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# Why Finance Should Care About Ecology

Bert Scholtens\*

## Abstract

Finance ignores ecosystems, which has resulted in a growing list of environmental and social problems. We assess the importance of ecology for finance. We suggest that the financial intermediation perspective can align finance and ecology for the benefit of society. This requires that financial institutions account for information about the impact of finance on the environment and vice versa, and that they are held accountable by their supervisors in this domain.

Keywords: finance, ecology, financial intermediation

\* Department of Economics, Econometrics and Finance, Faculty of Economics and Business, University of Groningen, The Netherlands; School of Management, University of Saint Andrews, UK. Contact details: PO Box 800, 9700 AV Groningen, The Netherlands, phone +31 503637064, e-mail [l.j.r.scholtens@rug.nl](mailto:l.j.r.scholtens@rug.nl).

## 23 **Finance needs ecology**

24 Finance ignores ecology. This has resulted in a growing list of environmental problems like  
25 loss of biodiversity, climate change, pollution, and exhaustion of natural resources. Finance  
26 plays a crucial role in the Anthropocene and very little has been achieved in terms of  
27 integrating ecological concerns in finance. Only recently has ecology begun to appeal to  
28 finance scholars. Central banks and financial market participants (e.g., [1,2]) become  
29 concerned about the resilience of the financial system to environmental hazards. Some  
30 researchers suggest that “green” financial instruments and institutions will achieve global  
31 environmental change (e.g., [3,4,5,6]). However, there is no framework to examine the ways  
32 in which financial and ecological systems interact. This paper assesses recent approaches to  
33 examining this interaction. It suggests an alternative perspective for constructive  
34 collaboration between finance and ecology.

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## 36 **Conventional view: Returns and risks**

37 The conventional view in finance is that financial investors can arrive at higher returns only  
38 by taking on more risk, and that most of this risk can be managed by diversifying  
39 investments; it assumes the presence of complete and perfect information [7]. However,  
40 dealing with the risks of climate change or biodiversity loss is highly problematic as such risks  
41 are poorly understood and cannot be diversified away. Further, it is not clear how, where,  
42 and when these risks will affect economic activity [8]. In addition, the risk of climate change  
43 itself constitutes a risk, as policy responses to mitigate it might result in so-called stranded  
44 assets [9]. This pertains to fossil fuel reserves that cannot be utilized if the policies required  
45 to reduce emissions are enforced. Thus far, the finance community has focused particularly

46 on increasing disclosure on the carbon intensity of corporations [1,2,10,11]. The related  
47 exposures of financial firms could then be “stress-tested” under different climate change  
48 scenarios. An example is Dietz et al. [12], who calculate a “Climate Value-at-Risk” for  
49 financial assets. In the conventional approach, nature is seen as hazardous.

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### 51 **Instrumentalist view: green finance**

52 This conventional view contrasts with the instrumentalist view of finance advocated by, for  
53 example, Shiller [4]. He argues that the finance industry can reverse the negative perception  
54 of finance. Shiller [4] provides examples, such as social impact funds and social benefit  
55 corporations, that show finance playing a positive societal role. Such innovations can  
56 account for human nature and social systems, in addition to enabling economic growth and  
57 productivity. Others (e.g., [5,6]) argue that financial innovation, increased sustainability  
58 ambitions, and changes in international commodity markets create new global connections  
59 that make finance an even more important aspect of global environmental change. Galaz et  
60 al. [5] highlight the advance of “green” financial instruments, especially green bonds and  
61 commodity derivatives (see also [13]). They also discuss how financial actors influence  
62 corporate behavior, by highlighting the Norwegian Government Pension Fund, The Equator  
63 Principles, and the Principles for Responsible Investment. However, none of these studies [4-  
64 6,13] investigate the ecological or social impact of these instruments and institutions.

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### 66 **Green finance is a niche**

67 Green instruments and institutions fill tiny niches. Regarding green bonds, the Bank for  
68 International Settlements reports total debt securities outstanding at year-end 2015 of

69 US\$21.1 trillion ([www.bis.org](http://www.bis.org)). The Climate Bonds Initiative reports US\$118 billion in green  
70 bonds outstanding at that moment, or less than 0.6% of the total market [14]. Commodity  
71 derivatives contracts (excluding precious metals) had a market value of US\$216 billion at  
72 year-end 2015; this is about 1.5% of all derivatives, which had a market value of US\$14.5  
73 trillion ([www.bis.org](http://www.bis.org)). The same holds for green financial institutions. For example, the 36  
74 members of the Global Alliance for Banking on Values, which is a network committed to  
75 positive change in their industry, manage US\$110billion (<http://www.gabv.org/about-us>),  
76 whereas the world's 50 largest banks manage US\$70trillion  
77 (<https://www.gfmag.com/magazine/november-2015/biggest-global-banks-2015>).

