

Controlling Externalities: Ownership Structure and Cross-Firm Externalities

Law Working Paper N° 603/2021

August 2021

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ECGI Working Paper Series in Law

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We thank Dhruv Aggrawal, Luca Enriques, Zohar Goshen, Daniel Hemel, Michael Ohlrogge, Mariana Pargendler, Gabriel Rauterberg, and workshop participants at the University of Chicago for helpful comments, and John Friess and Shreya Ram for outstanding research assistance. We are especially grateful to Jose Azar for kindly providing the country-level data on index funds' environmental engagements, used in the analysis reported in Section II. Dharmapala acknowledges the financial support of the Lee and Brena Freeman Faculty Research Fund at the University of Chicago Law School. Any remaining errors or omissions are our own.

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Abstract

In recent years, debates over the social purpose of corporations have taken center stage amidst rising concern about externalities (such as those associated with climate change and harmful speech) generated by firms. A key motivation is the claim that government regulation and liability regimes appear not to be functioning sufficiently well to force firms to internalize these externalities. There is thus rising interest in exploring alternative mechanisms. In particular, a rapidly growing body of scholarship argues that index funds increasingly approximate diversified “universal owners” with incentives to maximize portfolio value (and thus to internalize cross-firm externalities). However, much of this analysis has focused on diffusely held US firms, while most firms in the world (including many important firms in the US), and many firms thought to be large contributors to these externalities, are controlled firms. Could index funds influence such firms to internalize externalities; if not, what other options might we consider?

This paper examines these related questions within a more general conceptual framework for understanding how firms’ ownership structure and corporate law affect the internalization of cross-firm externalities. First, we provide novel empirical evidence suggesting that index funds are not well positioned to force controlled firms to internalize their cross-firm externalities (in particular, that index funds’ environmental engagements are concentrated among firms in countries with dispersed ownership structures). Second, we document that controlling shareholders are common among the largest firms in the energy, automobile, and technology sectors. Third, we explore the incentives of controllers by introducing the concept of “controller wealth concentration” (CWC): the fraction of a controller’s aggregate personal wealth that consists of stock in the firm that she controls. The lower the CWC the more scope there is for the controller to hold investments in other firms affected by the externalities created by the controlled firm. A low CWC is a necessary (though not sufficient) condition for controllers to have a pecuniary incentive to take cross-firm externalities into account (indeed, controllers with low CWC may be more effective than index funds in getting controlled firms to internalize their externalities because of their status as controllers). Fourth, we construct measures of CWC for the controlling shareholders of a global sample of large technology-focused firms. For this sample, CWC is very high relative to that of a diversified portfolio, typically varying from about 50% to close to 100%, despite the existence of controlling minority ownership structures (CMS) – such as dual class stock – that permit controlling shareholders to exert control while holding modest cash flow rights. Thus, we conclude that undiversified controlling shareholders constitute a significant obstacle to the internalization of cross-firm externalities, limiting the ability of universal owners to encourage their investee firms to internalize such externalities. Are there then steps that can be taken to encourage controllers to diversify more?

Our framework suggests that, in principle, dual class structures (and other CMS) have the hitherto ignored advantage of allowing controllers to diversify their personal wealth (thereby potentially mitigating cross-firm externalities). Yet, we find that controllers do not typically diversify and lower their CWC even when they maintain control through dual class structures or other CMS. We discuss possible reasons - including founders’ over-optimism about their firms, the need to incentivize founders’ ongoing effort, and founders’ incentives to defer capital gains taxes – to explain why controllers fail to diversify. We then discuss other measures that might encourage controllers to diversify, but conclude that they are unlikely to have very large effects.

Globally, a large fraction of corporations have controlled ownership structures. For these firms, the lack of controller diversification makes it difficult to identify mechanisms to internalize corporate externalities, besides increasing regulation and enhancing liability (although these solutions present their own challenges).

Keywords: Controlling shareholders, Externalities, Diversification, Dual class stock, Index funds, Environmental engagements

JEL Classifications: K22; G34; H23

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CONTROLLING EXTERNALITIES: OWNERSHIP STRUCTURE AND CROSS-FIRM EXTERNALITIES

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August 2021

Abstract

In recent years, debates over the social purpose of corporations have taken center stage amidst rising concern about externalities (such as those associated with climate change and harmful speech) generated by firms. A key motivation is the claim that government regulation and liability regimes appear not to be functioning sufficiently well to force firms to internalize these externalities. There is thus rising interest in exploring alternative mechanisms. In particular, a rapidly growing body of scholarship argues that index funds increasingly approximate diversified “universal owners” with incentives to maximize portfolio value (and thus to internalize cross-firm externalities). However, much of this analysis has focused on diffusely held US firms, while most firms in the world (including many important firms in the US), and many firms thought to be large contributors to these externalities, are controlled firms. Could index funds influence such firms to internalize externalities; if not, what other options might we consider?

This paper examines these related questions within a more general conceptual framework for understanding how firms’ ownership structure and corporate law affect the internalization of cross-firm externalities. First, we provide novel empirical evidence suggesting that index funds are not well positioned to force controlled firms to internalize their cross-firm externalities (in particular, that index funds’ environmental engagements are concentrated among firms in countries with dispersed ownership structures). Second, we document that controlling shareholders are common among the largest firms in the energy, automobile, and technology sectors. Third, we explore the incentives of controllers by introducing the concept of “controller wealth concentration” (CWC): the fraction of a controller’s aggregate personal wealth that consists of stock in the firm that she controls. The lower the CWC the more scope there is for the controller to hold investments in other firms affected by the externalities created by the controlled firm. A low CWC is a necessary (though not sufficient) condition for controllers to have a pecuniary incentive to take cross-firm externalities into account (indeed, controllers with low

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CWC may be more effective than index funds in getting controlled firms to internalize their externalities because of their status as controllers). Fourth, we construct measures of CWC for the controlling shareholders of a global sample of large technology-focused firms. For this sample, CWC is very high relative to that of a diversified portfolio, typically varying from about 50% to close to 100%, despite the existence of controlling minority ownership structures (CMS) – such as dual class stock – that permit controlling shareholders to exert control while holding modest cash flow rights. Thus, we conclude that undiversified controlling shareholders constitute a significant obstacle to the internalization of cross-firm externalities, limiting the ability of universal owners to encourage their investee firms to internalize such externalities. Are there then steps that can be taken to encourage controllers to diversify more?

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I. INTRODUCTION

In the last decade, debates over core aspects of the corporation have taken center stage across multiple fields of scholarly inquiry. Topics as fundamental as the corporation's purpose, the rise and impact of corporate social responsibility, and the effects of increased institutional ownership have dominated both scholarly and political discussions.¹ Although there are many motivations for this renewed attention, a critical one is rising concern about externalities generated by firms. The canonical example of such externalities involves activities giving rise to climate change and other adverse environmental consequences, although there are other significant examples as well (such as what many view as the role of some digital platform firms in facilitating hate speech and undermining democratic political systems).² As the harms from externalities grow and concerns over effective government regulation mount there has been a growing emphasis on alternative mechanisms that may induce firms to internalize externalities.

Indeed, increasing attention is being paid to the potential of large index funds to play a role. A rapidly growing body of scholarship has noted that a handful of index funds own increasingly large stakes in publicly traded firms in the U.S. and are beginning to approximate fully diversified

¹ As one example of a vast literature, see Colin Mayer "Reinventing the Corporation" *Journal of the British Academy*, 4, 53–72 (2016).

² e.g. Siva Vaidhyanathan *Antisocial media: How Facebook disconnects us and undermines democracy*. Oxford University Press, 2018.

investors (i.e., what are sometimes termed “universal owners”). Diversified investors care about the overall value of their portfolio, rather than about the value of any particular firm in isolation. This leads them to care about cross-firm externalities: a negative externality generated by one firm in their portfolio that may reduce the value of other firms in their portfolio (for instance, those adversely affected by climate change).³ Thus, diversified investors will seek – where feasible – to induce firms’ managers to take account of externalities that affect other portfolio firms.⁴ There has been extensive debate among scholars about whether index funds have the incentives and capability to act in this way in diffusely held US firms. However, most firms across the world (and many large ones in the US) are controlled firms.⁵ One need only look at the FANG firms (Facebook, Amazon, Netflix and Google), which represent around 13% of the market capitalization of the S&P 500 in 2021, to see that they are *all* dominated by controlling shareholders.⁶ Indeed, considered in the aggregate and across the world, controlled firms probably matter more for generating (and, potentially, for controlling) externalities than diffusely held firms.⁷

Given the importance of controlled firms to addressing externalities, we explore two fundamental, yet largely unexamined questions, in this paper. First, do index funds (or universal owners) have the incentives and capability to influence the behavior of *controlled* firms with respect to these externalities; second, if not (as one might suspect), then what other measures might be available to encourage controllers to take into account the externalities their firms generate? Through this two-step inquiry we set the stage for developing a more general conceptual framework for understanding how firms’ ownership structure and corporate law affect the internalization of cross-firm externalities. This contributes to the existing scholarship by analyzing a different set of legal and economic mechanisms, hitherto largely ignored, through which these externalities may (or, more pertinently, may not) be internalized.

³ See e.g. Simon Dietz, Alex Bowen, Charlie Dixon, and Philip Gradwell. “Climate value at risk’ of global financial assets.” *Nature Climate Change* 6, no. 7, 676-679 (2016).

⁴ See Hansen, Robert G., and John R. Lott Jr. “Externalities and corporate objectives in a world with diversified shareholder/consumers.” *Journal of Financial and Quantitative Analysis* (1996): 43-68; Anabtawi, Iman. “Some skepticism about increasing shareholder power.” *UCLA L. Rev.* 53 (2005): 561-599; Coffee, John C. “The Future of Disclosure: ESG, Common Ownership, and Systematic Risk.” *European Corporate Governance Institute-Law Working Paper* (2020); Condon, Madison, 2020. “Externalities and the Common Owner”, 95 *Washington Law Review* 1; Gordon, Jeffrey N. “Systematic Stewardship.” *Columbia Law and Economics Working Paper* 640 (2021).

⁵ For evidence on the prevalence of controlled ownership structures, see e.g. La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer. “Corporate ownership around the world.” *The journal of finance* 54, no. 2 (1999): 471-517; Faccio, Mara, and Larry H.P. Lang. “The ultimate ownership of Western European corporations.” *Journal of financial economics* 65, no. 3 (2002): 365-395; Aminadav, Gur, and Elias Papaioannou. “Corporate control around the world.” *The Journal of Finance* 75, no. 3 (2020): 1191-1246.

⁶ See discussion and evidence cited in Section III *infra*. The original source of the FANG acronym (now FAANG to reflect the addition of Apple) is Jim Cramer from MSNBC in 2013, see *Cramer: Does Your Portfolio Have FANGs?*, MAD MONEY, Feb, 05, 2013, available at: <https://www.cnbc.com/id/100436754>. If we include Microsoft and Apple in the FANG grouping then these six firms represent around 25% of the S&P 500 by market capitalization by the middle of 2021. See Edward Yardeni and Joe Abbott *Stock Market Briefing: FAANGMs*, July 2, 2021, available at: <https://www.yardeni.com/pub/faangms.pdf>.

⁷ See Armour, Enrique and Wetzer, July 02, 2021 blog (<https://www.law.ox.ac.uk/business-law-blog/blog/2021/07/corporate-carbon-reduction-pledges-beyond-greenwashing>) which cites to <https://climateaccountability.org/carbonmajors.html>.

We start with the first question – what are the incentives and capabilities of universal owners with respect to internalizing externalities? As noted earlier, the argument that diversified index funds will seek to internalize cross-firm externalities in diffusely held US firms has been formulated conceptually by a number of scholars,⁸ but many other scholars have also expressed skepticism that index funds have the incentives to have much impact.⁹ Empirically, a powerful source of evidence for this “universal owner” theory is a study by Professors Azar et al.¹⁰ They collect data on engagements by the “Big Three” index funds (BlackRock, Vanguard, and State Street Global Advisors) with firms on climate-related environmental issues, and find that Big Three ownership and engagements are associated with lower carbon dioxide (CO₂) emissions. In order to motivate our concern with ownership structure, we use this data on Big Three environmental engagements at the country level to establish that the engagements are strongly concentrated among firms in countries with relatively dispersed ownership structures, controlling for a variety of potentially relevant factors.¹¹ This suggests an important limitation of the “universal owner” theory – namely, that the ability of index funds to affect firm behavior (via engagements or other means) may be quite limited in the presence of a controlling blockholder.¹²

⁸ See fn. 4.

⁹ See e.g. Morley, John D., Too Big to Be Activist. 92 Southern California Law Review 1407 (2018); Christie, Anna, “The Agency Costs of Sustainable Capitalism” (January 13, 2021). UC Davis Law Review, Vol. 55, No. 2, 2021, Forthcoming, University of Cambridge Faculty of Law Research Paper No. 7/2021, Available at SSRN: <https://ssrn.com/abstract=3766478>; Giovanni Strampelli “Can BlackRock Save the Planet? The Institutional Investors’ role in Stakeholder Capitalism” *Harvard Business Law Review*, forthcoming.

¹⁰ Azar, José, Miguel Duro, Igor Kadach, and Gaizka Ormazabal. “The big three and corporate carbon emissions around the world.” *Journal of Financial Economics* (forthcoming, 2021).

