THE LIMITS OF PORTFOLIO PRIMACY

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ABSTRACT

According to a theory that is gaining increasing support, we should expect large asset managers (and, in particular, index fund managers) to become "climate stewards" and force companies to reduce their impact on climate change. According to this theory, by maximizing the value of their entire portfolio (portfolio primacy) rather than the value of the individual company (shareholder primacy), index fund managers are incentivized to reduce climate externalities and therefore to steer companies toward decarbonization.

This Article offers the first systematic critique of this theory and identifies four crucial limits that undermine its practical impact: mispricing of climate mitigation, portfolio biases, fiduciary conflicts, and insulation.

First, the stock market underestimates the social benefits of climate mitigation. In particular, stock prices do not accurately incorporate climate risk, and private investors discount the distant future at a much higher rate than the social discount rate.

Second, index funds are not real "universal owners"; rather, they invest in subsets of the economy that are relatively less vulnerable to climate change. Many of the Big Three index funds with the largest holdings in the top U.S. oil companies have incentives to oppose aggressive carbon mitigation measures, and even index funds with the broadest market bases internalize global climate externalities in a very limited way.

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Third, climate stewardship would create unsolvable fiduciary conflicts on multiple levels: between fund managers and fund investors; between large asset managers and undiversified shareholders; and between corporate directors and the individual company.

Fourth, even if index fund managers undertook the role of climate stewards, most firms across the world would be partially or totally insulated from index fund stewardship, because they are privately held, are owned by state governments, or have a controlling or influential shareholder.

The analysis of this Article reveals the serious limits of portfolio primacy and shows that this approach offers no adequate answer to the crucial threat of climate change. Policymakers should not rely on portfolio primacy as an effective substitute for climate regulation.

Keywords: corporate governance, index funds, climate change, portfolio primacy, corporate social responsibility, ESG, stewardship, common ownership

JEL Classification: D21, G30, G34, K22, Q5

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> *"If I was on a panel and someone asked me what's the best way to tackle climate change? Should I buy an [exchange-traded fund] or should I call my congressperson and demand legislation and a price on carbon? The truth is someone is better off calling their congressperson."*
>
> Tariq Fancy, former chief investment officer, BlackRock, Inc.[1]

INTRODUCTION

On May 26, 2021, at the end of a tense proxy fight, shareholders of ExxonMobil (Exxon) voted against management to elect three dissident directors proposed by the activist hedge fund Engine No. 1.[2] Among the activist's main complaints were that the current management had been underestimating the risk of climate change and there was a need to steer the company toward cleaner energy.[3] The management defeat was saluted as a "dramatic shake-up," a "landmark moment," and a "milestone in climate-driven activism."[4]

For the success of the dissident vote, support by Exxon's largest shareholders proved crucial.[5] Exxon's three largest shareholders, and largest asset managers in the world, BlackRock, State Street, and Vanguard (the so-called Big Three), voted for at least two of the four candidates proposed by Engine No. 1.[6] In explaining its choice, BlackRock said that it was dissatisfied with the company's plans for

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[1] Dominic Rushe, *Green investing 'is definitely not going to work', says ex-BlackRock executive*, THE GUARDIAN, Mar. 30, 2021, https://perma.cc/AY8L-UM5N.

[2] Jessica Camille Aguirre, *The Little Hedge Fund Taking Down Big Oil*, N.Y. TIMES, June 23, 2021, https://nyti.ms/3AFPuV7.

[3] *Id. See also* Engine No. 1 LLC, *Reenergize ExxonMobil – Investor Presentation*, May 2021, at 14-18, https://perma.cc/X52H-EMBN (stressing the need to "gradually but purposefully reposition[] the company to succeed in a decarbonizing world").

[4] Ceres, *Press Release*, May 26, 2021, https://bit.ly/3fqYyVm; Michael J. de la Merced, *How Exxon Lost a Board Battle with a Small Hedge Fund*, N.Y. TIMES, May 28, 2021, https://nyti.ms/2RVEMbE.

[5] *See* Aguirre, *supra* note 2 (reporting that BlackRock, State Street, and Vanguard jointly owned about 20% of Exxon stock). Based on the voting results reported by Exxon, the three Engine No. 1 nominees would not have been elected if BlackRock, State Street, and Vanguard had not voted for them. ExxonMobil, Current Report (Form 8-K/A) 3 (June 21, 2021).

[6] BlackRock, *Vote Bulletin: ExxonMobil Corporation*, May 26, 2021, at 1, https://bit.ly/3vwN0Fy (announcing that it voted for three of the four dissident candidates); Ross Kerber, *Top Exxon Investors State Street, Vanguard Backed Activist Nominees*, REUTERS, May 27, 2021, https://reut.rs/2SIq5bY (reporting that Vanguard and State Street voted for two dissident candidates).

the transition to a low-carbon economy.[7]

But why would BlackRock, State Street, and Vanguard pressure the largest U.S. oil company[8] into taking climate change more seriously? According to a view that is gaining increasing support among academics and market participants, the goal of index funds is not to maximize the value of individual companies, such as Exxon, but rather to maximize the value of their entire portfolio. Since index fund portfolios mirror the whole economy and climate change is a systemic threat for the economy, index funds have strong financial incentives to mitigate climate risk.[9]

Such "universal owners," as they are sometimes called, own stock both in companies that produce climate externalities and in companies that suffer them; therefore, the argument goes, if the externalities result in a net portfolio loss, universal owners benefit from their reduction, even when such a reduction damages the companies producing the externalities. According to this theory, by maximizing the value of their entire portfolio (portfolio primacy) rather than the value of the individual company (shareholder primacy), index funds have an economic incentive to become climate stewards and steer carbon emitters toward decarbonization. On this account, portfolio primacy would be a powerful market-based mechanism to address the threat of global climate change.

This Article questions this theory. It systematically scrutinizes its implicit and explicit assumptions, and it shows that the theory's optimistic take on the social role of index funds is grossly overstated. It reveals four crucial limits of portfolio primacy—mispricing of climate mitigation, portfolio biases, fiduciary conflicts, and insulation from index fund stewardship—that undermine the practical impact of this approach. Policymakers should not expect index funds to produce significant progress on climate change at the expense of individual portfolio companies and should rather rely on traditional regulatory tools to alter company-level incentives.

The Article is organized as follows. Part I discusses why climate change is a market failure, and it summarizes the main arguments in support of portfolio primacy as a market-based mechanism to correct this failure. Climate change is a collective action problem: individual companies do not have individual incentives to reduce their carbon emissions and therefore produce more emissions than

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[7] BlackRock, *Vote Bulletin*, *supra* note 6, at 4.

[8] Statista, *Leading Oil and Gas Companies in the United States Based on Market Capitalization as of April 2021*, https://bit.ly/3hZC8fv.

[9] *See* sources cited *infra* note 32.

is socially desirable. Climate policy can rely on several different tools to address this problem, including carbon taxes, cap-and-trade systems, disclosure mandates, and prescriptive regulation. In this context, portfolio primacy advertises itself as a powerful market mechanism to address climate change without intrusive government intervention. Understanding whether its promise is reliable is a crucial priority for policymakers.

Part I also identifies the key implicit and explicit assumptions of the portfolio primacy theory. The first assumption is that climate mitigation will produce a net gain for index fund portfolios despite the loss for some portfolio companies. The second assumption is that index fund managers—the entities that are supposed to engage companies on behalf of the fund—will have sufficiently strong incentives to invest in climate stewardship. The third assumption is that index fund stewardship will make meaningful progress on the reduction of climate externalities. The less accurate these assumptions prove, the less reliable the promise of portfolio primacy is.

In this Article, I will not discuss the incentives of index fund managers (the second assumption), which have recently been the focus of a persuasive literature showing that index fund managers have very weak incentives to engage in stewardship.[10] Instead, I will discuss the other two assumptions and their limits.

Part II examines the first important limit of portfolio primacy: *the mispricing of climate mitigation*. First of all, the emerging literature on climate finance casts doubt on whether stock prices accurately reflect climate risk, and a recent survey of asset managers shows that the prevailing belief in the industry is that stock prices underestimate future climate losses. Furthermore, private investors, such as index fund managers, discount the distant future at a much higher rate than the social discount rate—the rate at which society should discount intergenerational climate damages. Hence, index funds inevitably underestimate the costs of climate change and are thus incentivized to massively underinvest in climate mitigation.

Part III examines the second limit of portfolio primacy: *portfolio biases*. Index funds are not real "universal owners" but invest in subsets of the market. Consequently, their portfolios might be overexposed or underexposed to particular industries, geographic areas, and companies of a certain size, and these characteristics may affect funds' incentives with respect to climate risk.

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[10] *See* sources cited *infra* note 50, and accompanying text.

I empirically test the Big Three's portfolio biases by examining their investment in Exxon, one of the major carbon emitters in the world. This analysis shows that many of the Big Three index funds with the largest holdings in Exxon would oppose aggressive carbon mitigation measures with a significant net present value for the whole society. Furthermore, I simulate the exposure of Vanguard Total Stock Market—one of the three largest shareholders in all top ten U.S. oil companies—to local climate risk across the world. This simulation shows that Vanguard Total Stock Market, due to its overexposure to the United States and underexposure to Africa, India, China, and the Middle East, internalizes only part of the global social cost of carbon and would therefore oppose many potential mitigation measures despite their net value for society.

These empirical tests show that the characterization of the large index funds as "universal owners" that "own the entire economy" is seriously misleading. Index funds invest in subsets of the global economy that are relatively less vulnerable to climate change, and therefore are incentivized to underinvest in climate mitigation.

Part IV examines the third limit of portfolio primacy: the *fiduciary conflicts* that index fund managers would face if they acted as climate stewards in a serious and systematic way. Index fund managers manage dozens of different funds, which, due to their specific composition, might have conflicting incentives with respect to climate risk. For example, investors in an index fund focused on the energy sector would likely lose money on carbon mitigation measures that would instead benefit investors in a broad-base global equity fund. By pressuring companies to adopt climate policies that would favor one group of investors and harm another group, the investment manager that manages both funds (and is thus a fiduciary of both groups of investors) would face an irresoluble conflict of interests.

Furthermore, if companies were forced by the Big Three to sacrifice profits in order to create portfolio-wide benefits, the Big Three might be considered (under existing doctrines or perhaps new expansions of these doctrines) controlling shareholders in violation of their fiduciary duties to the company and the minority shareholders. Similarly, corporate managers have fiduciary duties to the corporation and its shareholders, and therefore they are unlikely to support a systematic value-decreasing strategy for the benefit of some large shareholders, to the detriment of the company and of undiversified investors. Taken together, all these fiduciary conflicts make the prospect of climate stewardship very unlikely, even in cases where index fund portfolios might benefit financially from aggressive climate mitigation.

Part V examines a fourth and final limit of portfolio primacy: the *insulation* of most global firms from index fund stewardship. Most global firms, including most carbon emitters, are privately held, are owned by state governments, or have a controlling or influential shareholder. In all these cases, companies are partially or totally insulated from the influence of index fund stewardship. Therefore, even if index fund managers did engage in aggressive climate stewardship, vast portions of the global economy would be effectively shielded from their action.

Part VI discusses some of the policy implications of the analysis presented in the Article. To some extent, policymakers can address some of the limits of portfolio primacy and try to increase its impact—for example, by mandating companies to disclose climate-related information (which would reduce the mispricing of climate mitigation) or by strengthening the power of socially minded shareholders and advocates to file climate-related shareholder proposals (which would increase social pressure on individual companies and push them toward decarbonization). Most importantly, however, policymakers should recognize that most limits of portfolio primacy cannot be fixed and therefore should not consider portfolio primacy as an effective substitute for traditional regulation.

Based on the analysis presented in this Article, the success of Engine No. 1 at Exxon is best explained by company-level incentives, not by portfolio primacy. Indeed, one concern recently expressed by many observers was that Exxon, unlike some of its competitors, operated under excessively optimistic assumptions about oil's future and was therefore vulnerable to future declines in demand.[11] Moreover, Exxon's recent financial performance had been disappointing.[12] Thus, the Big Three's decision to push for a new business strategy was likely driven by the traditional goal of maximizing shareholder value, not by portfolio-based climate stewardship. Indeed, given the urgency of the climate threat and the significant limits of portfolio primacy, we should focus our efforts on altering the incentives of individual companies rather

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[11] *See, e.g.*, Engine No. 1, *Reenergize ExxonMobil*, *supra* note 3, at 9; Derek Brower, *Why ExxonMobil Is Sticking with Oil as Rivals Look to a Greener Future*, *Fin. Times*, Oct. 28, 2020, https://on.ft.com/3c3m20O (reporting that Exxon, unlike many of its competitors, is continuing to be optimistic about future oil demand); Fernando Valle & Brett Gibbs, *Big Oil Brethren Chevron, Exxon Mobil Charting Opposite Paths*, *Bloomberg*, Mar. 23, 2021, https://bloom.bg/3p0GsMU ("Chevron now targets free cash flow, returns and constrained emissions, while Exxon is sticking to the traditional oil major mega-projects tactic").

[12] Engine No. 1, *Reenergize ExxonMobil*, *supra* note 3, at 7-8.

than trust the portfolio incentives of index funds.

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Before proceeding, some clarifications are in order. First, I should note that the portfolio primacy theory potentially applies to all large investors with maximally diversified portfolios, not only to index funds. This Article, however, focuses on index funds—and especially on the Big Three—because they have been gaining exceptional power in the stock market and are the most obvious candidates for the role of climate stewards. If we concluded that the Big Three offer little hope for climate stewardship, the whole promise of portfolio primacy would appear unreliable.

Second, the literature distinguishes two broad categories of climate-related risks: physical climate risk and transition risk.[13] Physical climate risk includes risks arising from rising temperatures, extreme weather events, and other changes in climate, whereas transition risk includes risks connected with the transition to a low-carbon economy, due to regulation or changes in technology and social preferences. This Article uses the phrases climate risk and climate damages to refer to physical climate risk and damages. Indeed, transition risk does not derive from climate change *per se* but from the social and political response to climate change.

Indeed, it is possible that investors (including index funds) want companies to adopt climate mitigation measures in anticipation of environmental regulation or a change in consumer preferences. Such a decision, however, is driven by a traditional company-level shareholder value-maximizing approach, not by a portfolio-primacy approach. In this scenario, it's the regulatory and social pressure that changes the investors' incentives, not the portfolio-wide internalization of externalities. In order to examine the ability of portfolio primacy—as opposed to regulatory and social pressure—to drive climate mitigation, we must examine the willingness of index funds to address physical climate risk, not transition risk.

Third, some commenters, discussing earlier drafts of this Article, argued that, due to Congressional gridlock and bad political incentives, a carbon tax or other aggressive regulatory measures against climate change are unlikely to materialize in the near future. Therefore, these critics argue, index fund climate stewardship is at least a step in the right direction, in the absence

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[13] See, e.g., BANK FOR INTERNATIONAL SETTLEMENTS, CLIMATE-RELATED RISK DRIVERS AND THEIR TRANSMISSION CHANNELS 5 (2021).

of better alternatives.

Matt Levine, for example, discussing an earlier draft of this Article on Bloomberg, observed that, while it is perhaps true, as I argue, that regulation would be a better response to climate change than index fund stewardship, "if policy makers *don't* want to fight climate change then BlackRock will probably do something anyway."[14] My goal in this Article, however, is to scrutinize the promise of index funds' climate stewardship and to examine its limits. The literature on this topic has so far disproportionately focused on the potential benefits of portfolio primacy for climate stewardship, thus distorting the debate and creating excessive optimism around the role of index funds for climate policy. Whatever one's prior beliefs about the likelihood of effective climate policy are, we must be clear-eyed about the severe limits of index fund stewardship. This Article seeks to shed light on this specific, but important, aspect of this conversation.

I. INDEX FUNDS AS CLIMATE STEWARDS

A. Climate Change as a Market Failure

1. Climate Change as a Collective Action Problem

The scientific consensus is that human activity is the dominant cause for global warming and other observed changes in the climate system.[15] Fossil fuel combustion and certain industrial processes, as well as forestry and other land use, have led to unprecedented levels of carbon dioxide (CO_2) and other greenhouse gases in the earth's atmosphere.[16] The resulting effects include rising average temperatures, impacts on temperature extremes, changes in

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[14] Matt Levine, *Money Stuff: Investment Banking is Cheap If You're Rich*, BLOOMBERG.COM, Sept. 20, 2021, https://www.bloomberg.com/news/newsletters/2021-09-20/money-stuff-investment-banking-is-cheap-if-you-re-rich. Others have made similar comments at workshops and conferences. I received especially insightful comments on this issue from Mike Vandenbergh, who has developed in his work a compelling case for the role of "private governance" in the fight against climate change. *See, e.g.*, Michael P. Vandenbergh, *The New Wal-Mart Effect: The Role of Private Contacting in Global Governance*, 54 UCLA L. REV. 913 (2007); Michael P. Vandenbergh, *Private Environmental Governance*, 99 CORNELL L. REV. 129 (2013); MICHAEL P VANDENBERGH & JONATHAN M GILLIGAN, BEYOND POLITICS: THE PRIVATE GOVERNANCE RESPONSE TO CLIMATE CHANGE (2017).

