

Controlling Shareholders and Sustainable Corporate Governance: The Role of Dual- Class Shares

Law Working Paper N° 700/2023

April 2023

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I wish to thank Luca Enriques, Zohar Goshen, Ehud Kamar, Kobi Kastiel, Roy Shapira, and participants in the Bank of Italy seminar of March 31, 2023, for valuable comments on previous versions of this article. I also thank Melek Redzheb for research assistance. All errors are mine.

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CONTROLLING SHAREHOLDERS AND SUSTAINABLE CORPORATE GOVERNANCE: THE ROLE OF DUAL-CLASS SHARES

Alessio M. Paces

Amsterdam Law School Legal Studies Research Paper No. 2023-16

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Abstract

If securities regulation curbs greenwashing, institutional shareholders catering to climate-conscious beneficiaries are profit-seeking, Socially Responsible (SR) investors with a mandate to ameliorate climate change. SR investors can contribute to sustainable corporate governance making portfolio companies abate CO₂. However, they cannot commit to low-carbon innovation because that is fundamentally uncertain, short-term unprofitable, and institutional investors do not have the competence and the incentives to identify breakthroughs. To commit to low-carbon innovation, institutional investors should cooperate with controlling shareholders and tie their hands with dual-class shares. Controlling shareholders can contribute their vision to low-carbon innovation while SR institutional investors allow them to scale this vision. The advantage of dual-class shares is to relax the financial conditions for control. SR investors can use this advantage to outcompete financial investors offering controlling shareholders a higher wedge between voting rights and security benefits and the possibility to cash-in higher idiosyncratic private benefits of control, if successful, conditional on engaging in low-carbon innovation. Having at stake welfare-increasing private benefits of control, and all or most of their wealth, controlling shareholders can be incentivized to discover low-carbon breakthroughs and to acknowledge failure to do so. Corporate law should facilitate contracting between controlling shareholders and SR investors to support these incentives. Contingent transfer sunsets should allow cashing in of control premiums only if the low-carbon innovations succeed. Divestment sunsets and other contractual safeguards should prevent controlling shareholders from diluting their commitment to the company, without undermining equity capital raising. Dual-class recapitalizations should be allowed with a Majority-of-Minority vote.

Keywords: corporate social responsibility, innovation, climate change, Paris agreement, institutional investors, entrepreneurship, private benefits of control, dual-class shares, wedge, commitment, sunsets

JEL Classifications: G34, K22

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Abstract

If securities regulation curbs greenwashing, institutional shareholders catering to climate-conscious beneficiaries are profit-seeking, Socially Responsible (SR) investors with a mandate to ameliorate climate change. SR investors can contribute to sustainable corporate governance making portfolio companies abate CO₂. However, they cannot commit to low-carbon innovation because that is fundamentally uncertain, short-term unprofitable, and institutional investors do not have the competence and the incentives to identify breakthroughs. To commit to low-carbon innovation, institutional investors should cooperate with controlling shareholders and tie their hands with dual-class shares.

Controlling shareholders can contribute their vision to low-carbon innovation while SR institutional investors allow them to scale this vision. The advantage of dual-class shares is to relax the financial conditions for control. SR investors can use this advantage to outcompete financial investors offering controlling shareholders a higher wedge between voting rights and security benefits and the possibility to cash-in higher idiosyncratic private benefits of control, if successful, conditional on engaging in low-carbon innovation.

Having at stake welfare-increasing private benefits of control, and all or most of their wealth, controlling shareholders can be incentivized to discover low-carbon breakthroughs and to acknowledge failure to do so. Corporate law should facilitate contracting between controlling shareholders and SR investors to support these incentives. Contingent transfer sunsets should allow cashing in of control premiums only if the low-carbon innovations succeed. Divestment sunsets and other contractual safeguards should prevent controlling shareholders from diluting their commitment to the company, without undermining equity capital raising. Dual-class recapitalizations should be allowed with a Majority-of-Minority vote.

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1. Introduction

Berkshire Hathaway is a dual-class shares publicly held company. It has two classes of outstanding shares, a class A with high voting rights and a class B with low voting rights.

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Warren Buffett is Berkshire Hathaway's controlling shareholder: by holding primarily class A shares, he has 32.1% of Voting Rights (VR) but only 16.2% of the economic interest (Security Benefits, SB).¹ Warren Buffett's estimated net worth is about \$100 billion, 98% of which is invested in Berkshire Hathaway.² Institutional investors own the majority of Berkshire Hathaway's capital: Blackrock, Vanguard, and State Street, the 'Big 3' institutional investors, hold together more than 21% of Berkshire Hathaway's SB, which is higher than Buffett's stake. However, because they hold primarily class B shares, their voting rights are negligible. Warren Buffett and his team have decided to acquire a controlling stake in Occidental Petroleum.³ Occidental recently stepped up its commitment to building 100 Direct Air Capture plants by 2035, portraying itself as a global market leader in the development of Carbon Storage and Capture (CCS) – potentially a key technology to address climate change.⁴

On the other side of the Atlantic, another controlling shareholder – the Porsche-Piëch family – has pulled off the largest European IPO in a decade.⁵ Porsche AG raised €9.4 billion albeit offering only 12.5% of the capital as nonvoting shares. Porsche is a dual-class shares company spun off from Volkswagen, which remains the controlling shareholder (75% of voting rights) and is in turn controlled by the Porsche-Piëch family. With this IPO, not only did the controlling family increase equity funding (of Volkswagen), but also the direct control of Porsche.⁶ After the IPO, Porsche restated its commitment to producing 80% as Electric Vehicles (EVs) by 2030, which is higher than the already ambitious electrification target of Volkswagen.⁷ Porsche is portraying itself as a global market leader in EVs, another

¹ Berkshire Hathaway Inc., Proxy Statement (Form DEF 14A) (May 1, 2021).

² Warren Buffett, *An Owner's Manual*, OWNER-RELATED BUSINESS PRINCIPLES, <https://www.berkshirehathaway.com/ownman.pdf> (last updated Mar. 2, 2015).

³ Yun Li, *Warren Buffett's Berkshire Hathaway Buys More Occidental Petroleum Shares*, CNBC, Mar. 7, 2023, <https://www.cnbc.com/2023/03/07/warren-buffetts-berkshire-hathaway-buys-more-occidental-petroleum-shares.html>.

⁴ Sabrina Valle & Ruhi Soni, *Occidental's Project to Capture CO2 Takes a Hit from Inflation*, REUTERS, Nov. 10, 2022, <https://www.reuters.com/business/energy/occidental-raises-costs-direct-air-capture-project-due-inflation-2022-11-09/>.

⁵ Alexandra White & Peter Campbell, *Investors Rush to Snap Up Shares Ahead of Porsche IPO*, FINANCIAL TIMES, Sep. 26, 2022, <https://www.ft.com/content/7e59d4a6-0c01-49b8-9cad-62da3b50fb14>.

⁶ Although Volkswagen sold Porsche shares and half of the proceeds were returned to Volkswagen's shareholders, the Porsche-Piëch family put back 12.5% of Porsche's capital (25% of voting shares), allowing them to decide on future equity issuances by Porsche AG without being vetoed by Volkswagen's minority shareholder, the Lower State of Saxony. Under German corporate law, a shareholder with 25% of voting right can veto capital restructuring. The so-called Volkswagen law extends this privilege to the Lower State of Saxony, qua holder of 20% of VR with 11.8% of SB in Volkswagen AG. See Carsten Gerner-Beuerle, *Shareholders between the Market and the State: The VW Law and Other Interventions in the Market Economy*, 49 COMMON MARK. LAW REV. 97, 102 (2012). See also *Shareholder Structure*, VOLKSWAGENAG.COM, <https://www.volkswagenag.com/en/InvestorRelations/shares/shareholder-structure.html> (last visited Apr. 4, 2023) and Olaf Storbeck, *Is the VW Structure too Complex for the Good of Germany?*, FINANCIAL TIMES, Oct. 13, 2022, <https://www.ft.com/content/4d8d9254-6777-4f8f-b395-7d4bb2c8704a>.

⁷ Compare Advertisement, *Porsche Enters a New Era with Successful IPO*, PORSCHE NEWSROOM, Sep. 29, 2022, <https://newsroom.porsche.com/en/2022/company/porsche-ag-initial-public-offering-p911-frankfurt-stock-exchange-29830.html>, with Press Release, *World Premiere of the ID. 2all⁰¹ Concept: The Electric Car From Volkswagen Costing Less Than 25,000 Euros*, VOLKSWAGEN NEWSROOM, Mar. 3, 2023 <https://www.volkswagen-newsroom.com/en/press-releases/world-premiere-of-the-id-2all-concept-the-electric-car-from-volkswagen-costing-less-than-25000-euros-15625> (EV only 80% of sales in Europe).

potential decarbonization technology. As in the previous example, institutional investors purchased significant stakes in Porsche without any chance to control it.⁸

These examples reveal the importance of controlling shareholders in sustainable corporate governance. In this article, I look at sustainability as an efficient decarbonization path to cope with climate change. Apart from the fact that CO₂ in the atmosphere must be reduced, little is known about how to transition to a low-carbon world. This transition is fundamentally uncertain.⁹ Controlling shareholders, such as Warren Buffet and the Porsche-Piëch family, can be more daring than managers in picking innovations to deal with this uncertainty. Controllers can be bold, bet on innovative technologies, and persevere until they are proved right or wrong. Having undisputed control, controlling shareholders do not have to abandon their vision even though the stock market undervalues the company. However, because controlling shareholders are wealth constrained, they need the cooperation of outside investors to scale their visionary project.¹⁰ Yet, raising outside equity dilutes the controlling shareholders' voting power and may undermine their vision. Dual-class shares can solve this problem.

As revealed by the examples, institutional investors invest in dual-class companies albeit knowing that they cannot, even collectively, outvote a controlling shareholder.¹¹ Institutional investors are, too, playing a prominent role in sustainable corporate governance, prodding companies to reduce CO₂. In previous work, I argued that institutional investor engagement with portfolio companies holds considerable promise of reducing the negative externalities of CO₂, particularly in jurisdictions where securities regulation curbs greenwashing.¹² However, institutional investors can only put pressure on listed companies to become more sustainable; they cannot identify the technologies to transition to a low-carbon world. Institutional investors should rather pick controlling shareholders with a vision on low-carbon technologies.

In this article, I argue that controlling shareholders and institutional investors must cooperate to make corporate governance sustainable. The former should contribute their vision; the latter should contribute finance to scale the vision and screen its quality. This cooperation can be supported by corporate law enabling efficient contracting on dual-class shares.

⁸ Victoria Waldersee, *Investors Mixed as Porsche Seeks Price Tag of Up to \$75 Billion*, REUTERS, Sep. 20, 2022, <https://www.reuters.com/business/autos-transportation/porsche-ag-valuation-sends-volkswagen-shares-3-higher-premarket-trade-2022-09-19/>. One of the key investors, Norway sovereign fund, commented that although they usually invest where they have voting rights, the fund made an exception for Porsche because there are "other ways to exert influence." See *infra* note 134 and accompanying text.

