the number of responses to each of the four themes, fiduciaries are prominent. The proportions of responses from fiduciaries in each thematic category (50; 42; 47; 44 percent, respectively) are nearly double the proportion of interviewees represented by fiduciaries (22 percent). By contrast, the proportions of responses from non-fiduciary functions in each category are roughly the same as their proportions to the total sample of interviewees.

The remainder of this section presents analyses of the interview data. The three interview themes mentioned above are used as rubrics. In accordance with confidentiality agreements made with interviewees, alphabetical codes are used to designate interviewees. The following schema is used to denote interviewees' organizational functions:

rp = research/information provider.
fm = fund manager.
fi = fiduciary, e.g., trustee, responsible entity.
pb = professional body.
po = policy organization.
pe = private equity firm.

(I) INTERVIEW THEME: ENVIRONMENTAL POLICY

A POLICY theme is contextualised against regulatory requirement that financial institutions disclose the bases of their environmental investing practices. Of note is that all interviewees considered current policy requirements as unimportant. On probing, preparation of information disclosures pursuant to current regulations had

not required inputs from members of investment teams. Most organizational functions in the interview sample expected that governmental policies should be designed such that relevant data could be used for constructing risk premia across a range of asset classes. The following extract from the principal of a policy organization based in Australia is typical.

> *The most critical policy in Australia is a price on carbon emissions. Reporting does not influence investment decisions in and of itself. Companies are generally careful to ensure that material price implications that may be reflected in their disclosures are addressed before they are disclosed [to data collectors and regulatory authorities]. This will change only once there is a price on carbon and current disclosures attract a financial liability (or investment driver or opportunity) in future. (x-po)*

Fiduciary interviewees tended to consider that policy requirements should promote the use of privately managed capital flows for carbon emissions reduction efforts and environmental management. Some cited grounds such as social justice and intergenerational equity. The following extract from a fiduciary of a Scandinavian public-sector insurance company is indicative.

> *The number doesn't matter. What really matters is that the bulk of the money needed for carbon emissions reductions should come from private sources. Now that's not going to happen if not supported by very, very strong policies and very, very committed targets and very, very ambitious policies set up by national governments and housed by international treaties. (n-fi)*

Interview extracts indicated fiduciaries' dissatisfaction with current policies related to reduction of carbon emissions levels, increases in sustainable energy usage and the role of privately managed finance. The following statement is typical.

> *Will America make the same mistakes as have been made in Europe with cap-and-trade and carbon markets? Cap-and-trade to my mind has been an abject failure so far: the carbon price is too low and whether it's actually achieved any carbon reduction is very debatable. (n-fi)*

A minority of information providers and media commentators opined that fund managers and fiduciaries would be averse to additional regulatory guidance. The following extract, selected from an interview with a senior manager in a European information provision firm, illustrates this exception view.

> *More stringent regulations might encourage companies to flee to low-regulation environments. It's also difficult to comprehend something which is not in companies' accounting models. (p-rp)*

Most interviewees had cause to complain that regulations and policy pronouncements had not been co-ordinated within and across jurisdictions, had vacillated over the 2000-2010 period, and had not been tailored appropriately to the capital markets. The following extract from a UK-based portfolio manager is typical.

> *Policies are incredibly weak (laughs). Market failures such as unpriced carbon emissions require direct regulation. Politicians that don't understand the markets are playing the markets. (z-fm)*

An argument appearing in a significant proportion of extracts is that public policies should serve to permit privately managed capital flows to act as a public policy tool. The following extract from a European fiduciary is indicative.

> *The number doesn't matter. What really matters is that the bulk of the money needed for carbon emissions reductions should come from private sources. Now that doesn't happen if not supported by very, very strong policies and very, very committed targets and very, very ambitious policies set up by national governments housed by international treaties. (n-fi)*

Some interviewees hoped that by investing according to environmental considerations, they could set in train changes to companies that would lead to improvements to environmental protection. In this group, concerns of social justice and collective morality can tussle with fiduciary principles of wealth accretion and risk management. Such mixed allegiances (in social-ecologic terms, a subjective struggle (Guattari, 2008)) were strongest in fiduciaries, referring to directors of insurance companies and trustees. This group tended to cite social justice and intergenerational equity as grounds to allocate towards 'carbon-sensitive' asset classes. A fiduciary trustee of a Scandinavian public-sector insurance company had the following to say the objectives of environmental investing.

> *What really matters is having policies that are put in place in order to support the creation of large-scale renewable energy facilities that reduce carbon emissions around the world. It is about policies that are set up to help countries that need help, especially China and India, about how they can be assisted to choose green technologies. And it is those types of policies that will help us (establish) these technologies. They are only just on a cost curve so with the right sort of policies they will be mature and quality assets in their own right. This is all strictly from a fiduciary basis. (n-fi)*

Some interviewees struggled to reconcile normative concerns ("to help countries" in the extract above) and purely private, economic concerns. Interviewees across all organizational functions and professional positions represented in the sample gave impressions in interview that they were uncomfortable with the commensurability of environmental concerns (e.g., 'saving the planet') with ostensibly private values housed in fiduciary obligations – such as the client mandate.

Evidence of tension in that regard is that interviewees invariably justified their arguments on economic grounds after presenting normative arguments and without challenge coming from the interviewer. The latter interviewee emphasised that his/her argument was motivated by a fiduciary desire to maximize wealth. An impression gained by the interviewer was that interviewees were alarmed they had somehow left themselves vulnerable by voicing normative concerns.

Most interviewees called for closer involvement of financial institutions in policy formulation and 'better' regulations. Some days after interview, a UK fund manager provided the interviewer with an open letter signed by members of a certain lobby group, of which s/he was a member, which includes financial institutions, ministers of parliament and expert commentators. The said letter, addressed to 'all UK ministers' and published in the UK financial press in 2009, calls for 'stronger signals' and for the government of the day 'to make [a] commitment' for mandatory carbon reporting by companies.

Other interviewees were (at the time of interview) members of certain investor-constituted associations which have lobbied regulators in Europe, US and elsewhere. Such groups have received comment in the literature (see, Haigh and de Graaf, 2009). Ministers in places such as Brussels and Washington DC have been consulted by these groups on policy measures that might encourage financial institutions to address climate change; on regulations that would mandate carbon reporting from companies and stock exchanges; and hoped-for economic incentives. While the implications of lobbying regulators for more regulations might seem surprising given the absence of the state assumed by portfolio management theory, the motivations for such activity are pragmatic. According to one interviewee in a leadership position in one of these groups:

> *Governments [should] provide the right kind of subsidies so that investors—long-term investors—will bring their acts and their money to the table. (n-fi)*

Investors are not short on the kinds of policies that would, in their opinions at least, bring about ecological improvements. From a chief investment officer of a public-sector pension fund in the US:

> *Effective climate regulation from an investor's perspective would be provision of short and long-term performance targets, market-based practices that set up robust carbon prices, and stimuluses to the renewable energy industry. Comprehensive information disclosure on a standardised disclosure platform is number two, and targeted governmental intervention for market development is probably number three. (ad-fi)*

And from a fiduciary of a public-sector insurance company in Scandinavia:

> *Regulation has to be tighter on companies if […] we're going to see some kind of results. At the moment we don't have any evidence that we're doing anything to reduce carbon emissions. (n-fi)*

To such phenomena as collective investor behaviour around public policies on the environment and companies' operations, Markovitzian portfolio theory (e.g., Debreu, 1959; Markowitz, 1971) would have no ready answer. What seem to be suggested by the extracts above are the beginnings of a social-ecologic theory of portfolio management in which investment risk is referenced to ecologic considerations and involving communications between policy makers, investors and companies.

Two extracts close analysis of the POLICY theme. Both extracts point at the expectations of investors towards public policy makers. The first extract is from a research provider operating chiefly in the French capital market; the second is from the head of a 'socially responsible research' unit at a UK-based fund manager:

> *We are not going to do anything unless and until sustainable energy is given the go-ahead from governments. (af-rp)*

> *Policy measures are an area which obviously needs work. There's been little awareness of the UK's CRC[17]. I suppose there are reputational issues which might be important. But the financial penalties are immaterial. (m-rp)*

(II) INTERVIEW THEME: SENSE-MAKING

This category of sense-making is contextualised against recent attention given to environmental investing approaches in the wake of global legislative and regulatory initiatives, the appearance of 'carbon solutions' consultancies providing research to the capital markets, and nascent discussions between privately managed financial institutions and member-constituted associations on the topic.

Interviewees were willing to talk about their motivations, intentions, and behaviour with respect to environmental policies, and the institutional features which contextualised decision-making processes. The sense-making theme includes interviewees' concerns of the legitimacy of decision-making processes and in that regard the salience of peer behaviour.

A sustainable investing adviser working exclusively at a UK fund manager explained the decision-making processes of the organization's active-styled (stock-picking) investment approach.

