



The finance perspective on fossil fuel divestment

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This paper reviews the fossil fuel divestment literature. It argues that the origin of climate change is in the ‘carbon shield’, meaning that fossil fuel firms are not held sufficiently responsible for their externalities. By divesting from these firms, investors do not want to be complicit. The literature differentiates three dimensions in the fossil fuel divestment debate: Justification, Impact, and Agent. The first discusses the justification for divesting, whereas the second discusses the impact of divesting on financial performance and/or emissions, and the third relates to how to accomplish divesting and its consequences for individual agents. The review concludes that the number of perspectives used to analyze the divestment debate is rising, that the environmental and financial impact of divestment is very limited, and that a wide variety of agents relate to divesting from fossil fuel.

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Current Opinion in Environmental Sustainability 2024, 66:101394

This review comes from a themed issue on **Climate Finance, Risks and Accounting**

Edited by **Rosella Carè, Othmar Lehner and Olaf Weber**

For complete overview of the section, please refer to the article collection, “[Climate Finance, Risks and Accounting](#)”

Available online 21 December 2023

Received: 12 September 2023; Revised: 23 November 2023;

Accepted: 26 November 2023

<https://doi.org/10.1016/j.cosust.2023.101394>

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The carbon shield

The Modigliani and Miller [1] theorem states that the value of the firm is independent of the way it is financed, it does not matter whether it is financed by debt or equity. This model is a highly idealized representation of reality. With corporate taxes, companies can increase firm value by issuing (tax-deductible) debt, the so-called tax shield [1]. The value of the firm is higher if it is financed with debt compared with when a firm is only financed with equity. The tax shield comes at the expense of tax revenues, thereby

undermining the government’s ability to fund public services. Hence, the increase in firm value is a transfer of taxpayers’ money to shareholders. In a similar fashion, mining fossil fuel creates a future liability for society as it reduces the future benefits from many activities and in many regions, such as lower crop revenues, higher health costs, and increased need of flood defenses. These are externalities of production that go unpriced and are not reflected in accounting indicators such as firm value and GDP [2,3]. The current legal systems make it difficult to hold individual fossil fuel firms accountable for the externalities [4], which effectively creates a *carbon shield* that protects them against the costs of global warming resulting from their operations. If these liabilities were attributed to individual fossil fuel firms, it is very doubtful whether they would yield positive value [5]. There are huge legal difficulties in addressing the externalities arising from fossil fuel extraction, because the costs of a system of internalizing the externalities of fossil fuel investing are much higher than for other environmental externalities [6]. This seriously limits the success of the financial divestment from fossil fuels. In the end, a new social contract is needed to close the gap between legal and ethical responsibility [4].

We focus on the literature of financial investors and in particular the owners of publicly listed fossil fuel companies, which account for about one-quarter of all fossil reserves [7]. We first explain financial investing and divesting and then reflect on the literature that relates to the financial impact of fossil fuel divestment.

Investing and divesting

The stock investor is entitled to a fraction of future profits (dividend), may benefit from rising stock prices, and can vote at the Annual General Meeting (AGM) of shareholders about corporate strategy and board appointments. The stock owner is a financial investor and provides capital to the firm, which can deploy this for real investment activities. Shares can be bought from the firm (i.e. the primary market) or at the stock exchange (secondary market). Shareholders can affect the firm via voting and engagement [8,9]. With voting, shareholders can file a petition at the AGM (e.g. in the US, when the value of their shares is at least \$ 2000 or when they own at least 1%) and can vote on petitions filed. However, the company does not necessarily need to follow up on the petition, although such behavior will taint the boards’ reputation. Engagement is the possibility to discuss with influential board members in the hope achieving objectives that are in the shareholder’s interest [9]. These

can be financial and nonfinancial [10]. Shareholder engagement can create financial value when the shareholder has a large stake in the company [11]. It can increase social value if the shareholder has similar objectives to other stakeholders [12].