⁹ The distinction between risk, which can be quantified by a probability distribution, and uncertainty, which cannot, is based on FRANK H. KNIGHT, RISK, UNCERTAINTY AND PROFIT, 20-21 (1921).

¹⁰ Lindsay Baran et al., *Dual-Class Share Structure and Innovation*, 46 J. FIN. RES. 169 (2023).

¹¹ There has been public outcry about dual-class shares, particularly in the U.S. See Jill E. Fisch & Steven Davidoff Salomon, *The Problem of Sunsets*, 99 B.U. L. REV. 1057, 1075-77 (2019). Arguably, institutional investors that complain about dual-class companies still invest in them to avoid missing the chance to benefit from the controller's vision.

¹² Alessio M. Paces, *Will the EU Taxonomy Regulation Foster Sustainable Corporate Governance?*, 13 SUSTAINABILITY 12316 (2021). As in the previous article, I focus on climate change as example of sustainability because, in this context, negative externalities and their reduction can be measured, which is helpful for investor accountability to their beneficiaries and the controllers' commitment to CO₂ abatement.

I frame the analysis of corporate governance differently from the mainstream agency cost approach.¹³ I consider managers and controlling shareholders as entrepreneurs with partial ownership.¹⁴ Entrepreneurship is comparatively more important than agency cost when a company faces fundamental uncertainty, in a Knightian sense, which implies that the market assessment of risk and return is imperfect.¹⁵ Uncertainty is a matter of degree. To deal with the uncertainty of climate change, companies can either discover breakthrough technologies or timely adapt to breakthroughs developed by others. Entrepreneurs are good agents of shareholders and other financiers when they innovate timely and make companies prosper in a low-carbon future.¹⁶

Not all companies pursue breakthroughs. Most companies innovate by adapting to new technologies. When they are listed, these companies are usually run by professional managers who are sensitive to the stock price because falling stock prices reduce their compensation and may lead to replacement. This results in managers' short-term orientation,¹⁷ which is often criticized, but can be efficient because companies under short-term pressure adapt more quickly to changes.¹⁸ Short-termism and long-termism are, in fact, different forms of entrepreneurship.¹⁹ Short-termism, however, is incompatible with breakthroughs because these are fundamentally uncertain and managers risk being replaced before the uncertainty is resolved.

Controlling shareholders are better positioned than managers to engage in low-carbon breakthroughs. Dual-class shares allow controllers to protect their vision from short-term pressure also when they need outside equity to scale their vision. This function of dual-class shares is potentially relevant not only for IPO companies, but also for already listed companies needing to raise additional equity.²⁰ For instance, as the automotive business is much exposed to the uncertainty of transition, controlling shareholders may prefer to lead this transition rather than react to it, raising equity capital without giving up control. Volkswagen listing only nonvoting shares of Porsche suggests this.

¹³ This framework is based on ALESSIO M. PACCES, *RETHINKING CORPORATE GOVERNANCE: THE LAW AND ECONOMICS OF CONTROL POWERS* (2012).

¹⁴ See KNIGHT, *supra* note 9, at 359-60 (1921):

The insistence on the large number of stockholders in some of our great corporations is definitely misleading. [...] The great companies are really owned and managed by a small group of men. [T]he 'personal' interests which our rich and powerful business men work so hard to promote are not personal interests at all in the conventional economic sense [...]. The real motive is the desire to excel, to win at a game, the biggest and most fascinating game yet invented, not excepting even statecraft and war.

¹⁵ See *infra* text accompanying notes 49-51 and notes 86-87.

¹⁶ ALEX EDMANS, *GROW THE PIE: HOW GREAT COMPANIES DELIVER BOTH PURPOSE AND PROFIT* 28 (2020) (characterizing companies' failure to create value, for shareholders and society, as "errors of omission").

¹⁷ Jeremy C. Stein, *Takeover Threats and Managerial Myopia*, 96 J. POL. ECON. 61 (1989); Patrick Bolton et al., *Executive Compensation and Short-Termist Behavior in Speculative Markets*, 73 REV. ECON. STUD. 577 (2006).

¹⁸ Mariassunta Giannetti & Xiaoyun Yu, *Adapting to Radical Change: The Benefits of Short-Horizon Investors*, 67 MANAGE. SCI. 4032 (2021).

¹⁹ Alessio M. Paccès, *Exit, Voice and Loyalty from the Perspective of Hedge Funds Activism in Corporate Governance*, 9 ERASMUS L. REV. 199, 202 (2016).

²⁰ Mike Burkart & Samuel Lee, *One Share One Vote: The Theory*, 12 REV. FIN. 1, 31-36 (2008).

Dual-class shares are also interesting for institutional investors wanting to commit to low-carbon innovation. In management-controlled companies, large and diversified institutional investors face a commitment problem. They have incentive and power to push portfolio companies to reduce CO₂.²¹ However, they cannot identify the firm-specific technology to do this efficiently. Institutional shareholders could pick managers on the spot to figure this out, possibly helped by activist hedge funds.²² However, because this strategy depends on stock market signals and stock markets misprice uncertainty, it can stimulate companies to adapt to new technologies, not to develop them. Until low-carbon breakthroughs prove feasible, institutional investors are time inconsistent and support mistargeting of low-carbon innovations by activist.²³ If the opportunity cost of high-carbon technologies increases (for instance, because of a temporary increase in the demand of fossil fuels), activist hedge funds prefer companies to generally slow down decarbonization and institutional investors, who maximize portfolio returns,²⁴ must support them. Moreover, diversified institutional investors have a conflict of interest. As common owners, they have incentive to reduce not only nonpecuniary externalities, such as CO₂, but also pecuniary externalities, i.e., competition.²⁵ Competition for breakthroughs is against institutional investors' interest to maximize portfolio returns because, if breakthroughs succeed, the cost of widespread stranded assets may exceed the benefit of lower CO₂ externalities in a diversified portfolio.

Controlling shareholders can commit investors because investors cannot replace controlling shareholders also when it would be in their interest to do so. As dual-class shares relax the financial conditions of this commitment, they misalign incentives creating a wedge between voting rights and security benefits. Therefore, dual-class shares are acceptable only if controlling shareholders reassure investors ex-ante that they will not be exploited ex-post.²⁶ Corporate law supporting this guarantee indirectly supports low-carbon innovation.

Controllers may undermine noncontrolling shareholders in two ways: first, stealing from them; second, maximizing something different than profit. This can be framed as extraction of Private Benefits of Control (PBC), respectively diversionary and distortionary.²⁷ Both are manifestations of agency cost: the lower the controller's security benefits, the higher the cost.²⁸ To increase equity funding via dual-class shares, controlling shareholders must otherwise commit to limiting agency costs. Committing to limiting diversionary PBC is relatively easy for reputable controllers in good-law jurisdictions. Distortionary PBCs are more difficult because their subtler manifestation is the controller's vision being wrong. The lower the controller's stake, the lower the incentive to acknowledge failure even though

²¹ See *infra* text accompanying notes 40-65.

²² Ronald J. Gilson & Jeffrey N. Gordon, *The Agency Cost of Agency Capitalism: Activist Investors and the Reevaluation of Governance Rights*, 113 COLUM. L. REV. 863 (2013).

²³ Zohar Goshen & Reilly S. Steel, *Barbarians Inside the Gates: Raiders, Activists, and the Risk of Mistargeting*, 132 YALE L. J. 411 (2022).

²⁴ Jeffrey N. Gordon, *Systematic Stewardship*, 47 J. CORP. L. 627 (2022).

²⁵ Martin C. Schmalz, *Recent Studies on Common Ownership, Firm Behavior, and Market Outcomes*, 66 ANTITRUST BULL. 12 (2021).

²⁶ Lucian A. Bebchuk & Kobi Kastiel, *The Perils of Small-Minority Controllers*, 107 GEO. L. J. 1453 (2019).

²⁷ PACCES, *supra* note 13, at 87-103.

²⁸ Michael C. Jensen & William H. Meckling, *Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure*, 3 J. FIN. ECON. 305 (1976).

that would be efficient for shareholders as a group. However, this agency cost is mitigated by the controllers' standing to lose the welfare-increasing private benefits of their vision.

When PBC extraction increases welfare, controlling shareholders and, possibly, the dual-class shares supporting them emerge as an efficient alternative to management-controlled companies.²⁹ Private benefits from entrepreneurship are unambiguously value-increasing because only the controller can appropriate them. As they account for the subjective value of the controller's vision, I have defined these benefits as idiosyncratic PBC.³⁰ At a minimum, they reward controllers with the psychic satisfaction to succeed in the enterprise. After success materializes, idiosyncratic PBC may also result in pecuniary compensation, in the form of a control premium. When entrepreneurs have their idiosyncratic PBC at stake, they have an additional incentive to succeed than their share of SB. Likewise, they have incentive to acknowledge failure to salvage the value of control and of their undiversified investment – so long as they cannot cash in either SB or PBC in the midstream.³¹ Idiosyncratic PBC determine the optimal level of agency cost. Entrepreneurs have incentive to sell noncontrolling stock until the discount reflecting agency cost is equal to idiosyncratic PBC, i.e., the value of their vision. This market equilibrium may leave controllers with less than a majority of SB, while securing PBC still requires a majority of VR. Investors accepting the wedge of dual-class shares accept efficient PBC extraction to support the controller's vision.

I extend this model to Socially Responsible (SR) institutional investors which commit to low-carbon innovation by funding dual-class controlling shareholders to discover it. SR investors cater to the preferences of climate-conscious beneficiaries, and I assume they cannot greenwash. To fulfil their mandate, SR investors must outcompete Financial Investors (FI), which only maximize financial return. As recently shown in financial economics,³² SR investors must 'bribe' entrepreneurs for them to resist the temptation by FI to pick a high-carbon technology, which is initially more profitable. Adapting this intuition to the situation in which the technology is unknown, and entrepreneurs are given control to discover it, the 'bribe' is a higher wedge than offered by financial investors. A higher wedge allows entrepreneurs to operate on a bigger scale and, if successful, make more profit and higher idiosyncratic PBC from low-carbon innovation. In return, SR investors require controllers to meet a specific CO2 target before they can cash in idiosyncratic PBC. I will show with a numerical example that, with plausible levels of idiosyncratic PBC, controllers are willing to commit in this fashion. Corporate law should support this commitment.

The rest of the article is as follows. Section 2 discusses institutional investors' incentives to engage in sustainable corporate governance and why they cannot commit to low-carbon innovation. Section 3 analyzes the incentive compatibility of dual-class shares in a theory of Private Benefits of Control. Section 4 illustrates, with a numerical example, dual-class shares as a commitment device. Section 5 discusses how the controlling shareholder commitment

²⁹ Ronald J. Gilson, *Controlling Shareholders and Corporate Governance: Complicating the Comparative Taxonomy*, 119 HARV. L. REV. 1641 (2006).