¹¹ We are grateful to Jose Azar for kindly providing the country-level data on index funds’ environmental engagements.

¹² In prior and contemporaneous work, a few scholars have expressed doubts that index funds are likely to influence behavior at firms with controlling blockholders. The most direct statement of this point is in a recent blog post by Alperen Afsin Gozlugol, “Controlling Shareholders: Missing Link in the Sustainability Debate?”, Oxford Business Law Blog, 16 July, 2021, available at: <https://www.law.ox.ac.uk/business-law-blog/blog/2021/07/controlling-shareholders-missing-link-sustainability-debate>. However, its focus is primarily on the futility of directors’ duties and other corporate law mechanisms, rather than the implications of controlling shareholders for the universal owner theory. It provides no empirical evidence (as we do on environmental engagements) or descriptive statistics on the importance of controlling shareholders, and does not address the role of CMS structures. Professors Enriques and Romano examine the links between externalities and dual class stock – as we do – but their focus is on the idea that dual class stock insulates insiders from the preferences of index funds and thus signals a commitment to maximizing firm (rather than portfolio) value, whereas we emphasize that dual class stock can, in principle, decouple cash flow and control rights in a way that allows controller diversification. See Enriques, Luca and Romano, Alessandro, “Rewiring Corporate Law for an Interconnected World” (February 1, 2021). European Corporate Governance Institute - Law Working Paper No. 572/2021, Forthcoming, Arizona Law Review, Issue 64:1, Available at SSRN: <https://ssrn.com/abstract=3814822>. Professor Puchniak argues that stewardship codes adopted in the UK are inapplicable in countries with controlled ownership structures; while this point is related to ours, it is formulated only in the specific context of stewardship codes. See Dan W. Puchniak, The False Hope of Stewardship in the Context of Controlling Shareholders: Making Sense Out of the Global Transplant of a Legal Misfit (May 19, 2021). American Journal of Comparative Law (Forthcoming), European Corporate Governance Institute - Law Working Paper No. 589/2021, Available at SSRN: <https://ssrn.com/abstract=3858339> or <http://dx.doi.org/10.2139/ssrn.3858339>. Professor Lim highlights governments’ conflicted objectives when they act both as regulators and concentrated owners (of SOEs), but studies only the SOE context. See Ernest W. K. Lim, “Concentrated Ownership, State-Owned Enterprises and Corporate Governance”, 41 Oxford Journal of Legal Studies *forthcoming* (2021). Thus, none of this literature has provided empirical evidence on the limits of index fund influence over controlled firms, nor the general conceptual framework that we develop for analyzing the impact of ownership structure on the creation and control of externalities.

Moreover, to illustrate the potential relevance of this limitation, we use publicly available data sources to document that controlling shareholders are very common among the largest firms at the global level in the energy, automobile, and technology sectors (the sectors that are often associated with significant externalities).

If index funds are unlikely to influence the behavior of controlled firms, then what other measures might be taken to encourage controllers to internalize at least some of the externalities created by their firms? Answering this question will require a deeper appreciation of the incentives of controllers with respect to externalities. To do that, we introduce a concept that we term “controller wealth concentration” (CWC). This is defined as the fraction of a controller’s aggregate personal wealth that consists of stock in the firm that she controls. We argue that a controlling shareholder’s CWC is a crucial determinant of the extent to which she is likely to internalize externalities (absent personal intrinsic motivation).¹³ In particular, a controller whose wealth consists entirely of stock in her controlled firm has little pecuniary incentive to avoid activities that adversely affect the value of other firms (except to the extent that avoiding such activities increases the value of the controlled firm itself, for instance by generating goodwill). On the other hand, a controller whose personal wealth consists mostly of a diversified portfolio of other firms will be more in the position of an “universal owner” who cares (mostly) about portfolio value. She will thus wish to choose policies for the controlled firm that take account of cross-firm externalities (and moreover, as a controller, is well positioned to influence the behavior of the controlled firm). Thus, if controllers are diversified (i.e., those with low CWC) then they are more likely to internalize at least some of the cross-firm externalities generated by their controlled firms.

What does the evidence then say about the actual level of CWC? Using publicly available data sources, we construct measures of CWC for the controlling shareholders of a global sample of 25 large and important technology-focused firms. In general, CWC is typically very high relative to that of a diversified portfolio, varying from about 50% to close to 100%. For instance, the controlling shareholders of Amazon and Facebook have CWC of over 90%. This situation prevails despite the existence of controlling minority ownership structures (generally termed CMS) – such as dual class stock – that permit controlling shareholders to exert control while holding modest cash flow rights. Thus, we observe primarily undiversified controllers, which should make it less likely that they will internalize cross-firm externalities.

We then consider certain measures that might facilitate the diversification of the controllers’ interests, thereby encouraging them to internalize cross-firm externalities. Before delving into that, we think it pertinent to note that one contribution of our framework is that it shows that the existence of cross-firm externalities fundamentally transforms how we should understand some of the most basic issues in corporate governance. For instance, a large literature in corporate law and governance has detailed the negative consequences of the divergence between cash flow rights and control rights typically associated with CMS. In particular, it is widely (and quite reasonably) thought that such a divergence creates incentives for controllers to engage in self-dealing transactions and to extract pecuniary private benefits of control (by, for instance, “tunneling” from the controlled firm to other related firms in which the controller holds larger cash

¹³ We also define a related concept – the controller’s delta – that represents the change in a controller’s personal wealth when the value of her controlled firm increases by a dollar (taking account of any externalities that this increase in value imposes on other firms).

flow rights).¹⁴ Thus, for example, there has been a heated debate about whether a dual class structure (used typically to entrench founder control, and a particularly prominent CMS, especially among US firms) is normatively desirable.¹⁵ In contrast, within our framework, a dual class structure gives the controller the opportunity to diversify her personal wealth. A controller who does so (while facing greater incentives for self-dealing, as in the conventional account) also faces stronger incentives to internalize cross-firm externalities.¹⁶ We then present a simple example that illustrates the inefficiency that arises when an undiversified controller chooses firm policies that reduce aggregate shareholder wealth across the economy by failing to internalize cross-firm externalities (for instance, under a legal regime that mandates one-share-one-vote (OSOV)). In principle, a legal regime that permits the issuance of dual class stock can mitigate this inefficiency.

Our analysis suggests that dual class structures create an opportunity for more diversified controllers (and thus have some under-appreciated advantages), but our data suggests that controllers typically do not avail themselves of this opportunity. For instance, Facebook's controller has a CWC of over 90%, despite Facebook's dual class structure. We then explore various possible explanations that, our framework suggests, may limit the extent to which controllers diversify, even when a CMS is available. These include founders' over-optimism about their firms, shareholders' desire to limit the extraction by controllers of pecuniary private benefits of control, the need to incentivize founders' ongoing effort, and founders' incentives to defer capital gains taxes. We discuss potential reforms that may motivate controllers to diversify their holdings, but ultimately conclude that these are likely to have only modest effects on controllers' incentives to internalize externalities.

The premise of the current literature on cross-firm externalities is that government failures and political dysfunction preclude the choice of socially optimal public policies to control corporate externalities. It is thus imperative, in this view, that viable alternative mechanisms emerge to internalize these externalities in this "second best" world. The "universal owner" perspective entails that the growth of index fund ownership provides precisely such a mechanism. However, the evidence we present suggests that the influence of index funds on portfolio firms' behavior is likely to be confined mostly to firms with no controlling shareholder. We then provide a broader perspective that encompasses controlled firms, which are of enormous importance globally, but are also very significant in the United States. In principle, diversified controlling shareholders can serve a similar internalization function as index funds, and would (if they so

¹⁴ See e.g. Bebchuk, Lucian A., Reinier H. Kraakman and George Triantis, 2000. "Stock Pyramids, Cross-Ownership and Dual Class Equity: The Mechanisms and Agency Costs of Separating Control From Cash-Flow Rights", in *Concentrated Corporate Ownership* (R. Morek, ed.), pp. 445-460; Masulis, Ronald W., Cong Wang and Fei Xie, 2009. "Agency Problems at Dual-Class Companies", 64 *Journal of Finance* 1697; Adams, Renee and Daniel Ferreira, 2008. "One Share-One Vote: The Empirical Evidence", 12 *Review of Finance* 51.

¹⁵ See e.g. Gompers, Paul A., Joy Ishii, and Andrew Metrick. "Extreme governance: An analysis of dual-class firms in the United States." *The Review of Financial Studies* 23, no. 3 (2010): 1051-1088 for empirical evidence, and Bebchuk, Lucian A., and Kobi Kastiel. "The untenable case for perpetual dual-class stock." 103 *Va. L. Rev.* 585 (2017): for a normative discussion.

¹⁶ Despite the emphasis in the discussion so far on negative externalities, such as those typically associated with climate change, the analysis above can be straightforwardly extended to the case of positive externalities. In principle, it is possible that firms may generate positive externalities for each other. Then, an undiversified controller (with high CWC) would fail to internalize these positive externalities and choose too low a level of activity for her firm. Inducing the controller to diversify would lead her to internalize these externalities and therefore to increase her firm's activity level.

choose) be substantially more effective than index funds in influencing firms' behavior. However, examples of diversified controllers seem to be rare, and the potential policy levers for encouraging controller diversification are limited. This suggests that the potential for "universal ownership" via index funds to solve the pressing problems of corporate externalities is severely constrained in a world where controlling ownership structures play an important role.

Before proceeding, we note that four fairly significant issues are bracketed in our analysis. One concerns the rather special (albeit widely-discussed) class of externalities involving product market competition. Here, the internalization of cross-firm externalities involves reductions in product market competition and reduces social welfare through the impact on other parties (such as consumers) whose welfare is impacted in the opposite direction to the relevant publicly-traded entities.¹⁷ In contrast, we focus on the case where – even though much of the externality may not be reflected in stock market values because some of the impact is on parties that are not listed firms – the stock market effects of the external harm are in the same direction as for entities outside the market. Because of this difference, our analysis would apply in reverse in the product market context. That is, ownership and control by undiversified controlling shareholders would be beneficial, as it impedes the internalization of product market externalities. Policy would aim to prevent these controllers from diversifying their portfolios. Our framework can thus shed some light on the product market context, even though it is not our primary focus.

Second, we do not directly address the case of state-owned enterprises (SOEs), where governmental entities are the controlling shareholders of publicly-traded corporations. It might be thought that political mechanisms, rather than pecuniary incentives, would be most determinative of whether SOEs take account of external harms.¹⁸ On the other hand, the basic premise of the literature on cross-firm externalities is that governments have failed to choose socially optimal public policies to control corporate externalities. Thus, one might not have much faith that political mechanisms would lead to the internalization of externalities. In any event, we do not focus on the SOE setting in our discussion.

Third, we do not discuss situations in which index funds might influence controlled firms in ways besides visible voting contests or engagements. There is mounting evidence in the context of diffusely held firms that index funds may often achieve certain goals without needing to proceed through (or complete or even win) a salient voting contest or engagement.¹⁹ These sorts of "behind-the-scenes" deals or successes may be likely with controlled firms as well for a number of reasons.²⁰ For instance, the controller might be interested in the views of index funds (outside of voting outcomes) because such funds may be important in raising capital at some other point in

¹⁷ See e.g. Azar, José, Martin C. Schmalz, and Isabel Tecu, 2018. "Anticompetitive Effects of Common Ownership", 73 *Journal of Finance* 1513; Posner, Eric A., Fiona M. Scott Morton, and Eric Glen Weyl, 2017. "A Proposal to Limit the Anti-Competitive Power of Institutional Investors", 81 *Antitrust Law Journal* 669.

¹⁸ See Lim, supra note 12.

¹⁹ See William T. Allen, Reinier H. Kraakman and Vikramaditya S. Khanna, *Commentaries and Cases on the Law of Business Organization* at 6.9.3.2 (6th edition, Wolters Kluwer, 2021); Michael Garland, Jennifer Conovitz, and Yumi Narita, *NYC's Comptroller Boardroom Accountability 3.0 Results*, Harv. L. School Forum on Corp. Gov., June 24, 2020. Available at: <https://corpgov.law.harvard.edu/2020/06/24/nyc-comptrollers-boardroom-accountability-3-0-results/>.

²⁰ See Kobi Kastiel "Against All Odds: Hedge Fund Activism in Controlled Companies", 1 *Columbia Business Law Review* 60 (2016).

time, the funds may have stakes (or be able to influence those with stakes) in the controller's other firms or investments, or the funds may be socially or politically salient enough that they can influence the reputation of the firm and the controller in important ways or even influence regulation. In our analysis, we do not address these alternative ways in which index funds might be important because these deals are difficult to observe and they seem sufficiently idiosyncratic that they do not seem to provide a reliable basis for expecting index funds to facilitate the internalization of cross-firm externalities.

Finally, we do not directly discuss in any depth conglomerate firms or diversified business groups, which are ubiquitous in many parts of the world. Conglomerate enterprises operate in various different industries, thereby partially replicating a controller with a more diversified portfolio (even when the controller's wealth is concentrated in the business group). Our framework suggests that these structures may have some under-appreciated advantages, but it should be noted that these structures often exist in legal and economic environments quite different from those in the United States.