[15] Intergovernmental Panel on Climate Change, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* 47-49 (R.K. Pachauri and L.A. Meyer eds. 2014).

[16] *Id.* at 45-46.

precipitation patterns, sea level rise, alterations in hydrogeological systems, wildfires, and more frequent extreme weather events.[17]

Without mitigation, the continued emission of greenhouse gases might cause "severe, pervasive and irreversible impacts for people and ecosystems."[18] In many plausible scenarios, climate change is a "major threat to humans and to the natural world,"[19] and in some highly uncertain but possible scenarios, it may have catastrophic consequences for human life.[20]

From an economic standpoint, the problem of climate change is a classic market failure.[21] Individuals and firms engage in activities resulting in carbon emissions because they benefit from them.[22] For example, many people drive a car to go to work, and companies burn fossil fuels to generate the energy needed for their industrial processes or buy energy that other firms produced by burning fossil fuels. However, while these individuals and firms benefit from these activities, they do not bear all the costs associated with the emissions of greenhouse gases resulting from these activities. In fact, since climate change affects firms and individuals globally, most costs of carbon emissions are effectively imposed on someone else. Climate change is a quintessential economic externality.[23]

As a result, individual actors lack the economic incentives to reduce carbon emissions. Despite the consensus that the current level of carbon emission is excessive, and that society as a whole would benefit from its reduction, individual actors would not benefit from the reduction of their own emissions. For example, individual firms that switch to renewable sources of energy that produce fewer emissions would pay the costs associated with such a decision, while most of the benefits would be reaped by someone else. Therefore, each individual firm has an incentive to maintain its

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[17] *Id.* at 49-54.

[18] *Id.* at 56.

[19] William Nordhaus, *Climate Change: The Ultimate Challenge for Economics*, 109 AM. ECON. REV. 1991, 1996 (2019).

[20] Martin L. Weitzman, *On Modeling and Interpreting the Economics of Catastrophic Climate Change*, 91 REV. OF ECON. & STAT. 1 (2009).

[21] For a general discussion of the economics of climate change, see generally NATHANIEL O. KEOHANE & SHEILA M. OLMSTEAD, MARKETS AND THE ENVIRONMENT (2nd ed. 2016).

[22] In this Article, I will use "carbon emissions" and "greenhouse gas emissions" interchangeably. Sometimes, for brevity, I will just use "emissions" to refer to carbon emissions.

[23] In economic theory, externalities can be positive or negative. Carbon emissions impose negative externalities. For simplicity, since the externalities discussed here are negative externalities, I will use the phrase "climate externalities" to refer to climate change-related negative externalities.

current level of emissions while benefitting from the mitigation measures implemented, and paid for, by other firms. The equilibrium resulting from this free riding problem is one in which the level of carbon emissions produced by economic activity is higher than what would be socially desirable.

2. Policy Remedies for Climate Change

A traditional policy remedy to an externality problem of this kind is the imposition of a tax equal to the social cost of the relevant activity.[24] With a "carbon tax," the individual firm would pay the entire social cost associated with the production of carbon emissions rather than imposing most of this cost on others. Therefore, the firm would internalize its own climate externalities and would have an economic incentive to set the level of carbon emissions at a socially desirable level.[25] Other examples of possible climate policies are abatement subsidies (subsidies for the reduction of carbon emissions), cap-and-trade policies (which establish a total allowable quantity of emissions and allow firms to buy and sell emission permits), information-based policies (such as mandatory disclosure, ecolabeling, and certification programs), and traditional prescriptive regulation (such as mandatory technology standards and ceilings on emissions).[26]

Climate externalities may also lead to the emergence of social and cultural norms (including changes in consumer and investor preferences) that would put pressure on companies and financial intermediaries to accelerate the transition to a low-carbon economy.[27] For example, some consumers might prefer products

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[24] These kinds of taxes are commonly named Pigouvian taxes, after the economist who first theorized them. ARTHUR C. PIGOU, THE ECONOMICS OF WELFARE 168-171 (1920). Pigou was of course unaware of the impact of greenhouse gases on climate, but one of his examples, of great concern for his contemporaries, was about industrial emissions. Pigou reported that in London, according to a recent study at the time, "there [was] only 12 per cent as much sunlight as astronomically possible" due to the smoke produced by factory chimneys. Pigou observed that although "factory chimney [could] be made practically smokeless" through existing technologies, firms underinvested in the prevention of smoke because much of the cost of those emissions was borne not by the emitting firm but by the community ("in injury to buildings and vegetables, expenses for washing clothes and cleaning rooms, expenses for the provision of extra artificial light, and in many other ways"). *Id.* at 160-161.

[25] *See generally* A. Lans Bovenberg & Lawrence H. Goulder, *Environmental Taxation and Regulation*, in 3 HANDBOOK OF PUBLIC ECONOMICS 1471 (Alan J. Auerbach & Martin Feldstein eds., 2002).

[26] For a discussion of various types of environmental policy instruments, see Keohane & Olmstead, *supra* note 21, at 139-147.

[27] For a discussion of the emergence of social norms as a response to negative externalities, see JAMES S. COLEMAN, FOUNDATIONS OF SOCIAL THEORY 250-251 (1990).

sold by companies with better environmental standards, and investors might be willing to accept a somewhat lower financial payoff in order to reduce their company's carbon emissions.[28] Recently, large companies have seen a rise in support of shareholder activism on social and environmental issues, including climate disclosure and decarbonization.[29] Furthermore, according to some authors, younger investors and consumers are more likely to demand social and environmental responsibility from investment managers and corporations.[30] Changing social norms may also affect investment managers directly: for example, investment managers might follow, to some extent, their own prosocial and expressive preferences (rather than those of the beneficial owners) or might cave in to peer pressure on environmental issues.[31]

All these mechanisms—taxes, regulation, and social and cultural pressures—affect corporate decisions at the level of the individual company. They either modify the incentives or constrain the choices of the individual company. For example, a carbon tax might raise the price of fossil fuels to a point where the construction of a new petrochemical plant, which would have been profitable without the tax, becomes unprofitable and is therefore abandoned. A government subsidy might turn an unprofitable investment in renewable energies into a profitable one. Consumers with environmentally friendly preferences might be willing to pay for the additional cost necessary to reduce carbon emissions and make such a measure profitable. And so forth. In all these cases, regulatory or social pressure changes the incentives or the available choices of the individual company in a direction that is socially more desirable.

By contrast, a theory that is gaining increasing support, and

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[28] On the altruistic preferences of shareholders, see Oliver Hart & Luigi Zingales, *Companies Should Maximize Shareholder Welfare Not Market Value*, 2 J.L. FIN. & ACCT. 247 (2017).

[29] For a discussion of this phenomenon, see generally Roberto Tallarita, *Stockholder Politics*, 73 HASTINGS L. J. (forthcoming 2021).

[30] Michal Barzuza, Quinn Curtis, & David H. Webber, *Shareholder Value(s): Index Fund ESG Activism and the New Millennial Corporate Governance*, 93 S. CAL. L. REV. 143 (2020).

[31] For a discussion of "image motivation," which is "the desire to be liked and well regarded by others," as a driver in prosocial behavior, see, for example, Dan Ariely, Anat Bracha, & Stephan Meier, *Doing Good or Doing Well? Image Motivation and Monetary Incentives in Behaving Prosocially*, 99 AM. ECON. REV. 544 (2009). For a discussion of social pressure as a driver of charitable giving (people would rather not donate but "dislike saying no … due to social pressure"), see Stefano DellaVigna, John A. List, & Ulrike Malmendier, *Testing for Altruism and Social Pressure in Charitable Giving*, 127 Q. J. ECON. 1 (2012).

that is the subject of this Article, holds that climate externalities could be addressed at the level of the investment portfolio rather than at the level of the individual company. According to this theory, large, broadly diversified investors, such as the most influential index fund managers, internalize climate externalities because they invest both in companies producing carbon emissions and in companies bearing the costs of those emissions. Therefore, by maximizing the value of their entire portfolio (portfolio primacy) rather than the value of the individual company (shareholder primacy), index fund managers use their growing shareholder power to become "climate stewards" and steer companies toward decarbonization.[32]

This theory is particularly appealing because it promises a solution to climate change that relies not on intrusive regulation or optimistic social and cultural changes but on the sheer power of financial incentives. If the theory held true, portfolio primacy would fix (or at least would significantly alleviate) an epochal market failure through a purely market-based mechanism.

This Article challenges this view and argues that regulatory and social pressures are more promising tools for addressing the threat of climate change. Activists and concerned citizens should pressure elected officials and policymakers to use regulatory tools to address climate risk rather than relying on the portfolio incentives of index funds. Before proceeding, however, the next Section will present the case for index funds' climate stewardship.

B. The Case for Portfolio Primacy

Index funds are broadly diversified investment vehicles that seek to replicate the performance of an index. Unlike active investment funds, they do not try to pick the stocks that will perform best; instead, they mechanically track the composition of

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[32] For an early model of internalization of externalities under a portfolio primacy rule, see Robert G. Hansen & John R. Lott, *Externalities and Corporate Objectives in a World with Diversified Shareholder/Consumers*, 31 J. FIN. QUANTITATIVE ANALYSIS 43 (1996). For recent academic articles arguing that index funds and other large diversified owners have strong economic incentives to reduce climate externalities, see Madison Condon, *Externalities and the Common Owner*, 95 WASH. L. REV. 81 (2020); Jeffrey N. Gordon, *Systematic Stewardship*, ECGI Law Working Paper No. 566/2021 (2021), available at https://perma.cc/KFL2-ECH3; John C. Coffee, Jr., *The Future of Disclosure: ESG, Common Ownership, and Systematic Risk Systematic Risk*, ECGI Law Working Paper No. 541/2020 (2021), available at https://perma.cc/4CVL-W6KW. *See also* UNITED NATIONS PRINCIPLES FOR RESPONSIBLE INVESTMENT, UNIVERSAL OWNERSHIP: WHY ENVIRONMENTAL EXTERNALITIES MATTER TO INSTITUTIONAL INVESTORS (2011), available at https://perma.cc/F2BL-RCYF.

an index, typically created by a third party.[33] For example, Vanguard 500 seeks to track the performance of the S&P 500 index, which includes large-capitalization companies in leading industries.[34] BlackRock's iShares Russell Mid-Cap Index Fund tracks the Russell Midcap Index, which includes the 800 smallest issuers in the Russell 1000 index.[35] And so on.

Behind such a passive investment strategy lie two fundamental insights. The first is the main insight of modern portfolio theory, according to which the investor's purpose should be to maximize risk-adjusted return.[36] By investing in a diversified portfolio, investors minimize (and potentially eliminate) the risk connected to company-specific decisions and events (so-called idiosyncratic risk) and therefore improve risk-adjusted return. The second insight is that, in the long run, the compound effect of fees charged by investment managers has a sizeable impact on returns. As compellingly illustrated by William Sharpe, "a person saving for retirement who chooses low-cost investments could have a standard of living throughout retirement more than 20% higher than that of comparable investors in high-cost investments."[37] Indexation allows managers to drastically reduce fees for investors.

This strategy has proven remarkably successful. According to some estimates, in 2020 index mutual funds and exchange-traded funds (ETFs)[38] owned about 14% of the whole U.S. stock market,

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[33] John C. Bogle, *The Index Mutual Fund: 40 Years of Growth, Change, and Challenge*, 72, FIN. ANALYST J. 9 (2016).

[34] Vanguard 500 Index Fund Admiral Shares, Vanguard.com, https://investor.vanguard.com/mutual-funds/profile/VFIAX.

[35] iShares Russell Mid-Cap Index Fund, iShares.com, https://www.ishares.com/us/products/280761/blackrock-mid-cap-index-fund-class-a.

[36] *See* Harry Markowitz, *Portfolio Selection*, 7 J. FIN. 77 (1952); Harry Markowitz, *Nobel Prize Lecture, Foundations of Portfolio Theory*, Dec. 7, 1990, https://bit.ly/2RWnU4o.

[37] William F. Sharpe, *The Arithmetic of Investment Expenses*, 69 FIN. ANALYST J. 34, 34 (2013).

[38] The term "index funds" refers to a wide category of funds whose investment strategy is based on indexing (i.e., the mechanical tracking of a benchmark index provided by a third party). Generally, index funds have two structures: mutual funds and exchange-traded funds (ETFs). Index mutual funds are open-ended funds—i.e., funds that issue securities that are redeemable on a daily basis. ETFs combine characteristics of mutual funds (they issue securities that are redeemable on a daily basis, but only in large blocks) and of closed-end funds (their securities are traded on a secondary market). In this Article, I will use the term "index funds" to refer to both kinds of investment vehicles.

up from 7% in 2010.[39] The Big Three—BlackRock, Vanguard, and State Street—are together the largest shareholder in 40% of listed companies in the United States and in 88% of S&P 500 companies.[40] By 2039, they are projected to vote 41% of the shares in S&P 500 companies.[41]

Many experts worry that such massive ownership concentration will soon lead to a scenario where a very small number of individuals control the majority of the United States' largest companies, thus creating a politically unsustainable concentration of power,[42] potential antitrust problems,[43] increasing volatility,[44] and weaker indirect investor protection.[45] At the same time, however, many scholars and practitioners believe that large index fund managers will use their growing influence to reduce corporate climate externalities.[46]

Broadly diversified investors, such as the Big Three and other index fund managers, bear the effects of a given corporate decision on their entire portfolio rather than on the individual company alone. What is bad for a single company might be good for the portfolio as a whole, and vice versa. Index fund managers are incentivized to maximize the value of the entire portfolio, even if doing so means sacrificing the value of some individual companies.

An example of this portfolio primacy framework would be, according to the theory at hand, the internalization of within-portfolio climate externalities. The reasoning behind this theory is quite simple. By investing in broad portfolios, index funds diversify company-specific risks but remain exposed to systematic risk (that is, risks concerning the market as a whole). Therefore, whereas index funds have very weak incentives to address company-specific

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[39] Investment Company Institute, 2021 INVESTMENT COMPANY FACT BOOK 50 (2021), https://perma.cc/FZ4E-GQQ7.

[40] Bob Eccles, *Concentration in the Asset Management Industry: Implications for Corporate Engagement*, FORBES, Apr. 17, 2019, https://bit.ly/3viwp8v.

[41] Lucian Bebchuk & Scott Hirst, *The Specter of the Giant Three*, 99 B.U. L. REV. 721, 724 (2019).

[42] *See, e.g.*, John C. Coates IV, *The Future of Corporate Governance Part I: The Problem of Twelve*, HARV. PUB. L. WORKING PAPER NO. 19-07 (Mar. 2019), https://ssrn.com/abstract=3247337.

[43] *See, e.g.*, José Azar, Martin Schmalz & Isabel Tecu, *Anticompetitive Effects of Common Ownership*, 73 J. FIN. 1513 (2018); Einer Elhauge, *Horizontal Shareholding*, 129 HARV. L. REV. 1267 (2016).

[44] *See* Itzhak Ben-David, Francesco Franzoni, Rabih Moussawi, & John Sedunov, *The Granular Nature of Large Institutional Investors*, MGMT. SCI. (forthcoming 2021).

[45] Holger Spamann, *Indirect Investor Protection: The Investment Ecosystem and Its Legal Underpinnings*, 14 J. L. ANALYSIS (forthcoming 2021), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3707249.

[46] *See* sources cited *supra* note 32, and accompanying text.

risks, they have strong incentives to address threats to their entire portfolio.

Some of these portfolio-level risks consist of climate externalities imposed by some portfolio companies on other portfolio companies. For example, oil companies are responsible for a significant fraction of carbon emissions,[47] while companies in the agricultural sector are believed to be especially vulnerable to the effects of climate change.[48] Therefore, a portfolio that includes both oil and agricultural stocks internalizes the externalities imposed by the former subset of companies on the latter. If these climate externalities result in a net portfolio loss (in the example, if the losses suffered by agricultural sector companies are larger than the corresponding gains for oil companies), the holder of the portfolio will benefit from a reduction or elimination of such externalities, even if it would damage one subset of companies (in the example, oil companies).

To illustrate, consider the following example, taken from a recent article by Madison Condon, which makes a compelling case for the portfolio internalization of climate externalities.[49] Suppose that BlackRock must decide whether to force Exxon and Chevron to cut 40% of their carbon emissions. According to Condon's estimates, based on the widely used Dynamic Integrated Climate Economy model, this cut in emissions would reduce climate damage by $385 billion over a 100-year period. If we assume that BlackRock benefits from such climate damage reduction in proportion to its share of the global economy, the emissions cut has for BlackRock a present value of $9.7 billion. Therefore, if the 40% reduction of emissions cost Exxon and Chevron a 20% drop in their stock value—a plausible estimate, according to Condon's calculations—BlackRock would still make a profit of $3.4 billion ($9.7 billion of reduction of climate change losses less $6.3 billion of losses from Exxon and Chevron stock decline).