³⁰ PACCES, *supra* note 13, at 109-115.

³¹ See *infra* text accompanying notes 104-108 and 131.

³² Martin Oemke & Marcus Opp, *A Theory of Socially Responsible Investment* (Swedish House of Finance, Research Paper No. 20-2, 2023), <https://ssrn.com/abstract=3467644>.

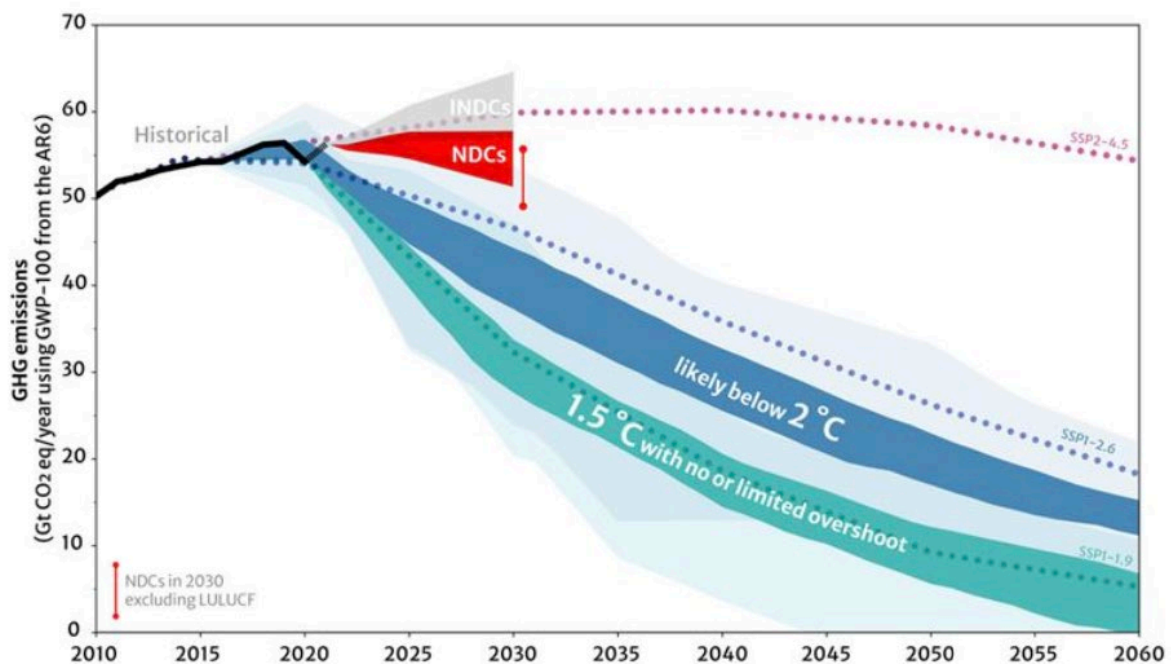
to low-carbon innovation can be supported by sunset clauses in corporate law. Section 6 concludes.

2. The Institutional Investor Commitment Problem

The CO₂ problem is big and complex. According to the latest UN Climate Report,³³ the 2030 projected impact of all Nationally Determined Contributions stemming from the Paris agreement will still leave a gap of 16Gt CO₂ per year relative to the 2° global warming pathway, and a gap of 23.9Gt CO₂ per year relative to the 1.5° global warming pathway. Figure 1 shows the gaps. These gaps are roughly equivalent to curtailing by between 1/3 and 1/2 of the current yearly CO₂ emissions, some 40Gt CO₂,³⁴ which sustain the lifestyle we are all used to for work and leisure. Absent technological breakthroughs, the world will miss the 2030 milestone, which reduces the chances of reaching the Paris agreement targets.

Figure 1

Comparison of scenarios assessed in the Intergovernmental Panel on Climate Change Sixth Assessment Report with projected total and per capita global emissions according to nationally determined contributions



Institutional investors can contribute to CO₂ abatement supporting sustainable corporate governance. Assuming that governments will eventually impose larger carbon taxes or

³³ UNEP, Emissions Gap Report (EGR) 2022: The Closing Window – Climate Crisis Calls for Rapid Transformation of Societies (2022), <https://www.unep.org/resources/emissions-gap-report-2022>.

³⁴ Zeke Hausfather & Pierre Friedlingstein, *Analysis: Global CO₂ Emissions From Fossil Fuels Hit Record High in 2022*, WORLD ECONOMIC FORUM (Nov. 11, 2022), <https://www.weforum.org/agenda/2022/11/global-co2-emissions-fossil-fuels-hit-record-2022>.

stricter regulations to meet the Paris agreement targets, institutional investors could divest from CO₂-intensive companies, starving them of capital, or directly engage with them to reduce CO₂.³⁵ This approach faces two limitations. First, bold actions by governments sound unrealistic. Without alternatives, governments are unlikely to impose a sudden stop of CO₂-intensive energy production and transportation, because this could lead to unprecedented turmoil.³⁶ As the policy response to climate change is all but 'inevitable,' the second limitation of sustainable corporate governance is the trade-off between the short-term profitability of high-carbon technologies and impact on climate change: investors must lose money to have impact.³⁷ It would make more sense for investors to sacrifice short-term returns to identify potentially profitable low-carbon innovations than to abate CO₂ of current technologies; this approach would complement government taxes and subsidies.³⁸

Institutional investors can push companies to reduce CO₂ but cannot commit to low-carbon innovation. Consequently, their impact is insufficient to internalize CO₂ externalities. Institutional investors cannot reallocate funds to low-carbon technologies, or compel managers to do so, because they are time inconsistent and face a conflict of interest. When the expected returns on high-carbon technologies exceed those on low-carbon technologies, institutional investors having the voting power to replace management will renege on their commitments to CO₂ abatement. Moreover, institutional investors have neither the competence nor the interest to identify innovations that could make CO₂ abatement profitable. As they widely hold stock in industries dependent on CO₂, they might lose more from stranded assets than they gain from the breakthroughs.

Investors making sustainability pledges might just engage in greenwashing. In this article, I assume greenwashing away. Greenwashing is not crucial as it can be ruled out by regulation.³⁹ Institutional investors may genuinely care about climate change for two reasons: Doing Well by Doing Good (DWDG) and Delegated Philanthropy.⁴⁰

To do well by doing good, investors could simply decarbonize their portfolio as a risk management strategy.⁴¹ Decarbonization implies divestment, lower valuations, and a higher cost of capital for carbon-intensive firms, which is confirmed by the empirical evidence.⁴² However, because the path towards the Paris agreement targets is uncertain, climate risk is likely underpriced.⁴³ Not knowing when, if ever, fossil fuels will be discontinued, some investors bid up the price of high-carbon technologies relative to more uncertain low-carbon technologies, underestimating climate risk. This implies that high-carbon stocks are overvalued which, in turn, leads to short-termism defined as managers' pursuit of value that quickly shows up in stock price as opposed to larger and more uncertain value that might

³⁵ Patrick Bolton et al., *The Financial Cost of Carbon*, 34 J. CORP. FIN. 17 (2022).

³⁶ Zohar Goshen & Assaf Hamdani, *Can Systematic Stewardship Reduce Carbon Emissions?* (2022) (unpublished manuscript, on file with author).

³⁷ Tom Gosling & Iain MacNeil, *Can Investors Save the Planet? - NZAMI and Fiduciary Duty*, CAP. MARKET LAW J. (forthcoming 2023).

³⁸ On the advantage of profit-seeking investment over subsidies, see *infra* note 62 and accompanying text.

³⁹ Paces, *supra* note 12 (explaining how EU securities regulation could achieve this result).

⁴⁰ Roland Bénabou & Jean Tirole, *Individual and Corporate Social Responsibility*, 77 ECONOMICA 1, 9-12 (2010).

⁴¹ Patrick Bolton et al., *Net-Zero Carbon Portfolio Alignment*, 78 FINANCIAL ANAL. J. 19 (2022).

⁴² Patrick Bolton & Marcin Kacperczyk, *Global Pricing of Carbon-Transition Risk*, J. FINANCE (forthcoming).

⁴³ Madison Condon, *Market Myopia's Climate Bubble*, 2022 UTAH L. REV. 63 (2022).

show up later.⁴⁴ A consequence of short-termism is that DWDG is not enough to close the gap between current emissions and the 1.5°-2.0° global warming pathway.

Short-termism is not a problem per se. However, it makes institutional investors time inconsistent about CO₂. Institutional investors react to short-term price signals. If the low-carbon technology is known, exposure to short-term reactions by institutional investors incentivizes managers to adapt quickly.⁴⁵ If the low-carbon technology is unknown, however, short-termism prevents managers from investing to discover it because markets are slow to recognize breakthroughs and, meanwhile, investors have incentives to replace managers. For example, the future of Electric Vehicles depends on profitable technologies to recycle batteries, which do not exist yet.⁴⁶ Until uncertainty is resolved, the market misprices risk because there are limits to arbitrage and even long-term investors profit from high-carbon technologies albeit knowing they are overvalued.⁴⁷ As investors will not wait for low-carbon technologies to prove viable, managers cannot wait either. If stock price drops while managers invest in battery recycling, institutional investors, either spontaneously or prompted by activist hedge funds, will renege on their climate pledges and push managers to sell more cars instead. While investors are incompetent to judge the innovation's viability, the returns on current technologies are too tempting to let go.⁴⁸

Mark Roe has contested framing the CO₂ problem as short termism on the grounds that negative externalities do not depend on investor time horizon.⁴⁹ This argument is impeccable so long as technology is fixed. With fixed technology, negative externalities increase profit, so profit-seeking investors only internalize externalities to the extent that prices incorporate foreseeable climate risk. But if technology is not fixed, breakthroughs may materialize beyond what is impounded in stock price. On this perspective, short termism undermines breakthroughs because of Knightian uncertainty: markets cannot price unforeseeable information. Breakthroughs, however, might alter relative prices in such a way that an externality today is no longer an externality tomorrow.⁵⁰ For instance, the invention of automobiles eliminated the externalities from horse manure. Profitable EVs or CCS might likewise eliminate CO₂ externalities. Short termism prevents institutional investors from supporting breakthroughs because they cannot judge which low-carbon innovation will 'beat the market.'⁵¹ Corollary of this finding is that Portfolio Value Maximization (PVM)⁵² also gives investors insufficient incentive to internalize CO₂.

⁴⁴ Patrick Bolton et al., *Executive Compensation and Short-Termist Behaviour in Speculative Markets*, 73 REV. ECON. STUD. 577 (2006).

⁴⁵ Giannetti & Yu, *supra* note 18.

⁴⁶ See Andreas Breiter et al., *Battery Recycling Takes the Driver's Seat*, MCKINSEY INSIGHTS (Mar. 13, 2023), <https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/battery-recycling-takes-the-drivers-seat>.