> *What you want is themes that will move stocks. Carbon is one theme that can be considered for individual companies. If we think a company is interesting on those grounds we will consult our fund managers and analysts. If everyone agrees then the company is placed on a watch list. Whatever the decision taken (with respect to a specific stock) the task is to integrate the theme into valuation. (y-fm)*

The interviewer gained an impression that interviewees who had adopted or had considered an environmental investing approach were uncomfortable with the commercial nature of their businesses. The extract immediately above illustrates how some interviewees justified stock-picking according to a carbon theme. Practices were validated by reference to market practice, which to some is about beating the market and to others is about moving in a bloc of peers. Both rationales are about establishing legitimacy.

[17] The reference is to the Carbon Reduction Commitment Energy Efficiency Scheme (CRC) of the UK, a market mechanism brought in under the UK's Climate Change Act of 2008.

Some interviewees referred to "market mechanisms" as a conduit for behavioural change in financial markets. Intermediaries were seen as both facilitating and restricting the settings in which investors could consult companies on operational issues such as carbon emissions management. The appearance of terms such as "fixed intervention" and "rigid settings" in some of the interview extracts is consistent with literature noting that fund managers and analysts subjectively accept the institutional settings in which they operate (Roberts et al., 2006). The salience of market practices is illustrated by the following comment of a manager working at an information provider in the European capital market:

> *Another assurance type is peer behaviour. (r-rp)*

The salience of beating the market is illustrated by the following comment on environmental investing from a specialist information provider connected to a UK funds manager:

> *This is about driving alpha -- engagement too, but primarily alpha. (y-fm)*

One interviewee brought material to the interview that had been issued by certain buy-side brokerage firms, gave it to the interviewer and urged the interviewer to contact the authors. Margin notes had been added to some of the material. Evidently, the manager was in the habit of using broker-issued reports on climate change to select target stocks, even though most of the said material was taken up with discussion of public policy and various kinds of physical risks posed by climate change.

A fiduciary asset owner operating in Scandinavia explained that "not a lot of (their) analysts are in active management" (h-fi) and as such could not be expected to advise on investing themes such as ecological concerns, carbon emissions and similar. The latter interviewee went on to explain that passive index-driven investment, which might represent a ubiquitous management style of public-sector and private-sector pension funds and insurance companies, is governed by "very strict regulations in terms of risk".

Portfolio construction in large financial institutions typically models the composition of indexes such as the MCSI World. Investors move as a bloc. Given the primacy of index-driven management styles and the importance of investment analysts in investment management decision processes (Krishnan and Booker, 2002), fiduciary asset owners and fund managers are unlikely to take account of environmental considerations if by doing so they will be acting alone.

A structural blockage to environmental investing is apparent in the three interview extracts provided immediately above. Interviewees expected the scale of environmental investing to grow only if the entire market would first swing to environmental investing. This is a subjective, self-fulfilling belief. In social-ecologic terms, managers' responses to ecological issues (of any description) are made with reference to the rest of the market as normative guidance. Without structural intervention of some sort, an impasse is likely to remain.

Buy-side investment brokerages were recognised by all interviewees as having the capacity to drive market interest in environmental, social impact and governance issues. The data suggest that the influence of investment analysts and brokerages on companies (Roberts et al. 2006) extends to influence over fund managers and fiduciaries. An advisor on sustainability-related and governance matters to a UK-based fund management company alluded to the capacity of investment brokerages to direct investor interest towards "sector drivers which move multiple stocks" (z-fm). Some interviewees explained they had framed environmental investing as 'part and parcel' of ordinary portfolio management in order to, it was hoped, legitimise environmental investing.

The data suggest that financial institutions have not determined the asset classes, e.g., debt, real estate and equities, to which carbon emissions, environmental awareness and climate change-related risks and opportunities might best belong. A fiduciary asset owner located in Scandinavia explained the organization's strategic position as follows:

> *Carbon trading and all that kind of stuff: that's not an asset class that we are looking at very greedily us. We don't understand it. We do not see a fit purpose from a risk perspective for us to go into that kind of asset class. (n-fi)*

All interviewees struggled to define environmental 'considerations' and related risks. The following short interview extract from a fiduciary located in Europe illustrates:

> *What does it mean to identify and respond to climate risk on a portfolio level? (n-fi)*

To two interviewees, environmental risk meant the same thing: a combination of policy-, regulation-, market- and information-related risks. These two interviewees were a small active-style fund manager and the other a fund manager at a large passive-styled pension fund. The first of two extracts below is from an interview with the chief investment officer of a 'boutique' fund manager in New York. S/he is explaining the firm's fiduciary situation relative to risks associated with environmental investing.

> *With equities, it is obviously a higher risk, so we track the market. I don't know too much about cap-and-trade. We'll have to wait until the markets factor carbon in. Utilities are already factoring it in. At the moment, is this really something we can use? We cannot gamble. (b-fm)*

The next extract is from the corporate governance advisor of a North American education-sector pension fund. The interviewee is explaining his/her fiduciary constraints.

> *Carbon reports currently don't allow us to make investment decisions, but we anticipate that they will once we have a price. In the absence of a clear carbon price, the impact of CO_2 emissions is really speculative. We don't want to go there at the moment. (c-fi)*

Some interviewees expected and hoped that by taking account of environmental considerations, incremental investment revenue opportunities might arise. In the extract immediately below, a principal of a European public-sector insurance company is arguing the advantages of early strategic positioning for a 'low-carbon economy' expected to arrive.

> *Let's face it – investors aren't in the business of saving the planet. There will a huge opportunity going forward in the environmental space. Investors should really be aware of what those opportunities are now and what they could be. Institutional investors – big pension funds, sovereign wealth funds -- should be really keen to be seen as promoting companies to be producing technologies that will underpin the energy revolution. (n-fi)*

Other extracts in this group give an impression that interviewees were attempting to convince themselves and the interviewer that environmental investing made sense because it was profitable to do so. To wit, all interviewees – not only in this thematic group but across the entire sample – mentioned carbon prices as a motivator for environmental investing. An unresolved issue is the valuation of an unpriced investing theme. Most interviewees considered the price of carbon below its worth and had cause to complain about the absence of a fungible carbon trading market, which in turn, according to interviewees at least, was related to an untradable carbon price.

To close our coverage of the sense-making theme, the following extract from a fiduciary asset owner explains its institution's motivation for environmental investing. The extract indicates that market practices, peer behavior and economic decision-making can be expected to facilitate while at the same time, if ironically, impede environmental investing.

> *I think we should all ask ourselves why we should be doing this? Because it is outside our fiduciary responsibilities to adopt any sort of messaging strategy targeting to save the world or anything like that. We are here to make money for the benefits of our organizations, our pensioners and our membership. That's what it's all about. (n-fi)*

(III) INTERVIEW THEME: DECISION-MAKING

All fiduciaries, portfolio managers and consultants interviewed for this paper considered environmental risks as important, yet, had struggled to design strategies for identifying and managing their concerns. Some interviewees had hoped that by engaging sustainability and climate-change consultancies they would identify their exposure to environmental risks. Other interviewees -- fund managers and fiduciaries -- had deferred any decision pending resolution of uncertainties. All interviewees questioned the operationalisation of climate/carbon/environmental-related risks. Three extracts illustrate. The first two are from information providers.

> *We are focusing more on risk management than opportunities now. We see climate change (management) at companies as a proxy for quality of management. At the moment we have to convince investors of that. (p-rp)*

> *The problem is how do you factor 'long-term' in with day-to-day issues of concern? (s-rp)*

A third speaker to question 'carbon risk' is an active-styled fund manager based in France and the UK.

> *I've heard the word carbon, carbon, carbon. What's the next big issue after carbon - or is it all about carbon? And if there is a carbon market, is there some kind of risk premium in that market? Is carbon a risk factor or an asset class, or both …? (r-fm)*

Interviewees considered that company-issued and other reports of, e.g., companies' carbon emissions levels would have to accommodate market conventions. An information provider with a stable of European pension fund clients outlined the type of comparative data s/he considered would be usable.

> *All valuation is relative. Bloomberg data has not solved our complete inability to compare peer companies across sectors (on carbon performance). No one collects that data. I need to see (how carbon) moves with sales and earnings. (y-fm)*[18]

Other fund managers and governance advisors interviewed for this paper reflected the sentiment above. A consultant working at a certain provider of company financial data to investors explained that data on, e.g., company carbon emissions levels were available but that the firm had been unable to determine the relevance of that data.

> *[Regulators] haven't said how companies should report boundaries. This is also a problem of multiple jurisdictions. We don't know the scope of the data. (v-rp)*

All interviewees commented that the main information providers used by the capital markets have not provided usable, relevant data. The following two extracts illustrate. The extracts are taken from an interview with the managing director of a 'boutique' active-styled investment firm operating in the US and India.