This rough estimate shows that, in theory, BlackRock might

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[47] *See, e.g.*, Paul Griffin, CDP CARBON MAJORS REPORT 2017 5-6 (July 2017), https://perma.cc/9THJ-TUUG.

[48] *See, e.g.*, Bruno Conte, Klaus Desmet, Dávid Krisztián Nagy, & Esteban Rossi-Hansberg, *Local Sectoral Specialization in a Warming World*, NBER Working Paper No. 28163 (Dec. 2020), http://www.nber.org/papers/w28163. Note, however, that the effects of climate change on agriculture depends on local temperatures. *Id.* at 3 ("Although agriculture is more sensitive to climate change than non-agriculture, we find that rising temperatures increase productivity growth in agriculture and decrease productivity growth in non-agriculture").

[49] Condon, *supra* note 32, at 45-47.

want to persuade some portfolio companies to make value-decreasing decisions at the company level that are value-increasing for BlackRock at the portfolio level. In this way, portfolio primacy would solve the collective action problem of climate change. Although individual companies, in a shareholder primacy framework, face a free riding problem and have no individual incentive to reduce climate externalities, large index funds, in a portfolio primacy framework, internalize the relevant externalities and have the incentives (and voting power) to pressure companies toward a reduction of climate externalities. This theory is based, however, on some implicit and explicit assumptions that deserve closer scrutiny.

C. The Key Assumptions of Portfolio Primacy

The model proposed by portfolio primacy theorists relies, implicitly or explicitly, on three important empirical assumptions. The less accurate these assumptions prove, the less we should expect from portfolio primacy. The *first assumption* is that climate mitigation will produce a net gain for the fund's portfolio despite the loss for some portfolio companies. Indeed, without such gain, index funds would have no economic reason to engage in climate stewardship.

The *second assumption* is that index fund managers—the entities that are supposed to engage companies on behalf of the fund—will have sufficiently strong incentives to invest in climate stewardship. Without these incentives, climate stewardship would not be put in practice except perhaps for mere lip service.

The *third assumption* is that index fund stewardship will make meaningful progress on the reduction of climate externalities. If climate stewardship proved impracticable or ineffective, its role in the global fight against climate change would be negligible.

On a close examination, all these three assumptions prove unreliable. In this Article, I will not discuss the incentives of index fund managers (the second assumption), which have recently been the focus of a persuasive literature showing that index fund managers have very weak incentives to engage in stewardship, even when stewardship would increase the value of the portfolio they manage.[50] This literature has focused on firm-specific stewardship,

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[50] *See*, in particular, Lucian A. Bebchuk, Alma Cohen, & Scott Hirst, *The Agency Problems of Institutional Investors*, 31 J. ECON. PERSP. 89 (2017); Lucian Bebchuk & Scott Hirst, *Index Funds and the Future of Corporate Governance: Theory, Evidence and Policy*, 119 COLUM. L. REV. 2029 (2019); Bebchuk & Hirst, *Specter*, *supra* note 41. *See*

not on portfolio-primacy stewardship, but I believe that its key insights apply to portfolio primacy as well.

Instead, I will discuss the other two assumptions and their serious limits. First, I will show that the stock market does not price climate risk accurately and index funds structurally underestimate the social value of climate mitigation. I will refer to this problem as "mispricing of climate mitigation."

Second, I will show that index funds are not real "universal owners" but instead invest in subsets of the economy that bias their interests in specific ways. The climate-related incentives of a fund that is overexposed to a subset of the economy and underexposed to another subset of the economy might be and often are weaker than optimal or even in conflict with social welfare. I refer to this phenomenon as "portfolio biases." Mispricing of climate mitigation and portfolio biases seriously undermine, in many plausible scenarios, the assumption that climate mitigation that reduces the value of some portfolio companies will produce substantial net gains for index fund portfolios.

Third, I will show that portfolio primacy creates unsolvable fiduciary conflicts on multiple levels: between fund managers and fund beneficiaries; between influential shareholders (such as the "Big Three") and undiversified shareholders; between corporate directors and the individual company. These conflicts clash with the structure of fiduciary and corporate law and represent a serious legal and economic constraint for climate stewardship.

Fourth, I will show that even if index funds did engage in actual climate stewardship, their impact would be quite limited on a global scale. In fact, most companies around the world, including most carbon emitters, are privately held, are owned by state governments, or have a controlling or influential shareholder, and therefore are totally or partially insulated from the influence of index funds. Fiduciary conflicts and insulation from index fund

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also Sean J. Griffith, *Opt-in Stewardship: Toward an Optimal Delegation of Mutual Fund Voting Authority*, 98 TEX. L. REV. 983 (2020); Dorothy S. Lund, *The Case against Passive Shareholder Voting*, 43 J. CORP. L. 493 (2018). For a different perspective, see Einer Elhauge, *The Causal Mechanisms of Horizontal Shareholding*, 82 OHIO ST. L. J. 1 (2021); Barbara Novick, *"The Goldilocks Dilemma": A Response to Lucian Bebchuk and Scott Hirst*, 120 COLUM. L. REV. FORUM 80 (2020); Marcel Kahan & Edward B. Rock, *Index Funds and Corporate Governance: Let Shareholders Be Shareholders*, 100 B.U. L. REV. 1771 (2020); Jill Fisch, Assaf Hamdani, & Steven Davidoff Solomon, *The New Titans of Wall Street: A Theoretical Framework for Passive Investors*, 168 U. PENN. L. REV. 17 (2019).

stewardship seriously undermine the assumption that index funds' influence based on the portfolio primacy paradigm will prove important in the global fight against climate change.[51]

II. MISPRICING OF CLIMATE MITIGATION

This Part examines the first limit of the portfolio primacy theory: the stock market is a highly ineffective mechanism to incentivize climate risk mitigation. Section II.A shows that stock prices likely underestimate climate risk, and therefore index funds would not reap the benefits of climate stewardship, at least in the short term. Section II.B shows that index funds give very low weight to the distant future and therefore underestimate the benefits of climate mitigation. Taken together, these two problems result in index funds having incentives to massively underinvest in climate mitigation.

A. Does the Stock Market Price Long-Term Climate Risk?

Index funds have financial incentives to engage in climate stewardship only if they are financially rewarded for it. But if future climate risk were not reflected in the companies' stock prices, index funds would not benefit from the mitigation of climate risk and therefore would have no financial incentive to pressure companies to invest in mitigation.

According to the textbook model of stock valuation, the price of a stock equals the present value of all expected future cash flows.[52] Therefore, even if climate change reduced a company's cash flows only in the very distant future, today's stock price should reflect the value of such an event, appropriately discounted. Yet the emerging literature on climate finance shows that this conclusion is far from certain.

Uncertainty besets our understanding of climate risk in

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[51] Since the release of the first draft of this Article, other scholars have commented on the limits of portfolio primacy. In particular, Marcel Kahan and Ed Rock have released a draft paper in which they propose some of the points discussed here, namely the "fiduciary conflicts" created by portfolio primacy and its tension with the existing structure of corporate law. Marcel Kahan & Ed Rock, Systemic Stewardship with Tradeoffs (unpublished manuscript) (Dec. 3, 2021), https://ssrn.com/abstract=3974697.

[52] JONATHAN BERK & PETER DEMARZO, CORPORATE FINANCE 271 (3rd ed. 2014) ("the price of a security should equal the present value of the expected cash flows an investor will receive from owning it").

multiple ways.[53] We face both scientific uncertainty (for example, how the average surface temperature rises in response to an increase in the atmospheric concentration of CO_2) and socioeconomic uncertainty (for example, the future path of emissions, societal reaction to specific climate events, migration patterns and policies, and technological progress).[54] As a consequence, leading climate models contain widely different estimates of future impacts of climate change.[55] Not only do we face uncertain outcomes with a known probability distribution within a given model, but we also face uncertainty across and about different models.[56] Furthermore, investors who would like to assess the specific effects of climate change on an individual company lack much of the necessary information to do so. Indeed, obtaining measures of assets' exposure to climate risks is a major challenge.[57]

Therefore, it is not clear whether the stock market is capable of pricing climate risk accurately. There is some empirical evidence that companies with higher carbon emissions are valued at a discount.[58] But this is arguably the effect of regulatory and other transition risks, not of physical climate risk (which is the central issue in this Article).[59] Moreover, recent studies cast doubt on price efficiency with respect to climate risk. For example, one study found

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[53] Geoffrey Heal & Antony Millner, *Uncertainty and Decision Making in Climate Change Economics*, 8 REV. ENVTL. ECON. & POL'Y 120, 120 (2014) ("The issue of climate change is beset with uncertainties, many of which are only partially captured by our existing analytical tools").

[54] *Id.* at 122-127.

[55] William Brock & Lars Peter Hansen, *Wrestling with Uncertainty in Climate Economic Models,* Working Paper 2019-71, U. Chi. Becker-Friedman Inst. Econ. (2018).

[56] Michael Barnett, William Brock, & Lars Peter Hansen, *Pricing Uncertainty Induced by Climate Change*, 33 REV. FIN. STUD. 1024, 1026-1028 (2020).

[57] Stefano Giglio, Bryan Kelly, & Johannes Strobel, *Climate Finance*, 13 ANN. REV. FIN. ECON. (forthcoming 2021) (manuscript at 10). *See also* Madison Condon, *Market Myopia's Climate Bubble*, UTAH L. REV. (forthcoming 2021).

[58] *See, e.g.*, Patrick Bolton & Marcin Kacperczyk, *Do Investors Care about Carbon Risk?* 142 J. FIN. ECON. 517 (2021).

[59] The fact that index funds might have incentives to address regulatory risk is not particularly relevant for the scope of this Article. Regulatory risk and physical climate risk can move in opposite directions. For example, an extreme weather event widely discussed by media and politicians might increase regulatory risk and (due to the higher probability of an effective government intervention) decrease physical climate risk. Likewise, mitigating regulatory risk might, in some cases, increase actual risk from climate damages (for example, if an oil company successfully lobbies elected officials to repeal a restrictive environmental policy). Furthermore, in cases where addressing regulatory risk decreases physical climate risk (for example, when a company reduces carbon emissions in anticipation of future regulation—so-called forward compliance), the main driver of such an effect is regulatory pressure at the individual company level, not portfolio-level incentives. Therefore, I will not discuss these effects in this Article.

that the price of food companies' stock underestimates the risk of climate change-induced droughts,[60] and an analysis of climate sensitivity and stock returns from 1930 to 2017 showed that climate effects are not efficiently priced by the stock market.[61]

At the same time, however, there is evidence that the market does consider future climate risk in pricing certain classes of assets. For example, a recent study found that coastal real properties that are more exposed to long-term climate risk sell at a discount, even after controlling for property characteristics.[62] To be sure, information on climate change-induced flood risk and its potential long-run impact on real estate is more easily available than the long-term climate risk for public companies, which depends on several risk factors with significant variation across time and space.[63] However, enhanced corporate disclosure and progress on climate science could significantly mitigate this problem.

Many investment managers seem to believe that climate change is relevant for their portfolio and take climate risk into account when making investment decisions;[64] however, they believe that the stock market underestimates climate risk, although not by much.[65] Interestingly, many investors put significant weight on transition risk and motivate their concern with climate change not only with merely financial reasons but also with legal and moral reasons.[66]

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[60] Harrison Hong, Frank Weikai, & Jiangmin Xu, *Climate Risks and Market Efficiency*, 208 JOURNAL OF ECONOMETRICS 265 (2019).

[61] Alok Kumar, Wei Xin, & Chendi Zhang, *Climate Sensitivity and Predictable Returns* (unpublished paper) (Feb. 2019), available at https://ssrn.com/abstract=3331872.

[62] Stefano Giglio, Matteo Maggiori, Krishna Rao, Johannes Stroebel, & Andreas Weber, *Climate Change and Long-Run Discount Rates: Evidence from Real Estate*, 34 REV. FIN. STUD. 3527 (2021). Other empirical papers have reached similar conclusions. For example, Bernstein, Gustafson, and Lewis found that houses exposed to the risk of sea level rise sell for a discount compared to equivalent unexposed houses, after controlling for distance from the beach. Asaf Bernstein, Matthew T. Gustafson, & Ryan Lewis, *Disaster on The Horizon: The Price Effect of Sea Level Rise*, 134 J. FIN. ECON. 253 (2019). Interestingly, two recent studies found that the price effect of physical climate risk on the housing market depends on whether local residents believe in climate change. Markus Baldauf, Lorenzo Garlappi, & Constantine Yannelis, *Does Climate Change Affect Real Estate Prices? Only If You Believe in It*, 33 REV. FIN. STUD. 1256 (2020); Laura A. Bakkensen & Lint Barrage, *Flood Risk Belief Heterogeneity and Coastal Home Price Dynamics: Going under Water?*, REV. FIN. STUD. (forthcoming 2021).

[63] For example, the National Oceanic and Atmospheric Administration provides detailed estimates of local impact of sea level rise. *See* National Oceanic and Atmospheric Administration, Sea Level Rise Viewer, https://coast.noaa.gov/slr.

[64] Philipp Krueger, Zacharias Sautner, & Laura T. Starks, *The Importance of Climate Risks for Institutional Investors*, 33 REV. FIN. STUD. 1067 (2020).

[65] *Id.* at 1095-1100.

[66] *Id.* at 1086, 1102.

Therefore, it is difficult to assess what different role portfolio primacy—rather than traditional company-level financial considerations, or moral and social pressures—plays in investment managers' responses.

This brief survey of theoretical and empirical studies shows that the evidence on market pricing of climate risk is mixed at best, and therefore climate stewardship might prove an expensive strategy with no tangible return, at least in the short term. Thus, index fund managers' incentives to become climate stewards would seem to be quite weak. To be sure, index funds have a long investment horizon, and therefore they might decide to address climate risk now, in anticipation of future market adjustments. However, the riskiness of such a strategy makes climate stewardship a hazardous, and therefore less likely, approach. After all, to paraphrase a famous investment adage, the market could very well remain inefficient much longer than climate stewards can remain solvent.[67]

B. Index Funds and Social Discount Rate

A fundamental problem in estimating the social value of climate policy is the determination of the appropriate discount rate. Discounting is a required step in the evaluation of any future payoffs.[68] Companies discount expected future payoffs in order to decide whether a given investment is worthwhile. Investors discount companies' future cash flows to estimate today's value of the company's stock.[69] Likewise, federal agencies use discounting to evaluate whether the present cost of a policy is justified in light of the expected future payoffs.[70] In all these cases, choosing the

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[67] A similar maxim ("Markets can remain irrational longer than you can remain solvent") is often attributed to John Maynard Keynes—*see, e.g.*, ROGER LOWENSTEIN, WHEN GENIUS FAILED: THE RISE AND FALL OF LONG-TERM CAPITAL MANAGEMENT 123 (2001)—although it is likely apocryphal. *See* Jason Zweig, *Keynes: He Didn't Say Half of What He Said. Or Did He?*, WALL ST. J., Feb. 11, 2011, https://www.wsj.com/articles/BL-MB-32547.

[68] For a general overview of discounting in corporate finance, see Berk & DeMarzo, *supra* note 52, at 63-69.

[69] This valuation methodology (commonly known as discounted cash flow, or DCF, analysis) is often used also by Delaware courts to determine the fair value of company shares, at least since *Weinberger. Weinberger v. UOP, Inc.*, 457 A.2d 701, 713 (Del. 1983). For a description of the method and discussion of the relevant case law, see 1 R. FRANKLIN BALOTTI ET AL., THE DELAWARE LAW OF CORPORATIONS AND BUSINESS ORGANIZATIONS § 9.45[B][1] (Supp. 2021).

[70] *See generally* Office of Management and Budget, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs*, Circular A-94 (1992), available at 57 Fed Reg 53519, 53523 (1992).

correct discount rate is crucial for determining whether a given investment is sound or wasteful.

Discounting is central to the evaluation of climate mitigation policies. Suppose that cutting 1% of carbon emissions costs us, as a society, $10 billion in the present and reduces climate damage by $1 trillion in 2150. Is the emissions reduction socially desirable? The answer depends on the rate at which we discount the future climate benefits.