⁴⁷ Andrei Shleifer & Robert W. Vishny, *The Limits of Arbitrage*, 52 J. FINANCE 35 (1997).

⁴⁸ Goshen & Steel, *supra* note 23, 453-454.

⁴⁹ Mark J. Roe, *What is Stock Market Short-Termism?*, 77 BUS. LAW. 1039 (2022).

⁵⁰ Israel M. Kirzner, *Creativity and/or Alertness: A Reconsideration of the Schumpeterian Entrepreneur*, 11 REV. AUSTRIAN ECON. 5 (1999).

⁵¹ Paces, *supra* note 19, at 209-211.

⁵² Vittoria Battocletti et al., *Dual Class Shares in the Age of Common Ownership* (Eur. Corp. Gov. Inst., Law Working Paper No. 628/2022, 2022), <https://ssrn.com/abstract=4046244>.

PVM is the engagement version of the portfolio decarbonization argument and suffers from similar limitations. The portfolio of large institutional investors mainly tracks market indices so that firm-specific risk is diversified, but systematic risk remains.⁵³ Systematic risk includes undiversifiable climate risk. To minimize systematic risk, while avoiding tracking error, index funds engage broadly with their portfolio companies to reduce CO2.⁵⁴ Although this strategy sacrifices the profit of individual firms, it maximizes risk-adjusted return from the perspective of fund beneficiaries. However, as long as climate risk is underpriced, also this strategy cannot internalize CO2 externalities.⁵⁵ Another version of PVM claims that because large institutional are universal owners with portfolios mirroring the global economy, they care about reducing CO2 externalities beyond risk management (i.e. giving up return).⁵⁶ This second version of PVM is more problematic from a quantitative and a legal perspective.⁵⁷ Firstly, even largest institutional investors do not internalize all climate change externalities because some pop up in contexts remote from the stock market, for instance consumption in a Pacific island or production by private companies. Second, reducing climate externalities at the expenses of financial return pose significant legal problems in the absence of a mandate from beneficiaries to forgo profit to reduce CO2.⁵⁸ In sum, under both versions of PVM, institutional investors cannot internalize CO2 externalities without giving up return.

In addition, PVM undermines institutional investors' interest in low-carbon innovation because of common or horizontal ownership.⁵⁹ Big institutional investors have large stakes in multiple companies in one industry. Therefore, these investors have incentive to dim competition between portfolio firms to capture monopoly rents and increase portfolio return. Even if horizontal shareholders do not directly affect decision-making, their sheer presence shapes managerial incentives in such way that they do not compete aggressively.⁶⁰ Therefore, institutional investors have a conflict of interest about low-carbon innovation. Although the latter could reduce externalities, it would also lead to a winner-takes-it-all competition in which the portfolio gains from breakthroughs could be offset by the cost of stranded assets.

Delegated Philanthropy is a more powerful reason for institutional investors to care about reducing CO2. Granted that curbing negative externalizes requires forgoing short-term return, delegated philanthropy means that beneficiaries give institutional investors a mandate to do so. Delegated philanthropy is a profitable way to aggregate prosocial preferences of beneficiaries⁶¹ Because climate-conscious beneficiaries are willing to pay a premium to invest in a more sustainable future, in which CO2 externalities will be internalized, institutional investors can pass on the cost of sustainable investment and operate as profit-maximizing enterprise. This is valuable. After a low-carbon technology has proven viable, profit-seeking investors can reallocate funds to other technologies and have

⁵³ Gilson & Gordon, *supra* note 22.

⁵⁴ Gordon, *supra* note 24.

⁵⁵ Condon, *supra* note 43.

⁵⁶ Madison Condon, *Externalities and the Common Owner*, 95 WASH. L. REV. 1 (2020).

⁵⁷ Roberto Tallarita, *The Limits of Portfolio Primacy*, 76 VAND. L. REV. (forthcoming 2023).

⁵⁸ Marcel Kahan & Edward B. Rock, *Systemic Stewardship with Tradeoffs* (Eur. Corp. Gov. Inst., NYU Law and Economics Research Paper No. 22-01, 2021), <https://ssrn.com/abstract=3974697>.

⁵⁹ Battocletti et al., *supra* note 52.

⁶⁰ M. Antón et al., *Common Ownership, Competition, and Top Management Incentives*, J. POL. ECON. (2022).

⁶¹ Benabou & Tirole, *supra* note 40, at 10-11.

more impact than finite government subsidies.⁶² Institutional investors still face the time inconsistency and conflict of interest problems hinted before, but attracting climate-conscious beneficiaries gives them an incentive to commit and overcome these problems.

Delegated philanthropy seems popular among the younger generations⁶³ and it is borne out by the empirical evidence.⁶⁴ One may doubt whether there are enough climate-conscious beneficiaries for institutional investors to have impact on CO₂. The number of climate-conscious investors or the intensity of their preference may just be too small. This question can only be answered empirically and is still unresolved.⁶⁵ However, theory suggests that the requirements for institutional investors' impact, in terms of beneficiaries' preferences, are less stringent for voice than for exit.

For exit to have an impact, an overwhelming proportion of climate-conscious beneficiaries must be willing to forgo large returns. This is necessary to offset the gains of investors who only care about financial returns and bid up the price of carbon-intensive assets.⁶⁶ Empirical evidence suggests that we are far away from this theoretical requirement.⁶⁷ The impact of negative screening by climate-conscious investors on the cost of capital has been about half of a basis point, which is too small to affect anything. It is estimated that currently, for climate-conscious investors to increase the cost of capital by 1%, they should exceed 80% of the investable wealth. Currently, institutional investors may achieve very little by excluding carbon-intensive companies from their portfolios.

Institutional investors can achieve more by voice, namely engaging with portfolio companies to reduce CO₂ emissions. Broccardo, Hart and Zingales demonstrated that, in a typical publicly held company, a vote to abate CO₂ can succeed if a majority of weakly climate-conscious beneficiaries exist and is aggregated by institutional investors.⁶⁸ The intuition is that, because beneficiaries have an infinitesimal stake in every publicly held company, a modest prosocial preference is sufficient to offset the individual cost of CO₂ abatement. For atomistic beneficiaries, voting for a low-carbon technology only costs a few cents of forgone return, but brings sizeable benefit so long as they care a little about global CO₂.

⁶² Benjamin Roth, *Impact Investing: A Theory of Financing Social Enterprises* (Harvard Business School Entrepreneurial Management Unit, Research Paper No. 20-078, 2021), <https://ssrn.com/abstract=3535731>.

⁶³ Michal Barzuza et al., *Shareholder Value(s): Index Fund ESG Activism and the New Millennial Corporate Governance*, 93 S. CAL. L. REV. 1243 (2019).

⁶⁴ Samuel M. Hartzmark & Abigail B. Sussman, *Do Investors Value Sustainability? A Natural Experiment Examining Ranking and Fund Flows*, 74 J. FINANCE 2789 (2019).

⁶⁵ Scott Hirst et al., *How Much do Investors Care about Social Responsibility?* (Eur. Corp. Gov. Inst., Law Working Paper No. 674/2023, 2023), <https://ssrn.com/abstract=4115854>, found moderate support for social responsibility in a lab experiment. Answering this question with observational data is much more challenging and has not been tried yet.

⁶⁶ Eleonora Broccardo et al., *Exit versus Voice*, 130 J. POL. ECON. 3101 (2022).

⁶⁷ Jonathan Berk & Jules H. van Binsbergen, *The Impact of Impact Investing* (Stanford University Graduate School of Business Research Paper, Law & Economics Center at George Mason University Scalia Law School, Research Paper Series No. 22-008, 2022), <https://ssrn.com/abstract=3909166>.

⁶⁸ Broccardo et al., *supra* note 66.

This reasoning can be generalized to the case in which institutional investors sort climate-conscious beneficiaries into low-carbon funds and act with one voice as their loyal agents.⁶⁹ In this case, Oehmke and Opp demonstrated that a Socially Responsible (SR) investor is willing to fund entrepreneurs at a loss to attract them to a low-carbon technology, outcompeting financial investors who prefer the high-carbon technology.⁷⁰ Crucially, SR funding comes with the right to choose the low-carbon technology or a commitment to it. The SR investor's loss is passed on climate-conscious beneficiaries and supports a 'bribe' to the entrepreneurs, taking the form of higher consumption or bigger project scale, to forgo the higher profit of the high-carbon technology preferred by financial investors.

Theory is more optimistic about sustainable corporate governance than empirical evidence. Although investors engage with portfolio companies, their impact on CO₂ is too small to affect climate change.⁷¹ Most worrisome, although institutional ownership is associated with lower CO₂,⁷² CO₂ emissions are *negatively* associated with low-carbon innovation: improved CO₂ efficiency does not lead to decarbonization.⁷³ This may suggest that sustainable corporate governance is driven by 'impact washing' or is insufficiently supported by climate-conscious beneficiaries.⁷⁴ I propose a different explanation.

Institutional investors' impact may be smaller than predicted by theory because committing to low-carbon innovation is costly for them. Economic theory assumes, simplistically, a binary technology – either low-carbon or high-carbon – which is known and recognizable by investors. But the CO₂ problem is more complex and the technology to solve it is unknown. Institutional investors are unable to identify breakthrough technologies and ask managers to implement it because, as I explained, they are incapable of dealing with Knightian uncertainty, are time inconsistent, and have a conflict of interest.

If, as I assume, securities regulation effectively curbs greenwashing, it may be worth for institutional investors tying their hands with controlling shareholders to attract climate-conscious investors who can screen for real impact. Funding controlling shareholders allows institutional investors to commit to low-carbon innovation. First, acting as entrepreneurs, controlling shareholders have the competence to deal with uncertainty. Second, because they are in control, controlling shareholders can resist the temptation of short-term return. Third, because they are not or are only minimally diversified,⁷⁵ controlling shareholders

⁶⁹ This corresponds with the assumption that institutional investors cannot greenwash to attract climate-conscious beneficiaries. On how securities law may support this, see Paces, *supra* note 12.

⁷⁰ Oehmke & Opp, *supra* note 32.

⁷¹ José Azar et al., *The Big Three and Corporate Carbon Emissions Around the World*, 142 J. FIN. ECON. 674, 686 (2021).

⁷² Patrick Bolton, *Firm Commitments* (Colum. Bus. School, Research Paper, 2022), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3840813.

⁷³ Patrick Bolton et al., *The CO₂ Question: Technical Progress and the Climate Crisis* (Working Paper, 2023), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4212567.

⁷⁴ Davidson Heath et al., *Does Socially Responsible Investing Change Firm Behavior?* (Eur. Corp. Gov. Inst., Finance Working Paper No. 762/2021, 2023), <https://ssrn.com/abstract=3837706>; see also Goshen and Hamdani, *supra* note 36.