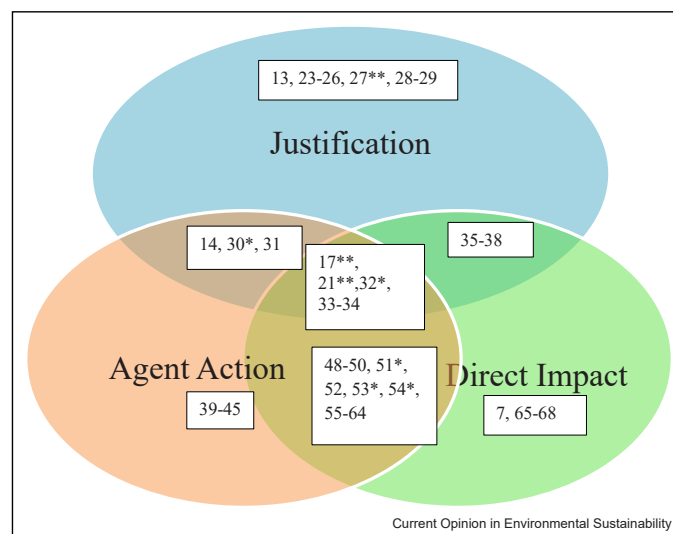
Divesting is typically linked to selling stocks from firms with controversial activities. There usually is a social and/or moral imperative to refrain from being committed to these activities [13,14]. However, it is not always clear when corporate activity is controversial and if everyone is convinced it is. NGOs try to influence public opinion and investors in this regard [7,15]. Investors may be hesitant to divest from controversies as these are included in stock market indices, which are used to benchmark their performance [10]. The divestor can use the proceeds to invest in firms with renewable energy projects, but they may also use it to invest elsewhere. However, the shares sold by a divestor will also be bought by another investor, possibly one who does not care about the externalities of fossil fuel investments [16]. While financial investors are limited in their abilities to directly impact fossil fuel mining, real divesting is more effective. An investor boycott of a newly issued share can result in insufficient funding for the firms' fossil fuel mining project and the project may have to be canceled [16]. Harstad [17] suggests that investors can invest directly in fossil fuel reserves and halt production or prevent development of the reserve. This will obviously annihilate the financial value of the investment (see also Ref. [7]).

From a financial perspective, investing in controversies can be appealing. Hong and Kacperczyk [18] show that 'sin stocks' (firms engaged in tobacco, gambling, and alcohol) may outperform the market. Trinks and Scholtens [19] use a similar approach for another 11 controversies. They conclude that investing in controversial stocks often results in additional risk-adjusted returns, whereas excluding them may reduce financial performance (see also Ref. [20]). This suggests that there are opportunity costs to negative screening, which is an argument for investors to resist divestment. However, this outperformance in fact reflects risk: the returns are relatively high as the stock is significantly riskier [21]. Heinkel et al. [22] argue that an increasing fraction of divestors implies that an increasing smaller fraction of investors must share the risk of the controversial investment. Consequently, they bear more risk than when all investors took part. This results in a lower market value and a higher cost of equity capital for divested firms [22].

Divesting from fossil

We consider three categories of papers in the academic fossil fuel divestment debate (see Figure 1). Papers can be positioned in relation to these three categories, but may relate to more than one category. The first category of papers

Figure 1



Fossil fuel divestment literature. This figure positions the literature studied along the categories that are identified in the study: Justification, Impact, and Agent.

discusses the justification for divesting, whereas the second category discusses what direct impact of divesting on financial performance and/or emissions, while the third category discusses the issues of how to accomplish divesting and its consequences for a single investor.

First is the justification for divestment. This starts with measuring and disclosing the amount of fossil fuel reserves [23,24]. Firms with large reserves are prime candidates for divestment. The corporate governance mechanisms provide the legal framework for divesting [25,26]. These studies find that there is little in the way of divesting. Furthermore, there are the studies after the impact of climate activism on investors, which show that activists find it hard to get their arguments accepted [14,27,28]. Another strand of the justification studies has a socio-political background and is primarily concerned with planetary and societal requirements and/or consequences of divestment; it often includes moral and philosophical notions [13,29,30]. Here, the notion of climate justice is brought forward as a motive to divest (e.g. [7,13]). This strand of the literature also stresses the symbolic and moral importance of holding fossil fuel companies accountable.