In climate economics, the social discount rate is the rate at which society as a whole is willing to substitute present payoffs with future payoffs across generations. The determination of the social discount rate is particularly relevant for climate policy because the effects of climate change as well as of mitigation measures will occur well into the distant future. Therefore, slightly different rates could lead to opposite conclusions. Just like the discount rate can make the difference between a good private investment and a bad private investment, the social discount rate can make the difference between a socially desirable climate policy and socially wasteful climate policy.[71]

Despite the importance of the question, there is a persistent disagreement among climate experts on the correct social discount rate.[72] One reason for such different estimates is that there is significant uncertainty around the parameters used for the calculation of the social discount rate. For example, it is difficult to predict the growth rate of consumption over the very long run, which plays an important role in determining the willingness of a society to forego present benefits (the cost of mitigation) in order to obtain future benefits (reduced effects from climate change).[73]

Another important reason for the disagreement on the social discount rate is a purely normative question regarding the socially desirable distribution of resources across generations. One approach to the calculation of the social discount rate relies solely

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[71] The question has generated a vast literature. For a general overview, see NATIONAL ACADEMIES OF SCIENCES, ENGINEERING, AND MEDICINE, VALUING CLIMATE DAMAGES: UPDATING ESTIMATION OF THE SOCIAL COST OF CARBON DIOXIDE (2017); Christian Gollier, PRICING THE PLANET'S FUTURE: THE ECONOMICS OF DISCOUNTING IN AN UNCERTAIN WORLD (2012); Cass R. Sunstein & David A. Weisbach, *Climate Change and Discounting the Future: A Guide for the Perplexed*, 27 YALE L. & POL'Y REV. 433 (2009).

[72] *See, e.g.*, National Academies, *supra* note 71, at 165 (reporting different social discount rates used in prominent academic studies and institutional reports in the 1990s and 2000s, with estimates ranging from 1.5% to 16%).

[73] The intuition behind the relevance of the growth rate is that the same amount of money is worth more to someone when they are poorer and less when they are richer. Therefore, estimating how richer future generations are is important to determine how valuable a certain benefit for them will be.

on the opportunity cost of capital, just like for the discounting of private investments. According to this approach, the market provides a reliable indication of the actual social preferences for the relative weights of present and future payoffs.[74] An alternative approach instead finds pure market measures morally inadmissible because they value the utility of future generations less than the utility of the current generation, thus violating the principle of intergenerational neutrality.[75] Others have tried to reconcile the two views by defending market discounting for the choice of the most efficient strategy and addressing intergenerational redistribution separately.[76]

Recent U.S. administrations have adopted very different estimates of the social discount rate to evaluate climate policies. During the Obama administration, the Interagency Working Group on the Social Cost of Greenhouse Gases (IWG) recommended three values of social discount rates: 2.5%, 3%, and 5%, with 3% being the primary value.[77] A few years later, however, during the Trump administration, the IWG was dismantled, and the Environmental Protection Agency adopted significantly higher estimates of the social discount rate: 3% and 7%.[78] In 2021, President Biden reinstated the IWG, which reintroduced the previous rates of 2.5%, 3%, and 5%.[79]

As of today, although there is no consensus on a precise estimate of the social discount rate, most experts seem to agree that

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[74] For a classic presentation of this view, see, for example, William D. Nordhaus, *A Review of the Stern Review on the Economics of Climate Change*, 45 J. ECON. LITERATURE 686 (2007).

[75] For a classic presentation of this view, see, for example, NICHOLAS STERN, THE ECONOMICS OF CLIMATE CHANGE: THE STERN REVIEW (2007). For a discussion of the social discount rate by moral philosophers, see JOHN BROOME, COUNTING THE COST OF GLOBAL WARMING (1992); Tyler Cowen & Derek Parfit, *Against the Social Discount Rate*, in JUSTICE BETWEEN AGE GROUPS AND GENERATIONS 144 (Peter Laslett & James S. Fishkin eds., 1992).

[76] *See, e.g.*, Sunstein & Weisbach, *supra* note 71.

[77] U.S. INTERAGENCY WORKING GROUP ON SOCIAL COST OF GREENHOUSE GASES, TECHNICAL SUPPORT DOCUMENT: SOCIAL COST OF CARBON, METHANE, AND NITROUS OXIDE (Aug. 2016), https://obamawhitehouse.archives.gov/sites/default/files/omb/inforeg/scc_tsd_final_clean_8_26_16.pdf.

[78] U.S. GOVERNMENT ACCOUNTABILITY OFFICE, SOCIAL COST OF CARBON 16-19 (June 2020).

[79] U.S. INTERAGENCY WORKING GROUP ON SOCIAL COST OF GREENHOUSE GASES, TECHNICAL SUPPORT DOCUMENT: SOCIAL COST OF CARBON, METHANE, AND NITROUS OXIDE (Feb. 2021), https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf.

the correct social discount rate is between 1% and 3%, with 2% being the modal response.[80] By contrast, stock investors such as index funds discount future cash flows at a rate of 7% or higher.[81] Such a higher discount rate means that index funds assign to future climate damages and benefits a much lower value that their social value. In particular, since climate change occurs on a very long-time horizon, such an underestimation results in massive underinvestment in climate mitigation.

To illustrate, suppose that an index fund that "owns 1% of the economy"[82] must decide whether to support a substantial climate change mitigation measure that would reduce global climate damage by $1 trillion in 2150. For simplicity, let us assume a stylized two-period economy, in which the cost of the mitigation measure is entirely borne in 2021 and the climate benefits are entirely produced in 2150.

Figure 1 shows how much the index fund would be willing to pay in 2021 in order to produce $1 trillion climate benefit in 2150. The graph identifies four different estimates based on different discount rates. If the fund used the 1.1% discount rate proposed by the Stern Review in 2007, it would be willing to pay up to $2.5 billion for climate mitigation.[83] If it used a "consensus" social discount rate between 2% and 3%,[84] it would be willing to pay a sum between $221 million and $777 million. But since index funds discount future cash flows at a 7% rate, our hypothetical index fund would not be willing to pay more than $1.6 million for the proposed mitigation measure—a very small sum. In other words, index funds' willingness to pay for climate mitigation is two or even three orders of magnitude smaller than the mitigation's social value.

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[80] Moritz A. Drupp, Mark C. Freeman, Ben Groom, & Frikk Nesje, *Discounting Disentangled*, 10 AM. ECON. J.: ECON. POL'Y 109, 118 (2018). The authors report that "92 percent of experts report that they would be comfortable with an SDR somewhere in the interval of 1 to 3 percent, and over three-quarters find an SDR of 2 percent acceptable." *Id.* at 111.

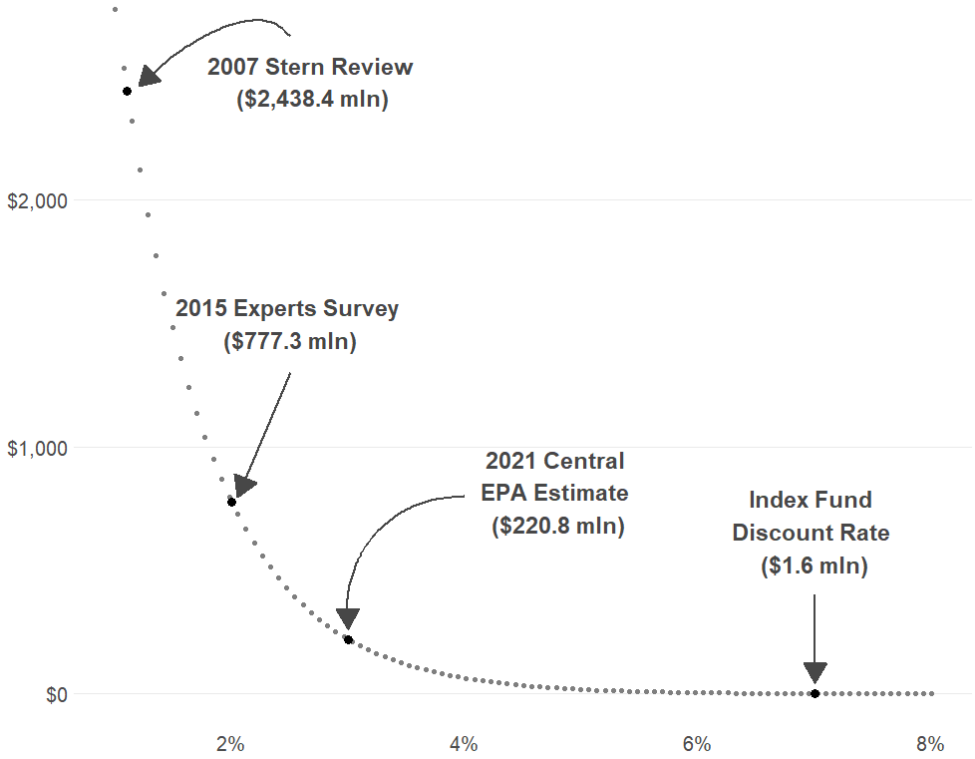
[81] *See, e.g.*, Aswath Damodaran, *Valuation of the S&P 500*, http://pages.stern.nyu.edu/~adamodar/.

[82] I will assume that the index fund bears 1% of the cost and receives 1% of the benefits of the mitigation measure. This assumption is made *arguendo* because, as explained in Part III, index funds are in fact underexposed to the benefits of climate mitigation.

[83] Stern, *supra* note 75.

[84] Drupp et al., *supra* note 80.

Figure 1. Willingness to Pay for Climate Mitigation



Maximum amount of money that an index fund would be willing to pay in 2021 in order to produce a $1 trillion gain in 2150, based on different discount rates. The simulation assumes that the index fund "owns 1% of the economy" and therefore captures 1% of all the positive externalities of the mitigation measure. The horizontal axis represents discount rates. The vertical axis reports figures in millions of dollars.

Many experts condemned the decision of the Trump administration to adopt a social discount rate of 7%, because they worried that it would have blocked many urgent and desirable climate policies.[85] Those worries should also apply to portfolio

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[85] *See, e.g.*, Brad Plumer, *Trump Put a Low Cost on Carbon Emissions. Here's Why It Matters*, N.Y. TIMES, Aug. 23, 2018, https://www.nytimes.com/2018/08/23/climate/social-cost-carbon.html; Institute for Policy Integrity, How the Trump Administration Is Obscuring the Costs of Climate Change (Mar. 2018), https://policyintegrity.org/files/publications/Obscuring_Costs_of_Climage_Change_Issue_Brief.pdf; Karl Hausker, *The Flawed Analysis behind Trump Administration's Proposed Repeal of the Clean Power Plan*, WORLD RESOURCES INSTITUTE, Oct. 16, 2017,

primacy, which would rely on similarly high discount rates to address climate risk.

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This Part has cast serious doubt on the ability of the stock market to provide index funds with the right incentives to act as effective climate stewards. The fact that stock prices likely underestimate climate risk implies that index funds would bear the costs of climate mitigation measures but would reap only limited benefits in terms of the reduction of future climate losses, as such benefits would not be reflected in stock price increases, or at least not fully. Furthermore, the fact that index funds structurally discount future climate losses at a much higher rate than the social discount rate implies that index funds systematically underestimate climate risk and therefore have incentives to massively underinvest in climate mitigation.

III. PORTFOLIO BIASES

This Part examines the second limit of the portfolio primacy theory. Index funds are not real "universal owners" and therefore they internalize climate externalities only in a very limited and partial way. As a consequence, index funds might not be willing to support mitigation measures even if these measures have a positive net present value for society after applying a 7% discount rate.

Section III.A shows how the specific composition of each index fund portfolio may affect the fund's incentives with respect to climate change. Section III.B presents an empirical test of the portfolio biases of the Big Three's index funds that hold stock in Exxon. It shows that, under plausible assumptions, many of these funds have incentives to oppose aggressive carbon mitigation measures even if they have huge net benefits for the whole stock market. Section III.C shows that even index funds with very broad market bases such as Vanguard Total Stock Market—one of the three largest individual shareholders in all top ten U.S. oil companies—are overexposed to the United States and internalize only part of the global social cost of carbon.

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https://www.wri.org/insights/flawed-analysis-behind-trump-administrations-proposed-repeal-clean-power-plan.

A. Portfolio Composition and Climate Incentives

Many scholarly and policy discussions tend to treat all index funds (or at least all funds managed or advised by the largest fund managers) as "universal owners"—that is, as though they all invested in the entire market proportionately to the size of every single company.[86] In reality, index funds are very different from one another, and these differences likely affect their incentives with respect to climate risk.

A recent study by Adriana Robertson found that U.S. index funds track hundreds of different indices, many of which specialize in specific industries, companies of a certain size, or stocks with specific characteristics.[87] Furthermore, many indices select stocks based on a specific "investment style"[88] or weigh companies based on criteria[89] that give disproportionate representations to certain industries.[90] When we consider the economic incentives of an index fund to mitigate climate externalities, these differences matter.

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[86] *See, e.g.*, Coffee, *supra* note 32, at ii ("For entirely rational reasons, the new 'universal' shareholders who now dominate the market will resist even large public companies who might seek to impose externalities on other companies. Owning the market, the 'universal' shareholder will protect the market").

[87] Adriana Z. Robertson, *Passive in Name Only: Delegated Management and "Index" Investing*, 36 YALE J. REG. 795, 815 (2019).

[88] The most popular investment styles are growth investment and value investment. Growth funds focus on stocks that have higher market value relative to earnings or book value and are believed to have above-average growth potential. By contrast, value funds focus on stocks that have lower market value in relation to those measures and are believed to be undervalued by the market. *See, e.g.*, Henrik Cronqvist, Stephan Siegel, & Frank Yu, *Value versus Growth Investing: Why Do Different Investors Have Different Styles?*, 117 J. FIN. ECON. 333, 334 (2015). Other widely used investment styles focus on high dividend yields, earnings, or volatility. Robertson, *supra* note 87, at 820-821.

[89] The most common weighting methodology is based on the market capitalization of the company. FTSE Russell, *How Are Indexes Weighted?*, https://perma.cc/7JNF-2GJX. With this method, the index fund will own a roughly similar percentage of stock in each portfolio company and will have a roughly proportional exposure to the costs and benefits of carbon emissions. There are, however, many funds using alternative weighting criteria, including equal weighting, weighting on the basis of revenues, cash flow or other fundamentals, weighting based on volatility, and so on. *See* Vanguard, *A Review of Alternative Approaches to Equity Indexing* (Nov. 2011), https://perma.cc/7TDG-JXPW. These alternative criteria may give the funds more exposure to carbon emitters and less exposure to companies with higher climate vulnerability, or vice versa.

[90] For example, iShares Russell 1000 Value ETF, which focuses on "value stocks," invests 25% of the portfolio in financial companies, 12% in health technology companies, and 5% in energy companies. By contrast, iShares Russell 1000 Growth ETF, which focuses on "growth stocks," invests 35% in technology services companies, 19% in electronic technology companies, 13% in retail companies, and only 0.25% in energy companies.

A portfolio that faithfully mirrors the entire stock market has, as the portfolio primacy theory predicts, a proportionate exposure to emitters and to externalities. By contrast, a portfolio that is overexposed to certain subsets of the market and underexposed to other subsets of the market might be biased with respect to climate risk. In this case, the incentives of the funds to address climate risk might be weaker than what society needs or even conflicting with the interests of society. I will examine in turn three specific portfolio characteristics that may create biases with respect to climate incentives: industry, geography, and size of portfolio companies.

1. Industry Bias

Many index funds specialize in specific industries or sectors. For example, among the 15 most popular indices (i.e., those tracked by the largest number of index funds) are the Dow Jones U.S. Real Estate Index (which includes real estate investment trusts and other companies investing in real estate), the Dow Jones Basic Materials Index (which includes chemical companies, metal and mining companies, construction materials companies, and other companies in the materials sector), the Dow Jones U.S. Financial Index (which includes U.S. companies in the financial sector), the Dow Jones U.S. Oil & Gas Index (which includes U.S. companies that produce and distribute oil and gas), and the NASDAQ Biotechnology Index (which includes NASDAQ-listed companies in the biotech and pharmaceutical industries).

It is widely believed that rising temperatures will have heterogenous effects across economic sectors.[91] For example, there is agreement among experts that climate change will materially affect recreation and tourism, insurance companies, the health sector, and the agricultural sector. By contrast, absent any mitigation policies, technology shock, or change in social preferences, oil and gas companies will continue to profit from carbon emissions. Thus, an index fund focusing on major carbon emitters (such as the energy sector) will have very different incentives to address climate risk than an index fund focusing on industries vulnerable to carbon externalities.

Suppose, for example, that iShares U.S. Energy ETF, managed by BlackRock, is considering whether to urge its portfolio companies to reduce their carbon emissions in order to decrease

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[91] *See* Conte et al., *supra* note 48 for a model estimating different effects of global warming for the agricultural and non-agricultural sectors. *See also* Intergovernmental Panel on Climate Change, FIFTH ASSESSMENT REPORT 662-693 (2014) (assessing the estimated impact of climate change on various economic sectors).

long-term global damage from climate change. iShares U.S. Energy ETF is a fund invested mostly in energy companies. According to the portfolio primacy theory, the fund would be willing to cut emissions if doing so increases the value of its overall portfolio, even if it decreases the value of the companies that most depend on carbon emissions. But in this case, the whole portfolio consists almost exclusively of oil and gas companies, which profit from fossil fuels.[92] It is unlikely that the fund would gain from cutting emissions of oil and gas emissions in order to reduce global climate losses.