78 In addition, the "greenness" of the financial institutions remains to be seen. The Norwegian  
79 Pension Fund has an ethical council that screens the firms in which the fund holds  
80 ownership. Firms are excluded from the investment universe if they engage in particular  
81 activities and/or refrain from changing course in a direction that is desired by the council.  
82 The fund excludes 120 companies but invests in about 9,000 firms. The rationale for  
83 exclusion is often ad hoc and it is not clear whether the ecological footprint of the firms  
84 invested in is significantly smaller than that of those being excluded [15, 16]. For example,  
85 Exxon, Royal Dutch Shell and other oil majors are not excluded, despite their enormous  
86 greenhouse gas emissions [17]. Similar arguments hold in relation to the Equator Principles  
87 and the Principles for Responsible Investing [18,19].

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## 89 **Information is key to finance**

90 Both the conventional and instrumental approach suggest the need for more information to  
91 assess ecological implications and risks for investors. However, as such, this is not sufficient,

92 as one should also assess the ecological and social impact of finance itself [16-19]. But  
93 information is not going to be sufficient if accountability, governance, and enforcement are  
94 left unaccounted for [16]. As to commodity markets, the instrumentalists seem unaware of  
95 the long standing debate regarding the interaction between prices and volatility in spot and  
96 future commodity markets, which establishes that it is very case-specific as to the impact of  
97 commodity derivatives on prices, returns, and price volatility in spot markets, as well as on  
98 production and income of agents involved (e.g., see [20-23]). Both the conventional and  
99 instrumental perspective ignore that, in fact, *all* aspects of finance have substantial effects  
100 on society and ecosystems, and that this has been the case since time immemorial. From a  
101 purely financial perspective, the relevance of such impact is absent, as the externalities by  
102 definition are unpriced and it is hard to assess how and to what extent financing in fact  
103 contributes to changes in ecosystems and which institutions can be held accountable for  
104 these changes (see also [10; 24-25]. The social and environmental impact of financial  
105 institutions' services and operations are not being reported on the basis of validated and  
106 reliable data and metrics [16]. There are preliminary estimates about which companies are  
107 responsible to what extent for global greenhouse gas emissions [17]. However, such  
108 information does not result in the transformation of the business model of these companies  
109 or their financiers [6, 9, 10]. Transparency, accountability, and governance of the financial  
110 industry is notoriously poor [26]. The (unintended) consequence of the focus on "green"  
111 finance is that it ignores the overwhelming majority of finance operations.

112

113 **Financial intermediation approach**

114 The financial intermediation perspective holds that the business of financial institutions is  
115 that they do not offer end-products that can be used or consumed, but provide advisory and  
116 intermediary financial services. They mediate between agents that have surpluses and  
117 deficits and between agents that want to reduce financial risks and those that are willing to  
118 take them on [27]. Compared to financial markets, banks have superior ability to grant credit  
119 on the basis of private information. To perform their role, financial institutions specialize in  
120 producing and processing information, managing risks, and reducing transaction costs.  
121 Further, they make do with agency problems, moral hazard, and adverse selection [28]. By  
122 engaging in this transformation function, financial institutions incur myriad risks that must  
123 be managed to assure the value of their business is sustained [29-31]. Banks specialize in  
124 gathering and processing information on borrowers and their projects to carry out screening  
125 and monitoring to reduce information problems. This intermediation view of finance does  
126 not go uncontested. For example, the experience of recurrent crisis, fraud, myopia, and  
127 social and environmental degradation that relates to mainstream finance is being heavily  
128 criticized (e.g., [4, 6, 31]). After the global financial crisis, this has resulted in some regulatory  
129 changes, such as the Dodd-Frank Act in the US, but so far supervisors and regulators have  
130 ignored the ecological impact of finance.

131 Financial institutions facilitate the transfer of risks and deal with an increasingly complex  
132 maze of international relations, regulations, institutions, products, and markets [30-31]. As  
133 such, they play an important role in the structure and development of social and economic  
134 systems, and their role and importance changes over time [32]. The crucial input for all  
135 intermediation services is information [27]. But information is incomplete or missing and  
136 there are information asymmetries. Financial intermediation adds value by reducing these  
137 information problems [28]. Further, it drives changes in the financial and economic

138 landscape [32]. If it goes untampered, its actions can result in crises with huge economic and  
139 social costs. In this respect, the global financial crisis has acted as a wake-up call [31], but  
140 only to some extent as climate change and biodiversity loss are still being ignored by  
141 financial regulators and supervisors.