⁷⁵ See the evidence provided by Dhammika Dharmapala & Vikramaditya S. Khanna, *Controlling Externalities: Ownership Structure and Cross-Firm Externalities* (Eur. Corp. Gov. Inst., Law Working Paper No. 603/2021, 2022), <https://ssrn.com/abstract=3904316> (arguing that controlling shareholders do not have incentive to

compete aggressively for breakthroughs. The problem is that, if investors commit, controlling shareholders could take advantage of them financially or fail to engage in low-carbon innovation. Therefore, controlling shareholders must commit too.

3. Private Benefits of Control and Optimal Design of Dual-Class Shares

Controlling shareholders can commit institutional investors to decarbonization as they uniquely contribute their vision to sustainable corporate governance. However, controlling shareholders must commit too to attract funding from institutional investors. Appropriately designed dual-class shares may support this double commitment.

The controlling shareholder problem can be framed as extraction of Private Benefits of Control (PBC). Because controlling shareholders have undisputed control over the company, they can extract benefits that are not shared pro-rata with noncontrolling shareholders. PBC are extracted inefficiently or efficiently. The inefficient extraction comes at the expense of profit, or Securities Benefits (SB), to be shared pro-rata with other shareholders. Inefficient PBC can be pecuniary or nonpecuniary. Pecuniary PBC are diversionary and are exemplified by tunneling: the controllers distribute part of the firm's assets, cash flow, or equity to themselves instead of pro-rata.⁷⁶ Tunneling is typically implemented by way of Related Party Transactions (RPTs).⁷⁷ Nonpecuniary PBC are distortionary: they do not imply non-pro-rata distributions, but failure to maximize SBs. Examples include control perquisites, pet projects, and simply being wrong. Both pecuniary and nonpecuniary PBC are manifestations of agency cost: the incentives of controllers are not aligned with the interests of all shareholders because there is a separation of ownership and control.⁷⁸ From this perspective, controlling shareholders imply a corporate governance tradeoff.⁷⁹ On the one hand, because of larger stakes, controlling shareholders' incentives are more aligned than management's with maximization of SBs; on the other hand, controlling shareholders are harder to replace than management, which exacerbates inefficient extraction of PBC even in jurisdictions that constrain tunneling.

Dual-class shares potentially worsen the controlling shareholder tradeoff because they create a *wedge* between Voting Rights (VR) and Securities Benefits (SB). Let us define the wedge as: $w = \frac{VR}{SB}$. For example, if there are 2 classes of shares, a class B in which each share carries 2 votes and a class A with a standard One-Share-One-Vote (1S1V) regime, and the controller only holds B shares, the wedge is 2:1 and control can be secured holding 25% of SB. With a wedge of 100:1, the minimum stake to maintain control via B shares becomes 0.99%.⁸⁰ Because dual-class shares enable control with a very tiny stake, they are regarded

internalize externalities because they are not diversified). As explained *supra* text accompanying notes 52-58, diversification and PVM are insufficient reason to internalize externalities.

⁷⁶ Vladimir Atanasov et al., *Unbundling and Measuring Tunneling*, 2014 U. ILL. L. REV. 1697 (2014).

⁷⁷ THE LAW AND FINANCE OF RELATED PARTY TRANSACTIONS (Luca Enriques & Tobias H. Tröger eds., Cambridge University Press 2019).

⁷⁸ Jensen & Meckling, *supra* note 28.

⁷⁹ Gilson, *supra* note 29.

⁸⁰ The minimum α stake to retain control given w is: $\alpha = \frac{1}{w+1}$.

with suspicion by corporate law scholars.⁸¹ While exercising control with very tiny stakes is a real problem, PBC may also be value-increasing. When this is the case, PBC provide controlling shareholders with additional incentives.

Controlling shareholders may have a long-term vision potentially increasing shareholder value beyond what is recognized by the stock market.⁸² This is because the future is uncertain and stock market participants do not have perfect foresight. If the controller's vision proves successful, it will result in higher financial returns than anticipated by the market, which will be shared pro-rata with noncontrolling shareholders. On this perspective, dual-class shares allow controllers to secure their vision from activists and takeover bidders without having to commit half of the company's equity.⁸³ This approach doesn't explain what motivates controllers to pursue vision. After all, if successful, controllers will share the proceeds of their vision with non-controlling shareholders who can just sit and wait.

It is quite settled in financial economics that control must be rewarded by private benefits, which could be either value-decreasing (as the distortionary and diversionary PBC described before) or value-increasing.⁸⁴ Value-increasing PBC include, for example, the personal satisfaction of implementing the vision, the pride and reputation of making it a success, and later on, the more pecuniary value of selling control at a premium. In earlier work, I have defined these idiosyncratic PBC.⁸⁵ Ex-ante, these benefits are only valuable for the controller, hence they are *idiosyncratic* because the market doesn't yet attach any value, or opportunity cost, to the vision. Ex-post, the possibility to cash in a control premium provides controlling shareholders with a deferred compensation for their vision.

Idiosyncratic PBC allow integrating corporate governance with the theory of entrepreneurship, which since Frank Knight defines entrepreneurs as the agents who deal with fundamental uncertainty by exercising judgment.⁸⁶ Because this theory rewards entrepreneurship with profit, it has been difficult to reconcile with separation of ownership and control, in which profit is distributed pro-rata to controlling *and* noncontrolling owners. Idiosyncratic PBC fill this theoretical gap providing entrepreneurs who are only partial owners (controlling shareholders) with a deferred compensation for their vision, in addition to the financial return on their equity. Idiosyncratic PBC also compensate controlling shareholders for forgoing risk diversification.⁸⁷ Differently from managers, including those receiving equity-based compensation, controllers substantiate their claim about vision having all or a significant part of their wealth invested in the company they control.

Idiosyncratic PBC add a nuance to the controlling shareholder tradeoff. Idiosyncratic PBC provide controllers with an incentive to succeed in realizing their vision, as their value would

⁸¹ Bebchuk & Kastiel, *supra* note 26.

⁸² Zohar Goshen & Assaf Hamdani, *Corporate Control and Idiosyncratic Vision*, 125 YALE L. J. 560 (2016).

⁸³ Zohar Goshen & Assaf Hamdani, *Corporate Control, Dual Class, and the Limits of Judicial Review*, 120 COLUM. L. REV. 941 (2020).

⁸⁴ See e.g., Philippe Aghion & Patrick Bolton, *An Incomplete Contracts Approach to Financial Contracting*, 59 REV. ECON. STUD. 473 (1992).

⁸⁵ PACCES, *supra* note 13, at 109-115.

⁸⁶ See Mark Casson, *Entrepreneurship*, THE CONCISE ENCYCLOPEDIA OF ECONOMICS, <https://www.econlib.org/library/Enc1/Entrepreneurship.html> (last visited Apr. 4, 2023).

⁸⁷ Burkart & Lee, *supra* note 20, at 26.

be nil otherwise. When entrepreneurs are wealth-constrained, they need the cooperation of financiers to implement their vision. If, because of fundamental uncertainty, the near-term returns on the vision are unpredictable, debt is not an option. To scale their visionary projects, entrepreneurs must attract equity from non-controlling shareholders. Dual-class shares allow removing the sales constraint to keep control uncontested. However, the entrepreneur must still find willing buyers of noncontrolling stock. To this purpose, controllers must commit to limiting extraction of diversionary and distortionary PBC.

Diversions PBCs are not high in jurisdictions, such as the U.S. and many European countries, in which corporate law does a decent job at constraining tunnelling.⁸⁸ Especially in these jurisdictions, idiosyncratic PBC can play a role in fostering entrepreneurship. Moreover, in not-so-good-law jurisdictions, other mechanisms constrain the controller's ability to extract diversionary PBC and create room for idiosyncratic PBC. As explained by Kang,⁸⁹ controllers who aim to repeated interactions with financial markets ('stationary' controllers) prefer to foster their reputation and commit to moderate levels of PBC extraction, because stealing more from the company would undermine their ability to implement their vision and can only be a one-off strategy (for 'roving' controllers). Finally, tunneling can be efficiently policed by procedural constraints on related-party transactions, which could be tightened – also contractually – when the risk of diversion is heightened by the wedge of dual-class shares.⁹⁰ All these mechanisms, in principle, enable entrepreneurs to commit to low levels of diversionary PBC extraction, so I set them aside for the moment.

Distortionary PBC are harder to curb, but idiosyncratic PBC put an upper limit on them. The worst case of distortionary PBC is the controller's vision proving wrong. Compared to managers, however, controlling shareholders stand to lose comparatively more from failure having larger shares of SB. Because dual-class shares reduce the share of SB necessary to secure control, *potentially* near to zero, they could eliminate the incentive advantage of controlling shareholders.⁹¹ Idiosyncratic PBC compensate this shortfall in the controller's incentives setting a lower bound to the share of SB that controllers will *actually* retain.

Anticipating distortionary PBC, investors discount the expected value of noncontrolling stock. Discount is increasing in the amount of stock sold to the investing public relative to the controller's stake. Investors expect that controllers will be more likely to be wrong, or to have a different opinion on how to maximize firm value,⁹² the lower the equity they retain. From the controller's point of view, the discount on each share sold cannot be higher than the idiosyncratic PBC divided by the number of shares retained. Otherwise, controllers would be selling equity claims that are worth less to the investing public than to themselves.

⁸⁸ See Luca Enriques et al., *Related-Party Transactions*, in *THE ANATOMY OF CORPORATE LAW: A COMPARATIVE AND FUNCTIONAL APPROACH* 145 (Reinier Kraakman et al. eds., Oxford University Press 3rd ed. 2017).

⁸⁹ Sang Yop Kang, *Generous Thieves: The Puzzle of Controlling Shareholder Arrangements in Bad-Law Jurisdictions*, 21 *STAN. J.L. BUS. & FIN.* 57 (2015).

⁹⁰ Alessio M. Paces, *Procedural and Substantive Review of Related Party Transactions: The Case for Non-Controlling Shareholder-Dependent Directors*, in *THE LAW AND FINANCE OF RELATED PARTY TRANSACTIONS*, *supra* note 77, 181. See also *infra* text accompanying note 132.

⁹¹ Bebchuk & Kastiel, *supra* note 26, at 1465-1468.

⁹² For this more nuanced approach to agency cost, see Goshen & Hamdani, *supra* note 82, at 566-568. See also *infra* text accompanying note 116.

Together with the entrepreneur's wealth constraint, idiosyncratic PBC set an upper limit to the amount of equity that can be raised from the investing public, and consequently, a lower limit to the controller's SB. The level of idiosyncratic PBC and the discount also determine the wedge between VR and SB. This wedge allows increasing the scale of the visionary project compared to 1S1V but is not unlimited even in the absence of regulation.