Part II outlines the emerging "universal owner" theory of the internalization of cross-firm externalities by index funds. It then reports novel empirical evidence on the relationship between index funds' environmental engagements and corporate ownership structure. It also reports some descriptive statistics highlighting the prevalence of controlled ownership structures among large firms in relevant sectors. Part III introduces the concept of CWC and provides descriptive empirical evidence on the magnitude of CWC in a sample of major firms. We then develop a simple example showing how CMS can enhance the likelihood that controllers diversify their personal portfolios. Part IV provides a general discussion of the implications, and Part V concludes.

II. INTERNALIZING EXTERNALITIES

A. *Traditional Approaches to Internalizing Externalities*

Firm-generated externalities are quite common and have attracted widespread attention. The canonical example that has been extensively discussed relates to environmental spillovers, for instance from pollution or from activities that contribute to climate change. The economic impact of these spillovers is generally estimated to be very large. Of course, much of this impact falls outside the subset of firms listed on stock exchanges (for instance, on individuals or on privately-held firms). However, some of the costs are borne by publicly-traded firms and so are reflected in the value of the securities that they issue.²¹ For example, a recent study by Professors Dietz et al. estimates that the "value at risk" of global financial assets due to climate change is quite substantial. As they explain,

“[T]here are two principal ways in which climate change can affect the value of financial assets. First, it can directly destroy or accelerate the depreciation of capital assets, for example through its connection with extreme weather events. Second, it can change

²¹ Moreover, some of the impacts that fall directly on individuals and private firms may indirectly affect the profitability of listed firms (e.g., if a decline in individual consumers' incomes due to climate change reduces demand for products produced by listed firms).

(usually reduce) the outputs achievable with given inputs, which amounts to a change in the return on capital assets, in the productivity of knowledge, and/or in labour productivity and hence wages”²²

Other types of externalities have also been discussed widely in recent years. One currently prominent line of argument is that some digital platform firms may create harms by facilitating hate speech targeting ethnic minorities. Another is that they may make possible the sharing of conspiracy theories and misinformation,²³ thereby undermining democracy and contributing to the recent widely-documented phenomenon of the erosion of democratic values and practices and the rise of elected strongmen.²⁴ Typically, the harms – if they exist - from these activities are borne by natural persons who do not issue publicly-traded stock, such as the victims of hate crimes that are encouraged by online hate speech and ordinary citizens who suffer from the erosion of democracy and the rule of law. However, it is possible that some component of these externalities may affect the value of financial assets. For instance, online hate speech may make it more difficult for firms to coordinate their ethnically diverse workforces, thereby reducing labor productivity. The erosion of the rule of law may make political connections more important and reduce the value of firms that are less willing or able to cultivate political ties.

External effects are thus potentially important, and their diffuse nature creates high transaction costs that make Coasean bargaining impractical.²⁵ The traditional approach to addressing such externalities is the Pigouvian tax – a tax imposed on firms that reflects the social cost of the externalities they generate.²⁶ In most real world contexts, however, it is very difficult to impose the appropriate Pigouvian tax because, among other reasons, information costs may be prohibitive, and administering such taxes is likely to involve substantial costs including enforcement and evasion costs. In light of this, ex post liability regimes (such as tort law) and ex ante regulation are widely used. The strengths and weaknesses of such regimes have been copiously discussed in the law and economics literature.²⁷

The overall sense in the literature is that, in practice, governments have failed to use instruments such as Pigouvian taxes, liability, and regulation to sufficiently internalize externalities, for a variety of administrative and political reasons. Thus, the full social costs associated with many externalities are thought to not be internalized by firms. This has led to a

²² Dietz et al. op cit. fn X at p. 676.

²³ A particularly topical form of misinformation currently being spread via social media concerns the COVID-19 vaccine and related issues. See e.g. Hartley, Kris, and Minh Khuong Vu. "Fighting fake news in the COVID-19 era: policy insights from an equilibrium model." *Policy Sciences* 53, no. 4 (2020): 735-758.

²⁴ Vaidhyathan op cit. fn X. See also Huq, Aziz, and Tom Ginsburg. "How to lose a constitutional democracy." *UCLA L. Rev.* 65 (2018): 78.

²⁵ COASE, RH. "The Problem of Social Cost." *Journal of Law and Economics* 3 (1960): 1-44.

²⁶ See e.g. Masur, Jonathan S., and Eric A. Posner. "Toward a Pigouvian state." *U. Pa. L. Rev.* 164 (2015): 93.

²⁷ Shavell, Steven. "Liability for Harm versus Regulation of Safety." *The Journal of Legal Studies* 13, no. 2 (1984): 357-374. Importantly (although this is rarely made explicit in the law and economics literature), analyzing the impact of these legal regimes requires some assumptions to be made about the ownership structure of firms. This literature appears to assume implicitly that the firm's owners have limited incentives besides those provided by these regimes to internalize the costs of the externalities. This is consistent with assuming that firms are owned by undiversified owner-managers who hold no other assets: for such shareholders, the costs of the externality are not visited upon them absent tax, liability, regulation or reputational effects. For a broader discussion along these lines see Vikramaditya Khanna, *The Delicate Dance of Corporate Liability and Ownership Structure*, Draft, 2021.

search for alternative mechanisms that hold the promise of inducing firms to internalize externalities. The most prominent of these is associated with the rise of index funds, which own shares in firms in an index that seeks to mimic the market (or a subset thereof). It is to their incentives that we now turn.

B. The “Universal Owner” Theory: Index Funds and Externalities

The literature on how index funds (and large asset managers) impact firm externalities has grown substantially in the last few years. Indeed, there has been an outpouring of scholarship putting forward arguments for how index fund common ownership might be beneficial in reducing certain kinds of externalities (e.g., climate change related externalities). This general point about the incentives of “universal owners” has been understood for a long time, and is explained as follows by Professor Anabtawi:²⁸

“[U]niversal owners can be expected to feel the impact of actions by one company in their portfolio on their other portfolio companies. In other words, through its extensive holdings, the universal shareholder internalizes many of the externalities generated by the companies in which it invests. Universal owners are thus likely to favor activities of firms in which they own shares that minimize negative externalities . . . to the extent that those activities impose costs on . . . other firms in which they own an interest.”

More recently, scholars have sought to identify the theoretical construct of “universal owners” with index funds, especially the “Big Three” funds (BlackRock, Vanguard, and State Street Global Advisors). Professor Coffee analyzes the growing demand among index funds for Environmental, Social and Governance (ESG) disclosures, and attributes this phenomenon to a situation in which “high common ownership enables institutions to take collective action to curb externalities caused by portfolio firms, so long as the gains to their portfolio from such action exceed the losses caused to the externality-creating firms.”²⁹ In a related but somewhat distinct contribution – based on Modern Portfolio Theory rather than the theory of externalities – Professor Gordon conceptualizes the role of index funds as being to engage in what he terms “systematic stewardship.” As diversified owners, index funds care little about the idiosyncratic risk that is specific to individual firms, but do care about systematic or market-wide risks that affect their entire portfolio. Thus, index fund managers should pursue engagement with firms not in order to increase firm-specific value, but rather to reduce firms’ contribution to systematic risks (such as those arising from climate change).

There is an active debate about whether index funds, in reality, have sufficiently strong incentives to pursue this vision of portfolio value maximization and systematic stewardship. For instance, as Bebchuk, Cohen, and Hirst argue such stewardship entails monitoring and engagement costs, and there may be agency costs between the index fund manager and the accountholders.³⁰

²⁸ Anabtawi op. cit. fn X at 585.

²⁹ Coffee op cit. fn. X at p. ii.

³⁰ See e.g. Bebchuk, Lucian A., Alma Cohen, and Scott Hirst. "The agency problems of institutional investors." *Journal of Economic Perspectives* 31, no. 3 (2017): 89-102. Note that index funds *per se* do not make decisions - their investment advisors do, and their incentives are not the same as those of a person who owns the index fund. For example, a \$1 billion rise in the fund’s value does not usually translate into a \$1 billion rise in the advisor’s fees. Fees for most index funds are very small – indeed, that is one of the key features on which they

While critics of the “universal owner” perspective have raised some cogent points, we do not take a stand on this question.³¹ Instead, we accept the universal owner theory’s premises, while confronting this perspective with the reality of a world in which concentrated ownership and controlling blockholders are widespread phenomena.

A question that is important for our analysis is whether index funds may be influential in determining behavior even at controlled firms with undiversified controllers. On *a priori* grounds, it may seem that the likely scope of index fund activism or engagement at controlled firms is more muted than at firms with dispersed ownership because the controller will ultimately decide what happens at the firm.³² Index funds could threaten to sell all or some of their shares if the controller resists certain suggestions, but given that index funds are supposed to hold a representative sample of the market that threat seems not entirely credible. While these considerations suggest that index fund engagement may have limited efficacy in controlled firms, we provide some novel empirical evidence below suggesting the importance of this idea.

Before proceeding to our empirical analysis we note some of the important and emerging body of empirical evidence that is broadly consistent with the claims of the universal owner theory. Professors Dyck et al. find a positive relationship between institutional ownership and firms’ environmental and social performance across 41 countries; they argue for a causal interpretation of this relationship.³³ Professors Chen, Dong and Lin analyze the impact on measures of firms’ corporate social responsibility (CSR) of exogenous increases in institutional ownership associated with reconstitutions of the Russell index.³⁴ They find that increases in institutional ownership lead to improved CSR performance, consistent with a view that index funds encourage firms to take account of externalities.

Perhaps the most direct evidence for the theory is that provided by Professors Azar et al.³⁵ They collect data on engagements by the “Big Three” index funds (BlackRock, Vanguard, and State Street Global Advisors) on climate-related environmental issues in 2018 and 2019, using the fund sponsors’ public disclosures, across a global sample of firms. They also construct a dataset of firm-level carbon dioxide (CO₂) emissions over 2005-2018. Using this data, they find that Big

compete – so that changes in the value of the fund (e.g., holdings in one industry) may not have as significant an impact on the size of the advisor’s fees and may not be worth the costs of these actions.

³¹ Barzuza, Michal, Quinn Curtis, and David H. Webber "Shareholder Value (s): Index Fund ESG Activism and the New Millennial Corporate Governance." (2019) argue that index funds’ increasing focus on climate change and on corporate social responsibility more generally is driven by the demands for socially responsible investing among the younger generation of investors (accountholders), rather than by considerations of internalization of externalities.

³² A recent study argues that Stewardship Codes are likely to be ineffective in countries with primarily controlled firms. See Puchniak, *supra* note 13. See also Christie, *supra* note 9.

³³ Dyck, Alexander, Karl V. Lins, Lukas Roth, and Hannes F. Wagner. "Do institutional investors drive corporate social responsibility? International evidence." *Journal of Financial Economics* 131, no. 3 (2019): 693-714.

³⁴ Chen, Tao, Hui Dong, and Chen Lin. "Institutional shareholders and corporate social responsibility." *Journal of Financial Economics* 135, no. 2 (2020): 483-504. The Russell index is a family of market indices that are widely used by index funds to serve as proxies for the market (representing, for instance, the largest 2000 US firms and the next largest 3000 US firms). The composition of each index is periodically changed based on firms’ market capitalization on a particular date. For firms close to the threshold for inclusion, whether they are included is essentially random; however, inclusion leads to a large increase in index fund ownership because many index funds seek to replicate the Russell indices. This generates arguably exogenous variation in index fund ownership.

³⁵ Azar et al. *op cit.* fn. X.

Three environmental engagements are targeted at large firms with high CO₂ emissions. They also find that increases in Big Three index fund ownership of firms are associated with lower CO₂ emissions (including when the focus is on exogenous increases in Big Three ownership generated by reconstitutions of the Russell index). This evidence does not, however, take account of the role of firms' ownership structure in mediating the frequency of environmental engagements by the index funds or the efficacy of these interventions. Moreover, the strongest causal evidence (based on Russell index reconstitutions) is restricted to US firms, and thus only applies to a market in which controlled firms are substantially less common than in most other countries. To address the role of ownership structure, we analyze in the next subsection how the frequency of environmental engagements differs across countries with different ownership structures.

C. Index Funds' Environmental Engagements and Corporate Ownership Structure

The data collected by Professors Azar et al. relates to engagements conducted with firms based in 46 different countries and territories. We use the country-level data on the number of engagements to analyze whether index funds disproportionately target firms in countries with relatively dispersed ownership (and a relative absence of controlling shareholders) for environmental engagements.³⁶ The underlying idea is that index funds will take into account the anticipated efficacy of undertaking these (costly) interventions and will tend to focus them where they are most likely to succeed. If the presence of a controlling blockholder (especially an undiversified controller who does not share the index fund's diversified perspective) presents an obstacle to encouraging the firm to pursue a path of internalizing externalities, then they will avoid such firms and focus on non-controlled firms (typically based in countries where control is relatively less common). Note that we do not have the firm-level data on environmental engagements (nor is there comprehensive data on firm-level ownership structure), and so we cannot analyze index funds' behavior at the firm level. Nonetheless, there is considerable country-level variation in ownership structure that we can use.