> *If I could see some variation in carbon data, say, trending across a particular section, then I'd be interested. At the moment, we have the data – from Trucost [a global environmental consultancy firm], I think – but we're not doing anything with it.*

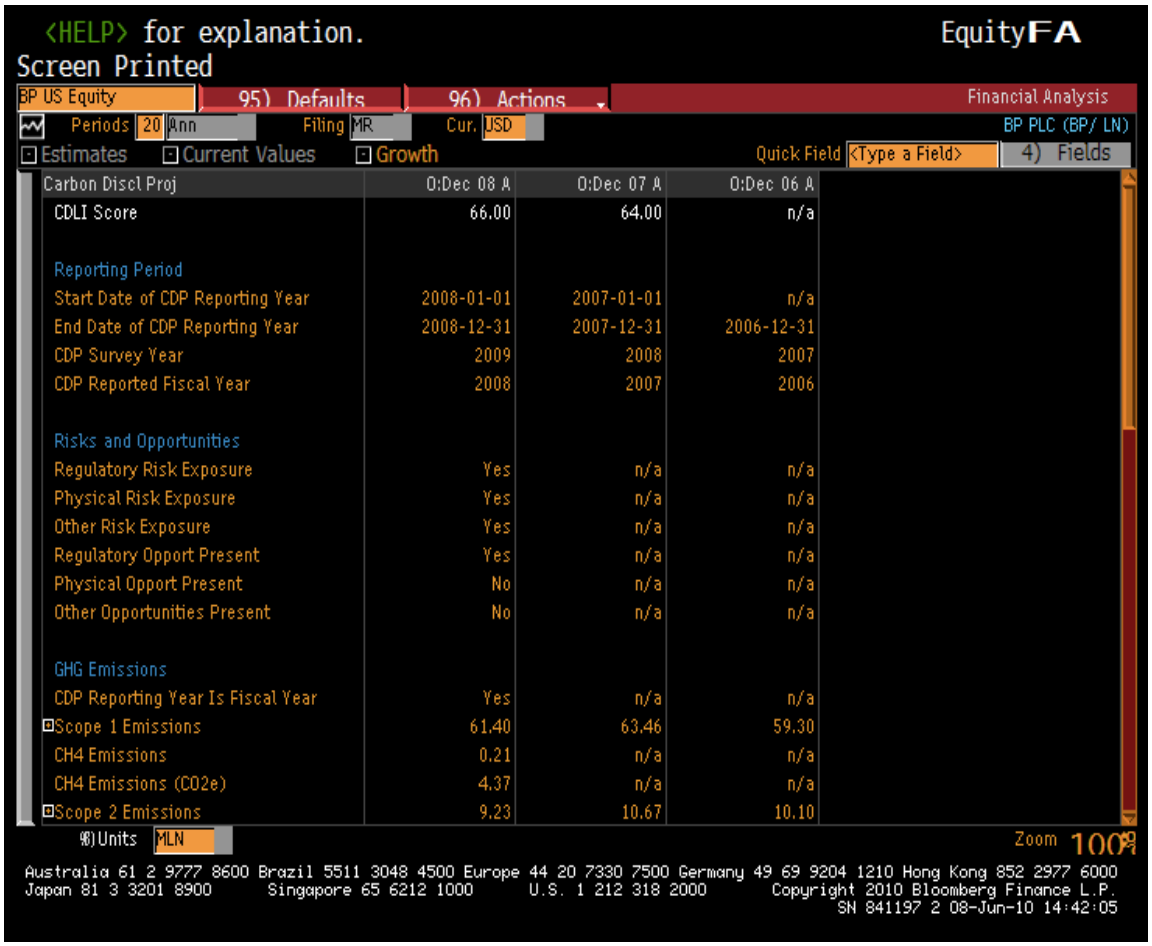
> *I would expect the Carbon Disclosure Project or anyone else to be able to supply me with formatted data and analytical reports – why not? Standardisation [of company carbon reporting] is important, but it's looking across sectors [that's useful]. If nothing is happening across a sector or if nothing is trending on a particular company, then I'm not interested. (b-fm)*

[18] At the time of writing, Bloomberg L.P. was using environmental data collected from company reports and also obtained from the Carbon Disclosure Project, a repository of company self-reports.

In light of investors' demand for data formatted in ways that they might use, the following extract illustrates the salience of market practice (the interviewee was a fiduciary of a Scandinavian public-sector fund).

> *My portfolio managers would probably prefer it (environmental data) in Bloomberg because that is the tool that they are using. The window of opportunity here is quite small. (h-fi)*

A Bloomberg screen was provided by another interviewee post-interview and is included below. The interviewee, the principal investment officer of an active-styled 'green' funds management company based in the US, provided the screen to the interviewer so as to illustrate Bloomberg's limited use of largely narrative company-supplied information. For this interviewee, environmental information provision to the capital markets is at an early stage.



Despite interviewees' frustrations with the type of 'carbon data' coming to their desks, several had cause to mention that "at least" Bloomberg now had included information from the Carbon Disclosure Project database in its data feeds. Some interviewees believed that Bloomberg's supply of company environmental data to the capital markets had established the legitimacy of environmental investing.

The optimal planning horizon if incorporating environmental considerations in investment decision-making processes was a particular issue of concern for research providers. An interviewee with some ten years' experience in researching companies' environmental management programmes highlighted the salience of horizon.

> *Doubts about the science have a real political impact. You factor in the time it will take to cost carbon, standardise information disclosures (from companies and investors), and the right sort of regulation – that's five years. So at the moment, allocations according to carbon don't matter to most (people). (s-rp)*

The interviewee explained that by 'five years' s/he was referring to his/her organization's average asset allocation planning horizon. When it came to consideration of possibly 'new' risk premia or asset classes, anything presenting beyond a five-year horizon was discarded from current consideration.

Asset managers and owners appear to be in an exploratory search phase regarding the investment vehicles that might best house carbon-sensitive assets. Most interviewees considered that appropriate vehicles for environmental investing approaches were limited in range and type. The following extract from a London-based asset consultancy/information provider suggests that such market structures are impeding the uptake of environmental investing.

> *Most people aren't really interested in stressing their portfolios in a very organized way to try and get companies to move in directions that will be in their interests and in the interests of, uhmm, the planet as well. There's a feeling that we're not all acting as if there's an urgent problem and time is, well, ticking away. (s-rp)*

The stammer in the extract above is thought to indicate the way the speaker handled the apparent 'otherness' of environmental considerations. A probe question on why financial institutions might be interested in 'saving the planet' was answered with reference to a need for financial institutions to '"stick to" fiduciary obligation to increase portfolio wealth.

Other salient market structures are the client mandate and the style of investment management. A distinction appears between an index-hugging, passive management style and an active, asset-specific, 'green' management style[19]. The following statements from an interviewee are typical of the comments of the passive-style investors interviewed. The interviewee worked as a manager in the funds management arm of a European national bank (and accordingly is classified as subject to fiduciary restraints).

> *I'd like to point out that we currently don't apply assessment on carbon emissions and climate change into investment decisions. We just follow the matter as relevant for some utilities companies we invest into. (a-fi)*

[19] The distinction is consonant with the outcomes of the behavioural experiment, presented in a section above.

A probe question asked the interviewee to name factors that might encourage the financial institution to include environmental considerations as data points in decision-making processes. The response is given below.

> *In case of new legislation, we might decide to set up a database for carbon emissions-related data related to each company [so as] to monitor the trend. We have not as yet and nor do we have plans to do so. We could consider carbon emissions in the event they become more material for the economic performance of companies. (a-fi)*

The two extracts immediately above suggest that investors will permit environmental ecology into the frame of meaning described by the client investment mandate. A conservative style such as followed by a nationalised central bank might not be expected to target, e.g., low-carbon-emitting energy assets on a basis that by so doing global carbon emissions levels might be reduced. It is assumed that passive-styled investors prepared to weight their portfolios in terms of climate-risk considerations will take into account institutions such as benchmark portfolio comparisons (following Sharpe, 1992).

Notwithstanding the (latent) influences of the structural features outlined above, investors appear ready to use company-supplied environmental data if they are supplied the reasons, including wealth-increasing rationales, and then to be shown how. The following extract from a US-based portfolio manager illustrates:

> *'Carbon emissions' is a project. It's on our agenda. We haven't done much with it. We might in the future. (Environmental data from) Bloomberg is in very early stages. It will take some time. But we expect to be using Bloomberg of course. (b-fm)*

5.4 SUMMARY

This section begins by identifying points of convergence and divergence between the outcomes of the research. The method of triangulation follows that suggested in Schostak (2009). Schostak considers strategies for research in institutional and organizational change where that research would also foster that change. The section continues by assessing whether the minimum institutional conditions and information requirements for environmental investing, as set out above in a previous section, are satisfied.