Although idiosyncratic PBC reflect the subjective value of entrepreneurial vision, they can be neither too high nor too low. Idiosyncratic PBC cannot be too high because, although increasing the wedge can support any size of idiosyncratic PBC, a higher wedge also commands a higher discount, which limits both the funds that can be raised from investors and the controller's share of SBs. As controllers value their own investment in the company, they will stop selling stock when they judge the price to be too low. Idiosyncratic PBC also cannot be too low. Low idiosyncratic PBC would mean that the controllers themselves expect little from their vision, which implies a low wedge and eventually frustrates the purpose of dual-class shares. In this situation, the controller would be better off by selling stock with a 1S1V voting structure as they would still manage to implement their vision and retain moderate idiosyncratic PBC with a positive probability.⁹³

Therefore, in a dual class shares company, the sale of noncontrolling stock stops when distortionary PBC are at the efficient level. In this situation, idiosyncratic PBC compensate the agency cost.⁹⁴ This finding is consistent with the popularity of dual class shares in businesses with high near-term uncertainty. Chemmanur and Jiao similarly derive the optimality of dual-class shares from a tradeoff between the controller's PBC and a project's long-term value, on the one hand, and agency cost from the controller's lower stake, on the other.⁹⁵ Differently from their model, here contracting for a higher wedge is always efficient because idiosyncratic PBC supporting this reflect the controller's vision of long-term value. Thus, idiosyncratic PBC do not reduce and potentially increase shareholder welfare.⁹⁶ In an extension of their model, Chemmanur and Jiao demonstrated that dual-class recapitalizations are also efficient as the controller's reputation lowers investors' discount.⁹⁷

Dual class recapitalizations are an opportunity and a problem for (sustainable) corporate governance. I will touch upon the opportunity in Section 5. In the remainder of this section, I discuss how the balance between idiosyncratic and distortionary PBC may change over time, undermining the ex-post efficiency of dual class shares and the willingness of investors to

⁹³ Thomas J. Chemmanur & Yawen Jiao, *Dual Class IPOs: A theoretical Analysis*, 36 J. BANK. FIN. 305, 315 (2012), explain the relevant tradeoff. In their model, the controller payoff is based on the IPO proceeds plus the expected value of PBC in the face of potential takeover bids, conditional on a bad intermediate signal about the performance of long-term projects. For an informal discussion of how low idiosyncratic PBC lead to managerial control, as opposed to controlling shareholders, see PACCES, *supra* note 13, at 133-138.

⁹⁴ Alessio M. Paccès, *Control Matters: Law and Economics of Private Benefits of Control* (Eur. Corp. Gov. Inst., Law Working Paper No. 131/2009, 2009), <https://ssrn.com/abstract=1448164>.

⁹⁵ Chemmanur & Jiao, *supra* note 93.

⁹⁶ In the model by Chemmanur & Jiao, *supra* note 93, 315, PBC are extracted at the expense of SB, which may lead to inefficient outcomes, such as a socially excessive wedge, to be ruled out by regulation. In contrast, in Paccès, *supra* note 94, idiosyncratic PBC are always welfare-increasing.

⁹⁷ Thomas J. Chemmanur & Yawen Jiao, *Dual Class IPOs, Share Recapitalizations, and Unifications: A Theoretical Analysis* (Eur. Corp. Gov. Inst., Finance Working Paper No. 129/2006, 2006), <https://ssrn.com/abstract=925236>.

commit to it ex-ante. This intertemporal problem is twofold. First, the value of the controller's vision may decrease with time.⁹⁸ Second, controllers may increase the wedge over time, undermining their incentive to maximize the project's value or abandon it if it is not viable.⁹⁹

Idiosyncratic PBC may solve both problems if corporate law sets the right (default) rules.¹⁰⁰ The controller has incentives to acknowledge the end of vision and part with control if two conditions are met: a) ability to sell control at a premium; b) lack of wealth diversification.

Controllers selling their stake at a premium are effectively cashing in their idiosyncratic PBC. They have an incentive to do so when they realize they cannot increase the market value of their controlling stake, whereas potential acquirers can, as revealed by their willingness to pay a control premium. While the control premium would compensate controllers for the still unrealized value of their vision, the remainder of the controlling stake's price will reflect the pro-rata share of SB. This is in line with corporate law in the U.S., although in Europe and the UK the mandatory bid rule restricts the controller's ability to cash in a control premium by selling high-voting shares at a different price than low-voting shares.¹⁰¹ These restrictions foster entrenchment and potentially undermine the efficiency of dual-class shares over time.¹⁰²

Similarly, the incentivizing role of idiosyncratic PBC supports some sunset clauses, but not others. Sunset clauses collapse dual-class shares structures into 1S1V when triggered. General transfer sunsets, which are triggered when the controlling stake changes hands, always disallow a control premium and support the controller's entrenchment even when they realize that someone else is in a better position to continue the vision. Transfer sunsets contingent on the failure to meet specific goals are potentially more beneficial because they are triggered only when the visionary project has failed and it is efficient, also for the entrepreneur, to liquidate it on the same terms as noncontrolling shareholders.¹⁰³

The second condition is that all or a significant part of the controllers' wealth remains invested in the company. If this condition is met, even untalented controllers will not keep pursuing their vision when the stock market sends strong signals that this vision is failing. It would be better for controllers' undiversified wealth to acknowledge failure, accept parting with control for limited or even no compensation of idiosyncratic PBC, and possibly sell their shares so long as they are worth something.¹⁰⁴

The second intertemporal problem with dual-class shares is the increasing wedge. After having locked in control, controlling shareholders could reduce their stake to invest somewhere else and diversify risk. However, the credibility of the dual-class arrangement

⁹⁸ Lucian A. Bebchuk & Kobi Kastiel, *The Untenable Case for Perpetual Dual-Class Stock*, 103 VA. LAW REV. 585 (2017).

⁹⁹ Bebchuk & Kastiel, *supra* note 26.

¹⁰⁰ See *infra* Section 5.

¹⁰¹ BOBBY REDDY, FOUNDERS WITHOUT LIMITS: DUAL-CLASS STOCK AND THE PREMIUM TIER OF THE LONDON STOCK EXCHANGE, 316-319, 407-412 (2021).

¹⁰² See PACCES, *supra* note 94, at 37.

¹⁰³ See *infra* text accompanying notes 125-129.

¹⁰⁴ Yifat Aran & Elizabeth Pollman, *Ousted* (unpublished manuscript, on file with author) (2023).

for investors depends on the controllers' maintaining large SB to lose from the company's failure. Controllers should not be allowed to dilute this incentive by cashing in their stake while retaining control.

Bebchuk and Kastiel have provided a thorough analysis of the increasing wedge in U.S. dual-class shares companies, which, over time, could reduce the controllers' stake to a very tiny fraction of SB.¹⁰⁵ As a solution, the authors proposed ownership dilution sunsets that would collapse the dual-class structure into 1S1V when the wedge exceeds a certain threshold. Bebchuk and Kastiel, however, provide no evidence that the wedge increased because of controllers' exit. In a more recent study, Dharmapala and Khanna suggest the opposite, namely that controllers do not diversify their wealth although dual-class shares enable them to do so.¹⁰⁶ The wedge increase observed by Bebchuk and Kastiel could depend on the increase of equity funding, by way of seasoned equity offerings or other share issuances, which would reflect investors' consent and be presumably efficient strategies to scale the entrepreneur's vision.¹⁰⁷ Ownership sunsets would discourage fundraising of this kind.

The problem with dual-class shares is not the wedge per se. The real problem is the controllers' opportunistic exit from the initial investment. To prevent opportunistic increase of the wedge, divestment sunsets are preferable to ownership dilution sunsets.¹⁰⁸ A divestment sunset screens for controllers' opportunistic exit from their investment as opposed to recapitalizations aiming to increase equity funding in the midstream.

4. The Controlling Shareholder Commitment Problem

Dual-class shares can support entrepreneurship in corporate governance while reassuring investors about agency cost. In this section, I extend the analysis to commit controlling shareholders to low-carbon innovation. Borrowing the setting from Oehmke & Opp,¹⁰⁹ I assume that noncontrolling stock is purchased by two classes of investors: Financial Investors (FI) and Socially Responsible (SR) investors. SR investors cannot greenwash and make a loss (on their beneficiaries' behalf) to be more attractive than FI investors. However, differently from the model by Oehmke & Opp, investors assign control rights to the entrepreneurs via dual-class shares, thereby committing to the controller's vision.¹¹⁰ To attract controllers to low-carbon innovation, SR investors offer a lower agency cost discount than FI investors. The following numerical example shows that a lower discount allows to scale the vision and extract higher idiosyncratic PBC. It is then worth for controlling

¹⁰⁵ Bebchuk & Kastiel, *supra* note 26, at 1474-89.

¹⁰⁶ Dharmapala & Khanna, *supra* note 75.

¹⁰⁷ As theorized by Chemmanur & Jiao, *supra* note 97, dual-class recapitalizations can be value-enhancing when they are supported by the controller's post-IPO reputation. This theory is borne out by the empirical evidence. See Valentin Dimitrov & Prem C. Jain, *Recapitalization of One Class of Common Stock Into Dual-Class: Growth and Long-Run Stock Returns*, 12 J. CORP. FIN. 342 (2006).

¹⁰⁸ See the proposal by REDDY, *supra* note 101, at 382-383.

¹⁰⁹ Oehmke & Opp, *supra* note 32.

¹¹⁰ Investors are incompetent to identify the low-carbon technology. See *supra* text accompanying notes 48-52.

shareholders committing to low-carbon innovation via a contingent contract, in which they lose the option to sell control at a premium if they do not reach a zero-emission target.¹¹¹

Imagine an entrepreneur considering setting up a company in Amsterdam to produce Trika, an electric tricycle. Her vision is that Amsterdam's inhabitants will demand Trika, instead of traditional bicycles, to protect themselves from extreme rainfall due to climate change. Trika could be developed with standard rechargeable batteries or with two innovative technologies: (1) a CO₂-positive swapping battery technology; or (2) a carbon-neutral solar panel technology. The two innovations are uncertain, but if successful, they would revolutionize mobility in Amsterdam for which the entrepreneur would enjoy Private Benefits of Control (PBC) = €50.000 as pride of having launched this company and control premium upon selling it. The entrepreneur is indifferent between the two technologies,¹¹² but she cares about implementing Trika with a revolutionary technology (PBC = €50.000) because she regards a standard tricycle as a trivial substitute of e-bikes (PBC = 0).

The entrepreneur faces two kinds of investors: FI are financial interest investors only maximizing return, SR are socially responsible investors which maximize return subject to carbon neutrality. Investors cannot distinguish between technology 1 and 2 ex-ante, although they can observe CO₂ emissions ex-post. To finance the company, the entrepreneur issues 1.000 shares worth €1.000 each. As outside option, I assume it is always possible to realize €1.000 per share by developing Trika as a standard tricycle (PBC = 0).

Let us initially consider an entrepreneur who is not wealth constrained and maximizes her entrepreneurial return as PBC relative to the initial investment. This is on top of financial return, which is identical for controlling and noncontrolling shareholders and is equal to $(€1000 - P)/P$ (P is the IPO price).¹¹³ Later I will drop this assumption and introduce a more realistic wealth constraint. To secure PBC, the entrepreneur uses dual-class shares enabling control with stakes $\alpha \leq 50\%$,¹¹⁴ which is given by her k shares divided by the $n = 1.000$ shares issued ($\alpha = \frac{k}{n} = \frac{k}{1.000}$). Because investors do not have control, $n-k$ shares are sold at $P = €1.000 - D(\alpha)$, with the discount $D(\alpha)$ decreasing in α and equal to zero if $\alpha > 50\%$. The question is how much α Securities Benefits are retained by the entrepreneur.