2. Geography Bias

Index funds typically have a specific geographic focus. For example, Vanguard 500 includes almost exclusively companies incorporated in the United States,[93] whereas BlackRock's iShares ISCF ETF invests mostly in companies incorporated in Europe and Asia.[94]

The widespread scientific consensus is that climate change is a phenomenon with heterogenous local economic effects. For example, a recent study by Jose Luis Cruz Alvarez and Esteban Rossi-Hansberg estimated that, in a baseline scenario with no climate policies, by 2200, world productivity would decline by 19% on average, but the effect would vary significantly across regions. In some parts of the world (such as Alaska, Northern Canada, and Northern Russia) productivity would double relative to a scenario without global warming, while in other regions (such as Brazil, Africa, the Middle East, India, and Australia) productivity would decline by up to 60%.[95]

Furthermore, there is "near universal agreement that poorer countries are more vulnerable to climate change."[96] The Notre Dame Global Adaptation Initiative has developed an index

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[92] According to the FactSet Company/Security Database, as of July 2021, iShares U.S. Energy ETF invested 97.3% of its portfolio in oil companies (integrated oil, oil and gas production, oil refining and marketing, oil and gas pipelines, and oilfield services and equipment) and 99.6% of its portfolio in U.S. companies.

[93] As of July 2021, 96% of Vanguard 500 Index Fund portfolio companies were U.S. companies. Data collected from the FactSet Ownership database.

[94] As of July 2021, 48% of iShares ISCF ETF's portfolio companies were European companies, 19% were Asian companies, and 12% were North American companies.

[95] Jose Luis Cruz Alvarez & Esteban Rossi-Hansberg, *The Economic Geography of Global Warming* 27, NBER Working Paper 28466 (Feb. 2021), http://www.nber.org/papers/w28466.

[96] Richard S. J. Tol, *A Social Cost of Carbon for (Almost) Every Country*, 83 ENERGY ECON. 555, 564 (2019).

measuring each country's vulnerability and resilience to climate change (the ND-GAIN Index), which shows enormous differences across countries.[97] According to these estimates, Norway, New Zealand, and Finland have the three highest scores and are therefore expected to suffer the least from climate change. In general, the United States, Western European countries, and many other high-income countries are among the top 50 countries in the index, while the bottom 50 positions are occupied predominantly by low-income countries, with Chad, Somalia, and the Central African Republic as the most vulnerable. Therefore, a fund investing exclusively in U.S. companies will have very different incentives with respect to climate risk compared to a fund significantly exposed to companies located in emerging or developing economies.

3. Size Bias

Many funds have a broad portfolio in terms of market capitalization of the individual companies—that is, they include large, medium, and small companies. Many others, however, focus on companies of a certain size. For example, Vanguard 500 focuses on large-capitalization companies. The vast majority of the fund (78.5%) is invested in companies with a market capitalization exceeding $50 billion, and less than 1% of the fund is invested in companies worth less than $2 billion.[98] By contrast, none of the portfolio companies of State Street's SPDR Portfolio Mid Cap ETF has a market capitalization larger than $20 billion, and most are worth less than $5 billion.[99]

Adaptation to climate change is relatively more difficult for smaller companies, which have more limited capital for investment in expensive climate resilience projects with long-term, uncertain payoffs.[100] Therefore, a portfolio with a disproportionate fraction of large companies may be underexposed to the total risk of climate change and thus have reduced incentives to address climate externalities.

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[97] The ND-GAIN database, covering 181 countries over the period 1995–2018, is available at https://gain.nd.edu/.

[98] Data collected from the FactSet Ownership database as of July 28, 2021.

[99] Data collected from the FactSet Ownership database as of July 28, 2021.

[100] *See, e.g.*, CENTER FOR CLIMATE AND ENERGY SOLUTIONS, WEATHERING THE STORM: BUILDING BUSINESS RESILIENCE TO CLIMATE CHANGE 22 (July 2013).

B. Testing the Big Three's Biases

1. The Portfolio Biases of the Big Three in Exxon

To empirically test whether and how the portfolio biases discussed in Section III.A may affect index funds' incentives to support carbon mitigation measures, I examined the investment of the Big Three in Exxon, one of the world's biggest carbon emitters.[101] Major emitters such as Exxon make significant profits from fossil fuels and do not have economic incentives to reduce climate externalities. As discussed in Section I.A, they internalize the profits of carbon emissions but externalize most of the costs; hence, absent any regulatory or social pressure, they have no economic reason to bear the cost of carbon mitigation, which would benefit for the most part other firms and individuals.

If, following the portfolio primacy theory, the Big Three were to become climate stewards, we would expect them to persuade companies like Exxon to reduce their emissions, even if doing so is economically irrational at the company level. As of the end of June 2021, index funds advised by BlackRock, State Street or Vanguard owned, in the aggregate, 15.7% of Exxon stock,[102] and their influence is realistically bound to grow.[103] Therefore, they could exert significant influence on Exxon's emissions policy.

However, the portfolio primacy theory is premised on the assumption that the Big Three internalize the externalities produced by Exxon at the portfolio level. According to this view, the economic incentives of an index fund to push for an emissions reduction derive from the fund's exposure to many different companies and industries that bear the costs of climate change. If, for example, the funds investing in Exxon were disproportionately invested in oil companies, their economic incentives would be more strongly aligned with Exxon and other carbon emitters, and more weakly aligned with social welfare. In such a case, we couldn't realistically expect that they would serve as effective climate stewards.

The Big Three's investment in Exxon is therefore an ideal setting to study how portfolio composition and climate incentives are closely intertwined. To examine this question, I reviewed the

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[101] Paul Griffin, Carbon Majors Report (2017) at 8, https://climateaccountability.org/pdf/CarbonMajorsRpt2017%20Jul17.pdf (listing Chevron among "the highest emitting companies since 1988 that are investor-owned").

[102] Data collected from the FactSet Ownership database on July 25, 2021.

[103] *See* Bebchuk & Hirst, *Specter*, supra note 41.

composition and fund characteristics of each of the 167 equity index funds (mutual funds and ETFs) managed by BlackRock, Vanguard, or State Street that owned stock in Exxon as of June 30, 2021. Table 1 reports data on the composition of their portfolios with respect to industry, geography, and size of portfolio companies.

Table 1. Big Three Index Funds in Exxon

	% Of Outstanding Shares of Exxon			
	BlackRock	State Street	Vanguard	Total Big Three
Exposure to Oil Companies				
- *Mirroring the market (2%-4%)*	1.8%	1.2%	6.4%	9.4%
- *Underexposed (<2%)*	<0.1%	<0.1%	<0.1%	<0.1%
- *Overexposed (>4%)*	1.6%	2.8%	1.9%	6.2%
Exposure to North America				
- *Mirroring the market (45%-50%)*	<0.1%	<0.1%	<0.1%	<0.1%
- *Underexposed (<45%)*	<0.1%	<0.1%	<0.1%	<0.1%
- *Overexposed (>50%)*	3.3%	3.9%	8.3%	15.5%
Exposure to Small-Cap Companies				
- *Mirroring the market (2%-4%)*	0.2%	0%	3.4%	3.6%
- *Underexposed (<2%)*	2.8%	3.8%	4.7%	11.3%
- *Overexposed (>4%)*	0.1%	0.1%	<0.1%	0.2%

Percentage of outstanding shares of ExxonMobil held by equity index funds advised by BlackRock, State Street, or Vanguard, based on certain characteristics of their portfolio.

Oil companies account for about 2% to 4% of global market capitalization.[104] However, as the table shows, about 40% of the Exxon stock owned by the Big Three is held by index funds that have a disproportionately large exposure to oil companies. Furthermore, more than a fifth (21.8%) of the Big Three holdings in Exxon are held by funds investing almost exclusively (more than 88% of their portfolio) in oil companies.

If fund managers voted their shares and used the relevant shareholder power in the best interest of the specific fund that

[104] In this Article, by oil companies I refer to companies in the following industries: integrated oil, oil and gas production, oil refining and marketing, oil and gas pipelines, oilfield services and equipment, and contract drilling. For simplicity, I use the classifications utilized in the FactSet Ownership database. As of July 25, 2021, companies in these industries accounted for 3.02% of the Vanguard Total World Stock Index Fund (a market-cap weighted index fund invested in 8,963 companies around the world) and for 2.4% of the Vanguard Total Stock Market Index Fund (a market-cap weighted index fund invested in approximately 100% of the stocks traded on the New York Stock Exchange and Nasdaq.

holds the shares, as they should,[105] we should not expect State Street's SPDR Energy Select Fund, the Vanguard Energy Index Fund, or BlackRock's iShares U.S. Energy ETF—three of the index funds with the largest holdings in Exxon—to support carbon mitigation policies that are costly for oil companies but benefit companies in other industries. Even if the managers of these funds adopted a portfolio primacy approach rather than a traditional shareholder primacy approach, their portfolio incentives would not support climate stewardship.

But even if fund managers adopted a centralized approach to voting and stewardship, by making decisions at the level of the institution rather than at level of individual funds, the overexposure to oil companies would significantly affect their cost-benefit analysis. For example, almost half of BlackRock's investment in Exxon and more than two thirds of State Street's investment in Exxon is made through funds overexposed to oil companies. Hence, it is plausible that BlackRock would not take an aggressive stance in favor of a costly carbon mitigation policy and that State Street would outright oppose it.[106]

The table also shows that these index funds are overwhelmingly overexposed to companies incorporated in North America and significantly underexposed to small and micro capitalization companies (with a market capitalization less than $2 billion). As discussed in Section III.A., these geographic and size biases create additional incentives to underinvest in climate mitigation.

2. Simulation of Carbon Mitigation Measure

To illustrate how these portfolio biases may affect a fund's cost-benefit analysis with respect to carbon mitigation, I simulated the net portfolio effect, for each of the Big Three's index funds with the twenty largest holdings in Exxon ("Top B3 Funds"), of a mitigation measure that would be significantly costly for oil companies but hugely beneficial for all other companies (even with a 7% discount rate). Namely, I calculated the net effect of a measure that would reduce the value of oil companies by $1 trillion and would increase the value of all other companies by $1.3 trillion, thus netting a

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[105] For a discussion of this issue, see *infra* Section IV.A.

[106] To be sure, institutional investors holding Exxon stock might want to push for reducing emissions and mitigating climate externalities in anticipation of stricter environmental regulation or in response to environmentally friendly preferences of consumers and beneficial owners. These would be, however, decisions based on company-level incentives, not on portfolio-level considerations, and they would be driven by regulatory and social changes, not by portfolio primacy.

global stock market gain of $300 billion, in present value terms.

Undeniably, this is the typical scenario in which portfolio primacy predicts that index funds would have strong financial incentives to support the mitigation measure. Furthermore, the Top B3 Funds hold, in the aggregate, 13.2% of Exxon stock, and therefore the simulation provides a very good sense of whether the Big Three would support or oppose Exxon's implementation of a mitigation measure of this kind.

To simulate such a scenario, I assumed that the entire costs and benefits of the proposed mitigation measure would be captured by the companies in which the Top B3 Funds invest. In other words, I assumed that the portfolios of the Top B3 Funds, taken together, internalize all the effects of the proposed mitigation measure. These funds invest in 11,512 different companies, of which 307 meet the definition criteria of oil company.[107] I also assumed that oil companies bear the cost of the mitigation measure in proportion to their market capitalization (specifically, the measure reduces the market value of each oil company of about 16.8%), whereas all other companies reap the benefits of the measure in proportion to the square root of their market capitalization (the marginal benefit of carbon mitigation decreases with the increase of the company size, since smaller companies face disproportionately larger climate risk). However, the qualitative takeaway of this simulation doesn't change significantly if we assume that the benefits of carbon mitigation are distributed more or less proportionally.

Figure 2 reports the result of the simulation. As the figure shows, Vanguard Total Stock Market, which invests in more than 4,000 companies, would make a substantial gain ($4,983 million), whereas other funds (in particular, funds specialized in the energy sector and funds focused on "value" or "high dividend" stocks) would take a hit. For example, State Street's Energy Select Sector SPDR Fund would lose $4,245 million, Vanguard Energy would lose $1,114 million, and BlackRock's iShares US Energy would lose $372 million.

Interestingly, only for Vanguard the aggregate net effect of the proposed mitigation measure would be positive. For BlackRock and State Street the measure would result in a net loss despite the huge positive effect for "the whole market." If each fund voted its shares based on an individual cost-benefit analysis, the Top Big3 Funds would vote 8.2% in favor of the measure and 4.9% against the

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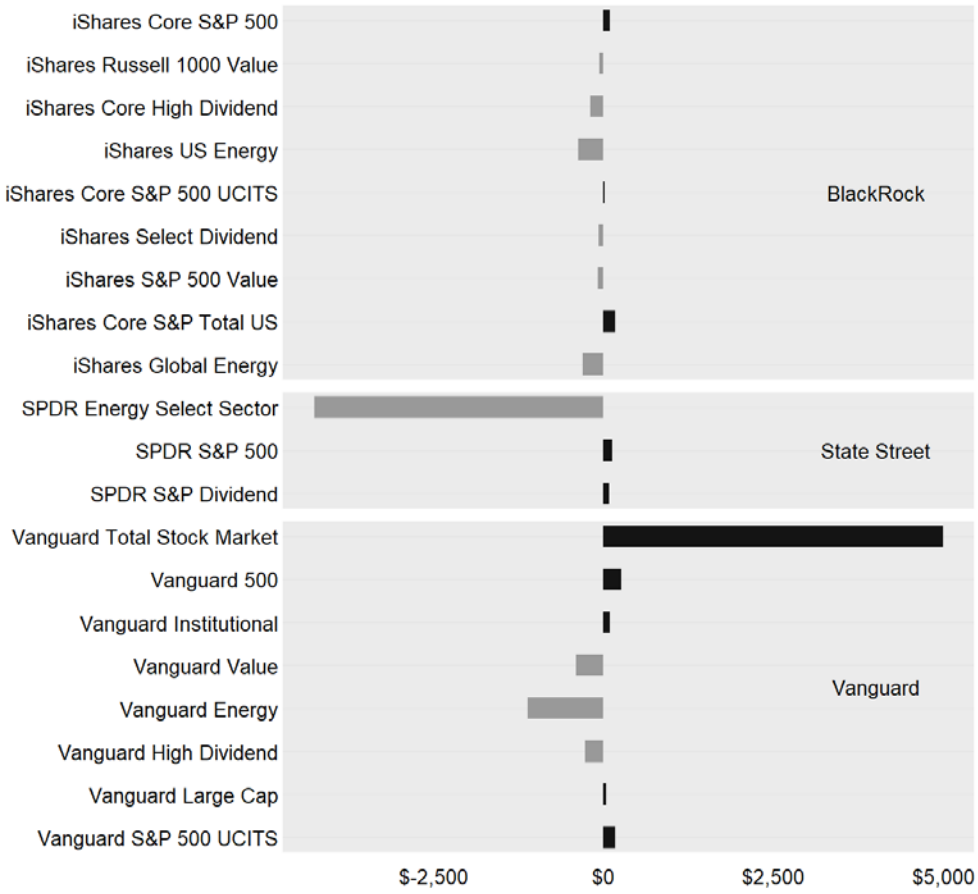
[107] *See supra* note 104.

measure. In the aggregate, however, the net effect of the proposed measure for these 20 funds would be negative: a loss of about $1 billion.

Figure 2. Net Portfolio Effect of a Carbon Mitigation Measure



The simulation assumes that the effects of the mitigation measure are entirely captured by the 11,512 companies in which the above funds invest. Oil companies bear the cost of the mitigation in proportion to their market capitalization. The other companies capture the benefit of the mitigation in proportion to the square root of their market capitalization (i.e., with diminishing marginal benefits). Data on the portfolio of the various funds were collected from FactSet as of November 30, 2021. Values on the horizontal axis are in millions of dollars.

To be sure, the results of the simulation are highly sensitive to the specific input. For example, if we assume that large companies and small companies receive the benefits of climate mitigation in a purely proportional way, the proposed measure will result in a net gain for Vanguard and BlackRock, and in a net loss of State Street.

By contrast, if we assume that the stock market benefit is $200 billion rather than $300 billion, the Top B3 Funds would vote 3.3% in favor of the measure and 9.9% against the measure.

Regardless of the specific numeric examples, however, this simulation is instructive because it shows that, contrary to some widespread intuitions, a net positive effect for the stock market as a whole does not imply a net positive effect for all index funds. In fact, even huge net positive effects for the stock market might result in very small positive effects or even significant net negative effects for many Big Three index funds.