We collect data on countries' aggregate stock market capitalization and on the number of listed firms in each country from the World Bank's World Development Indicators (WDI) database.³⁷ This reports data on these variables for 79 countries and territories, and we are able to match 39 of these to countries or territories with Big Three environmental engagements in the Azar et al. dataset. We assume that the engagements data (based on fund sponsors' public disclosures) is comprehensive, and therefore assume that countries with stock market capitalization data that do not appear in the Azar et al. dataset had zero engagements. We exclude one country – Bermuda – as an apparent outlier, as its number of environmental engagements per billion dollars of stock market capitalization is dramatically larger than for the rest of the sample.³⁸ Thus, we have a sample of 78 countries. For 54 of these, we have more detailed data on average ownership patterns (including the average free float – the fraction of shares not owned by insiders, blockholders or

³⁶ We are grateful to Jose Azar for kindly providing the country-level data on index funds' environmental engagements.

³⁷ See: <https://databank.worldbank.org/reports.aspx?source=world-development-indicators>.

³⁸ Bermuda is reported to have had 8.36 engagements per billion dollars of stock market capitalization, while the mean for the other countries in the sample is 0.013 (and the number for the US is 0.032). Note, however, that including Bermuda does not fundamentally change the basic findings.

the state) across listed firms, from a recent OECD publication.³⁹ Descriptive statistics for our dataset are provided in Table 1.

It is well-known in the corporate governance literature that there is a wide gulf between the US, the UK, and a few other jurisdictions on the one hand (where controlled ownership structures are relatively less common) and the rest of the world (where controlled ownership structures predominate). To obtain a more precise measure, we draw on a recent study by Professors Aminadav and Papaioannou of the ultimate ownership of a large global sample of firms.⁴⁰ They report the fraction of controlled firms for each country in their sample in 2012.⁴¹ We identify seven countries – Australia, Canada, Ireland, New Zealand, Taiwan, The UK, and the US – which have the lowest fractions of controlled firms.⁴² Figure 1 reports the mean number of environmental engagements per billion dollars of stock market capitalization for these seven “dispersed-ownership” countries and for all other countries in the sample. The countries with relatively dispersed ownership had about 0.06 environmental engagements per billion dollars of stock market capitalization, compared to 0.009 for the countries with relatively concentrated ownership.

Column 1 of Table 2 reports the corresponding regression results; because of the highly skewed nature of the number of engagements and of stock market capitalization, a logarithmic specification is used.⁴³ Column 1 of Table 2 shows that the difference between dispersed-ownership countries and other countries in the number of engagements (controlling for stock market capitalization) is highly statistically significant. Thus, the Big Three index funds appear to direct their engagements towards firms in countries where controlling shareholders are less common.

It is of course possible that there are many other factors that may affect the likelihood of environmental engagements. Thus, Column 2 of Table 2 adds a number of potentially relevant control variables. The number of listed firms is included, as a larger number of firms may entail a larger number of distinct engagements. Countries’ wealth and size is controlled for by including gross domestic product (GDP) per capita (in nominal US \$) and population (in millions). It is possible that index funds target firms with higher levels of CO₂ emissions, and countries’ level of CO₂ emissions (in millions of tonnes) are also included. All of these variables are from the World Bank’s WDI database.

All of the “Big Three” index funds are based in the United States, and so may potentially be more likely to engage with firms in the US or in similar countries due to cultural familiarity. To control for this, we use an exogenous measure related to cultural distance, the genetic distance between the ethnic majority of the US and the population of each of the other countries in the

³⁹ De La Cruz, A., A. Medina and Y. Tang (2019), “Owners of the World’s Listed Companies”, OECD Capital Market Series, Paris, www.oecd.org/corporate/Owners-of-the-Worlds-Listed-Companies.htm

⁴⁰ Aminadav, Gur, and Elias Papaioannou. "Corporate control around the world." *The Journal of Finance* 75, no. 3 (2020): 1191-1246.

⁴¹ Aminadav and Papaioannou op cit. fn. X Table 1, pp. 1205-1208.

⁴² See the discussion in Aminadav and Papaioannou op cit. fn. X p. 1209. These countries have shares of controlled firms below 30%, whereas the corresponding percentage is very high for most other countries.

⁴³ The dependent variable is the natural logarithm of one plus the number of engagements (with the constant one being added to avoid losing observations due to the logarithm of zero being undefined).

sample.⁴⁴ In addition, indicator variables (or fixed effects) for each continent are included.⁴⁵ As shown in Column 2 of Table 2, the estimate of the greater propensity for environmental engagements in dispersed-ownership countries is essentially unaffected by the inclusion of these control variables.

The dependent variable in Table 2 – the number of environmental engagements – represents a “count” variable that only takes on non-negative integer values. In addition, the number of environmental engagements is zero for a substantial number of countries. To accommodate these features of the data, Columns 3 and 4 of Table 2 use a Poisson model. As shown in Column 3 of Table 2, the basic result is robust to the use of the Poisson specification. In Column 4 of Table 2, we use an alternative (continuous rather than dichotomous) measure of dispersed ownership. This is the free float – the fraction of shares in listed firms not owned by insiders, blockholders, or the state – as reported by the OECD.⁴⁶ This is an imperfect measure of control, as it is possible in principle that the free float for common stock may be quite high even when a firm is controlled (if the controller uses a CMS to maintain control). Nonetheless, it provides a check on our baseline binary measure of dispersed ownership. As shown in Column 4 of Table 4, higher levels of free float are strongly associated with more index fund environmental engagements.

Overall, the results in Table 2 imply that index funds very strongly target firms in countries with relatively dispersed ownership structures when undertaking environmental engagements. This result is highly statistically significant and very large in magnitude. The estimates imply a prevalence of environmental engagements that is about 640% higher in dispersed-ownership countries than in other countries, controlling for other relevant factors.⁴⁷ This is fairly similar to the raw difference in the number of environmental engagements per billion dollars of market capitalization, shown in Figure 1.

An important caveat is that this data on engagements may not capture undisclosed meetings “behind closed doors” with firm insiders. If such meetings are more common for controlled firms than for those with dispersed ownership, then that may potentially confound the results discussed above. However, there is no evidence that this is the case. Moreover, whether this is likely depends on the mechanisms through which an index fund might persuade a controlling shareholder to modify a firm’s policies. At a firm with dispersed ownership, index funds are likely to be the largest shareholders (albeit typically holding only a minority of shares). This makes index funds

⁴⁴ This variable is from Dhammika Dharmapala. “A new measure of foreign rule based on genetic distance.” *Economic Inquiry* 59, no. 2 (2021): 622-647. It is constructed using bilateral genetic distance data for countries and populations constructed by Enrico Spolaore and Romain Wacziarg. “The diffusion of development.” *Quarterly Journal of Economics* 124, no. 2 (2009): 469-529. Genetic distance provides a measure of the time that has elapsed since two populations last shared common ancestors. Genetic distance is based on random drift in neutral characteristics and not on traits selected for fitness. In sufficiently large populations, such random genetic drift occurs at a predictable rate, and thus genetic distance is larger for populations that have been separated for longer periods of time.

⁴⁵ The classification of countries by continent is from Dharmapala op. cit. fn. 45, and is based on Oana Borcan, Ola Olsson, and Louis Putterman. “State history and economic development: evidence from six millennia.” *Journal of Economic Growth* 23, no. 1 (2018): 1-40.

⁴⁶ De La Cruz et al. op. cit. fn. X

⁴⁷ For instance, using the estimate in Column 3 of Table 2, the impact of a one-unit increase in the dispersed ownership dummy variable in percentage terms can be approximated by $100(e^2 - 1) \approx 640\%$, holding all other independent variables fixed.

important in director elections, control contests, and potential interventions by activist investors, thereby creating a significant incentive for managers to heed the expressed wishes of index funds.⁴⁸ In controlled firms, the controller by definition dominates director elections, while control contests and activist interventions are infeasible. Thus, in order to change a controlled firm's behavior, an index fund would need to persuade the controller that she would be better off adopting externality-mitigating policies.⁴⁹ This is not impossible – it may be that the index fund is able to provide (credible) information that the controller does not have, pertaining to the benefits from such policies. However, in general, the scope for such persuasion seems limited, especially in view of the conflicting interests of diversified index funds and (typically undiversified) controllers with respect to externalities.

D. The Prevalence of Controlled Ownership Structures among Large Firms

The results in Table 2 are quite consistent with the idea that index funds expect engagements to be more successful at firms without controlling shareholders. Moreover, it seems reasonable to view this expectation as being accurate, given the sophistication of index fund managers. This points to a limitation of the universal owner theory – namely, that its sphere of application seems to some degree restricted to widely-held firms. However, this limitation may not be all that significant in practice if all or most of the larger firms that generate substantial externalities are listed in dispersed-ownership markets (or at least themselves have dispersed ownership).

To shed some light on whether this is the case, we collect data from various publicly available sources to document the prevalence of controlling shareholders among the largest firms in sectors that are widely thought to be associated with important externalities. In particular, we identify the world's largest 25 firms by market capitalization in the automobile, energy, and technology sectors. We then collect data from financial media and other sources on the ownership structure of these firms, determining whether a controlling shareholder exists and, if so, what category this shareholder belongs to (a founder or family, the state, or some other type of owner). Due to missing data on some firms, we end up with information on 19 automobile firms, 22 energy firms, and 24 technology firms. Within this last sector, virtually all firms are controlled by a founder or family (as detailed further in Table 3). The ownership structure of large firms in the automobile and energy sectors is shown in Figure 2. It is evident that the majority of these firms have controlled ownership structures. The type of controlling shareholder differs across these

⁴⁸ See Azar et al. (pp. 9-10) and Coates, J. C., 2019. The future of corporate governance part I: the problem of twelve. Harvard Public Law Working Paper No. 19-07. Available at SSRN: <https://ssrn.com/abstract=3247337> for discussions of how index funds may influence managers (implicitly, their discussion is restricted to diffusely-held firms).

⁴⁹ Doron Levit ("Soft Shareholder Activism", 32 Rev. Fin. Stud. 2775 (2018)) develops a model of communication and persuasion by activist investors that could potentially apply to controlled as well as diffusely-held firms. Kobi Kastiel *supra* note 20 documents a nontrivial number of activist interventions by hedge funds at controlled firms, and attributes this to the power of reputational concerns among controllers. Although hedge fund and index fund activism are different in important respects, similar reputational concerns may also enable index funds to exert some influence over controllers' actions. In addition, as noted in the Introduction, the controller might be interested in the views of index funds because such funds may be important in raising capital in the future, or because the funds may have stakes in the controller's other firms or investments.

sectors, with founding families being dominant among automobile firms, while state ownership is common among energy firms.

Figure 2 highlights the challenge facing index funds' portfolio value maximization as a mechanism to address the externalities created by the largest firms in sectors that are critical to climate change. Essentially, the prevalence of controlled ownership structures among these firms create potential barriers to index funds exerting their influence in order to mitigate externalities. The extent to which this matters depends on the incentives of controlling shareholders, however, and it is to this question that we turn next.

III. CONTROLLING SHAREHOLDERS AND EXTERNALITIES.

In this Part we explore the incentives of controlling shareholders to internalize externalities. In particular, we introduce the concept of “controller wealth concentration” (CWC) as a key metric for assessing a controller's incentives to internalize externalities.

A. Controller Wealth Concentration (CWC)

Suppose that there exist N assets, indexed by $i = 1$ to N , where asset i has value V_i . Asset f is firm F , which is controlled by the controller Z . Assume Z owns a share z_i of asset i (where z_i takes on values from 0 to 1). Then, Z 's personal wealth, denoted W_Z , is:

$$W_Z = \sum_{i=1}^N z_i V_i$$

Controller wealth concentration (CWC) can then be defined as:

$$CWC = \frac{z_f V_f}{W_Z} = \frac{z_f V_f}{\sum_{i=1}^N z_i V_i}$$

CWC measures the degree of Z 's diversification of her personal asset holdings. For example, suppose that Z owns 60% of the stock of firm F ($z_f = 0.6$) and owns no other assets ($z_i = 0$ when $i \neq f$). Then, $CWC = 1$, or 100%. On the other hand, suppose Z owns 10% of F (while controlling F through a controlling minority structure such as dual class stock), $V_f = \$100$, and $W_Z = \$200$. Then, $CWC = ((0.1)(100))/200 = 0.05$ (or 5%).

Figure 3 illustrates the types of circumstances in which controllers may have high or low CWC. It is important to emphasize that a low CWC is a necessary, but not a sufficient, condition for controllers to have incentives (based on cash flow rights from stocks) to take account of the externalities generated by their controlled firms.⁵⁰ If CWC is high, then such incentives will necessarily be very limited. Even if CWC is low, however, it may be the case that a controller's investments outside her controlled firm are in a small and non-diversified set of assets (for instance, other firms in the same sector as her controlled firm). In such circumstances, there may be very

⁵⁰ Of course, a controller may have nonpecuniary motivations to take account of these externalities, but CWC is intended to capture pecuniary incentives.

little incentive for the internalization of externalities. Thus, CWC is admittedly an imperfect measure of controllers' incentives. However, as we generally find high values of CWC, it is possible – notwithstanding the limitations of the CWC measure – to conclude that controllers have limited incentives based on cash flow rights from stocks to take account of externalities.