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### 143 **Value chain analysis**

144 How can the financial intermediation approach be amended in such a way that it accounts  
145 for the impact of finance on ecological (and social) systems, and vice versa? In principle, the  
146 approach allows for accounting for non-financial information. For example, traditionally, it  
147 already includes the assessment of the borrower's character in the decision to grant credit,  
148 next to financial ratios, collateral and project prospects [29]. Leaving out this judgement of  
149 character has been regarded as one of the main drivers of the financial frenzy that was at  
150 the root of the global financial crisis [4, 19, 31]. Further, there is both theoretical and  
151 empirical evidence that firms' environmental and social conduct interacts with their financial  
152 performance in a complicated manner [33-35]. So far, only few intermediaries integrate this  
153 perspective into their business model, but those who do seem to be more resilient to  
154 financial shocks [19; 36-38]. The financial intermediation approach might be used to help  
155 bridge the gap between finance and ecology as it opens the way to include information that  
156 might be value-relevant and reduce their risks and those for society. For example, the  
157 analysis of the vulnerability or resilience of ecosystems to climate change is of crucial  
158 importance to agricultural production [12, 20]. Financing decisions of institutions affect  
159 companies' decisions as to the way in which to exploit and manage natural resources [6, 9].

160 The intermediation approach contrasts with the instrumental perspective, which sees  
161 “green” instruments as the ultimate objective of financial institutions. It reveals that the  
162 conventional perspective might miss the upside potential associated with for example  
163 climate change; in addition to financing mitigation and adaptation, new businesses and  
164 business models will emerge that require financial services. From the intermediation  
165 perspective, the instruments and their pricing are regarded as a means to an end, namely,  
166 providing risk management and information services which both are being appreciated by  
167 their clientele. Where the instrumental perspective gives rise to “telecoupling” of “good”  
168 and “bad” financial instruments [4,5] and the conventional view regards ecosystems as  
169 hazard-prone [10,12], the intermediation approach relates to the complete financial and  
170 ecological value chain and can account for their interaction.

171 By using information on the impact of financial activities on ecosystems and by being held  
172 responsible and accountable for such impact, financial institutions could very much improve  
173 the management of scarce resources. This would require that financial supervisors broaden  
174 their perspective regarding the social and ecological impact of finance. That is, they should  
175 be open for the consequences of finance for society as these impact the ‘license to operate’  
176 of financial institutions [4; 34]. Therefore, financial institutions should no longer should be  
177 assessed only on the basis of their financial performance, but held accountable for their  
178 societal impact too. This would complement the initiatives by the Bank of England and the  
179 Dutch central bank regarding the vulnerability of financial institutions and the financial  
180 system to climate change [1, 2, 11], as it would reveal how the behavior of financial  
181 institutions themselves does play a role in this respect. Many European pension funds have  
182 to report how they account for environmental and social issues. The next step would be to  
183 set requirements regarding these.



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185 **How to align ecology and finance?**

186 Reviews of the literature on environmental and ecological economics (see, e.g., [39-45])  
187 reveal that the finance perspective is underdeveloped. However, several financial  
188 intermediation approaches emerge that try to integrate the financial and ecological  
189 perspective. For example, the discount rate has been hotly debated in the context of  
190 economic appraisal. Discount rates are the minimum rates of return required from an  
191 investment project to make it desirable to implement. Gollier [46] provides a theoretical  
192 foundation for amending the discount rates currently used for project analysis to account for  
193 the social and environmental aspects of business operations and investments (see also [47-  
194 48]). It would be very helpful if supervisors provide guidelines for banks regarding their  
195 appraisal of projects that improve or degrade the environment.

196 Another line of research relates the financial conduct and performance of financial  
197 institutions to their corporate social responsibility (e.g., see [50-55]). This literature  
198 establishes that financial institutions show much variety as to their environmental and social  
199 policies and performance. Further, this translates into both positive and negative association  
200 with financial performance, which highly depends on the types of indicators (both  
201 environmental and financial) being used [19; 34; 56-57]. However, a drawback of this type of  
202 studies is that they rely on ratings that combine a very large number of indicators which  
203 predominantly are policy related. The material impact of corporate conduct is not part of  
204 such ratings though (see [16; 58-59]). As such, it seems this type analysis is not sufficient to  
205 gauge the value relevance of the interaction between finance and ecology. More  
206 sophisticated information is required and ecology can prove indispensable to achieve this. In

207 this respect, it could be promising to link up with the nascent literature that addresses  
208 biophysical issues from the business perspective [17; 24-25; 60]. This would also help  
209 regulators set requirements regarding the societal and ecological impact of financial  
210 institutions.

211

## 212 **Conclusion**

213 Ecologists should care about financial markets and institutions, because they have an  
214 enormous impact on society and ecosystems. They should not concentrate solely on “green”  
215 financial instruments and institutions, as this will misguide them regarding the real game  
216 changers. We argue that a thorough understanding of financial intermediation would help  
217 ecologists see the financial forest beyond the trees. This will help the financial industry and  
218 its regulators and supervisors recognize and govern the interactions between financial and  
219 ecological systems, which should help to arrive at a wise, efficient, and effective allocation of  
220 both financial and natural resources to the benefit of society. Finance should care about  
221 ecology because it helps them perform their societal and economic role in an efficient and  
222 effective manner.

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