All the limitations and biases of survey research apply to the findings presented from the questionnaire administration. The findings and inferences are limited from the sample obtained, the subject matter and the nature of analysis. The questionnaire data are self-reports and might be tainted by a range of biases, including those of comprehensibility, emotional affect and social desirability (Frankfurter et al., 2004). The risk of such biases, despite a pilot administration, could not be eliminated entirely. The results must also be viewed in light of the limitations imposed by non-parametric testing on a relatively small sample of self-selected respondents (Chen and Popovich, 2002, p. 81). The generalisability of the results of the experiment should be seen in context of a relatively small sample (23 per treatment). The basis of selection of the interviewees was neither random nor systematic, being informed primarily by

the first-named author's professional networks and access to certain investor clubs. Although the interviewer deliberately allowed the interviews to be shaped by the interaction between interviewer and interviewees, the chance that the basis of the sample influenced the conclusions drawn is not eliminated.

Taking into account the paper's limitations, the findings contrast with prior behavioural research that has found that retail investors in environmentally- and socially-themed mutual funds are driven by a range of considerations, including but not only wealth maximisation (Kempf and Osthoff, 2008; Haigh, 2008). This paper finds that in financial institutions, wealth maximisation drives behavioural motivations, intentions and behaviour almost exclusively. It is possible that the level of attention to wealth maximisation serves to restrict the uptake of environmental investing practice. But there are other salient factors and these also inform fiduciary concerns. Although some of the financial institutions examined had monitored (and in some cases, had also promoted) company environmental programmes, no passive-styled investor had incorporated ecological data in its decision processes.

Although the results of the questionnaire suggest robust investor demand for corporate environmental reporting, the minimum information requirements for environmental investing (set out in a section above) are not met.

The observed fund management behaviour has important implications for regulatory policy issues on environmental information, on corporate disclosure, the environmental policy role of financial institutions, and for the governance of financial institutions, particularly those that benchmark themselves against investment indices.

The triangulated outcomes are summarised as follows.

There is no evidence that the fiduciary principle of precautionary management has been operationalised in the Japanese and North American financial institutions examined for this paper. There is some evidence that precautionary management has been reference by executive trustees and fund managers in Australia and Europe.

Sharpe (1992) asserts that the minimum information requirements of an investor can be assessed using an asset class factor model. It was not identified that any financial institution examined in this paper had developed a model for identifying and including 'environmental considerations', 'carbon', or greenhouse gases emissions'. Further, there was no convergence on terminology in the financial institutions examined.

Investor uncertainty is exacerbated by isomorphic concerns. To wit, a widespread perception that most financial institutions have not used environmental considerations has served to discourage investors from identifying and adopting environmental investing approaches.

There is evidence that investors use intuitive, heuristic, multi-attribute models in their decision-making processes. However, it cannot be asserted that available information on environmental considerations is framed meaningfully for analysts, investment brokers and portfolio managers. Available information on company sustainable development and environmental protection programmes is reported inconsistently and

in a piecemeal fashion, serving to frustrate the inclusion of such information in investors' asset allocation models.

As yet, diversified financial institutions such as pension funds and insurance companies have not integrated economic and environmental performance indicators. Investor demand for a widely accepted set of eco-efficiency indicators is strong. Eco-efficiency indicators are nascent and germane to individual financial institutions.

As consequence, it is not possible for a well-diversified investor to determine the exposure of the environmental component of a portfolio to movements in the portfolio return, to determine consequently an overall effective asset mix, and to determine how effectively individual fund managers have performed their functions and the extent (if any) to which economic value has been added through environmental investing.

Passive investors such as pension funds tend not to use benchmark asset mixes that include environmentally-sensitive assets. This is due in part to the restricted range of 'environmental' thematic indices[20] and in other part to the influence of isomorphism in financial services. A corollary is that environmental portfolio performance cannot be determined readily using average portfolio returns.

The remainder of this section elaborates on the points summarised above.

The relationship between usage and decision-usefulness is weak. It is not observed that investors are concerned about the quality of company-issued 'environmental data' and carbon reports. Questionnaire respondents display strong demand for company-issued carbon reports despite opining negatively on the quality of the data. Representing a departure from Ferreira and Matos' (2008) finding that financial institutions are attracted to companies that can demonstrated sounds systems of governance, we identify a gap between behavioural intentions and actual behaviour. Figure 3 above shows that nearly sixty percent of questionnaire respondents rarely or occasionally used carbon data from any provenance.

Superficially, the observations mentioned immediately above are in accordance with prior research (e.g., Milne and Chan, 1999; Friedman and Miles, 2001; Clark and Hebb, 2005). The current paper makes a contribution by identifying that investors' absence of concern over data quality can be attributed to investors' little use for such data. In short, the quality of and demand for 'carbon data' are not factors affecting the uptake of environmental investing. Rather, adoption of environmental investing approaches is contingent principally on the modes by which relevant data are made available and investors' abilities to put valuations on a range of environmental data. Pricing, subsidies and taxes (and valuation issues in general) are salient and particularly so with index-driven investors. Environmental data are reported inconsistently, confounding investors' ability to incorporate such data in valuation models. Inconsistent reporting is attributed in part to relevant data available only in company-issued reports. Investors can be expected to use environmental data points if

[20] E.g., Standard & Poor's thematic indices (http://www.standardandpoors.com/indices/thematic/en/us/?assetName=Thematic&assetID=1221186708607) do not include environmental considerations or 'climate change'. It is noted that S&P indices include sustainable energy portfolios.

information is made available in familiar modes such as reports issued by analysts and brokerages, and screen dumps provided by information providers.

In interview, fiduciaries were concerned with appropriate policy, the legitimacy of environmental investing, and the interpretation of climate change and associated matters. This finding is consonant with the outcomes of the questionnaire analysis, which finds that asset owners conceive of environmental matters in terms of fiduciary obligations. Our triangulated finding that fiduciaries are more receptive than are fund managers to environmental investing policies and practices bears implications for delegation of fiduciary responsibilities, the use to which company carbon reports are put, and the possibilities for a social-ecologic theory of investment management.

The findings of the study permit the following concluding remarks.

A factor limiting the efficacy of policy that would encourage investing by reference to environmental considerations is that relevant data have been made available to investors only in company-issued reports. Investors can be expected to use environmental data points if data are made available in familiar modes such as reports issued by analysts, and screen dumps provided by information providers.

Portfolio managers and analysts accord importance to non-financial data insofar as financial implications of that data can be identified. If ‘carbon data’ are to be incorporated in investment decisions, investors will need to expect, e.g., that carbon prices and options on carbon prices will behave in ways consistent with commodities and derivative asset markets and that the instruments to which carbon prices attach will trade in volumes beyond minimum trading thresholds.

Policies concerning such as carbon taxes are relevant for investment decisions. Current policy requirements for disclosure of methods used to recognise ‘environmental considerations’ fall short of objectives to ameliorate levels of investment risk, promote stability of capital markets and reduce absolute levels of pollution. In the absence of a consistent application of precautionary management that includes environmental management, we do not have the minimum institutional conditions for setting up (something like) a carbon emissions factor model.

The outcomes of the experiment and interviews suggest that carbon pricing policy is a material influence on motivations, intentions and actual decisions to invest according to environmental considerations. An absence of robust carbon prices and price drivers to date (Alberola et al., 2008) might be associated with the behaviour observed in the experiment. Use of firm-specific information sources (company carbon reports and data on company environmental projects) in the investment decision is invariant between management styles. Neither the green mandate group nor the index-tracking group recognised firm-specific information. Among various non-firm-specific information sources, the index-tracking group gave most importance to carbon prices and did not allocate funds to carbon-sensitive assets.

While interviewees treated objectives of wealth accretion and environmental responsiveness as both falling with the province of fiduciary management, the connections between the two were made awkwardly. Some questionnaire respondents and also some interviewees viewed fiduciary obligations as sufficient motivation for

taking environmental considerations into account. Contrarily, the same interviewees also framed fiduciary obligations in terms that would exclude environmental considerations. No interviewee could explain how an active investment style that referred to such as companies' environmental management programmes could lead to reductions in investment risk or reductions in companies' carbon emissions levels. More often, attention to environmental considerations was argued as leading to expected incremental revenues. Such observations lend import to the governance implications (Holland, 2009) of fiduciary money management.

It is observed that in this sample financial institutions were unwilling to be exposed as mavericks by including climate-related risks as data points in portfolio construction. If market-based fiduciary obligations are influenced by institutional factors, and there is evidence that this is so (e.g., Holland, 2006; Haigh, 2006; Roberts et al., 2006), how then should fiduciaries behave given the public warnings that connect environmental risks to asset values? This conundrum presents challenges for fiduciary responsibilities and environmental policy, and stops short of a comprehensive grounded theory of environmental investing. Jacques Derrida, examining the response of the French government to the refugee crisis in the 1990s, sought a method to reconcile opposing values appearing between policy objectives and policy exigencies. The dialectic on "both poles of the tension" (Derrida, 2001, p. xiii) suggests that responsible solutions (can) be negotiated. Policy recommendations are presented in a following section.