CWC captures the overall portfolio diversification of the controller. Z 's *marginal* incentives to raise the value of firm F (despite potentially negative effects on other firms) can be measured by a related but distinct concept that we term “controller's delta” (by analogy to a concept widely used in the study of executive compensation).⁵¹ Suppose that when V_f increases by \$1, asset i 's value changes by δ_i . Then, the controller's delta, denoted δ_Z , can be defined (noting that $\delta_f = 1$ by definition when V_f increases by \$1) as:

$$\delta_Z = \sum_{i=1}^N z_i \delta_i$$

For example, if Z owns 60% of the stock of firm F and changes in the value of firm F do not have any spillover effects on other firms ($\delta_i = 0$ when $i \neq f$), then $\delta_Z = 0.6$ (a \$1 change in firm F 's value increases Z 's wealth by 60 cents). When cross-firm spillovers exist, it is not possible to compute the controller's delta without knowing the magnitude of these external effects. Thus, we focus below on computing estimates of CWC.

B. Controller Wealth Concentration (CWC): Estimates

To provide some preliminary evidence on the magnitude and distribution of CWC, we use various publicly available sources to collect data on controlling shareholders' holdings in controlled firms and their aggregate personal wealth.⁵² We begin by identifying the largest technology-oriented firms by market capitalization, focusing on those for which a controlling shareholder can be identified, and data on his or her personal wealth and company holdings is available. This leaves us with the set of 24 firms and 24 controllers listed in Table 3. Some notable features of this data are that CWC is generally quite high, even for these very large firms and for these particularly wealthy controllers. For instance, the controlling shareholders of Amazon and Facebook have CWC of over 90%. This is the case even though controllers' holdings of the controlled firms' stock are not generally all that large in percentage terms – the mean holding is 14% and the median is 7%. Figure 4 illustrates this absence of any particularly strong relationship between CWC and controllers' shares of their controlled firm's common stock.

For a substantial fraction of these controllers, CWC is considerably below 100% (the mean is 65% and the median is 68%). Even the lower values of CWC, however, represent a dramatic over-representation of the controller's firm relative to its role in a fully diversified portfolio. If it were the case that controllers are diversified to a significant extent, they would potentially have some pecuniary incentive to care about the externalities generated by the firm(s) they control: those externalities might impact investments the controller has in firms that are negatively affected by

⁵¹ Jensen, Michael C., and Kevin J. Murphy. "Performance pay and top-management incentives." *Journal of political economy* 98, no. 2 (1990): 225-264.

⁵² See the notes to Table 3 for the sources.

the externality (of course, externalities will not be fully reflected in other firms' values as some of the external effects will fall on parties other than listed firms, but this limitation applies to index funds as well). Further, if the costs of the externality were large enough the controller might prefer to take steps at the controlled firm to reduce these costs. Given her status as a controller, the controller would be more effective than index funds or small dispersed shareholders in achieving this.

A simple example might prove illustrative. Let us assume Z controls firm F with a 60% stake, and also owns shares in each of 10 other firms. An externality produced by F generates costs of \$100 to each of the 10 other firms (i.e., a total of \$1000) and that externality can be prevented if F spends \$110 on precautions. If Z's stake in each of the 10 other firms is 7%, then she bears \$70 in losses from the externality which can be avoided at a cost of \$66 to her (60% of the \$110 in precautions). One would expect her to push F to take the precautions to avoid the externality, assuming that undertaking the precautions does not violate any corporate law duties that the controller may have to the minority shareholders of firm F. Moreover, because she is F's controller (and does not need to coordinate with others) she is likely to be quite successful in ensuring this happens. Simply put, a *diversified controlling shareholder* will likely internalize some of the costs of externalities generated by the controlled firm and is better placed than other diversified investors to make the controlled firm change its behavior. We hasten to add that one can think of counter-examples where a diversified controller will still decide to favor the controlled firm. Our point, however, is not that diversified controllers will *always* internalize enough of the costs to act in the social welfare maximizing manner, but rather that they may often have incentives to do so and that compared to other diversified shareholders they may be more effective in changing the firm's behavior.⁵³

One might expect the risk bearing costs of being over-weighted in one firm would provide a powerful incentive for (risk averse) controllers to diversify by relinquishing control. However, this must be weighed against the possibility that controllers capture private benefits of control. These may take various forms. For example, controllers may derive pecuniary private benefits by structuring related-party transactions (RPTs) in advantageous ways for themselves, such as by having firm F buy inputs at an artificially high price from a related firm in which Z owns 100% of the cash flow rights. Controllers may also derive nonpecuniary private benefits, for example from having the ability to implement their idiosyncratic vision for the firm. Thus, controllers may be reluctant to diversify if that means they must sell down their stake in their controlled firm (thereby sacrificing private benefits) in order to have the financial resources to purchase enough shares of other firms to diversify.⁵⁴

Yet, it is not always necessary to relinquish control to diversify. If there are ways in which controllers could maintain control but still sell down their stakes in the controlled firm then they would be able to maintain control and still have the resources to diversify. Controlling minority

⁵³ Their effectiveness in changing the controlled firm's behavior is undoubtedly one of the reasons why controllers sometimes bear liability for their subsidiaries via statute – see Allen, Kraakman, and Khanna, *supra* note 18, at Ch. 8.

⁵⁴ There is a vast literature on private benefits of control – see e.g. Zingales, Luigi. "The value of the voting right: A study of the Milan stock exchange experience." *The Review of Financial Studies* 7, no. 1 (1994): 125-148; Dyck, Alexander, and Luigi Zingales. "Private benefits of control: An international comparison." *The journal of finance* 59, no. 2 (2004): 537-600.

structures – such as dual class shares – enable precisely this behavior.⁵⁵ Controllers retain control through, say, a dual class structure and can use the resources freed up by selling down their common stock to buy shares in other firms or in a market-wide portfolio. This enables controllers to diversify more easily and is potentially a social benefit of dual class shares and controlling minority structures that has not been discussed in the literature.

While a dual class structure allows controlling shareholders to diversify, our descriptive statistics in Table 3 and Figure 4 suggest that controllers typically do not avail themselves of this opportunity. In the next subpart, we develop a detailed numerical example that clarifies the potential efficiency costs from the failure to diversify and provides a framework within which to discuss the possible reasons why controllers typically do not diversify.

C. *Controller Diversification and Dual Class Stock: A Simple Example*

Assume that firm F was founded by Z. Immediately prior to F's initial public offering (IPO), Z holds 50% of its stock. The other 50% of its stock is held by others, in particular by venture capital (VC) funds that are assumed to sell their stock as soon as F goes public. Z is wealth-constrained, in the sense that she has no source of wealth or assets other than her stock in F, and is risk-averse. Assume that holding a 50% stake is (just) sufficient to exert control of firm F. Z derives a (nonpecuniary) idiosyncratic value of control (denoted IVC) when she is in control of F's decision making, as control allows her to pursue her idiosyncratic vision for the firm. For now, the utility gained from pursuing her idiosyncratic vision is assumed to be independent of the value of the firm and of its pecuniary returns. Initially, we assume away the possibility that Z can extract pecuniary private benefits of control (PBC), but this possibility is introduced and discussed later.

The timing of the scenario that we assume is depicted in Figure 5. At time 1, firm F goes public. The IPO decision is assumed to be exogenous, although we discuss later how incentives to go public might be affected by the different legal regimes that we analyze. The market portfolio, denoted by P, consists of a large number of firms (other than F), each of which is potentially subject to negative spillovers from F's activities. At the time of the IPO, the VC investors are assumed to exit, and the stock they sell is bought by widely dispersed risk averse investors who are fully diversified, in the sense that they hold the market portfolio P. The crucial decision at time 1 is taken by Z, who decides whether to sell her stock in F and use the cash proceeds to buy the diversified portfolio P (thereby relinquishing control of F, under the one-share-one-vote regime discussed below, though not under a dual-class regime), or to hold on to her F stock (and thereby retain control, even in the one-share-one-vote regime).

At time 2, firm F decides whether to undertake a high (H) or low (L) level of activity. In practice, Z makes this decision if she has retained control at time 1. Alternatively, if Z has not retained control, firm F's choice is made by a Board representing diversified outside shareholders (reflecting the latter's interest in maximizing the value of their diversified portfolio). Importantly, it is assumed that there is no commitment that can be made at time 1 about the decision at time 2; for instance, Z cannot commit at time 1 to choose H at time 2.

⁵⁵ e.g. Bebchuk, Lucian A., Reinier Kraakman, and George Triantis. "Stock pyramids, cross-ownership, and dual class equity: the mechanisms and agency costs of separating control from cash-flow rights." In *Concentrated Corporate Ownership*, pp. 295-318. University of Chicago Press, 2000.

Choosing H increases F's value but imposes a negative externality on all other firms. While the external harm experienced by any individual firm is assumed below to be small, the aggregate external harm (summed across all firms in P) is assumed to be larger in magnitude than the incremental gain to F's value from choosing H rather than L. Thus, L is the socially efficient – and market-portfolio-value-maximizing – choice. It is assumed that firm F (whether or not it is controlled by Z) faces few serious legal constraints in choosing between H and L. For instance, corporate law is assumed not to compel firm F to take account of the harms to other firms, nor to require that F ignore harms to other firms. This assumption seems reasonable in the light of the discussion of the relevant legal doctrines in Section IV below.

Finally, at time 3, the values of the firms are realized. From the perspectives of time 1 and time 2, the ultimate value of F is a random variable – that is, it is partly determined by chance and hence risky. This uncertainty is resolved at time 3. If firm F chose H at time 2, then the values of F and P realized at time 3 reflect the consequent gain to F and the harms to other firms. Specifically, ex ante (prior to time 3), there are two possible contingencies, each of which occurs with probability $\frac{1}{2}$. In the first (the “good” contingency from the perspective of firm F), F's value is 12 under H and 10 under L. In the second (the “bad” contingency from the perspective of firm F), F's value is zero, regardless of whether it chose H or L at time 2. The value of the diversified portfolio P is assumed to be deterministic (i.e. not random), and hence is unaffected by whether the first or second contingency occurs. The assumptions here abstract from market (or systematic) risk, and focus on the impact of the external harms generated by firm F on the value of P. In particular, if F chooses L at time 2, the value of P is 1000, and if F chooses H at time 2, then the value of P is 998. Thus, the losses from choice H to other firms ($1000 - 998 = 2$) exceed the expected gain of $(\frac{1}{2})(2) = 1$ to firm F. Table 4 shows the values of firm F and the market portfolio P under each possible scenario (i.e. each contingency under each choice of activity level by F). Note that, strictly speaking, the “market portfolio” following F's IPO should include firm F. However, it is convenient in characterizing the outcomes to distinguish between P (the market portfolio excluding firm F) and firm F; moreover, as long as F is small in relation to the aggregate market, its exclusion from P makes little difference.

Using this simple framework, we analyze the outcomes that result under two alternative legal regimes – one that mandates a one-share-one-vote (OSOV) rule, and one that permits firms to issue dual class stock.

C.1) Outcomes under One-Share-One-Vote (OSOV)

Under an OSOV regime, Z faces two possible choices at time 1. The first is to retain her 50% stake in F and maintain control, while the second is to sell this stake and diversify by using the cash proceeds (which, by assumption, are Z's only source of wealth) to buy the market portfolio P. In the latter scenario, it is expected that firm F will choose L (a low level of activity) at time 2, and so market participants anticipate that F will have a value of either 10 or zero at time 3 and that P will have a value of 1000. Note that any intermediate strategy on the part of Z – selling part of her stock and ending up somewhat diversified but over-weighted in F relative to F's share of the market – is clearly dominated by one or other of the choices sketched above. An intermediate strategy will result in a loss of control (and hence the loss of IVC), while leaving Z less than

optimally diversified. Thus, we can focus only on the choice between the two options described above.

Investors in the market are assumed to be fully informed and rational. They anticipate that if Z is in control at time 2, Z will choose H or L to maximize her expected payoff. This consists of her expected wealth, her IVC and a risk premium, denoted R, that reflects her loss from risk-bearing. This expected payoff can be expressed as:

$$E[W_Z] + IVC - R$$

where IVC is the idiosyncratic value of control (assumed to be a utility gain to Z from being in control, and not a transfer from minority shareholders) and R is the loss from bearing risk (and is equal to the risk premium Z would pay to be insured against this risk). Investors also anticipate that if Z is not in control, a Board representing diversified outside shareholders will choose the activity level to maximize diversified shareholders' expected wealth. In these circumstances, it is clear that the Board will choose L.

If Z chooses at time 1 to retain ownership and control, it is clear that Z will then choose H at time 2. Thus, the expected value of F is $(1/2)12 + (1/2)0 = 6$. As Z owns 50% of F, Z's expected wealth is 3 (albeit with variance of 36 and thus a loss R from risk-bearing). Z's payoff is thus:

$$3 + IVC - R$$

Suppose instead that Z sells her stock and diversifies at time 1. Then, investors anticipate that F will choose L at time 2 and so the expected value of F is $(1/2)10 + (1/2)0 = 5$. By assumption, those investors who buy Z's stock at time 1 are fully diversified. Thus, they care only about the expected value when deciding how much to pay for F's stock and do not care about F's idiosyncratic risk (more generally, they would care only about the relationship between F's idiosyncratic risk and the systematic risk of the market portfolio, but the latter is assumed away here for simplicity).