¹¹¹ As in Oehmke & Opp, *supra* note 32, the SR capital is finite (it depends on the preferences of climate-conscious beneficiaries) so not every entrepreneur can commit to low-carbon innovation. Moreover, in the spirit of Bhagwan Chowdhry et al., *Investing for Impact*, 32 REV. FIN. STUD. 864 (2019), profit-seeking entrepreneurs must commit to low-carbon innovation offering investors a compensation if they fail to produce the social benefit.

¹¹² The model could be extended adding the entrepreneur's preference for low-carbon technology, making $PBC_2 > PBC_1$. This would only strengthen the results of the example. However, differently from Oehmke & Opp, *supra* note 32, the entrepreneur's preference for low-carbon technology is not essential because financiers cannot observe the technology ex-ante (thus they cannot choose it); they can only observe CO₂ ex-post.

¹¹³ I assume no time value of money and no risk other than entrepreneurial uncertainty, reflected by PBC, and agency cost, reflected by the discount $D(\alpha)$. As the outside option is not attractive except in case of failure, the entrepreneur invests her wealth exclusively to maximize the entrepreneurial return.

¹¹⁴ I assume that the entrepreneur prevails if there is a tie. The minimum wedge supporting control with α (assuming that the controller holds all the high-voting shares) is: $w = \frac{1-\alpha}{\alpha}$.

The entrepreneur retains an equilibrium stake α^* as follows: ¹¹⁵

$$\alpha^* \mid \frac{PBC}{k} = D(\alpha) \quad (1)$$

From the entrepreneur's standpoint, noncontrolling stock is worth selling until the discount per share is equal to the PBC per share. At that point, what she misses in terms of investor valuation is equal to what she gains as subjective valuation of her vision. Before that point, investors overvalue Trika so it's rational to sell additional shares. Beyond that point, investors undervalue Trika so it's rational for the entrepreneur to keep the shares. The discount reflects expected agency cost. As I assume that diversionary PBC are ruled out by corporate law and idiosyncratic PBC minimize distortionary PBC, agency cost reflects the expected divergence between the entrepreneur's vision and investors' goals. For instance, the entrepreneur may choose to undercut e-bikes producers in which the investors have common ownership. ¹¹⁶

I posit that SR investor charges a lower discount $D(\alpha)^{SR}$ than FI investors [$D(\alpha)^{FI}$], in exchange for the entrepreneur's commitment to bring CO2 to zero. The entrepreneur can commit designing a dual-class shares structure that reverts to 1S1V if carbon neutrality is not achieved. If this sunset clause is triggered, the entrepreneur can no longer appropriate PBC. Below are different scenarios simulating the equilibrium sale of noncontrolling stock.

$$D(\alpha)^{FI} = 1.000 - 2k \quad (2)$$

$$D(\alpha)^{SR} = 1.000 - 4.1k \quad (3)$$

$$\frac{PBC}{k} = \frac{50.000}{k} \quad (4)$$

Let us consider FI investors first. To protect her PBC, the entrepreneur could raise at most €500.000 investing as much ($\alpha = 50\%$) with an expected entrepreneurial return of 10% ($\frac{50.000}{500.000}$). Under 1S1V, the entrepreneur cannot raise more funds from FI investors without putting PBC in jeopardy. In this baseline scenario, the expected financial return is zero, because the expected share value is 1.000 and there is no discount on issuance.

Introducing dual class shares, the entrepreneur can improve the entrepreneurial return selling low-voting shares at a discount, while maintaining control. From the combination of (2) and (4), ¹¹⁷ we have the following solution of (1) which is point A in Figure 2:

$$\alpha^* = 444/1000 = 44.4\% \quad A (444; 112)$$

¹¹⁵ This is based on Paces, *supra* note 94. The notation is slightly different in this numerical example. $D(\alpha)$ is the discount per share.

¹¹⁶ This setup reveals that, by giving control to the entrepreneurs, investors commit against common ownership, passing on the cost to their beneficiaries. See *infra* text accompanying notes 133-134.

¹¹⁷ This is the smallest-discount solution of the polynomial equation of the 2nd degree: $-2k^2 + 1.000k - 50.000 = 0$

The entrepreneur retains control with 444 shares at $P = €1000 - €112 = €888$,¹¹⁸ investing €394.272 which gives an entrepreneurial return from PBC of 12.7% (50.000/394.272). The entrepreneur raises from investors €493.728. Because shares are issued at discount, both the investors and the entrepreneur can expect a financial return at least equal to the entrepreneurial return if they take the outside option (developing Trika as a traditional tricycle). However, financial return does not affect decision-making because, ex-ante, the option is out-of-the-money for the entrepreneur. Ex-post, the entrepreneur would take the outside option only if she acknowledged failure (with stock worth less than €1.000 and PBC = 0). Investors can never take the outside option because they do not have control.¹¹⁹ Our entrepreneur is exclusively motivated by the entrepreneurial return, taking a chance at innovating. As the entrepreneur can choose any innovation, she picks the carbon-neutral technology 2 with a 50% probability.

Let us now introduce SR investors. SR investors demand a lower discount as in (3) on condition that the entrepreneur commits to zero CO2. This framing is like the model by Oehmke & Opp, in which SR investor buy shares at a premium to induce the entrepreneur to forgo FI's offer to pick a dirty technology. Here however the 'bribe' is a lower discount and the entrepreneur, not investors, chooses the technology, which is not known ex-ante. To push entrepreneurs away from discovering the high-carbon technology, investors threaten to take away PBC if CO2 are above zero ex-post. To get funding from SR investors, the entrepreneur must commit to technology 2.

From the combination of (3) and (4),¹²⁰ we have the following solution of (1) for SR investors, which is point C in Figure 2:

$$\alpha^* = 174/1000 = 17.4\% \qquad C (174; 287)$$

The entrepreneur retains control with 174 shares at $P = €1000 - €287 = €713$,¹²¹ investing €124.062, which gives an entrepreneurial return from PBC of 40,3% (50.000/124.062). Entrepreneurs raise from SR investors €589.000, which is more than can be raised from FI and almost five times higher than the entrepreneur's committed wealth. Therefore, the financial conditions of SR investors are more attractive than those of FI investors. However, the entrepreneur faces the risk of not being able to cash in her PBC if she fails to develop technology 2. This is riskier than the previous scenario, in which the entrepreneur could secure PBC also by developing the high-carbon technology 1. This risk is fundamental Knightian uncertainty, so it cannot be quantified, but a bold Schumpeterian entrepreneur could take up this challenge.

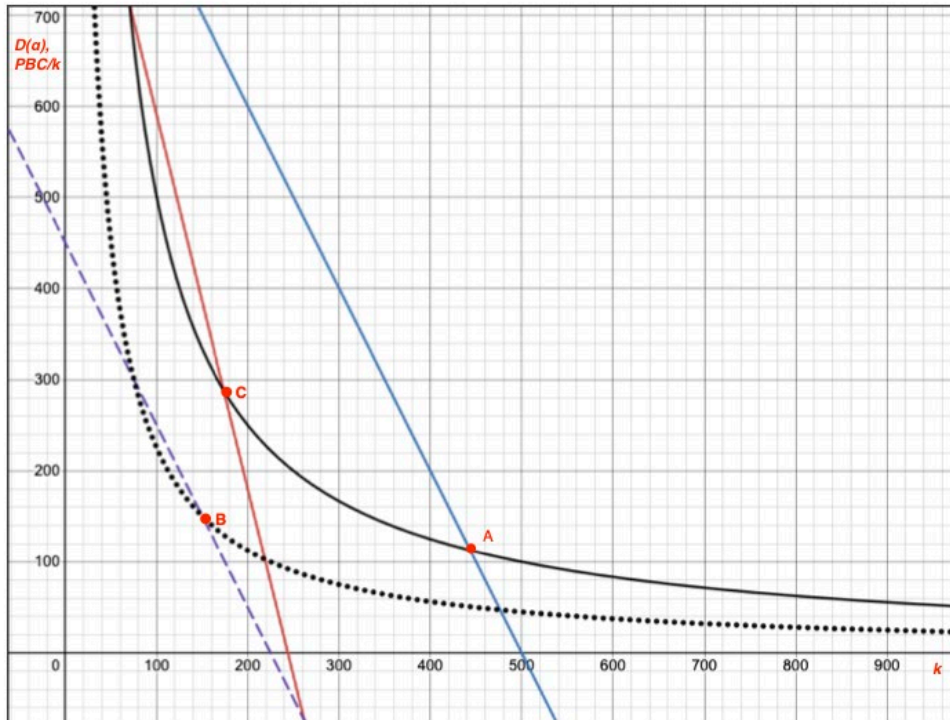
Figure 2

¹¹⁸ The minimum wedge to support control is $w = 1,27 \cong 1,5$.

¹¹⁹ This setup highlights investor commitment against short termism.

¹²⁰ This is the smallest-discount solution of the polynomial equation of the 2nd degree: $-4.1k^2 + 1.000k - 50.000 = 0$

¹²¹ The minimum wedge to support control is $w = 4,75 \cong 5$.



The comparison becomes more interesting if we assume, more realistically, that the entrepreneur is wealth-constrained and invests all her wealth in the company.¹²² Assume, for example, that she has only $W_E = € 130.000$. In this case, she can only take the offer from SR investors. To highlight the trade-off between SR and FI, let's bring the FI offer within reach of the wealth-constrained entrepreneur by reducing the scale of the project (and the number of shares) by 55%. I assume that idiosyncratic PBC decrease in the same proportion as entrepreneurs enjoy scaling their vision. The new FI offer is the dotted line in Figure 2 calculated as follows.

$$D(\alpha)^{FI} = 450 - 2k \tag{5}$$

$$\frac{PBC}{k} = \frac{22.500}{k} \tag{6}$$

From the combination of (5) and (6),¹²³ we have the following solution of (1) for FI investors, which is point B in Figure 2:

$$\alpha^* = 150/450 = 30\% \tag{B (150; 150)}$$

The entrepreneur retains control with 150 shares at $P = €1000 - €150 = €850$,¹²⁴ investing €127.500 which gives an entrepreneurial return from PBC of 17,6% ($22.500/127.500$). The entrepreneur raises from investors €225.000. When funding comes from FI investors, the

¹²² The investment of all the entrepreneur's wealth is a standard assumption in financial contracting, which depends on agency cost. See Jean Tirole, *Corporate Governance*, 69 *ECONOMETRICA* 1 (2001).

¹²³ This is the smallest-discount solution of the polynomial equation of the 2nd degree: $-2k^2 + 450k - 22.500 = 0$.