6. POLICY RECOMMENDATIONS

The prospects for a social-ecologic theory of risk management depend on strong policy measures. The current policy arrangements of legislated financial reporting and regulated environmental reporting have roots in the post-Depression era where demands for 'restoring public trust' in the banking system were thought to be satisfied by issuance of public information (Zingales, 2009). The intermediated nature of financial markets some eighty years later, in which trust still surely has a central role, has not been met by substantial adjustments to fiduciary accountabilities. The extant regulative and legislative approaches booth seek to improve the quality of public information by, e.g., additional disclosures of managerial processes and third-party verification and, as examined in this paper, by extending the scale of reporting to cognisance of environmental considerations.

Extending the call of Zingales (2009) for securities regulations that focus on corporate governance, a call is made for environmental investing policy measures centring on the relationships between financial institutions and the companies that they invest in. To that end, effective policy prescriptions will be those that (i) recognise that investment behaviour is shaped by intermediated capital markets, and (ii) that distinguish information items used by financial institutions which are firm-specific (such as company environmental programmes) and non-firm-specific (such as carbon prices and energy use subsidies).

Policy prescriptions need to be tailored to the types of investment mandates held by financial institutions. 'Green' active investors with mandates to invest in companies and assets that bring about reductions in greenhouse gases emissions behave in ways that are significantly different from the index-hugging, diversified investor. Rather

than expecting the government to provide policy incentives, green investors tend to place value on both firm-supplied information and interaction with the firm. Index-hugging investors, on the other hand, without specific mandates for any particular investment theme beyond matching the return on the particular portfolio to that of the average portfolio, can be expected to take notice of market momentum and features such as carbon prices available to the entire market.

Accepting the literature which finds that statutory company financial reporting and environmental sustainability reporting have declining value relevance to investors (e.g., Farneti and Guthrie, 2008; Guthrie et al., 2008), we suggest a combination of behavioural policies consistent with Fischer and Newell (2008).

A behavioural approach to policymaking would reflect an objective of policymakers that investment mandates (will) countenance investing in projects and companies that reduce levels of industrial carbon emissions. In line with the radical, social-ecologic approach to policy put forth here (Guattari, 2008; Schostak, 2009), such a policy shift would reflect a stronger green investor population across all types of financial institutions. Our results suggest that index-hugging investors rely more heavily on policy signals such as carbon prices, carbon taxes, and subsidies. These will continue to play a role as governments acquit their obligations under environmental legislation, such as designing policies for the business and financial sectors under the UK's Climate Change Act 2008.

Firm-based information can play a larger role if policy is designed to further legitimise the use of carbon emissions data in the ordinary course of the business of privately managed financial institutions. Inevitably, given the patchwork of reporting regulations in force in Europe, North America, Japan and Australia, the quality and reliability of company-supplied data on carbon emissions and environmental management programmes will increase. A likely flow-on effect is some amelioration of the information adequacy problem identified in this paper. Relying solely on the reputation effects of voluntary emissions disclosure on firm environmental performance is untenable as such disclosures have little bearing on firm value for most investors (Clarkson et al., 2010). Thus, reporting policies should be introduced requiring, at the minimum:

- Companies to disclose their carbon emissions strategies and management programmes;
- Relevant information disclosures to be audited in the same way as are company financial reports; and
- Financial institutions of all types to disclose the adjudged effect of taking environmental considerations into account on portfolio risk levels.

Policies that seek to introduce environmental investing across the board need to take account of and coordinate the most valued information types: carbon prices (above USD 50 per tonne), subsidies to ease the transition from high- to low-polluting practices, and carbon taxes.

Our findings suggest that coordination problems between the national and multinational levels present a particular threat to the viability of a social-ecologic

approach to portfolio management. The exposure of large financial institutions to international equity and debt markets is a commonplace and for policy to be effective it will have to reach across borders. The absence of a single policy making mechanism voice represents a problem in the global polity with regard to carbon emissions (Okereke et al., 2009). In smaller capital markets such as Scandinavia, a single company, e.g., an energy provider, can simulate the entire market if able to show that a strategy to adopt less-polluting forms of energy will produce a favourable dividend policy--as has occurred in Norway. Government policies in smaller markets can also be expected to have relatively speedy effects (Sinani et al., 2008). Policies without immediate economic import and that carry no remedies and sanctions such as those that are currently in place in, e.g., the UK, Denmark and Australia, cannot be expected to be given much truck in globalised capital markets.

Investors' concerns on the direction and content of environmental policies appear in the data obtained from the questionnaire, experiment and interviews. Unexpectedly, most interviewees expected and some had invited governments of the day to issue regulations addressing investor's behaviour and extent of responsibilities.

The remainder of this paper presents some policy suggestions that might address concerns arising from the analysis. Three sections are used to suggest certain macroeconomic policy innovations; product pricing and product-form innovations; and modifications to extant disclosure regulations, respectively.

6.1 RISK PERCEPTIONS AND ECONOMIC BEHAVIOUR

This section refreshes Stigler's proposal (1961) that investors' recognition of corporate environmental management performance be promoted using policies that lead to desirable market behaviour. Theoretical support is found in loosely coupled sets of principles that might justify industry self-regulation. Such principles centre on the presumed advantages of enlightened self-interest, such as business risk, reputational capital and learning (Haufler, 2001), couched by regulatory oversight (King and Lenox, 2000). A tension between the private sector and environmental regulators, e.g., Environmental Protection Agencies, has been thought as diffusible or, at the least, politically digestible if using market mechanisms (Haufler, 2001, p. 107). Ordinarily, financial institutions do not lobby governments on company-specific or even sectoral-specific issues, unlike other community pressure groups (Smith, 1990, p. 114). Recent attention directed by financial institutions towards environmental risks appears an exception. Collective behaviour of certain groups of financial institutions in the US, Europe and Australia coalescing around the issue of climate change and climate change-related investment risks potentially challenges the tenets of Tobin-Markowitz portfolio theory[21].

At first glance, a policy position to rely on governments to promote a market in externalities seems ironic, given the observed capacity of governments to identify externalities. It might be supposed that the markets will respond to identified externalities by pricing them into asset valuations. Financial institutions offering socially tailored investment portfolios, for instance, have claimed that a presumed

[21] E.g., the Investor Network on Climate Change (www.incr.com); CERES (www.ceres.org); and the Institutional Investors Group on Climate Change (http://www.iigcc.org).

eventual pricing of externalities will enable them to outperform other investment managers. The role of governments in directing social outcomes is also generally accepted.

The application of the ideas of Ronald Coase (1960) would hand over the 'solution' of negative social and environmental externalities exclusively to market mechanisms. Contemporary economic opinion has considered this approach as generally infeasible. Factors such as transaction costs, imperfect information, strategic behavior on the part of polluting corporations and the belief that multiple parties and differing property rights will not achieve efficient outcomes, have forced most governments to abandon free market solutions (Abelson, 2002, p. 155). Governments have claimed they rely on shifting mixes of corrective market mechanisms (such as emission standards), tradable permits and direct regulations[22]. For some externalities – and possibly industrial carbon emissions would rank among them – there may not be a feasible market-instrument policy alternative and government regulation, supported by financial penalties, would be the only appropriate solution (Abelson, 2002, p. 156).

Regulatory incentives, if applied judiciously, can be an effective driver of environmental management. It is a commonplace that Western countries have introduced legislation to make environmental reporting mandatory for corporations. Since the 1970s, various jurisdictions (e.g., the US, Denmark and the Netherlands) have required companies to send reports of their environmental management efforts to agencies set up for the purpose (Richardson, 2002). As an instance of such enabling regulation, in 1995 the Dutch government offered personal income taxation exemptions to investors in an attempt to stimulate environmentally sensitive energy, agriculture and technology projects, whereby fund managers have issued debentures to fund projects certified by the government environmental agency. Certification was necessary before Dutch investors could claim tax exemptions on the economic returns on their capital. The latter initiative is said to have allowed investment managers involved to offer project finance at competitive terms (Richardson, 2002).

In that regard, governments might grant concessional income and capital gains taxation status to eligible investment corporations and association offering environmental-themed and carbon-responsive investment products. Examples of products that might be eligible for concessional status on these grounds include venture capital funds, fixed-interest green debentures, and life insurance bonds. Other example is financial incentives offered to restructure development-specific investment vehicles such as the Pooled Development Funds in Australia, which until 2009 enjoyed concessional taxation status in that country.