We normalize the market return between time 1 and time 3 to zero, which implies that diversified outside investors are willing to pay the expected value for Z's stock at time 1. Thus, Z's stock in F is worth half the expected value of F, conditional on the choice of L at time 2. The expected value of F conditional on the choice of L is denoted by $E[F_L] = \frac{1}{2}(10) + \frac{1}{2}(0) = 5$. Thus, Z raises 2.5 from selling her stock at time 1, and is assumed to use this cash to buy the diversified portfolio P. Z's payoff is thus 2.5 with certainty (as IVC and R are both equal to 0 when Z has no control and faces no risk).

Thus, retaining ownership and control will be preferred by Z when $IVC > R - 0.5$. For example, if we assume that $IVC = R = 1$, then Z will choose to retain ownership and control. When Z chooses to retain ownership and control at time 1, the choice at time 2 is straightforward. H leads to wealth of either 6 or 0 (each with probability $\frac{1}{2}$), while L leads to wealth of either 5 or 0 (each with probability $\frac{1}{2}$), so H is preferred (note that although H involves greater risk, this risk is all on the upside). Given that Z chooses H, aggregate shareholder wealth is the sum of the value of P (which is 998 when F chooses H) and the expected value of F ($E[F_H] = 6$) – i.e. 1004. This

characterization of shareholders' aggregate payoff ignores the small amount of risk entailed by the two possible contingencies for firm F, but this is innocuous to the extent that F is small in relation to the aggregate market.

C.2) Outcomes when Dual Class Stock is Permitted

Now suppose that dual-class stock can be issued at time 1. In particular, we assume in this subsection that when dual-class stock is issued F has two classes of stock – class A stock (which has sufficient voting rights to exert control and – for simplicity – no cash flow rights) and class B stock (i.e., common stock). As before, we assume that Z holds 50% of the common stock; we add here the assumption that Z initially holds all the voting stock. In principle, Z could sell the voting stock to someone else (who would then become the controller). However, if we assume that Z's $IVC > 0$ and everyone else has $IVC = 0$ (or at least that Z's IVC exceeds anyone else's) then Z will always wish to retain control via holding the voting stock.

Clearly, dual class stock allows Z to retain control and enjoy IVC while also diversifying her asset holdings to eliminate firm-specific risk. Given that she always retains control via the voting stock, what will Z do with the common stock at time 1? If she holds it, then she will choose H at time 2. Thus, the expected value of F is $(1/2)12 + (1/2)0 = 6$. As Z owns 50% of F, Z's expected wealth is 3 with variance of 36, just as under OSOV, and her expected payoff is identical to that from retaining control under OSOV (i.e., Z's payoff = $3 + IVC - R$). If Z sells her common stock at time 1, unlike under OSOV, Z still has control. However, having diversified, Z will choose L rather than H at time 2. Buyers of Z's stock are willing to pay 2.5 for her common stock, under the same assumptions as before. Thus, Z raises 2.5 from selling her stock, and uses this cash to buy the diversified portfolio P. Z's payoff is now $2.5 + IVC$ (as Z still gains the idiosyncratic value of control).

If $R > 0.5$ (i.e., Z's risk-aversion is sufficiently large in relation to the gains to F from pursuing the externality-generating activity), then Z will choose to sell the common stock and diversify (regardless of how large IVC is). This will happen, for instance, under the assumption made earlier that $R = 1$. Permitting dual class stock obviously makes Z better off, by allowing her to retain control and enjoy IVC while also diversifying and eliminating firm-specific risk. Moreover, permitting dual class stock also increases aggregate shareholder wealth. When Z diversifies and chooses L, aggregate shareholder wealth is the sum of the value of P (which is 1000 when F chooses L) and the expected value of F ($E[F_L] = 5$) – i.e. 1005. This is higher than the value of 1004 under OSOV when Z chooses H, for instance under the assumption made earlier that $R = 1$). Thus, a legal regime permitting dual class stock potentially makes the ordinary diversified shareholder better off through the internalization of cross-firm externalities.

C.3) Factors Constraining Controller Diversification

Despite the opportunity that a dual class regime creates to diversify while retaining control, the evidence in Table 3 indicates that controllers of dual class firms (such as Facebook) typically fail to diversify and have very high values of CWC. In our simple framework, the only reason why Z may choose to hold on to the common stock of F is a low degree of risk aversion in relation to the gains to F from pursuing the externality-generating activity (for instance, if $R < 0.5$ in the

example). In reality, there are additional reasons why a controller may retain common stock. This subsection describes four of these – optimism bias, private benefits of control, controllers' incentives to exert effort, and the deferral of capital gains taxes. Note also that, in reality, divestment by Z of her F stock does not necessarily imply that Z will then invest in a diversified portfolio. Z could buy any of a wide variety of assets with the proceeds from the IPO. If these assets happen not to be significantly affected by the external harms generated by F, then any incentive to choose L rather than H would be attenuated (even when CWC appears to be low).

C.3.1) Optimism Bias

Perhaps the most intuitively appealing reason for founders to hold on to substantial cash flow rights – even when this is unnecessary for control – is over-optimism about the value of their firms. For instance, suppose that Z wrongly perceives the value of F in the top left cell of Table 2 as being 18 rather than 12 and that in the top right cell of Table 2 as being 15 rather than 10. Essentially, Z believes the upside potential of F is greater than it really is. Obviously, this is not the only way to formulate optimism bias: Z could instead (or also) overestimate the probability of contingency 1, or believe that the downside in contingency 2 is not as bad as it really is. These alternative formulations also lead to similar conclusions, however.

Another possible distinction is between optimism bias about firm F's prospects (regardless of who manages it) and optimism bias about firm F's prospects when it is managed by Z. The former would lead Z to demand high cash flow rights in F but not necessarily to maintain control (indeed, Z may be willing to sell her voting stock in a dual class setting while retaining her common stock). The latter would entail maintaining control (via the voting stock) while also holding a large amount of common stock to benefit from the perceived high returns that F is thought to generate. While these possibilities have somewhat different implications, they would both lead Z to be an undiversified holder of F stock.

Consider the outcomes under the dual class regime. Holding all other assumptions fixed, if Z were to sell at time 1 and diversify, she would receive 2.5 from outside investors (who do not, by assumption, share Z's over-optimism about F, and whom Z may view as being overly pessimistic).⁵⁶ Z's payoff is thus 2.5 + IVC, as above. Z's perceived expected value of F from holding her common stock at time 1 (and therefore choosing H at time 2) is $(1/2)18 + (1/2)0 = 9$ and her expected wealth is thus 4.5 (versus 2.5 with certainty by selling and diversifying). For $R = 1$, Z will prefer to hold her common stock at time 1. This may be a plausible scenario in that founders of startups are often thought to be over-optimistic about their firms' prospects of success, and this trait may carry over to the post-IPO setting as well.⁵⁷

⁵⁶ In principle, a related but distinct possibility is that Z is not over-optimistic, but rather that outside investors are irrationally pessimistic about F's value. That scenario would also induce Z to hold on to her common stock, as potential buyers would not be willing to pay its true value. This, however, requires a significant degree of market inefficiency, as underpricing due to the excessive pessimism of outside (retail) investors is readily subject to arbitrage. In contrast, it may be difficult for arbitrage to correct Z's optimism bias.

⁵⁷ See Barros, Lucas Ayres Barreira de Campos and Di Miceli da Silveira, Alexandre, "Overconfidence, Managerial Optimism and the Determinants of Capital Structure" (February 25, 2007). Available at SSRN: <https://ssrn.com/abstract=953273>; Verheul, Ingrid and Carree, Martin A., "Overoptimism Among Founders: The Role of Information and Motivation" (March 2008 3). ERIM Report Series Reference No. ERS-2008-008-ORG, Available at SSRN: <https://ssrn.com/abstract=1117785>.

C.3.2) Private Benefits of Control

The basic framework described above assumes a nonpecuniary IVC, with no possibility of Z extracting pecuniary private benefits of control. In reality, it is possible that when Z has control via the voting stock and holds low cash flow rights (i.e., when she sells the common stock and diversifies), she will have greater incentives to extract pecuniary private benefits of control (PBC) than if she held on to the common stock and had greater cash flow rights.

For instance, suppose that Z extracts \$4 of PBC when diversified in contingency 1 (i.e., when L is chosen), but would extract zero PBC when she holds the common stock (i.e., when H is chosen). Note that no PBC can be extracted in contingency 2, where the value of F is zero. Then, rational forward-looking investors will anticipate that F's value with a diversified controller will be $\frac{1}{2}(E[F_L] - \text{PBC}) = \frac{1}{2}(10 - 4) = 3$. Thus, Z will receive 1.5 at time 1 for her 50% stake in F, while also receiving expected PBC = 2. Z's payoff from diversifying will be $1.5 + 2 + \text{IVC} = 3.5 + \text{IVC}$. The payoff from retaining her stock (and, by assumption, extracting zero PBC) is $3 + \text{IVC} - R$ (as above). Thus, Z will choose to sell and diversify at time 1 (regardless of the value of R).

Aggregate shareholder wealth in the scenario above will be the sum of the value of P (which is 1000 when F chooses L) and the expected value of F to outside shareholders ($E[F_L] - E[\text{PBC}] = 5 - 2 = 3$) – i.e. 1003. This is lower than aggregate shareholder wealth of 1004 when Z chooses H. Thus, outside shareholders may encourage Z to retain a substantial holding of cash flow rights in F in order to disincentivize the extraction of PBC. It should be noted, however, that for outside shareholders to be worse off due to Z's extraction of PBC, it is necessary that the magnitude of PBC is quite large in relation to the economy-wide external harms from F's activities.

Note also that in reality it may be the case that Z's control raises the expected value of firm F. This can be accommodated within our framework by assuming a higher value for F in contingency 1 when Z is the controller. Under the OSOV regime, this will tend to make Z more inclined to retain control (and hence more likely to choose H). It makes no difference under the dual class regime, where (under our assumptions) Z will always retain control via the voting stock. Thus, taking account of value effects of control by Z tends to reinforce the basic conclusions above.

C.3.3) Incentivizing Controller Effort

A possibility that is also not part of our basic framework is that Z may face stronger incentives to exert effort (in implementing her idiosyncratic vision or in managing the firm more generally) when she has greater cash flow rights in F (i.e., more "skin in the game"). Thus, even if she were to sell and diversify at time 1, the Board may provide her with stock-based compensation at time 2 that leads to her being over-weighted in F. If this over-weighting is sufficiently large, Z will choose H rather than L at time 2 (and, anticipating this, may prefer not to sell and diversify at time 1).

For instance, suppose that the value of F in contingency 1 when Z is diversified and chooses L is not 10 (as in the top right cell in Table 2) but rather 6, due to low effort by Z . This would make diversification less attractive to Z , but suppose that due to either the extra utility obtained from lower effort or a high degree of risk aversion (or some combination of the two) Z nonetheless diversifies (and therefore chooses L). Aggregate shareholder wealth in this scenario is the sum of the value of P (which is 1000 when F chooses L) and the expected value of F to outside shareholders ($E[F_L] = 3$) – i.e. 1003. This is lower than aggregate shareholder wealth of 1004 when Z retain her stock and chooses H . Thus, aggregate shareholder wealth is higher in this example when Z is undiversified and exerts greater effort. This possibility also implies that the diversification outcome is less likely to occur under the dual class structure, and so represents a countervailing consideration to the internalization of externalities.

However, this outcome requires that the productivity of Z 's incremental effort due to being undiversified is quite large in relation to the economy-wide external harms from F 's activities. It is also worth noting the following two points. First, diversified shareholders of F would want Z to exert effort, but would also take account of the external harms of choosing H . This would temper their inclination to compensate Z with large amounts of stock in F (or any preference on their part that Z not diversify at time 1). Second, the amounts of stock or stock options that are granted to managers are often substantial, but typically are far smaller than the stock holdings of founders/controllers who choose not to diversify. Moreover, these grants generally take the form of stock options that, while they give the manager an undiversified stake in the firm over the vesting period, tend to be exercised and sold (enabling diversification) soon after vesting. The incentivization of Z 's effort through stock-based compensation is likely to have similar features to managers' stock-based compensation, and these would limit the extent to which it would leave Z over-weighted in F stock.

C.3.4) Deferring Capital Gains Taxation

The discussion so far has not taken account of the likelihood that at the IPO stage (time 1 in Figure 5) Z 's stock is likely to have appreciated substantially in value since the founding of firm F . Founders such as Z receive large amounts of stock in their firm as compensation for their labor and ideas.⁵⁸ As a general matter, stock received as compensation is taxed as ordinary income at the time that it is vested (that is, no longer subject to restrictions on sale). However, founders can make what is known as a Section 83(b) election to elect to be taxed immediately on the value of the stock grant as ordinary income, while treating future appreciation as capital gain (that is subject to a lower tax rate imposed at the time of future sale). The reported value of the stock grant is typically small - which may be reasonable in view of the high probability that startups fail – and implies a small tax liability at the time the firm is founded.