¹²⁴ The minimum wedge to support control is $w = 2,3333 \cong 2,5$.

downsized project is slightly more attractive because it offers 17.6% entrepreneurial return as opposed to 12.7%. This is a small difference compared with what can be obtained from SR investors. SR investors allow the entrepreneur to more than double the scale of the project keeping her own investment under the budget constraint (€130.000). Consequently, the PBC compensation is higher both in absolute terms (€50.000 vs €22.500) and as rate of return (40.3% vs 17,6%). If the entrepreneur is wealth-constrained, the relevant comparison is between the lower-scale project funded by FI, allowing for two innovative technologies, and the bigger-scale project funded by SR conditional on the carbon neutral-commitment. As both technologies are uncertain and the entrepreneur is indifferent between them, a 122% increase in the scale enabled by SR investors makes it likely that the entrepreneur will accept committing to the zero-carbon technology.

This numerical example supports the following conclusions about dual-class shares. First, protecting idiosyncratic PBC, dual-class shares incentivize entrepreneurs to innovate. Second, conditioning the appropriability of idiosyncratic PBC to CO2 abatement incentivizes the entrepreneur to engage in low-carbon innovation. Third, if the entrepreneur is wealth-constrained, dual class shares allow SR investors to commit to low-carbon innovation funding entrepreneurship on a larger scale than FI investors.

5. Corporate Law to Promote Low-Carbon Innovation

The preceding analysis reveals that both entrepreneurs and institutional investors can commit to low-carbon innovation through dual-class shares. In this section, I explain how corporate law can support this.

To commit entrepreneurs to low-carbon innovation, controlling shareholders must be able to cash in idiosyncratic PBC only if they meet the CO2 target agreed with investors. Investor can achieve this outcome requesting a contingent transfer sunset. If controlling shareholders meet the target, dual-class shares become permanent, and controllers may sell their controlling stake at a premium. If controlling shareholders miss the target, the security voting structure reverts to 1S1V upon controllers selling their shares, effectively disallowing the control premium. Importantly, there is no deadline. Controllers could maintain control indefinitely despite being late with the CO2 target. However, in the meantime, their controlling stake would be illiquid. The only way for controllers to liquidate their investment is to trigger the contingent transfer sunset, acknowledging failure to develop the low-carbon innovation.

The contingent transfer sunset fares better than alternative solutions. The obvious alternative is a time-based sunset, but that is problematic. Firstly, any deadline for innovation to succeed would be arbitrary.¹²⁵ Secondly, a deadline would create a cliff in control rights, incentivizing controllers to perform potentially value-destroying actions as the deadline approaches.¹²⁶ Thirdly, although advocates of time-based sunsets point to

¹²⁵ Zohar Goshen, *Against Mandatory Sunset for Dual Class Firms*, THE CLS BLUE SKY BLOG (Jan. 2, 2019), <https://clsbluesky.law.columbia.edu/2019/01/02/against-mandatory-sunset-for-dual-class-firms/>.

¹²⁶ Fisch & Solomon, *supra* note 11, at 1083-84.

investors' ability to extend the deadline,¹²⁷ extensions are inapplicable to our setting because institutional investors are time inconsistent: as they support hedge funds mistargeting innovation, they are unlikely to extend control rights to fend them off. Noting these problems, Battocletti, Enriques, and Romano propose to sunset the controller's supervoting rights gradually, based on a policy-calibrated algorithm that reduces the wedge over time, depending on CO2 emissions.¹²⁸ A contingent transfer sunset is still preferable because it reflects contracting between sustainability-minded investors and profit-oriented entrepreneurs, rather than inevitably arbitrary regulation. Moreover, this sunset is not only triggered by a delay in CO2 abatement, but also by the controller's exit acknowledging failure (i.e., PBC=0).¹²⁹

Skeptics may object that the contingent transfer sunset is insufficient to commit controlling shareholders. Before the uncertainty about low-carbon innovation is resolved, controllers may extract diversionary PBC (e.g., via tunneling) or reduce their stake, propelling the incentive to extract distortionary PBC (e.g., via perquisites). Alternatively, the contingent transfer sunset may just entrench failing controlling shareholders. These fears are legitimate and likely explain institutional investors' reluctance to deal with controlling shareholders. Corporate law should therefore dissipate these concerns by setting default rules for dual-class shares along the lines sketched out below.¹³⁰

To prevent controllers from inefficiently extracting PBC, it is important to disable an opportunistic increase of the wedge contracted upon with investors. Opportunism does not include raising additional equity funds, which may be necessary to implement the controller's vision, and anyway requires willing buyers of newly issued stock. As opportunistic dilution of the controller's stake may be hard to detect, a divestment sunset is recommended.¹³¹ This sunset is triggered when the controller's stake falls below a specific proportion (by default, the same proportion as at the IPO stage) of the company's equity *as of the IPO*. Imposing the current value of IPO-equity as the trigger's denominator disincentivizes opportunistic exit without undermining capital raising.

Similarly, institutional investors should be able to contract safeguards against diversionary PBC. So far, I have assumed that corporate law and the courts enforcing it are enough to rule them out. However, particularly in the context of innovation, Related Party Transactions (RPTs) are difficult for courts to screen. A procedural check by noncontrolling

¹²⁷ Bebchuk & Kastiel, *supra* note 26, at 623-624.

¹²⁸ Battocletti et al., *supra* note 52.

¹²⁹ See *supra* text accompanying note 119. The contingent transfer sunset is a commitment device comparable to the one proposed by John Armour et al., *Green Pills*, ARIZ. L. REV. (forthcoming 2023). In that article, the authors commit companies to CO2 abatement through a pecuniary private sanction. This article's solution is simpler because idiosyncratic PBCs are only valuable to the controller and do not have a pecuniary equivalent in case of failure. This obviates the problem of strategic behavior to appropriate the sanction.

¹³⁰ These rules should be default because it is arguably cheaper for reputable entrepreneurs to opt out of inefficient contractual safeguards than for unknown entrepreneurs to opt into efficient ones. Conversely, the contingent transfer sunset discussed earlier should be a menu rule because only scarce SR investors may request it. This argument is based on Ian Ayres, *Regulating Opt-Out: An Economic Theory of Altering Rules*, 121 YALE L.J. 2032 (2012).

¹³¹ REDDY, *supra* note 101, at 382-83.

shareholders-dependent (NCS-dependent) directors may fare better.¹³² Institutional investors should get, by default, a minority representation on the board to screen RPTs.

The incentives of controlling shareholders who cannot take out money from the company, neither by selling shares nor by tunnelling, are reasonably aligned with the investor interest. As the low-carbon innovation proves unfeasible, because of incompetence or bad luck, controllers must acknowledge that idiosyncratic PBC are worthless to recoup the value of their investment. This is the interest of noncontrolling shareholders too. As institutional investors do not have control, they depend on the controller's decisions to implement, change, or liquidate the project. It is wrong to assume that investors cannot influence this decision through engagement.¹³³ Investors commit by giving up control, not persuasion. As both controlling and minority shareholders get price signals about the company's future profitability, investors without control (but possibly a board representative) can persuade controlling shareholders to incorporate value-increasing feedback about continuing or terminating the project.¹³⁴ The interest alignment supported by appropriately designed dual-class shares should give investors an additional reason to tie their hands. Investing in controlled companies not only commits investors to low-carbon innovation, but also allows them to deflect allegations of horizontal ownership.

These considerations apply equally to dual-class recapitalizations. With the passage of time, entrepreneurship could not only become less relevant, but also more relevant because vision does not necessarily belong to founders.¹³⁵ In the interest of space, I refrain from extending this article's arguments to the midstream introduction of dual-class shares or increase of their wedge. I only observe that controlling shareholders should be able to issue nonvoting equity for cash, subject to the above safeguards. Unilateral control enhancements based on issuing super-voting shares, which is restricted by US listing rules,¹³⁶ should be allowed subject to a Majority of the Minority vote, effectively enabling institutional investors to request the contractual safeguards. The traditional argument against these recapitalizations was the risk of coercion for dispersed shareholders.¹³⁷ Ownership concentration by institutional investors makes this argument less relevant today. In addition, particularly in Europe, midstream control enhancements are already possible through loyalty shares, which can be introduced without a minority shareholder veto.¹³⁸ Loyalty shares are poor substitutes of dual-class shares because they do not support control

¹³² Paccès, *supra* note 90, at 209-212.

¹³³ Dharmapala & Khanna, *supra* note 75, argue that institutional investors cannot engage with controlled companies to reduce their externalities. They base their argument on the finding that the engagements in Azar et al., *supra* note 71, mainly occurred in countries where controlling shareholders are rare. However, Azar et al.'s results extend beyond actual engagements, as only a subset of them is observable (Paccès, *supra* note 19, at 206-207). Azar et al.'s main result is that institutional ownership reduces CO2 emissions, and this holds true also in countries where controlling shareholders are prevalent.

¹³⁴ See Kobi Kastiel, *Against all Odds: Hedge Fund Activism in Controlled Companies*, 2016 COLUM. BUS. L. REV. 60 (2016); Doron Levit, *Soft Shareholder Activism*, 32 REV. FIN. STUD. 2775 (2019). See also *supra* note 8.

¹³⁵ Goshen, *supra* note 125. See also Baran et al., *supra* note 10 (finding that dual class shares foster innovation when either the founders or investor executives have disproportionate control).

¹³⁶ Stephen M. Bainbridge, *The Short Life and Resurrection of SEC Rule 19C-4*, 69 WASH. U. L. Q. 565 (1991).

¹³⁷ Ronald J. Gilson, *Evaluating Dual Class Common Stock: The Relevance of Substitutes*, 73 VA. L. REV. 807 (1987).

¹³⁸ Marco Becht, *Tenure Voting, Dual Class and ESG* (unpublished manuscript, on file with author) (2023).

premiums and contracting upon them,¹³⁹ which is the main mechanism of sustainable corporate governance advocated by this article.

6. Conclusion

Institutional investors may contribute to sustainable corporate governance making their portfolio companies reduce CO2. However, their impact is insufficient to move companies closer to the Paris agreement's targets because institutional investors cannot commit to low-carbon innovation. Institutional investors catering to climate-conscious beneficiaries may credibly commit to low-carbon innovation tying their hands with dual-class shares.

With dual-class shares, controlling shareholders can contribute their vision to low-carbon innovation while institutional investors allow them to scale this vision. Having at stake welfare-increasing Private Benefits of Control (PBC), as well as all or most of their wealth, controlling shareholders are incentivized to discover low-carbon breakthroughs and to acknowledge failure to do so. Appropriate sunset clauses in corporate law can support this incentive.

¹³⁹ See Claire A. Hill & Alessio M. Paces, *The Neglected Role of Justification Under Uncertainty in Corporate Governance and Finance*, 3 ANN. CORP. GOV. 276, 379-385 (2018) (comparing loyalty shares with dual-class shares).

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