3. Simulation of Portfolio Cost of Carbon

The simulation discussed in the previous section is based on the assumption that all the costs and the benefits of the carbon mitigation measure are captured by the funds' portfolio companies. In reality, however, index funds are significantly overexposed to developed economies and underexposed to developing and emerging economies. Since there seems to be a consensus that richer countries are relatively less vulnerable to climate risk, it is plausible to believe that index funds internalize only a portion of global climate risk.[108]

To study the heterogeneous effect of climate change across countries, climate economists use the concept of country-level social cost of carbon, which is the damage created by an additional ton of greenhouse gases to a particular country. Recent estimates of country-level social cost of carbon, although significantly different from one another, show that India and Africa will bear a much larger share of climate costs, relative to the size of their economy, than the United States.[109] Hence, a portfolio with a disproportionately large exposure to the United States and a

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[108] *See, e.g.*, William D. Nordhaus, *Revisiting the Social Cost of Carbon*, 114 PROC. NAT'L ACAD. SCI. OF THE U.S. 1518, 1521-1522 (2017) (estimating that the country-level social cost of carbon for the United States, India, and Africa are 15%, 9%, and 3%, respectively, of the global cost of carbon); Katharine Ricke, Laurent Drouet, Ken Caldeira, & Massimo Tavoni, *Country-level Social Cost of Carbon,* 8 NATURE CLIMATE CHANGE 895 (2018) (estimating that the country-level social cost of carbon for the United States, India, and Africa are 11%, 20%, and 10%, respectively, of the global cost of carbon); Tol, *supra* note 96 (estimating that the country-level social cost of carbon for the United States, India, and Africa are 0.6%, 23.9%, and 30.4%, respectively, of the global cost of carbon). These estimates refer to the base case for each study. As of the end of 2019, the gross domestic product of the United States, India, and Africa was 24.4%, 3.3%, and 2.3%, respectively, of the world gross domestic product, in current U.S. dollars, at purchase power parity. WORLD BANK, OPEN DATA DATABASE, available at https://data.worldbank.org/.

[109] *See* Nordhaus, *supra* note 108, at 1521.

disproportionately small exposure to India and Africa will bear a less-than-proportional share of climate costs. At a minimum, the optimal decarbonization goal for such a portfolio will be smaller than the socially optimal goal; but, under some plausible circumstances, decarbonization might well result in a portfolio loss, and therefore the index fund would have no incentive to push for it.

To examine this aspect, I simulated the fraction of country-level social cost of carbon internalized by Vanguard Total Stock Market. This index fund is the largest individual shareholder in six of the ten largest oil companies in the United States and one of the three largest shareholders in the remaining four largest U.S. oil companies.[110] Vanguard Total Stock Market tracks the CRSP U.S. Total Market Index, which includes 4,000 companies "representing near 100% of the U.S investable equity market,"[111] and it is proportionally exposed to the energy sector.[112] Funds with these characteristics (broad market base, market-cap weighting, proportional exposure to various industries) manage a majority of the assets managed by U.S. index funds[113] and therefore wield significant influence on public companies. Understanding the "climate geography" of Vanguard Total Stock Market is thus particularly instructive.

To build the simulation, I assumed that a company internalizes local climate externalities in proportion to its local revenues, relative to the size of the local economy. For example, if Apple's revenues in Germany correspond to 0.3% of Germany's GDP and Germany's social cost of carbon is $5, then I will assume that Apple internalizes $0.015 of the Germany's social cost of carbon; if Vanguard Total Stock Market owns 2.7% of Apple stock, I will assume that it internalizes 2.7% of $0.015. I collected data on the geographic distribution of revenues of the portfolio companies of Vanguard Total Stock Market from FactSet GeoRev,[114] and I collected estimates of country-level social cost of carbon from a

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[110] Data collected from the FactSet Ownership database, as of November 30, 2021.

[111] CRSP U.S. Total Market Index, CRSP.org, https://perma.cc/N9LZ-GMQ3.

[112] For the methodology of the CRSP U.S. Total Market Index, see https://perma.cc/HDD8-4E67.

[113] *See* Robertson, *supra* note 87, at 816 (reporting that index funds tracking the S&P 500, CRSP U.S. Total Market, Russell 1000, Russell 2000, or Russell 3000—which are broad-based, generalist, market cap-weighted indices—account for 56% of all the assets under management by U.S. index funds).

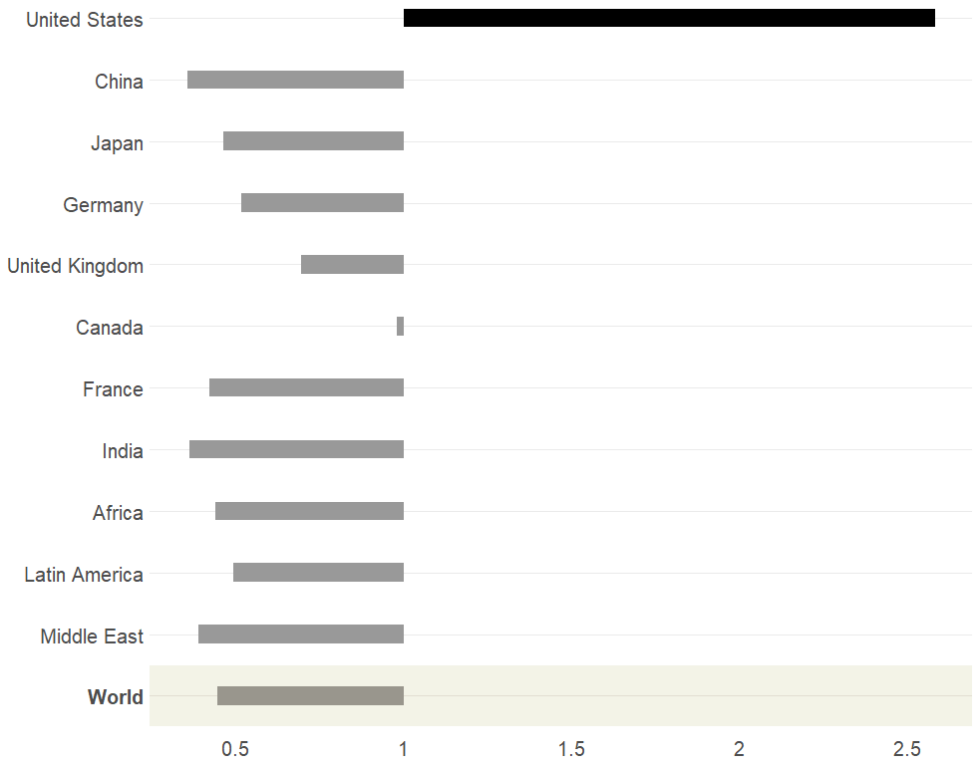
[114] Data collected from the Factset GeoRev database as of June 9, 2021.

recent study by Richard Tol.[115]

Figure 3 measures the fraction of the country-level social cost of carbon internalized by Vanguard Total Stock Market. The ideal scenario, implicitly assumed by the portfolio primacy theory, is the one in which Vanguard Total Stock Market is proportionally exposed to each country and therefore internalizes local climate externalities in proportion to the size of the local economy. I call this scenario the unbiased scenario. In Figure 3, the horizontal axis reports the ratio between the country-level social cost of carbon actually internalized by the fund and the country-level social cost of carbon that would be internalized in the unbiased scenario. A value of one on the horizontal axis means that the actual portfolio cost of carbon is equal to unbiased portfolio cost of carbon. A value greater than one means that the fund over-internalizes externalities in that country. A value less than one means that the fund under-internalizes climate externalities in that country.

[115] Tol, *supra* note 96. Country-level estimates used in this simulation are taken from the study's dataset, generously made available by the author. All estimates are based on the study's base scenario.

Figure 3. Internalization of Global Social Cost of Carbon



Fraction of country-level social cost of carbon internalized by Vanguard Total Stock Market Index Fund, assuming that an index fund internalizes the social cost of carbon of a given country in proportion to the local revenues of its portfolio companies relative to the size of the local economy (GDP). Data on country-level revenues were collected from FactSet GeoRev as of July 6, 2021. Data on country GDP were collected from the World Bank database and refer to 2019. Estimates of country-level social cost of carbon are taken from Richard Tol (2019).

As the figure shows, Vanguard Total Stock Market is overexposed to the United States and underexposed to most other country. As a result, the fund internalizes only 44.4% of the global cost of carbon.[116] Therefore, many potential mitigation measures that would be socially desirable would be too expensive for Vanguard, and therefore Vanguard would have economic incentives

[116] If I use the estimates proposed in another recent study, by Katharine Ricke, Laurent Drouet, Ken Caldeira, and Massimo Tavoni (*supra* note 108), Vanguard Total Stock Market internalizes 65.2% of the global social cost of carbon.

to oppose these measures.[117]

This is, of course, a rough simplification. The actual financial impact of climate change on individual companies (and therefore, in the aggregate, on an index fund portfolio) will likely depend on several different factors, including, for example, not only local revenues but also the location of plants and other physical assets, local labor pool and productivity, supply chain, etc.[118] This simulation demonstrates, however, three important points. First, geography matters for climate risk. Second, even if in the climate economics literature country-level estimates of the social cost carbon vary significantly,[119] there is a consensus that richer countries are less vulnerable to climate change and poorer countries are more vulnerable. Third, even the index funds with the broadest market bases are disproportionally exposed to richer countries and therefore have weak incentives to address the global consequences of climate change.

C. Public Shareholder Bias

It is important to note that even in the absence of the portfolio biases discussed in the previous sections, index funds would not "own the economy." In fact, the interests of index funds would still be aligned with the interests of shareholders of public companies, but the equity value of public companies does not correspond to the entire economy, let alone to social welfare.

First of all, index funds invest in stock, and therefore their incentives are aligned with the producer surplus but not necessarily with the total economic surplus. Companies might implement various strategies to adapt to climate change and to mitigate their individual losses, including, for example, the relocation of operations to colder regions. These strategies, however, do not necessarily mitigate the total damages of climate change for the stakeholders of the company, let alone for society. As equity investors, index funds will favor climate strategies that protect

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[117] For example, a mitigation measure with a portfolio cost of $0.80 per ton of CO_2 reduced would be socially desirable (all measures with a portfolio cost up to $1.10 are, based on the assumption of this illustration, socially beneficial) but would be financially undesirable for Vanguard 500 (Vanguard 500's willingness to pay for carbon mitigation measures stops at $0.75).

[118] *See, e.g.*, CALIFORNIA PUBLIC EMPLOYEES' RETIREMENT SYSTEM & WELLINGTON MANAGEMENT, PHYSICAL RISKS OF CLIMATE CHANGE (P-ROCC): A NEW FRAMEWORK FOR CORPORATE DISCLOSURES (2019).

[119] For example, Richard Tol estimates a global cost of carbon of $23.85 per ton of CO_2-equivalent. Tol, *supra* note 96, whereas Katharine Ricke and coauthors estimate a global cost of carbon of $418. Ricke et al., *supra* note 108.

shareholder value but not necessarily strategies that protect the interests of other constituencies.

Second, investors in public equities are on average richer than the rest of society and therefore less vulnerable to climate change. Index funds' interests are aligned with this subset of individuals but not necessarily with the poorer and more vulnerable individuals who are not stock investors. Even in the Unites States, where most people saving for retirement are beneficial owners of stock through their retirement plan, index funds fail to represent the interests of people who are *not* shareholders.

Third, public companies represent only a subset of the economy. In emerging economies, public companies represent a very small fraction of economic activity and are not representative of the entire economy[120]. Furthermore, the divergence between size of the economy and size of the equity market seems to be widening over the years. [121] In many developing countries, the stock market is even less representative of the local economy. Some of the most significant effects of climate change will be felt by small farmers, agricultural laborers in small farms, and other micro-firms representing important parts for the economy of those country, but that are not represented in equity indices. For example, "subsistence" or "smallholder" farmers are responsible for "90% of the production of ice, wheat, other food crops, cocoa, and cotton in Nigeria,"[122] and for "70 percent of arable and permanent cropland in several West and Southern African and Pacific countries."[123] The economic activity of these farms is very vulnerable to extreme weather events and other climate change effects, although they might also have peculiar adaptation skills.[124] Stock market investors, including those heavily investing in global stocks, are not

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[120] *See* Joon Woo Bae, Redouane Elkamhi, & Mikhail Simutin, *The Best of Both Worlds: Accessing Emerging Economies via Developed Markets*, 74 J. FIN. 2579, 2579-2580. In 2019, for example, China's GDP accounted for 16.3 percent of the world GDP; however, the size of its equity market was only 10.2 percent of the global equity market. Even more remarkably, Argentina's 2019 GDP was 0.5 percent of the world GDP but its equity market was only 0.05 percent of the global equity. By contrast, in 2019 the GDP of the United States accounted for 24.5 percent of the world GDP, but its equity market accounted for 40.6 of the global equity markets. Data collected from the World Bank Open Data dataset (https://data.worldbank.org).

[121] Geert Bekaert & Campbell R. Harvey, *Emerging Equity Markets in a Globalizing World*, Working Paper (April 2017) (manuscript at 5), available at https://ssrn.com/abstract=2344817.

[122] John F. Morton, *The Impact of Climate Change on Smallholder and Subsistence Agriculture*, 104 PROCEEDINGS OF THE NAT'L ACAD. SCI. 19680, 19680 (2007).

[123] *Id.* at 19681.

[124] *Id.* at 19684.

exposed to these risks and therefore have no incentives to mitigate them.

Even in the United States, the equity market has become less important for the overall economy. In the last two decades there has been a sharp decline in public equity.[125] In 1997, the U.S. publicly-traded companies were 7,576; in 2018, their number had plummeted to 3,613.[126] Furthermore, public companies have become increasingly less relevant for the overall economy. For example, in the early 1970s more than 41% non-farm workers in the private sector were employed by public companies in the United States, but in 2019 it was only 29%.[127] Over the same period, public companies' contribution to the U.S. gross domestic product has fallen, and at the end of the period top market capitalization companies accounted for a much smaller fraction of the overall economy than at the beginning of the period.[128] As recently observed by two prominent economists, "the stock market may have become less valuable as a proxy for the overall levels economic activity."[129]

Fourth, climate change raises distributive issues that many democratic societies would be willing to address but that private actors driven by portfolio value maximization would not be incentivized to address.[130] Climate change is expected to have unequal effects across the income and wealth distribution, with poorer individuals and countries being more seriously damaged by the effects of climate change.[131] Even those who believe that the distributive concerns of climate change are better addressed through the tax and transfer system, rather than through climate

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[125] *See, generally,* René M. Stulz, *Public versus Private Equity*, 36 OXFORD REV. OF ECON. POL'Y 275 (2020).

[126] *Id.* at 275.

[127] Frederik P. Schlingemann & René M. Stulz, *Have Exchange-Listed Firms Become Less Important for the Economy?*, NBER Working Paper No. 27942 (February 2021), http://www.nber.org/papers/w27942.

[128] *Id.*

[129] *Id.* at 7.

[130] In an influential work, Henry Shue identified four distinct questions of international distributive justice raised by climate change: (1) how to allocate mitigation costs; (2) how to allocate the costs of coping with unavoidable consequences; (2) what is the background allocation of wealth that would allow fair bargaining among nations; and (4) how to allocate carbon emissions. For other perspectives on climate change and distributive justice, see ERIC A. POSNER & DAVID WEISBACH, CLIMATE CHANGE JUSTICE 73-98 (2008); Mathias Frisch, *Climate Change Justice*, 40 PHIL. & PUB. AFF. 225 (2012); PETER SINGER, ONE WORLD; THE ETHICS OF GLOBALIZATION 26-49 (2002).

[131] *See supra* Section III.B.3.

regulation,[132] would recognize that portfolio primacy is poorly positioned to tackle these issues.

Finally, climate change will likely affect environmental amenities, which hold non-pecuniary value for local residents, and it will likely have other non-pecuniary effects on health, migration, and quality of life.[133] Although there is a time-honored debate on the extent to which environmental amenities are capitalized into wages and prices and thus reflected in conventional economic metrics, it is unlikely that market-based climate stewardship would be able to give appropriate weight to these non-pecuniary values.[134]

These brief considerations are meant to emphasize a significant problem even in the case in which the stock market provided index funds strong incentives to address global climate risks. Even in this optimistic scenario, the perspective of index funds would be quite parochial: strongly aligned with shareholders of public companies but not representative of the interests of other corporate constituencies, developing and emerging economies, and non-pecuniary welfare.

* * *

The analysis presented in this Part has revealed that one crucial assumption of the portfolio primacy theory is grossly overstated. Index funds are not "universal owners," except in a very limited and imperfect way. The specific composition of their portfolios varies significantly and shapes in different ways the funds' incentives with respect to climate change. In particular, index funds can be, and often are, biased in favor major carbon emitters, richer countries, and larger companies, thus being ill suited to act as guardians of the most vulnerable firms and world regions. Even the largest funds with the broadest market bases are disproportionately exposed to the United States and therefore do not internalize the significant climate risks of emerging and developing economies.

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[132] *See, e.g.*, Louis Kaplow & Steven Shavell, *On the Superiority of Corrective Taxes to Quantity Regulation*, 4 AM. L. & ECON. REV. 1 (2002); Louis Kaplow, *Taxes, Permits, and Climate Change*, in U.S. ENERGY TAX (ed. Gilbert E. Metcalf 2010).

[133] For example, on the non-pecuniary nature of "environmental displacement," see Avner de Shalit, *Climate Change Refugees, Compensation, and Rectification*, 94 THE MONIST 310 (2011).