6.2 INVESTMENT VEHICLES

A significant minority of respondents to the questionnaire expressed their doubts that investment products explicitly taking into account carbon emissions and climate risk, if compared to financial investment products that do not, represented a complete and viable investment approach. Outlined above, some respondents to the questionnaire

[22] Pigou (1932) is credited with initiating the concept of a corrective tax that reflects the marginal damage cost. Pigou argued that in some cases both governments and free markets should deal with the social costs of goods and services (Abelson, 2002, p. 158).

complained of the information sources available for investment strategies based on climate risk considerations. The primary reasons for investors' reluctance to take up the climate change policy agenda may be the low carbon price attained and thin fungibility observed in carbon trading markets. Until policy makers signal their support for a stable trading market, financial institutions are likely to exclude climate-related risks from (their conceptions of) fiduciary responsibility. Reporting is not the problem here (Gibson, 2006): signalling is.

The first of three suggestions brings focus on the management expense ratio levels of financial institutions[23].

CARBON EMISSIONS-RESPONSIVE INVESTMENT PLATFORMS. Product platforms could be tailored according to climate-risk and carbon emissions mitigation considerations. A master fund, for instance, could offer products categorised along investment styles, screening styles, and ranked lists of carbon emitters. Advantages of such products, at least in terms of policy objectives, would include standardised reporting of disclosures associated with environmental investing criteria[24]. To have significant influence in the capital markets such investment platforms would need to offer a wide range of products, including fixed interest and property trusts. Apart from offering a suite of investment products congruent with public policies, the potential variety of products on shared investment platforms can be expected to lower management expense levels.

Exchange Traded Funds might also be developed that track indices such as the Dow Jones Sustainability Group Indexes, FTSE4GOOD, and other sub-indices as might be appropriate. The latter innovation might also serve to mitigate otherwise inflated management expense levels, as well as provide the benefits of transparent portfolio listings.

HEDGE INVESTMENT PRODUCTS could be designed to operate so as to compensate an investment manager for losses realised from reweighting portfolios but only when those portfolios are reweighted on non-economic grounds (such as climate-risk considerations). Such products would operate against ordinary equity securities if, on review of environmental performance ratings, a particular stock fell below acceptable investment grade. Ordinarily, a significant portfolio reweighting would be expected to carry negative effects on economic performance or portfolio investment risk. This proposal involves complicated manoeuvres that fall outside the scope of this study.

CARBON FOLIOS AND CARBON BONDS. Financial institutions prepared to employ social and environmental considerations in portfolio construction are exposed to significant risks. In the US, investment products referred to as 'folios' allow lead investment managers to select a customised basket of stocks in which they receive the benefits of adequate diversification but without the 'moral hazard' created by intervening layers of advisory, brokerage and custodianship services. The

[23] We not model the likely effects on financial institution's management expenses from factoring company-issued environmental information disclosures into decision processes. It is reasonable to assume that this process pressures management expense levels.

[24] Including, possibly, social impact, social development and corporate governance investing criteria.

development of climate folios would allow financial institutions to invest directly in companies that report according to a recognized suite of climate reporting standards.

The next section addresses issues of information relevance and information assurance with respect to emerging climate reporting standards.

6.3 INFORMATION CONDUITS USED IN FINANCIAL MARKETS

The analyses presented above suggest that financial institutions have tended to ignore company-issued reports of environmental management programmes, 'environmental performance' and so on. Four suggestions are provided below which focus on the information exchanged between investment intermediaries.

The analysis of the interview data presented above identifies that isomorphism – in this case, an absence of market conventions regarding financial institutions' treatment of environmental considerations – has stifled the uptake of environmental investing. A possible exit from this conundrum is bringing regulatory requirement for fund managers to demonstrate to fiduciaries how portfolios have been constructed with reference to adjudged environmental risks.

For reasons of technical expertise, the oversight of such a requirement would not be the natural province of corporate regulators, nor that of fiduciaries. Such a requirement can be expected to be effective if extended to all the decision points in managed investment, in which case it is unreasonable to expect that regulators and fiduciaries have the wherewithal to monitor policy[25]. Further, the efficacy of government regulation is limited to investment remits that do not extend beyond national borders and national taxation regimes. Regulatory problems arise from (i) the absence of a conceptualisation of transnational governance of financial markets (as commented by Held, 2000) and (ii) the absence of a coordinating mechanism linking national regulatory systems (Haufler, 2001, p. 119). Although the hegemony construction of corporate control of environmental protection (Laclau, 1995) cannot be ignored, a pragmatic suggestion is for the support of a contractual solution. Interviewees indicated they would support a contractual requirement of fund managers to demonstrate how portfolios had been constructed by reference to adjudged environmental risks. None, however, had included such requirement in their fund manager contracts. When probed why not, a trustee of a public-sector Australian pension fund admitted that its sphere of (fiduciary) influence did not extend to all decision points in investment processes.

> *My board of directors is one step removed. We can't force our managers or our companies to do anything. We're not a private equity firm. However, in direct property, that's quite tangible and somewhere we can demonstrate commitment (to sustainable investing principles). (W-fi)*

After a further probe, possibility of including an environmental investing mandate in an agent contract had not come to the attention of his/her board as market conventions

[25] Managerial accountabilities exist between trustees and portfolio managers; and between portfolio managers and equity and debt analysts, corporate governance advisors and investment brokerages.

had not, at the time of interview, adopted such a measure. It appears, then, that regulatory policy might have a role in effecting this desirable market convention.

It is noted that the policy directives considered in the current paper relate to the range of asset classes that might be included in pooled investment portfolios: equities, real estate, debt, money market, and commodities. In equities, structural issues are significant impediments to environmental investing – at least, to a greater extent than they are in other asset classes. A salient difference between equities and other asset classes is directness of ownership. Equity investments are surrounded by depositories, custodians, trustees, asset consultants, management firms, transaction brokers and product distributors, whereas, e.g., a property portfolio can consist of certificates of title perhaps held in escrow and a management firm. For this reason, contractually enforced accountabilities can be expected to affect the uptake of environmental investing in equities.

The suggestion for a contractual remedy here echoes recommendations issued in 2009 by the United Nations Environment Programme[26]. Certain trade associations in Australia and the UK have encouraged and in some instances required their institutional members to instruct their investment/portfolio/fund managers to adopt ESG-type (environmental, social and governance-themed) investing policies. Although the mode of regulatory oversight is outside the scope of this paper, it can be expected that supranational associations (e.g., UNEP, and transnational trade associations) may have some utility in this regard. Explicit sanctions administered by informed out-siders may be needed to avoid opportunism within an industry self-regulatory scheme (King and Lenox, 2000, p. 713).

INFORMATION ASSURANCE. Guidelines by which companies and financial institutions can voluntarily report non-economic information about their activities have appeared in both private sector and public initiatives in O.E.C.D. countries since 2000. The European Union, the European Sustainable and Responsible Investment Forum, the International Organization for Standardisation, the Climate Disclosure Standards Board, the Global Reporting Initiative and AccountAbility offer examples. Investors can be expected to appreciate information disclosure principles of comparability, reliability and transparency when the reports produced that reference such principles are seen as useful for investment decisions. Presently, it does not appear that investors consider any particular company-specific voluntary reporting framework as particularly salient. The perceived shortcomings of company-specific voluntary reporting frameworks have been identified above.

At the time of writing only two bodies -- the EU Emissions Trading System and Denmark's corporate regulator -- have mandated that professionally qualified accountants be engaged by organizations to provide assurance reports on organizations' non-economic accounts. (The non-economic accounts considered here include those mooted under the UK's Climate Change Act, the product disclosures made subject to Australia's Corporations Act, and the 'social/environmental' disclosures required of pension funds and insurance companies by the UK Pensions

[26] (Available) http://www.unepfi.org/fileadmin/documents/fiduciaryii.pdf (accessed 9 November 2010).

Act 1995[27]). An assurance mandate might serve to overcome a possibly widely perceived maverick connotation to climate investments, which in turn might allow climate-risk considerations to be refined and made pervasive in investment processes.

A question goes to the type of supervisory agency. This paper is confined to the interest financial institutions in company environmental information disclosures. However, it can be commented that the "international institutions, nongovernmental organizations, popular movements, and transnational interests" claimed by Mols (2010) as representing viable forms of regulatory oversight in efforts for environmental reform have limited influence in global financial markets[28]. Ecological modernisation in the financial markets is frustrated by an absence of any kind of transanational policy mechanism. Investment trustees and responsible entities comply with national corporate laws by sending externally audited compliance plans to regulators[29]. It cannot then be expected that regulators would have the breadth of expertise necessary to assess information disclosures informing on the environmental considerations used in portfolio allocation. Current practice is that 'sustainability assurance' providers issue no-opinion reports of engagement, which financial institutions and companies can attach to reports sent to their members and shareholders.