However, the upshot of this situation is that a founder (such as Z) of what turns out to be a successful startup will reach time 1 in Figure 5 with a large embedded gain. Selling her stock in order to diversify her portfolio would trigger capital gains tax on this gain. Retaining her stock – while exposing her to continued firm-specific risk – would enable the deferral of capital gains tax until a realization event occurs. Moreover, if Z were to hold the stock until her death and bequeath it to her heir, the tax basis of the stock would be “stepped up” to its market value at the time of Z 's

⁵⁸ Fleischer, Victor. "Taxing Founders' Stock." *UCLA L. Rev.* 59 (2011): 60.

death (exempting her heir from being taxed on the gain that occurred over Z's lifetime).⁵⁹ Thus, there will often be a fairly powerful tax incentive for Z to defer the sale of her stock at time 1, even if she is somewhat risk-averse and has an unbiased expectation about the future value of F.

If the deferral of capital gains taxes were the sole reason for controller nondiversification, there would be an incentive for Z to attempt to divest herself of her economic stake in firm F by some means other than a sale, in order to diversify her portfolio. Tax deferral in itself does not require that Z exert control or be active in management. However, provisions of US tax law designed to prevent the avoidance of capital gains taxes create obstacles to a strategy of divesting without triggering taxation. In particular, the constructive sale provisions of §1259 treat certain transactions that would eliminate Z's economic exposure to firm F as equivalent to a sale (including short sales that offset Z's long position in F and certain derivative transactions that have similar effects).⁶⁰ Thus, Z is essentially locked in to holding F stock if she wishes to defer taxation of gains. This severely limits her ability to simultaneously diversify her portfolio and continue to defer taxation of gains.

The realization doctrine – the deferral of capital gains taxation until sale – is generally thought to give rise to various inefficiencies such as the lock-in effect (a tendency to maintain the same portfolio over time to defer taxation, even when it is no longer optimal). The possibility that founders/controllers retain stock in their firm in order to defer capital gains taxes – thereby placing themselves in a situation where they are less likely to internalize external harms generated by their firms – represents a distinctive variant of the wider lock-in effect. There is a long tradition in the tax policy literature of proposals to replace the realization doctrine with alternatives, such as imposing an interest charge on deferred taxes or taxing the appreciation of assets independently of whether they are sold or not.⁶¹ Increasing controllers' diversification would potentially be an additional benefit of such a reform.

IV. DISCUSSION

Our analysis suggests that controlling shareholders might be particularly well placed to internalize the costs of externalities generated by their controlled firms if they could simultaneously maintain control of the firm and invest more broadly. In principle, this can be achieved by controlling minority structures (CMS) such as dual class structures that facilitate the separation of cash flow and voting rights. This represents an additional advantage of dual class structures and CMS in general that merits further discussion. We hasten to add that internalizing externalities is unlikely to motivate a controller to seek dual class structures; rather, it might provide a reason for us to consider them potentially socially beneficial in spite of their various

⁵⁹ 26 U.S. Code § 1014.

⁶⁰ 26 U.S. Code § 1259. It has been argued that these provisions play an important (albeit indirect and unintended) role in underpinning the current structure of stock-based executive compensation by imposing a tax penalty on hedging transactions by executives that would eliminate their economic exposure to the stock-based compensation that they receive - see David M. Schizer "Executives and hedging: The fragile legal foundation of incentive compatibility." 100 *Columbia L. Rev.* 440 (2000).

⁶¹ Vickrey, William. "Averaging of income for income-tax purposes." *Journal of Political Economy* 47, no. 3 (1939): 379-397; Auerbach, Alan J. "Retrospective Capital Gains Taxation." *The American Economic Review* 81, no. 1 (1991): 167.; Weisbach, David A. "A Partial Mark-to-Market Tax System." *Tax L. Rev.* 53 (1999): 95.

costs.⁶² Importantly, however, while CMS or dual class structures create an opportunity for controllers to retain control and diversify, our data suggests controllers generally do not do so. Having discussed some possible reasons for this in Section III above, we explore below some additional reforms that may encourage controller diversification. However, we are ultimately skeptical that these will have substantial impact.

A. *Dual Class Structures and CMS*

The literature on CMS and dual class structures is voluminous and we do not intend to cover it here. Rather, we note the key arguments made for and against dual class structures and CMS and note how the potential benefits we identify might be relevant to the debate. Generally speaking, the arguments related to CMS are grouped into two categories. First, a number of scholars have noted that CMS create an agency cost “wedge” between cash flow and control rights.⁶³ For example, if someone has voting control of a firm but possesses only 12.5% of the cash flow rights, then she bears only 12.5% of the costs of a decision but may receive more than this in terms of benefits (as these benefits may include private benefits of control). A number of empirical studies have found evidence consistent with the presence of an agency wedge with CMS.⁶⁴ More recently, some scholars have argued that CMS structures are potentially useful because they enable a controller with an idiosyncratic vision that can add value to the firm to stay in control even when the firm becomes publicly traded.⁶⁵ In addition, some scholars argue that CMS structures can provide controllers with insulation from “short-termist” market pressures in order to make valuable long term investments. In this latter respect, the advantages of CMS are analogous to the benefits that have been claimed for staggered boards and other anti-takeover devices.⁶⁶

Both sides of this argument are about whether CMS structures benefit the firm (considered in isolation) in net terms. Our argument is different in scope – we are not arguing that CMS increases firm value, but rather that it can facilitate the internalization of externalities. Thus, it is possible that on firm value grounds CMS may create a net loss for externality-generating firms, while being potentially beneficial in social welfare terms because it facilitates externality internalization. Whether this will make CMS socially desirable overall will naturally depend on the specifics of the situation. However, just because a CMS is available does not mean that it will be used. Even if it is, the controller may not choose to hold a diversified portfolio as noted above (e.g., because the controller is overly optimistic about the controlled firm or invests in only a couple of sectors). If we think that more diversified controllers are a desirable outcome then we may wish to consider other steps that can be taken in addition to (or perhaps instead of) CMS to cajole controllers into acquiring a more diversified portfolio.

⁶² This is perhaps too broad. Some controllers may be personally motivated to reduce certain externalities (e.g., climate change), but we abstract away from that for expositional simplicity.

⁶³ e.g. Bebchuk, Kraakman, and Triantis op cit. fn. X.

⁶⁴ See e.g. Adams, Renée, and Daniel Ferreira. "One share-one vote: The empirical evidence." *Review of Finance* 12, no. 1 (2008): 51-91; Masulis, Ronald W., Cong Wang, and Fei Xie. "Agency problems at dual-class companies." *The Journal of Finance* 64, no. 4 (2009): 1697-1727; Gompers et al. op. cit. fn. X.

⁶⁵ Goshen, Zohar, and Assaf Hamdani. "Corporate control and idiosyncratic vision." *Yale LJ* 125 (2015): 560.

⁶⁶ Cremers, KJ Martijn, Lubomir P. Litov, and Simone M. Sepe. "Staggered boards and long-term firm value, revisited." *Journal of Financial Economics* 126, no. 2 (2017): 422-444.

An interesting analog – although not an exact one – is when an asset manager such as BlackRock has within its family of funds some index funds and some private equity funds (which typically take a control position in their investee firms). If BlackRock is willing and able to coordinate some activity between the private equity funds and the index funds, then it may produce somewhat similar results to the diversified controlling shareholder. While there are noteworthy differences – the private equity fund and index fund would be run by different managers and hence coordination is not as simple as with a diversified controlling shareholder – the parallels are notable. Further, to the extent that BlackRock is required by law to keep the management of its private equity fund independent from the index funds our analysis suggests potential costs arising from that separation.

B. *Controllers' Fiduciary Duties*

The analysis thus far has assumed that controllers face few fiduciary duty, or other legal, constraints in reducing externality causing activity at their controlled firms. Here we examine this assumption and ask whether these sorts of duties might seriously constrain controllers. We conclude that, at present, they do not. In theory fiduciary duties could potentially constrain controllers on these sorts of facts (although to the best of our knowledge there are few, if any, cases addressing this situation), but it appears fairly easy to avoid violating these duties. Further, if it seems useful to encourage controllers to internalize cross-firm externalities, then there may be ways to limit the effects of these potential constraints.

In the United States, many states impose fiduciary duties on controllers when there is a conflict between the controller and minority shareholders.⁶⁷ However, most of these cases involve situations where a controller is on both sides of a transaction so that it is conflicted in a financial sense (e.g., a freezeout merger) or where the controller usurps an opportunity that belongs, in some legally cognizable way, to the firm.⁶⁸ Thus, in the simple case of a decision by an undiversified controller to reduce externalities because of her intrinsic preferences, one doubts that the controller's fiduciary duties would be serious obstacles. First, controllers are generally entitled to vote their shares as they see fit (e.g., in favor of certain directors, green-friendly policies etc.); it is when they use their *control over the board* (as distinct from just casting their votes as shareholders) to obtain a particular outcome, that benefits them in some way differently than other shareholders, that they may risk fiduciary duty liability.⁶⁹ Second, we suspect few controllers would baldly assert they are making a decision simply to pursue an intrinsic motivation and would probably dress up their decision in language that sounds more consistent with pursuing the interests of the firm (e.g., a step taken to reduce the firm's carbon footprint may enhance its long run reputation amongst customers or employees) thereby making a breach of duty case harder to show.⁷⁰

⁶⁷ For a general discussion see Allen, Kraakman and Khanna, *supra* note 18, at Section 8.5.

⁶⁸ See *id.*

⁶⁹ See *id.*

⁷⁰ Moreover, it seems fairly clear that if the board of a diffusely-held firm chose to pursue measures to reduce the carbon footprint of the firm for long run reputational gains that would not generate liability if the board was unconflicted, informed and acting in good faith. See *A.P. Smith Manufacturing Co. v. Barlow*, 98 A.2d 581 (N.J. 1953); Allen, Kraakman, and Khanna, *supra* note 18, at 8.1.2. It probably would not generate liability for the controller in this situation either.

The case of the more diversified controller who reduces one firm's externalities (thereby reducing its profits) in order to increase profits (or avoid losses) to some other firm(s) in her portfolio presents a more difficult case. To the best of our knowledge, there are no cases exploring this fact pattern, but it more closely fits the scenario where a controller's fiduciary duties might trigger liability (i.e., harming one firm to benefit another firm controlled by the controller thereby signaling a conflict).⁷¹ Of course, a controller is allowed to act in his own interest, but when that activity involves the use of the controller's power over the firm (e.g., to get the board to put a freeze out merger up for a vote) then judicial scrutiny becomes more intense. The *Sinclair* decision provides the general guidelines on how to police this line: if the controller did not rely on the power of control to act (e.g., simply voting her own shares in the way she desires) then she is unlikely to face serious judicial scrutiny.⁷² Further, even if the controller relies on control, that seems unlikely to generate liability unless the decision results in different corporate outcomes for different shareholders (e.g., there are "unique benefits" the controller receives that other shareholders do not).⁷³ Thus, it is plausible that minority shareholders could make a case that a more diversified controller relied on control of the firm to compel it to reduce its externalities to benefit some other firms in which the controller has an interest thereby creating different outcomes for different shareholders. However, we do not consider this to be a large liability risk because one anticipates that a controller could justify this decision fairly easily (e.g., describing it as a way to enhance goodwill, or having an independent committee approve it) and many minority shareholders are typically also diversified and may benefit from the controller's decision in a portfolio sense. In any case, even if current law in the US might provide a way to potentially sue the controller successfully (which again we consider fairly unlikely), that would simply mean that if it were thought desirable to encourage controllers to reduce externalities then it would be helpful to examine options for how they might do that without subjecting themselves to heightened fiduciary duty liability (e.g., a safe harbor of some type).

When we leave the United States and look at other jurisdictions the fiduciary duties of controlling shareholders tend to be weaker with two partial caveats. First, in many jurisdictions an important remedy an aggrieved minority may have is a general statutory oppression or

An interesting case is *EBay Holdings v. Newmark* 16 A.3d 1 (Del. Ch. 2010) where Craigslist's controllers and directors put in place defensive measures (and other steps) to ostensibly protect the culture of Craigslist from minority shareholder EBay's profit-oriented preferences. The Court relied on case law addressing directors' duties (rather than controllers' duties) and found some of these steps violated the directors' duties because they were openly taken to keep Craigslist a community service rather than that they might have beneficial effects on the profitability of Craigslist. The case does not specifically address controller's duties and involves a case where the fiduciary is openly pursuing non-profit maximizing motivations.

⁷¹ See Allen, Kraakman, and Khanna, *supra* note 18, at 8.5.

⁷² See *Sinclair Oil Corp. v. Levien* 280 A.2d 717 (Del. 1971). See also *Tanzer v. International General Industries, Inc.*, 379 A.2d 1121, 1124 (Del. 1977); *Thorpe v. CERBCO, Inc.*, 676 A.2d 436 (Del. 1996) (controller can vote against sale of all assets that public shareholders regard as advantageous without having to justify fairness because this is purely exercising power as shareholder).