[134] For a general discussion of the capitalization of environmental amenities, see Todd L. Cherry & Dan S. Rickman, *Introduction*, in ENVIRONMENTAL AMENITIES AND REGIONAL ECONOMIC DEVELOPMENT 1-2 (Todd L. Cherry & Dan S. Rickman eds. 2009).

IV. FIDUCIARY CONFLICTS

This Part examines the third limit of portfolio primacy. Climate stewardship would create serious fiduciary conflicts that make its practical implementation extremely problematic.[135] Section IV.A discusses the fiduciary conflicts between index fund managers and fund investors. Section IV.B discusses the potential fiduciary conflicts between large fund managers (such as the Big Three) and undiversified shareholders. Section IV.C examines the fiduciary conflicts between corporate directors and the individual company.

A. Between Fund Managers and Fund Investors

A mutual fund must be managed "on behalf of its investors."[136] In particular, the law makes it clear that mutual funds must operate in the interest of all classes of investors and that such a duty is violated when the fund acts in the interests of directors, officers, investment advisers, special classes of investors, other mutual funds, or entities engaged in other lines of business.[137]

The duty of loyalty not only prohibits fraud and misappropriation but also condemns conflicts of interests between directors and officers of the fund, or investment advisers, and the investors in the fund.[138] As we have seen throughout this Article, investment advisers manage dozens or even hundreds of different funds; furthermore, large financial groups such as the Big Three consist of several investment advisers. These funds present different characteristics, including with respect to industry, size, and geography of the portfolio companies. Given such a large number of different, and potentially divergent, interests, the conflicts of interests among mutual fund managers are ubiquitous.[139]

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[135] Since the first draft of this Article was made public, the tension between portfolio primacy and the fiduciary duties of index fund managers and corporate directors has been discussed also by Marcel Kahan and Ed Rock. *See* Marcel Kahan & Edward Rock, *Systematic Stewardship with Tradeoffs* (working paper) (Jan. 30, 2022), https://ssrn.com/abstract=3974697.

[136] Investment Company Governance, Exchange Act Release No. IC-26520, 2004 WL 1672374 (July 27, 2004).

[137] Investment Company Act § 1(b)(2), 15 U.S.C. 80a-1(b)(2).

[138] *See generally* Arthur B. Laby, *The Fiduciary Structure of Investment Management Regulation*, in RESEARCH HANDBOOK ON THE REGULATION OF MUTUAL FUNDS 79-110 (William A. Birdthistle & John Morley eds. 2018).

[139] *See, e.g.*, Ann M. Lipton, *Family Loyalty: Mutual Fund Voting and Fiduciary Obligation*, 19 TENN. J. BUS. L. 175, 176 (2017); Utpal Bhattacharya et al., *Conflicting Family Values in Mutual Fund Families*, 68 J. FIN. 173 (2013); José-Miguel Gaspar et al.,

This problem is clearly relevant for climate stewardship. As shown in Section III.B.2, carbon mitigation measures might benefit some index funds and damage other funds advised by the same investment adviser. What should the investment adviser do in this case? From a legal standpoint, the answer seems straightforward. Directors and officers (or trustees)[140] of each fund, as well as their investment advisers,[141] must resolve any conflicts in the interests of the investors of that particular fund.[142] Hence, in our hypothesis, the investment adviser should vote and engage companies in opposite and conflicting ways on behalf of different funds.[143] In practice, however, index fund managers do not make this kind of decision at the level of the individual fund. They typically have centralized governance offices that make decisions on voting and other engagement issues at the level of the entire institution.[144]

Advocates of portfolio primacy find that the centralization of engagement decisions, although potentially problematic from a fiduciary standpoint, ultimately favors institution-level stewardship.[145] Indeed, according to this view, by making centralized decisions for the funds they manage, large asset managers will choose to maximize value across portfolios rather than at the level of a particular fund, also because this strategy has a low chance of being legally challenged.[146]

Favoritism in Mutual Fund Families? Evidence on Strategic Cross-Fund Subsidization, 61 J. FIN. 73 (2006).

[140] Most funds are organized as Delaware or Massachusetts trusts, or as Maryland corporations (with a board-centric governance). Deborah A. DeMott, *Fiduciary Contours: Perspectives on Mutual Funds and Private Funds*, in RESEARCH HANDBOOK ON THE REGULATION OF MUTUAL FUNDS, *supra* note 138, at 61.

[141] Investment advisers owe fiduciary duties to the fund they advise under the Investment Advisers Act of 1940. SEC v. Capital Gains Research Bureau, Inc., 375 U.S. 180, 191–92 (1963) ("The Investment Advisers Act of 1940 … reflects a congressional recognition of the delicate fiduciary nature of an investment advisory relationship, as well as a congressional intent to eliminate, or at least to expose, all conflicts of interest which might incline as investment adviser—consciously or unconsciously—to render advice which was not disinterested") (citations omitted).

[142] *See generally* Lipton, *Family Loyalty*, *supra* note 139.

[143] For a discussion of the conflicts of interests in mutual fund voting, see also Sean J. Griffith & Dorothy S. Lund, *Conflicted Mutual Fund Voting in Corporate Law*, 99 B.U. L. REV. 1151 (2019).

[144] Bebchuk & Hirst, *Index Funds*, *supra* note 50, at 2076-2084.

[145] *See, e.g.*, Condon, *supra* note 32, at 57-59.

[146] *Id.* at 59 (reporting that the Securities and Exchange Commission has brought only one enforcement action punishing conflicted proxy voting practices, in 2009, and that investment managers can provide a "plausible business-purpose cover" for their strategy, thus avoiding legal consequences).

However, this view seems to underestimate investment managers' incentives to maximize value for investors in order to attract capital (and fees). Although such incentives are not powerful enough to prevent all kinds of malfeasance,[147] they might be able to dissuade management companies from systematically and visibly harming the value of portfolio companies. If the Big Three overtly pressured energy companies to engage in value-decreasing strategies for the benefit of other companies, it is very likely that investors in their energy-focused funds would flee (and perhaps even take legal action). In fact, mutual funds' strong exit rights—stronger than in regular corporations—and the desire of investment managers to attract new investors force fund directors, officers, and investment advisers to pay careful attention to conflict-of-interest issues.[148]

B. Between Large Asset Managers and Undiversified Shareholders

The largest asset managers might also face a different type of fiduciary conflict. Corporate shareholders can freely decide how to vote their shares and use their rights, based on their own private interests and preferences, and owe no fiduciary duties to other shareholders. However, "controlling shareholders" are in a very different position. They owe fiduciary duties to minority shareholders and may not use their superior influence to extract private benefits from the company.[149]

Under Delaware law, to qualify as a controlling shareholder, the shareholder does not necessarily need to have a majority of votes.[150] Indeed, even a minority shareholder (or a group of minority shareholders)[151] may be considered a controlling shareholder if it has "effective control"[152] or "outsized influence"[153] on the board. It is

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[147] In fact, the role of investment management law and of the Securities and Exchange Commission is justified on the grounds that market incentives are not enough to police investment managers' behavior.

[148] *See* John Morley, *The Separation of Funds and Managers: A Theory of Investment Fund Structure and Regulation*, 123 YALE L. J. 1228, 1263 ("[Investment] [m]anagers must therefore constantly consider how conflict resolutions will affect their ability to attract new investors").

[149] *See generally* Ann M. Lipton, *After Corwin: Down the Controlling Shareholder Rabbit Hole*, 72 VAN. L. REV. 1977 (2019).

[150] Certainly, if a shareholder has a majority of votes, it is a controlling shareholder. Weinstein Enters., Inc. v. Orloff, 870 A.2d 499, 507 (Del. 2005).

[151] Dubroff v. Wren Holdings, LLC, C.A. Nos. 3940, 6017, 2011 WL 5137175, at *7 (Del. Ch. Oct. 28, 2011) (quoting Dubroff v. Wren Holdings, LLC, C.A. No. 3940, 2009 WL 1478697, at *3 (Del. Ch. May 22, 2009))

[152] Corwin v. KKR Fin. Holdings LLC, 125 A.3d 304, 307 (Del. 2015).

therefore possible that if large index funds exercised a decisive influence on major carbon emitters and obtained from them an expensive emissions reduction, this strategy would be scrutinized under the controlling shareholder doctrine. Such a prospect will become more and more realistic as the voting power of the index funds grows.[154]

To be sure, the controlling shareholder doctrine is beset with inconsistencies.[155] In particular, Delaware case law distinguishes between a group of shareholders connected in some legally relevant way and a group of unconnected shareholders with converging interests.[156] Strictly speaking, the former is a controlling group whereas the latter is a group of independent shareholders, each acting in their own self-interest, which happens to coincide. A group of large asset managers acting contrary to the interest of the corporation to maximize the value their portfolios would probably fall in the second category and, under current Delaware law, would probably not be considered controlling shareholders.[157] However, the precise criteria to distinguish the two categories are not crystal clear.[158]

In any event, if portfolio primacy were to prove consequential for corporate decision making, the doctrinal landscape might change as a result. The excessive voting power of the Big Three is already attracting concern and scrutiny from several points of view.[159] If the Big Three started to implement a systematic strategy of portfolio

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[153] Basho Techs. Holdco B, LLC v. Georgetown Basho Invs., LLC, No. CV 11802-VCL, 2018 WL 3326693, at *27 (Del. Ch. July 6, 2018), *aff'd sub nom.* Davenport v. Basho Techs. Holdco B, LLC, 221 A.3d 100 (Del. 2019).

[154] *See supra* notes 41-42, and accompanying text.

[155] Lipton, *After Corwin*, *supra* note 149, at 1997-2005.

[156] *Id.* at 1997-1998. *See also* In re PNB Holding Co. Shareholders Litigation, No. CIV.A. 28-N, 2006 WL 2403999 (Del. Ch. Aug. 18, 2006).

[157] *See, e.g.*, In re Crimson Expl. Inc. Stockholder Litig., No. CIV.A. 8541-VCP, 2014 WL 5449419, at *15 (Del. Ch. Oct. 24, 2014):

> Under Delaware law, in appropriate circumstances, multiple stockholders together can constitute a control group [when they are] connected in some legally significant way—such as by contract, common ownership, agreement, or other arrangement—to work together toward a shared goal. The law does not require a formal written agreement, but there must be some indication of an actual agreement. Plaintiffs must allege more than mere concurrence of self-interest among certain stockholders to state a claim based on the existence of a control group (quotations omitted).

[158] Lipton, *After Corwin*, *supra* note 149, at 1998 ("It seems, then, that sometimes concurrent interests in the same transaction are a hallmark of control, and sometimes they are not").

[159] *See* sources cited *supra* notes 42-45.

value maximization to the detriment of individual companies, it is unlikely that Delaware courts would simply refer to a doctrine that was designed for a very different scenario, and it is not implausible that legislatures or regulators might intervene to regulate the phenomenon.

C. Between Corporate Directors and the Individual Company

A further type of fiduciary conflict concerns the duty of loyalty that directors and officers of the company owe to the corporation and its shareholders.[160] Does the duty of loyalty allow directors and officers to make a decision (e.g., an emissions reduction) that favors one group of shareholders (broadly diversified investors) but harms another group (undiversified shareholders)? Also in this case, the answer seems straightforward: "the best interest of the corporation and its shareholders takes precedence over any interest possessed by a director, officer or controlling shareholder and not shared by the stockholders generally."[161] Furthermore, the duty of loyalty requires maximization of the long-term firm value,[162] whereas the scenario under consideration would entail a loss for the company: the benefit for the index funds would derive from investments of these funds in other companies, not from the investment in the company that the directors and officers making this decision are tasked to manage.

Advocates of portfolio primacy have observed that, under the business judgment rule, courts must abstain from second-guessing managerial decisions that seem reasonable on their face. Therefore, in order to escape judicial review, corporate managers can simply

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[160] Whether such a duty is owed only to the shareholders or also to other corporate stakeholders is the subject of a time-honored debate in corporate law that periodically resurfaces and is currently at the center of the academic and policy discourse. *See, e.g.*, Lucian A. Bebchuk & Roberto Tallarita, *The Illusory Promise of Stakeholder Governance*, 106 CORNELL L. REV. 91 (2020); Edward B. Rock, *For Whom Is the Corporation Managed in 2020? The Debate over Corporate Purpose*, 76 BUS. LAW. 363 (2021); Leo E. Strine, Jr., *Restoration: The Role Stakeholder Governance Must Play in Recreating a Fair and Sustainable American Economy. A Reply to Professor Rock*, 76 BUS. LAW. 397 (2021); Jill E. Fisch & Steven Davidoff Solomon, *Should Corporations Have a Purpose?* 99 TEXAS L. REV. 1309 (2021); Stavros Gadinis & Amelia Miazad, *Corporate Law and Social Risk*, 73 VAND. L. REV. 1401 (2020). The topic is, to some extent, connected to the question addressed in this Article. Indeed, portfolio primacy predicts that index funds will push companies to consider systematic social risks such as climate change (i.e., stakeholder interests) rather than just shareholder value. However, the two problems are fundamentally distinct, and a discussion of the stakeholderism debate is beyond the scope of this Article.

[161] Cede & Co. v. Technicolor, Inc., 634 A.2d 345, 361 (Del. 1993), *decision modified on reargument*, 636 A.2d 956 (Del. 1994).

[162] In re Trados Inc. S'holder Litig., 73 A.3d 17, 37 (Del. Ch. 2013).

offer some reasonably sounding business justification for the emissions reduction.[163] While this might be true under certain circumstances, it would become less so in a scenario in which portfolio primacy turned into the prevailing *modus operandi* of large asset managers. If corporate managers systematically chose value-decreasing strategies to cater to the portfolio-level interests of the most influential shareholders, courts would be hard pressed to condone this phenomenon and might very well be compelled to stop it.

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This Part has shown that even if index fund portfolios had strong incentives to mitigate climate externalities, climate stewardship would create serious fiduciary conflicts on multiple levels; therefore, if index fund managers undertook the role of climate stewardship would face economic and legal constraints and, perhaps more importantly, a potential policy backlash. Take together, these factors significantly reduce the likelihood that asset managers embrace portfolio-based climate stewardship in a decisive and effective way.

V. INSULATION FROM INDEX FUND STEWARDSHIP

This Part examines the fourth and final limit of portfolio primacy. Even if index fund managers did engage companies on climate risk in a serious and systematic way, their influence would be limited on a global scale. It shows that most firms around the world are privately owned (Section V.A), owned by state governments (Section V.B), or with a controlling or influential shareholder (Section V.C). These firms are partially or totally shielded from the influence of index funds and therefore unlikely to sacrifice profits to mitigate societal climate risk.

A. Private Companies

The policy conversation on universal owners and climate stewardship focuses almost exclusively on funds that invest in public equities. While the Big Three and other index fund managers also manage funds that invest in private companies, the size of their private investments is very small compared to their

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[163] *See* Condon, *supra* note 32, at 59.

investments in public equities.[164] Yet, public companies represent only a subset of the entire economy. This is particularly true for developing and emerging economies but is increasingly true in the United States as well.[165]

Climate stewards are supposed to pressure firms to reduce their carbon emissions and, in doing so, mitigate global climate risk. But if private firms represent an increasingly larger part of the economy, the sphere of influence of climate stewardship is destined to get smaller and less relevant over time.

Furthermore, companies that are currently public may well decide to go private or to sell their most carbon-intensive assets to private buyers, precisely because of the costs they would bear as a public company subject to climate stewardship. Suppose that large index fund managers effectively started to pressure portfolio companies into decarbonization at the expense of the companies' individual profits. The companies that would suffer the most under this regime—that is, those that produce the most externalities—would have strong incentives to escape the oversight of climate stewards by staying private or going private, or by selling assets to private buyers. As a result, an increasing fraction of climate externalities would be produced by private companies, and the efficacy of climate stewardship would rapidly decrease over time.

Indeed, under a functioning portfolio primacy regime, a major emitter would be worth more outside an index or as a private company than as a public company with a large presence of diversified asset managers in its stock. In the long run, carbon-intensive assets would be systematically pushed out of the public market, thus defying the very purpose of climate stewardship.

B. State-Owned Companies

A similar issue concerns the many oil and gas companies owned or controlled by governments, regardless of whether their stock is publicly traded. As with private companies owned by individuals or private businesses, these state-owned companies—which are major contributors to climate risk—are and will remain out of the reach of climate stewardship.

Consider, as an illustration, a recent list of the world's major

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[164] *See, e.g.*, Sungjoung Kwon, Michelle Lowry, & Yiming Qian, *Mutual Fund Investments in Private Firms*, 136 J. FIN. ECON. 407 (2020).

[165] *See supra* Section III.C.

carbon emitters circulated in the media.[166] Several of the companies in this list—including National Iranian Oil Co., Coal India, Petróleos de Venezuela S.A., and Abu Dhabi National Oil Co.— are owned by national governments. Even some of the publicly listed companies in the list—such as Saudi Aramco and PetroChina—are effectively controlled by state governments.