A 'no-opinion report' does not provide assurance on the subject of the engagement. Accordingly, current practice represents a less than satisfactory mechanism of allaying any concerns as to the integrity of investors' environmental information disclosures. An alternative is requirement that relevant disclosures be sent to government agencies with relevant expertise. Potential candidates would be agencies with expertise and experience in monitoring compliance with occupational health and safety legislation and environmental legislation. Requirement for lodgment of non-economic data with government agencies possessing suitable expertise might accelerate the processes by which governments identify, price and regulate economic externalities. More immediately, lodgment would be expected to improve the accountabilities of investment managers.

The International Organization for Standardization (ISO) has addressed environmental auditing in its ISO 14000 series of Environmental Management Systems (EMS) standards. Organizations choosing to use the ISO 1400 series must establish programs to periodically audit the operation of its EMS systems (ISO, 2004). The European Union has established the Environmental Eco-Management and Audit Scheme (EMAS)[30] and other initiatives. Organizations that choose to subscribe to EMAS are required to publicly disclose the results of their efforts to improve their environmental performance and subject those disclosures to the review of an 'environmental verifier' (EMAS, 2004).

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[27] Amendment to Statutory Instrument 1999 (No. 1849), The Occupational Pension Schemes (Investment and Assignment, Forfeiture, Bankruptcy etc.) Amendment Regulations 1999, Her Majesty's Stationery Office (available) http://www.hmso.gov.uk (accessed 21 July 2010).

[28] At least to the extent that financial institutions are independent of some of the institutional features of the European Union and the US-administered NAFTA scheme.

[29] Australian superannuation schemes lodge audited data returns with a regulatory agency.

[30] EMAS is constituted by European Regulation 1836/93.

AccountAbility's AA1000 Assurance Standard aims to provide a basis to review organizations' non-economic information disclosures[31]. The ostensible objective of AA1000 is to help establish the credibility of sustainability reporting. Reviewers adopting the AA1000 standard can only conduct agreed-upon procedures (no-opinion reports). Although AA1000 states that a reviewer must form an opinion 'based on the available evidence', compliance with professional standards would require an audit practice, if an organization engaged it for this purpose, to issue its report only to its client. Such a statement would not offer an opinion on the veracity or credibility of the information reviewed but would only state the extent to which the reviewer complied with the procedures that the auditor was instructed to follow. If the reviewer did not detect any inconsistencies with the information reviewed, a statement to that effect would be permissible.

It would be a transforming step to use the initiatives of the Climate Disclosure Standards Board, ISO 14000, EMAS, the Global Reporting Initiative and AA1000 as models for designing assurance mandates over investors' environmental information disclosures. The mandatory environmental reporting disclosures brought on investors by Japan, Australia, the UK and several other European countries (and the recent pronouncements issued in the US by the Securities and Exchange Commission) provide an opportunity. Institutional investors (and companies) with climate-risk strategies in place could adopt an appropriately branded suite of disclosure standards that would require some form of independent review.

EDUCATIONAL FORUMS AND PROFESSIONAL TRAINING. Most interviewees had not entertained a connection between environmental investing and investment risk and to that extent policy pronouncements might also promote a radical education campaign. Take-up of environmental investing might be promoted if investors were encouraged to countenance environmental considerations as bearing on portfolio allocation, which translates to risk and performance assessments. Requirements placed on trustees and responsible entities to use accredited advisers on environmental risk might also alleviate market inertia towards environmental (and social) investing (Haigh and Hazelton, 2004).

At educational forums and in professional training syllabuses, representatives of financial institutions might be required to argue and demonstrate how investment decision-making processes adopt and comply with environmental guidelines. Institutions likely to host such fora would be special-purpose public agencies (e.g., EPAs), and industry and third-sector special-purpose associations. Likely candidates attending such fora would be fund managers, investment analysts, and members of professional investment associations.

Providing information on companies' economic externalities in this public way might overcome observed nervousness of financial institutions to allocate funds to environmental purposes. This is not to say that trustees, fund managers, and corporate raters will have to or are likely to agree with each other. Disagreements on the best responses to environmental problems will remain but so will, to paraphrase Schostak (2009, p. 10), the experiences about how to develop relationships and forms of association in order to represent those disagreements.

[31] AccountAbility is a UK-based consultancy.

Any of the innovations suggested in this section might serve to strengthen the confidence of regulators in the environmental responsiveness of the financial services sector. Concessional taxation status and investment products that track environmentally tailored equity indexes and counter environmental risks might serve to ameliorate higher levels of management expenses expected if financial institutions were to take environmental considerations into account. Accountabilities between financial institutions, the companies in which they invest, and the beneficiaries of managed investment can be expected to change if financial institutions were to introduce process assurance systems, improve the transparency of portfolio allocation methods, and issue standardised, externally reviewed sets of environmental information disclosures. Certain legislative amendments and the involvement of government agencies might also create opportunities for governments to price the economic externalities of industrial activity.

A question remains open, however, as to whether any of the innovations presented above would mitigate the problems that give rise to rampant levels of industrial carbon-equivalent emissions, namely, the generation of economic externalities affecting communities and the biosphere. Certain problems of inclusion are not addressed here, e.g., that the direct beneficiaries of the environmental responsiveness of financial institutions exclude by definition those who are not policyholders, labour union members, pension fund beneficiaries and retail investors. The areas of the world thought to suffer most from climate change, for example, are those that do not enjoy the benefits of membership in the typical private investment vehicles of the US, Europe, Japan and Australia.

An instrumental approach of self-regulation and ‘business as usual’, to date the dominant method of policy analysis (Helm, 2003; Richardson, 2009b; Haigh and Guthrie, 2009; King and Lenox, 2000; Farzin and Kort, 2000), is not expected to motivate engagement of the financial services sector with climate change and other pressing environmental issues. If financial services practitioners are brought together then the empty signifier ‘environmental considerations’ potentially becomes a focus for disagreements about who is to represent the interests, needs and hopes of individuals and communities exposed to changes in ecosystems.

Successful policies requiring financial institutions to take environmental considerations into account are likely to be those that bring focus on the precautionary principle that underpins fiduciary responsibilities (Kysar, 2010). Representatives of market and political power such as largely unmonitored sell-side analysts and investment brokerages bring a potential for compromise of the precautionary principle. This brings requirement that policy design explicitly connects environmental sustainability to the precautionary principle. ‘Environmental considerations’ would then be reflected in trust deeds, company articles of association, stock exchange listing requirements, and contracts struck between fiduciaries and intermediaries. Desirable policy outcomes might then be expected.

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7. APPENDICES

APPENDIX ONE

POLICY PRONOUNCEMENTS RELATING TO INVESTORS' RECOGNITION OF ENVIRONMENTAL CONSIDERATIONS, INCLUDING MATTERS RELATING TO CLIMATE CHANGE: U.K., OTHER E.U., U.S.A., JAPAN AND AUSTRALIA

Mandatory national reporting requirements are stipulated by the United Nations' Kyoto Protocol and have been introduced by Japan, the UK, the EU, and some US states with respect to greenhouse gas emissions trading systems and environmental management systems. Several non-regulated reporting initiatives were in issue at the time of writing (June 2010); notable instances are reports of companies' responses to questionnaires issued by the Carbon Disclosure Project; the Climate Change Reporting Framework of the Climate Disclosure Standards Board; and sets of reporting principles promulgated by the Global Reporting Initiative, the World Resources Institute (authors of the 'Greenhouse Gas Protocol'), the Greenhouse Gas Measurement and Management Institute, and the UK-based academic/business consultancy initiative Accounting for Sustainability.

UNITED KINGDOM

Legislation:

Climate Change Act 2008.
Company Act 2006.
Finance Act 2004.
Pensions Acts, 1995 and 2004.

Regulations:

Carbon Reduction Commitment Energy Efficiency Scheme, effective April 2010, pursuant to the Climate Change Act 2008, administered by the Department of Energy and Climate Change.

Changes in regulation of pension schemes, The Pensions Regulator, London, 2005.

Statutory Instrument No. 1849, The Occupational Pension Schemes (Investment and Assignment, Forfeiture, Bankruptcy etc.) Amendment Regulations 1999.

Statutory Instrument No. 3649, The Financial Services and Markets Act 2000 (Consequential Amendments and Repeals) Order 2001.

Binding pronouncements:

Code on Corporate Governance, 2003 [amended 2010], Financial Reporting Council [imposing inter alia requirements for shareholder evaluation of company disclosures and approaches to risks arising from social and environmental matters].

Department for Environment, Food and Rural Affairs, UK National Allocation Plan Phase 1, Environment - Climate Change - Trading - EU Emissions Trading Scheme, 17 September 2007 (available) http://www.defra.gov.uk/environment/climatechange/trading/eu/operators/phase-1.htm (accessed 23 July 2009).