Second is the literature that focuses on the impact of divestment on the financial performance of the firms and their investors. This can be of a micro-nature (individual firms or projects), a meso-nature (markets, transition), or of a global (planetary) one. This literature studies fossil fuel investments and relates to the 'stranded assets' literature [31-36]. Stranded assets are worth less than expected because of the realization of climate change and

policies to mitigate this. It argues that divestment is a means to reduce the risk of assets getting stranded. Other studies investigate the impact on firms' cost of capital and financial performance, as well as on the impact on investors (portfolio) performance [21,37–44]. These studies generally find a limited financial effect from divestment: for firms, the costs of capital (and risk) increase and, hence, their value decreases. Economically, these effects are very small. For investors, there is no significant effect, except in the study of Henriques and Sadorsky [39]. Some studies focus on the potential of underweighting fossil in portfolios ('tilting'), sometimes in combination with engagement. For example, Ref. [44] suggest an optimal investment strategy that leans away from a brown industry but is willing to invest in best-in-class companies rather than blanket exclusion. They argue that exclusion gives the firm no incentives to reform as it will be excluded anyway; tilting incentives the company to reform and become best-in-class. Other studies concentrate on the impact on the energy transition or global GHG emissions [45,46]: these do not show divestment has had any significant effect so far. While disappointing, it is in line with the findings of Ref. [6].

Third is the literature that focuses on how agents (investors, firms, and policymakers) are going to accomplish divesting. Pension funds decarbonize their portfolios in different ways and especially public funds divest by gradually bringing down their exposure to fossil fuel companies [47,48]. Divestment and the risk of asset stranding should affect the business model of fossil fuel companies [49,26,50–52]. These studies do not find a substantial change in the deployment of capital by fossil fuel firms. There are serious concerns on how acquirers of divested assets handle these and the credibility of their 'net zero' ambitions [16]. Furthermore, Refs. [33,53] analyze how electricity giants strategically respond to the divestment movement. Here, it shows they gradually diversify their resources and increase the share of renewable energy resources. Academic institutions may have substantial investments from endowments and are often targeted by climate activists first [7,15,54–57]. They are a specific niche of institutional investing and we did not find studies investigating whether changes in the portfolio allocation of academic funds, especially divesting from fossil fuel companies, have triggered others to do so as well.

Conclusion

To halt climate change, some investors have decided to divest from fossil fuel companies. Reviewing the literature suggests that divestment from fossil fuel has limited financial consequences; it slightly increases divested firms' risk and their cost of capital, while reducing divested firms' market value [21,27]. So far, divestment by investors does not have significantly impacted carbon emissions or the business model of the fossil fuel industry. There are concerns that some investors might be 'greenwashing' their

investment portfolios [16,49]. Next to divesting, the investor can also use their voting rights to change the course of fossil fuel firms, and/or they may engage with the firm's leaders in this regard. There is no evidence that this has been effective in reducing greenhouse gas emissions. Alternative economic instruments such as carbon taxation of emission trading schemes appear to be more efficient and effective in bringing down carbon emissions [58,59]. This is due to the fact that these encompass overall economic conduct, whereas divestment targets a specific group of firms only [60,45,61]. In this respect, divestment and shareholder activism (engagement) can be seen as private sector instruments. Fossil companies are not keen on being divested and claim they increasingly diversify along less carbon-intense energy sources, plan to become net-zero for our own plants in the future, or suggest they are not responsible for externalities as they only serve demand for fossil fuels [7,9,22,60].

In conclusion, the impact of divestment on emissions and firm value has been very limited so far. The challenges for divesting from fossil fuel are to put the money to the best use from an investor perspective. The market as such is not capable of providing guidance regarding nonfinancial objectives. This guidance has to be provided by society at large via a smorgasbord of political and governing constellations.

CRedit authorship contribution statement

Auke Plantinga: Conceptualization, Investigation, Validation, Writing – original draft, Writing – review & editing. **Bert Scholtens:** Conceptualization, Investigation, Methodology, Visualization, Writing – original draft, Writing – review & editing.

Data Availability

No data were used for the research described in the article.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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- of special interest
- of outstanding interest

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