Moreover, local governments, state-owned enterprises, and sovereign wealth funds control 20% of the world's listed companies and 10% of the Fortune 2000 largest companies.[167] It is unrealistic to think that index fund managers could influence the climate policies of the governments of Iran, India, or China. In fact, it is a well-known fact in the corporate governance literature that institutional investors are less likely to engage with state-owned enterprises.[168]

It is possible, of course, that a government might decide to embrace a climate mitigation strategy as a public policy and that it might use state-owned firms as tools to implement such a strategy. But in that case, the government shareholder would be the driver of the decision—and for political reasons, not because of the climate stewardship of index funds. Therefore, in addition to private companies, another vast subset of global firms (and of major carbon emitters) would be effectively shielded from the influence of climate stewards.

C. Controlled Companies

Another subset of companies that would be insulated from climate stewardship is publicly traded controlled companies. This is a large and important group of firms. Indeed, most public companies around the world are controlled companies. According to a recent study of the 10,000 largest publicly listed companies in the world, in 29% of the companies the largest shareholder owns more than 50% of the stock; and in 21% of the companies, the largest shareholder owns between 30% and 49% of the stock.[169]

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[166] Matthew Taylor & Jonathan Watts, *Revealed: The 20 Firms Behind a Third of All Carbon Emissions*, THE GUARDIAN, Oct. 9, 2019, https://www.theguardian.com/environment/2019/oct/09/revealed-20-firms-third-carbon-emissions.

[167] Ernest W. K. Lim, *Concentrated Ownership, State-Owned Enterprises and Corporate Governance*, 41 Oxford J. L. Stud. 663, 664 (2021).

[168] *Id.* at 685-688.

[169] Adriana De La Cruz, Alejandra Medina, & Yun Tang, *Owners of the World's Listed Companies*, OECD CAPITAL MARKET SERIES (2019) at 17.

Furthermore, in 49% of the companies, the three largest shareholders jointly own more than 50% of the stock.[170]

Even in the United States, in which dispersed ownership is by far the dominant ownership structure, controlled companies have been growing in number, and many of the largest public corporations have a controlling shareholder. Indeed, as Table 5 shows, in seven of the twenty largest companies in the S&P 500, the shareholder with the largest voting power is not one of the largest asset managers, but the founder of the company or another large controller or blockholder. Furthermore, in three other companies, even if the largest shareholder is Fidelity or Vanguard, the founder-CEO has a significant individual equity stake, corresponding to most or almost all of his personal wealth.[171]

Therefore, in ten of the twenty largest S&P 500 companies, there is an important shareholder who should be persuaded by the Big Three to abandon the traditional paradigm of firm value maximization. Note that the 20 companies listed in Table 5 account for about 39% of the portfolio of the Big Three's S&P 500 funds, and almost half of this fraction is represented by companies with a private controller or blockholder.[172]

In the presence of a controlling shareholder, or even of a significant blockholder, the influence of institutional investors is limited, as the controller/blockholder can unilaterally appoint the board of directors or, at the very least, heavily influence its composition and key business strategies. A shareholder with a significant equity stake in a company would be very reluctant, based on purely financial reasons, to sacrifice the value of the company in order to reduce climate externalities. Even if, *in arguendo*, index fund managers had strong incentives to propose a portfolio primacy strategy, due to their maximal diversification, the controller/blockholder, who is by definition a concentrated owner, would likely oppose and successfully block its implementation.[173]

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[170] *Id.*

[171] Dhammika Dharmapala & Vikramaditya S. Khanna, *Controlling Externalities: Ownership Structure and Cross-Firm Externalities*, EUR. CORPORATE GOV. INST. LAW WORKING PAPER No. 603/2021 (Aug. 2021) at 38, https://ssrn.com/abstract=3904316.

[172] Based on data collected from FactSet in November 2021, the 20 companies listed in Table 5 account for 38.8% of Vanguard 500 ETF, 38.8% of iShares Core S&P 500 ETF, and 38.9% of SPDR Portfolio S&P 500 ETF. The ten companies with a founder-controller or blockholder (or other private controller/blockholder) account for 18.6% of Vanguard 500 ETF, 18.7% of iShares Core S&P 500 ETF, and 18.7% of SPDR Portfolio S&P 500 ETF.

[173] *See generally* Dharmapala & Khanna, *supra* note 171.. *See also* Alperen Afşin Gözlügöl, *Controlling Shareholders: Missing Link in the Sustainability Debate?*, Oxford

Table 2. Main Shareholder of the 20 Largest S&P 500 Companies

Company	*Main Shareholder*	*Voting Power*
Microsoft	Vanguard	8.1%
Apple	Vanguard	7.8%
Amazon	Bezos	14.0%
Alphabet	Brin & Page	51.6%
Meta Platforms	Zuckerberg	57.7%
Tesla	Musk	23.1%
Nvidia	Vanguard*	7.7%
Berkshire Hathaway	Buffett	32.1%
JPMorgan Chase	Vanguard	8.0%
UnitedHealth	Vanguard	7.9%
Johnson & Johnson	Vanguard	8.4%
Home Depot	Vanguard	8.3%
Visa	Vanguard	8.7%
Procter & Gamble	Vanguard	9.0%
Bank of America	Buffett	12.0%
Adobe	Vanguard	8.0%
Walt Disney	Vanguard	7.4%
Mastercard	Mastercard Foundation	11.0%
Salesforce	Fidelity**	8.3%
Netflix	Vanguard***	7.5%

* Founder-CEO Huang owns 3.65% of common stock. ** Founder-CEO Benioff owns 3.5% of common stock. *** Founder-CEO Hastings owns 1.8% of common stock.

The table reports the shareholder with the largest voting power in each of the 20 largest companies included in the S&P 500 index. Data for the market capitalization of S&P 500 companies were collected from FactSet on November 11, 2021. Data for largest shareholders and their voting powers were collected from each company's 2021 proxy statement, as filed on EDGAR.

In theory, a diversified controller (for example, a dual-class controller who has controlling voting power but only a small fraction of the company's common stock) might be inclined to support a portfolio-driven climate strategy.[174] In practice, however, dual-class controllers fail to diversify their wealth.[175] Therefore,

Business Law Blog, July 16, 2021, https://www.law.ox.ac.uk/business-law-blog/blog/2021/07/controllingshareholders-missing-link-sustainability-debate

[174] Dharmapala & Khanna, *supra* note 173, at 19-22.

[175] *Id.* at 38.

even in dual-class companies, controllers are likely to resist a portfolio primacy approach.[176]

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This Part has shown that despite the significant shareholder power amassed by the Big Three and other large index fund managers, a substantial and perhaps predominant fraction of firms is partially or totally insulated from the influence of climate stewardship, whether because these firms are or can become private, are owned by state governments, or are controlled or significantly influenced by private controllers or blockholders. Taken together, these companies plausibly represent the vast majority of global firms and produce a significant fraction, and possibly the majority, of global climate externalities.

Such a crucial limitation shows that even if index fund managers did engage in aggressive climate stewardship, the practical impact of this approach on a large number of firms and carbon emitters would be significantly weakened by the companies' ownership and control structure.

VI. SOME POLICY IMPLICATIONS

This Article has shown that the promise of portfolio primacy for climate mitigation is seriously weakened by four crucial limits and therefore some of the optimism found in the academic literature and in the policy discourse with respect to the promise of index fund stewardship for climate risk seems grossly exaggerated. Such an important recognition has significant implications for current policy decisions.

As discussed in Section I.A.2, regulators can use different tools to address climate externalities, including Pigouvian taxes, cap-and-trade systems, abatement subsidies, information-based policies, and traditional command-and-control regulation (such as standard setting or emissions ceilings). Each of these tools presents advantages and disadvantages and raises complex legal and economic questions.[177] However, growing expectations that portfolio primacy would force companies to internalize emissions'

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[176] Consistent with this view, although on different theoretical bases, Luca Enriques and Alessandro Romano argue that the adoption of a dual-class structure is a signal by the controller that the company will be managed with a shareholder value maximization approach rather than with a portfolio value maximization approach. Luca Enriques & Alessandro Romano, *Rewiring Corporate Law for an Interconnected World*, 64 ARIZ. L. REV. (forthcoming 2021).

[177] *See* sources cited *supra* notes 26-28.

externalities and therefore to reduce climate risk might undermine support for much-needed regulatory interventions.

For example, public opinion might accept an exceedingly optimistic version of portfolio primacy and become persuaded that the stock market on its own will be able to reduce climate externalities to a significant degree. This phenomenon might in turn reduce political support for more stringent regulation. Decarbonization will likely be costly for most people, with varying impacts on their habits,[178] and democratic support for effective decarbonization policies is reduced by positive intergenerational externalities (that is, the fact that most of the benefits of decarbonization will be enjoyed by future generations). Therefore, portfolio primacy's flawed promise of an internalization mechanism might become a political argument to justify weaker support for painful but effective measures.

If portfolio primacy does not have a meaningful effect on climate stewardship, then what can explain the public statements and concrete engagement actions of the Big Three and other large asset managers in favor of climate risk disclosure and emissions reductions?[179] One reason, as discussed in Section II.A, is the concern of investment managers for regulatory and transition risks. If market participants anticipate a transition toward a low-carbon economy due to regulatory intervention, technological changes, or changes in social preferences, they have good economic reason to pressure companies into preparing for such a transition.

Another reason might be the concern of fund investors for climate issues, which creates a demand for environmentally conscious mutual funds and thus an incentive for investment managers to signal their commitment to climate mitigation. A further driver might be the effect of moral and social norms on investment managers, either because they hold genuine beliefs that favor environmentally friendly behaviors or because they are forced to act in that way as a result of image concerns and social pressure.[180] Other reasons, of course, might be less noble: some

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[178] *See, e.g.*, Michael P. Vandenbergh & Paul C. Stern, *The Role of Individual Household Behavior in Decarbonization*, 47 ENVTL. L. REP. NEWS & ANALYSIS 10941 (2017).

[179] For some anecdotal evidence, see, for example, Condon, *supra* note 32, at 18-25. *See also* José Azar, Miguel Duro, Igor Kadach, & Gaizka Ormazabal, *The Big Three and Corporate Carbon Emissions around the World*, J. FIN. ECON. (forthcoming 2021) (preprint at 4).

[180] *See supra* note 31, and accompanying text. Interestingly, a study by Alexander Dyck, Karl V. Lins, Lukas Roth, and Hannes F. Wagner on the effect of institutional

asset managers, for example, might simply use the promise of climate stewardship as a marketing tool or as a way to curry personal favor with elected officials or policymakers.

Regulatory, technological, and moral or social drivers ultimately rely on government intervention and social or cultural changes rather than on financial incentives. In fact, financial incentives are, at best, the mere transmission mechanism through which regulatory interventions or social and moral norms affect investment and corporate decisions. In other words, financial incentives are the proximate cause, but not the ultimate driver, of climate stewardship. Therefore, to improve the overall effects of climate stewardship, policymakers should prioritize regulatory and social pressure.

It is worth noting, however, that some innovations in capital market policy could facilitate the connection between regulatory and social pressure on the one hand and investment and corporate decisions on the other. One of these policy innovations could be the mandatory disclosure of climate risk for public companies. As discussed in Section II.A, it is not clear whether stock prices currently reflect climate risks, and part of the reason for this uncertainty is that granular information on company-level risks is not easily available. Enhanced disclosure of exposure to climate change risk and transition risk would help investors make better-informed decisions on climate risk at the company level. Furthermore, more accurate price reactions to the company's exposure to policy risk might incentivize management to accelerate the transition to a low-carbon economy.

Another corporate governance innovation that could amplify the effect of external pressure on corporate climate strategies would be a revision of the Securities and Exchange Commission (SEC) shareholder proposal rule in order to strengthen the power of shareholders. In 2020, the SEC amended Rule 14a-8, which regulates shareholder proposals, to introduce more restrictive requirements for shareholder-proponents.[181] This controversial

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investors' engagement in certain corporate environmental metrics finds that social and cultural norms are a decisive driver of this phenomenon. In particular, European institutional investors—based in countries with stronger social and cultural norms with respect to environmental protection and climate mitigation—affect companies' environmental scores, while U.S. investors do not. Alexander Dyck, Karl V. Lins, Lukas Roth, & Hannes F. Wagner, *Do Institutional Investors Drive Corporate Social Responsibility? International Evidence*, 131 J. FIN. ECON. 693, 695, 705-710 (2019).

[181] Procedural Requirements & Resubmission Thresholds Under Exch. Act Rule 14a-8, Exchange Act Release No. 89964, 2020 WL 5763382 (Sept. 23, 2020).

reform restricts access to the shareholder proposal mechanism and is expected to reduce the number of proposals.[182] In particular, the amendments target certain specific characteristics of shareholder activism on political, social, and environmental issues,[183] which in recent years has been receiving growing support from shareholders.[184]

Commentators expect that under the new administration the SEC might revise the 2020 amendments to the shareholder proposal rule.[185] The analysis presented in this Article suggests that a revision of the shareholder proposal rule in a direction more favorable for environmental shareholder activists would be socially desirable for at least four reasons.

First, proposals by experts on climate issues provide information on climate risk that might be otherwise not available to other shareholders. Given the scarce availability of climate risk information, as discussed in Section II.A, this function of environmental shareholder proposals is particularly valuable. Second, given the low propensity of index fund managers to invest resources on climate stewardship,[186] and the general "rational apathy" of smaller shareholders, climate activists are the only players with strong enough incentives to monitor managerial discretion on corporate externalities.[187] Third, given the role played

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[182] *See, e.g.,* Jay Clayton, Chairman, U.S. Sec. & Exch. Comm, *Statement on Modernizing the Shareholder Proposal Framework for the Benefit of All Shareholders*, HARV. L. SCH. F. ON CORP. GOVERNANCE (Sept. 24, 2020), https://corpgov.law.harvard.edu/2020/09/24/statement-by-chairman-clayton-on-modernizing-the-shareholder-proposal-framework-for-the-benefit-of-all-shareholders/ (motivating Chairman Clayton's support for the new rule); Caroline Crenshaw, Commissioner, U.S. Sec. & Exch. Comm, *Statement on Procedural Requirements and Resubmission Thresholds under Rule 14a-8*, HARV. L. SCH. F. ON CORP. GOVERNANCE (Sept. 25, 2020), https://corpgov.law.harvard.edu/2020/09/25/statement-by-commissioner-crenshaw-on-procedural-requirements-and-resubmission-thresholds-under-rule-14a-8/ (explaining Commissioner Crenshaw's dissent on the new rule).

[183] *See* Tallarita, *supra* note 29, Section III.A.2.

[184] *Id.* at Section I.B.

[185] *See, e.g.*, Suzanne Smetana, *ESG and the Biden Presidency*, HARV. L. SCH. F. ON CORP. GOVERNANCE (Feb. 19, 2021), https://corpgov.law.harvard.edu/2021/02/19/esg-and-the-biden-presidency/. Also, in March 2021, the acting chair of the SEC, Allison Herren Lee, announced having "asked the staff to develop proposals for revising Commission or staff guidance on the no-action process, and potentially revising Rule 14a-8 itself." Allison Herren Lee, *Speech by Acting Chair Lee on Meeting Investor Demand for Climate and ESG Information at the SEC*, HARV. L. SCH. F. ON CORP. GOVERNANCE (Mar. 16, 2021), https://corpgov.law.harvard.edu/2021/03/16/speech-by-acting-chair-lee-on-meeting-investor-demand-for-climate-and-esg-information-at-the-sec/.

[186] *See* sources cited *supra* note 50, and accompanying text.

[187] Tallarita, *supra* note 29, at Section II.B.

by moral and social norms on climate decisions, climate activism is valuable because it increases social pressure on investors and companies. Fourth, shareholder proposals are an effective tool to measure the extent to which the climate commitments of the Big Three and other large asset managers are genuine, and they therefore reduce the confounding effect of public relations strategies and greenwashing. It might not be a coincidence, indeed, that the Big Three did not oppose the recent limitations to shareholder proposals.[188]

CONCLUSION

Climate change is one of the most pressing problems for our society. It is the product of a collective action problem: individuals and firms do not have incentives to produce a socially desirable level of carbon emissions. Portfolio primacy theory claims that large asset managers, particularly index fund managers, can solve this collective action problem by internalizing climate risk within their investment portfolios. This Article has shown that the promise of this theory is grossly overstated and should not be relied on by policymakers to address climate risk. The implications of such recognition are significant for both climate policy and corporate governance. Climate policy should rely on regulatory tools—carbon taxes, cap-and-trade systems, and prescriptive regulation—and social pressure rather than on the portfolio incentives of index funds. Corporate governance can be used as a transmission mechanism for climate policy but altering company-level incentives is a more promising route than focusing on portfolio-level incentives.

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[188] Ann M. Lipton, *ESG Investing, or, If You Can't Beat 'Em, Join 'Em* (unpublished manuscript) (July 2021), manuscript at 10, available at https://ssrn.com/abstract=3715935 (reporting that Vanguard and the Investment Company Institute, of which the Big Three are influential members, supported the amendments).