Non-binding pronouncements:

Guidelines on GHG emissions reporting, 2010, pursuant to the Climate Change Act 2008, issued by the Department for Environment, Food and Rural Affairs.
House of Commons Committee of Public Accounts, The UK Emissions Trading Scheme: A New Way to Combat Climate Change, Forty-sixth Report Session 2003-2004 (available) http://www.publications.parliament.uk/pa/cm200304/cmselect/cmpubacc/604/604.pdf (accessed 19 July 2009).
Myners principles for institutional investment decision-making: review of progress, HM Treasury, 2004.
Myners report on institutional investment in the UK: a review, HM Treasury, 2001.
Review of the 2003 Combined Code: the findings of the review, Financial Reporting Council, 2004.
Thornton, P., A review of pensions institutions, Lords Hansard, 2007.

EUROPEAN UNION

Legislation:

[France] Grenelle 1 Act of 3 August 2009 – Article 53 requiring certain companies in France to disclose environmental and social information in the annual report for the stockholders' meeting. Document with application to France only.[32]
Directive 2003/41/EC of the European Parliament and of the Council of 3 June 2003 on the activities and supervision of institutions for occupational retirement provision, EC Directorate-General Internal Market and Services, Official Journal of the European Union, Brussels.
Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC, Official Journal of the European Union L 275, 25/10/2003, P. 0032-0046, Brussels.
Directive 2004/101/EC of the European Parliament and of the Council of 27 October 2004 amending Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms, Official Journal of the European Union, Brussels.
Directive 2004/35/EC of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage, Official Journal of the European Union, Brussels.
Directive 2008/101/EC of the European Parliament and of the Council of 19 November 2008 amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community, Official Journal of the European Union, Brussels.
Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC, Official Journal of the European Union, Brussels.

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[32] Article 53 of the Grenelle 1 Act requires disclosure of the "quality of information on the way companies address social and environmental consequences of their activity". Sanctions had not been brought pursuant to the Grenelle Act as at the time of writing (June 2010).

Regulations:

Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS), 22 December 2009, repealing Regulation (EC) No 761/2001 and Commission Decisions 2001/681/EC and 2006/193/EC, Commission of the EC, Brussels.

Binding pronouncements:

Commission Decision 2007/589/EC of 18 July 2007 establishing guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council, Commission of the EC, Brussels.

Commission Decision No 280/2004/EC of 11 February 2004 concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol, Commission of the EC, Brussels.

Decision No 358/2002/EC of the European Parliament and of the Council of 25 April 2002 concerning the approval, on behalf of the European Community, of the Kyoto Protocol to the United Nations Framework Convention on Climate Change and the joint fulfilment of commitments there under, Official Journal of the European Union L 130, 15/05/2002 P. 0001 – 0003.

Financial Services Policy 2005–2010, Commission of the EC, Brussels.

Non-binding pronouncements:

Commission Communication "Implementing the framework for financial markets: action plan" [COM (1999) 232 final - Not published in the Official Journal of the European Union], Commission of the EC, Brussels, 1999 [updated 04.07.2006].

Commission Communication “Corporate social responsibility: A business contribution to sustainable development” [COM (2002) 347 final - Not published in the Official Journal of the European Union], Commission of the EC, Brussels.

Commission Communication “Financial services: building a framework for action”, 1998, Commission of the EC, Brussels.

Commission Communication “Integration of Environmental Aspects into European Standardisation” [COM (2004) 130 final], Commission of the EC, Brussels.

Committee of Wise Men, The Regulation of European Securities Markets ['Lamfalussy Report'], Brussels.

Communication from the Commission to the European Council and the European Parliament of 10 January 2007, "An energy policy for Europe" [COM (2007) 1 final - Not published in the Official Journal of the European Union], Commission of the EC, Brussels.

UNITED STATES OF AMERICA

Legislation:

2010 [not ratified by the US Senate at the time of writing]: American Clean Energy and Security Act of 2009 (H.R. 2454) (available) http://energycommerce.house.gov/press_111/20090701/hr2454_house.pdf (accessed 24 July 2009).
2008 Consolidated Appropriations Act.
1990 Clean Air Act, which introduced an operating permit program for larger industrial and commercial sources that release atmospheric pollutants, and which includes civil and criminal sanctions. The Act is administered by the United States Environmental Protection Authority.
Employee Retirement Income Security Act of 1974 (ERISA) (Pub.L. 93-406, 88 Stat. 829), administered by the United States Department of Labor.

Regulations:

[Proposed 2010]: Mandatory Reporting of Greenhouse Gases Rule, pursuant to 2008 Consolidated Appropriations Act (H.R. 2764; Public Law 110–161), administered by US Environmental Reporting Authority, effective December 29, 2009. N.B.: Generally, facilities and suppliers must begin collecting data and complying with all requirements of the rule starting on January 1, 2010.

Binding pronouncements:

2005: Interpretive bulletin 29 CFR 2509.94-2 relating to written statements of investment policy, including proxy voting policy or guidelines, administered by the United States Department of Labor. N.B.: This interpretive bulletin relates to the Employee Retirement Income Security Act of 1974.

Non-binding pronouncements:

2010: Guidance Regarding Disclosures Related to Climate Change, Release Nos. 33-9106; 34-641469; and FR-82, Securities and Exchange Commission, Washington DC.

JAPAN

Legislation:

Climate Change Bill (available) http://www.env.go.jp/en/earth/cc/bagwc/overview_bill.pdf.
Act on Promotion of Global Warming Countermeasures.

Binding pronouncements:

Mandatory Greenhouse Gas Accounting and Reporting System, supervised by the Ministry of the Environment.
Manual for calculating and reporting the amount of greenhouse gas emissions, Ministry of the Environment, 2006.
Environmental Reporting Guidelines, Ministry of the Environment, 2007.

Non-binding pronouncements:

Japan's Voluntary Emissions Trading Scheme (JVETS), 2007.

AUSTRALIA

Legislation:

Corporations Act 2001(Cth) [Section 1013DA].

National Greenhouse and Energy Reporting Act 2007.
Renewable Energy Act 2000 [which has instituted trading in 'Renewable Energy Certificates' by electricity retailers].

Regulations:

Australian Securities & Investments Commission, Disclosure about labour standards and environmental, social and ethical considerations in product disclosure statements (PDS) s1013DA, Canberra, 2003.
Greenhouse and Energy Audit Framework.
National Greenhouse and Energy Reporting Regulations 2008.

Binding pronouncements:

Australian Securities & Investments Commission, 2003, Section 1013DA disclosure guidelines, Canberra.
National Greenhouse and Energy Reporting (Measurement) Determinations 2008 and 2009.

APPENDIX TWO

QUESTIONNAIRE INSTRUMENT

1. What is your main area of professional responsibility? (Fiduciary / Funds management / Investment advisory / Governance / Other (please specify)
2. What region/s do you cover? (Asia / Australasia / Europe / North America)
3. Do you use carbon emissions data in your main area of professional responsibility? (Always/ Very Often / Occasionally / Rarely / Never)
4. How often do you use the following sources to obtain climate change and carbon data? (Always / Very Often / Occasionally / Rarely / Never) *Sources:* Carbon Disclosure Project / Bloomberg or similar / Company earnings reports / Company sustainability reports
5. How would you rate company reports on carbon emissions levels and climate risk management according to the following criteria? (Very Satisfied / Satisfied / Indifferent / Dissatisfied / Very Dissatisfied) *Criteria:* Can use in portfolio analysis / Information is complete / Information is reliable
6. *SCENARIO 1:* Imagine you are responsible for the major decisions on a balanced investment mandate. The following constraints apply: 1. The maximum deviation between the actual portfolio and the applicable benchmark portfolio is controlled. 2. The investment universe includes but is not restricted to asset classes that actively reduce carbon emissions.

   SCENARIO 2: Imagine you are responsible for the major decisions on a balanced investment mandate. The following constraints apply: 1. The maximum deviation between the actual portfolio and the applicable benchmark portfolio is relaxed. 2. The investment universe is restricted to asset classes that actively reduce carbon emissions.

   (The following question was presented to all respondents.)

   How important is each of the following? (Very Important / Important / Indifferent / Not Important / Not At All Important): Carbon prices (three ranges were provided) / Carbon taxes / Company projects with a goal of decreasing carbon emissions / Industrial carbon emissions levels / Subsidies for sustainable energy use.

APPENDIX THREE

INTERVIEW GUIDE

1. What policies would encourage investors to recognise and incorporate climate change issues? What factors are encouraging / impeding those policies?
2. What if any climate related policy areas have you consulted government agencies on?
3. What if any climate policy areas have you worked on with other investors, and how?
4. Describe how carbon emissions data are used in your business. *Consider points:* Fund managers, asset consultants, brokerage.
5. How if at all has your use of carbon emissions data affected the ways you engage with companies?
6. Suggest how company carbon emissions reports might be improved. *Consider points:* Comparisons between companies and sectors. Disaggregating and aggregating carbon data between installations, geographical regions, and company groups. Provision of data from providers such as CDP and Bloomberg.