⁷³ See *Sinclair*, *supra* note 68, at X. See *GAMCO Asset Management Inc., v. iHeartmedia, Inc.*, WL 6892802 (Del. Ch. Nov. 23, 2016). Nonetheless, cases finding controllers liable admittedly involve fairly "extreme" facts and thus we do not expect controllers to face much liability risk. See *id.*, at 41 – 45. The "unique benefit" line of cases involve unusual facts, where narrow circumstances sustain entire fairness review. For example, the liquidity crisis argument "would have to involve a crisis, fire sale where the controller, in order to satisfy an exigent need. . . agreed to a sale of the corporation without any effort to" engage in a sales process that would reflect the market value." *Id.* at 44 – 45 (quoting then V.C. Strine in *In re Synthes, Inc. S'holder Litig.*, 50 A.3d 1022, 1036 (Del. Ch. 2012)).

mismanagement claim.⁷⁴ However, it seems unlikely that a controller's decision to reduce the externalities her firm is producing would amount to oppression or mismanagement unless it affected a very large part of corporate profits or threatened the firm's solvency.⁷⁵ Second, many jurisdictions have "shadow director" liability for those individuals and entities who *de facto* exercise the power of directors.⁷⁶ Controllers might fit this definition (though this is by no means a given in all jurisdictions),⁷⁷ but many cases have tended to arise in bankruptcy proceedings (rather than more generally) and none, to our knowledge, address the fact patterns noted here.⁷⁸

This suggests that both in the United States and elsewhere the fiduciary duty-like liability risks faced by controllers are either quite thin or can be reduced through various steps controllers might take. Further, to the extent that the risks might become greater and operate as something of a constraint one could argue that we might want to at least partially insulate controllers from liability in these circumstances to facilitate more internalization of cross-firm externalities. This could be with "safe harbors" for controllers in these situations or other ways to cabin liability risk.

C. *Would Controllers' Efforts Matter?*

Even if one thought that controllers might attempt to reduce externalities if they were diversified and there was little risk of fiduciary duty liability, we might still think controllers' efforts might be of little consequence. For instance, how much can one controller's efforts matter to global externalities? Although focusing on one controller leads to this conclusion, we think it is important to note that for much of the world controlled firms are the norm (and many important firms in the US are controlled). Thus, the collective impact of controlled firms is likely to be fairly large. Whether they can reverse certain externalities (e.g., climate change) is of course unclear, but their efforts – if they were to occur – are likely to dwarf those of firms without controllers

⁷⁴ See, e.g., Cheffins, Brian R. and Black, Bernard S., "Outside Director Liability Across Countries", *Texas Law Review*, Vol. 84, pp. 1385-1480, 2006; Khanna, Vikramaditya S. and Varottil, Umakanth, "The Rarity of Derivative Actions in India: Reasons and Consequences" (November 25, 2015). In Dan W. Puchniak, Harald Baum & Michael Ewing-Chow (eds.), *The Derivative Action in Asia: A Comparative and Functional Approach* (Cambridge University Press, 2012; Ben-Ishai, Stephanie and Puri, Poonam, "The Canadian Oppression Remedy Judicially Considered: 1995 – 2001" (June 30, 2004). *Queen's Law Journal*, Vol. 30, pp. 79-113, 2004.

⁷⁵ See Cheffins and Black, *supra* note 72; Khanna and Varottil, *supra* note 72; Ben-Ishai and Puri, *supra* note 72.

⁷⁶ See Hopt, Klaus J., "Groups of Companies - A Comparative Study on the Economics, Law and Regulation of Corporate Groups" (January 21, 2015). This article is to be published as ch. II 26 Groups of Companies in Jeffrey Gordon/Georg Ringe, eds., *Oxford Handbook of Corporate Law and Governance*, Oxford University Press 2015., European Corporate Governance Institute (ECGI) - Law Working Paper No. 286/2015, Available at SSRN: <https://ssrn.com/abstract=2560935>; Moore, Colin Robert, "Obligations in the Shade: The Application of Fiduciary Directors' Duties to Shadow Directors" (August 30, 2014). Available at SSRN: <https://ssrn.com/abstract=2489472>; Bicker, Eike Thomas, "Creditor Protection in the Corporate Group" (July 2006). Available at SSRN: <https://ssrn.com/abstract=920472>.

⁷⁷ See cites in note 75.

⁷⁸ See cites in note 75. There are also other doctrines that may aid those bringing suit against controlling shareholders in various situations. For greater discussion see Conac, Pierre-Henri and Enriques, Luca and Gelter, Martin, "Constraining Dominant Shareholders' Self-Dealing: The Legal Framework in France, Germany, and Italy" (October 2007). *European Company and Financial Law Review*, Vol. 4, No. 4, 2007, ECGI - Law Working Paper No. 88/2007, Harvard Olin Fellows' Discussion Paper No. 18/2008, Available at SSRN: <https://ssrn.com/abstract=1532221>.

across a range of potential externalities. Another related question is whether diversified controllers are likely to be more (or less) effective than index funds. Prior scholarship has already discussed economic and legal reasons for why index funds face challenges to engaging in activism to address externalities in the typical U.S. firm.⁷⁹

A few further matters merit comment. Our analysis does not depend upon a “horse race” between index funds and diversified controllers in reducing externalities – rather if the goal is to reduce externalities then one might presume the more entities that are likely to do so the better. A second point is that diversified controllers may try to reduce externalities at firms that have index funds as significant owners as well as those that do not. However, index funds are unlikely to successfully push for externality reduction at controlled firms where the controller is not diversified (as we noted earlier).

Finally, a more natural comparison, if one is desired, is between conglomerate business groups and index funds. Conglomerate business groups typically involve one holding company controlling many firms in different lines of business (where the holding company is generally controlled by a family or other group). Here we have a controlling shareholder with interests across multiple firms in different sectors but with control over each of these firms. One would expect some degree of externality internalization. Index funds, on the other hand, usually own shares in many more firms than conglomerates but do not typically exercise day-to-day control at any of them (though they may have influence in certain respects). The index funds are likely to have an impact if they can bring along other shareholders (e.g., other index funds, hedge funds, mutual funds, pension plans), whose interests may differ, so that they can direct the firm’s policies on externalities. This involves collective action and should require more effort than when a controller decides to police firm externalities (especially when that controller might control other firms affected by the externality as in some conglomerates). Our point is not that conglomerates are good or bad, but rather that they may be a more natural comparison to index funds.⁸⁰ There is, however, little evidence on whether jurisdictions with more conglomerates tend to have fewer externalities (perhaps conglomerates strongly influence political outcomes in their home countries to avoid regulation or liability). Ultimately, though, we think it is important to emphasize that diversified controllers are unlikely to be a panacea for addressing externalities.

D. Additional Reforms

Some jurisdictions or stock exchanges impose minimum float requirements for firms undertaking IPOs. That is, the firm must offer some minimum fraction of the firm’s stock to the public in order to conduct an IPO.⁸¹ This approach can be adapted to encourage controller diversification. For example, suppose that firm F were required to offer 90% of its common stock to the public (under the dual class regime; we assume that this requirement does not apply to the voting stock). Under the assumptions made earlier, the VC investors exogenously wish to exit at

⁷⁹ See [cites](#) in note 9.

⁸⁰ As discussed earlier, another interesting analog is to situations where an asset manager such as BlackRock has within its family some index funds and some private equity funds (which typically take a controlling position in their investee firms).

⁸¹ Minimum float requirements can be found in many countries. For a recent discussion of many of them see Baker McKenzie, *Global PIPE Guide*, June 2020, available at: <https://www.bakermckenzie.com/-/media/files/insight/publications/2020/06/global-private-investment-in-public-equity-guide-050620.pdf>.

the IPO stage, and so will automatically offer their 50% of the common stock for sale. Z will then have to offer a further 40% of F's common stock (i.e., 80% of her 50% stake) to the public in order to conduct the IPO. Recall the scenario assumed above in which Z is over-optimistic. Generally, Z will then prefer to hold her common stock at time 1, absent a minimum float requirement. In such circumstances, a minimum float requirement will force Z to sell more of her common stock than she would otherwise have sold, and potentially induce greater diversification.

A minimum float requirement would reduce the perceived value to Z of undertaking an IPO, as it forces her to sell more common stock than she would like. Thus, it may disincentivize IPOs. However, recall the assumption that the VC investors wish to exit. As Z is wealth-constrained and cannot buy their stock, an IPO may be the only practical means of exit for the VC funds. Thus, in what is arguably a realistic scenario, the IPO decision may be fairly inelastic with respect to the imposition of a minimum float requirement. Even so, the possible impact on IPOs should be considered. Another important point to note is that the minimum float requirement would have to be an ongoing requirement (that 90% of the common stock is in the hands of public investors at any given time), rather than applying only at the IPO stage; this would prevent the controller from buying up common stock from dispersed outside investors following the IPO.

An altogether different approach may involve tax policy. In particular, a higher tax rate on equity returns derived by a controller from a firm that she controls may counteract the effects of controller over-optimism. Such a tax provision would be unusual but not completely without precedent. In some jurisdictions, taxes on inter-corporate dividends vary depending on the level of ownership (and therefore) by one corporation of the other (although the tax rate is generally lower when dividends are paid by one corporation to another that it controls).⁸² Some countries' tax systems include special provisions for imputing the wage and dividend income of owner-managers from their controlled closely-held firms, and imposing different tax rates on these different types of income.⁸³ Thus, the hypothetical policy sketched above is not necessarily unimaginable. However, it would entail some error costs (inducing non-optimistic controllers who would optimally hold their common stock to sell). It would also require some anti-avoidance rules.⁸⁴

If over-optimism is indeed the reason that controllers resist diversification, then the types of policies outlined above may, in a sense, make controllers themselves (along with everyone else) better off. From the perspective of the controller's long-run self, diversification will typically be optimal as long as the degree of risk-aversion is sufficiently high. The misperception of the returns from firm F due to over-optimism imposes an "internality" on the controller's long-run self. This

⁸² Morck, Randall, and Bernard Yeung. "Dividend taxation and corporate governance." *Journal of Economic Perspectives* 19, no. 3 (2005): 163-180.

⁸³ Alstadsæter, Annette, and Martin Jacob. "Dividend taxes and income shifting." *The Scandinavian Journal of Economics* 118, no. 4 (2016): 693-717.

⁸⁴ For example, it would be straightforward for Z to sell her common stock but subsequently enter into a total return equity swap (TRES) with a counterparty who promises to pay Z the dividends and net capital gains that a shareholder of F would receive (with the counterparty typically holding F stock to hedge the risk created by these payments), if the payments under the TRES were subject to a lower tax rate than were dividends from a controlled firm. The economic exposure to F's common stock would induce Z to choose H at time 2. This type of scenario, however, is already addressed by anti-avoidance rules in the context of withholding taxes on cross-border dividend payments (26 U.S. Code § 871).

can be corrected by policies that force the controller to diversify, and these policies can potentially benefit the controller (in a long-run sense) as well as raise aggregate shareholder value.

While ideas along these lines may hold some promise, we are ultimately skeptical that they would have a dramatic impact on the extent of controller diversification, given the powerful forces discussed in Section III that tend to limit such diversification. Nonetheless, we view them as worthy of further discussion, in view of the importance of corporate externalities in today's world.

V. CONCLUSION

Externalities generated by corporations (such as those associated with climate change and harmful speech) are widely considered to be among the central issues facing the world today. It is generally thought that the first-best responses – in the form of Pigouvian taxation or better government regulation – are currently thought to be politically infeasible. Attention has thus turned to the possibility of market-based solutions implemented by private actors. A particularly important example is a rapidly growing body of scholarship that conceptualizes index funds as diversified “universal owners” with incentives to maximize portfolio value (and hence to internalize cross-firm externalities).

This paper has sought to develop a general conceptual framework for understanding the interrelationships among firms' ownership structure, corporate law, and the internalization of cross-firm externalities. Within this framework, we highlight an important limitation of the “universal owner” theory that has not previously drawn much attention, namely that index funds may have little power to influence behavior in the presence of a controlling blockholder. Moreover, this implies a potentially severe constraint on the ability of index funds to internalize cross-firm externalities, as controlled ownership structures are dominant globally (and are also of great importance in the United States).

In making this argument, this paper has made three primary contributions. The first relates to environmental engagements with firms by index funds, which are a crucial channel through which portfolio firms can be encouraged to behave in ways that reduce externalities. We provide novel empirical evidence showing that index funds' environmental engagements with firms in 2018-2019 are highly concentrated among firms based in countries with relatively dispersed ownership structures. This is consistent with index funds perceiving a lower efficacy of interventions in controlled firms. Second, we use publicly available data sources to document that controlling shareholders are common among the largest global firms in sectors that are thought to be particularly associated with the generation of externalities (the energy, automobile, and technology sectors). This reinforces the point that there are many firms of substantial size and importance that appear to be largely beyond the reach of index fund interventions.

We also introduce the concept of controller wealth concentration (CWC), defined as the fraction of a controller's aggregate personal wealth that consists of stock in the firm that she controls. The paper argues that a low CWC is a necessary (though not sufficient) condition for controllers to have a pecuniary incentive to internalize externalities. We construct measures of CWC for the controlling shareholders of a global sample of large technology-focused firms, and show that in this sample, CWC is very high relative to that of a diversified portfolio, typically

varying from about 50% to close to 100%. These high levels of personal wealth concentration in controllers' controlled firms prevail despite the existence of controlling minority ownership structures, such as dual class stock, that permit controlling shareholders to exert control while holding modest cash flow rights.

Indeed, our framework suggests that, in principle, dual class and other CMS structures have the hitherto ignored – and potentially important - advantage of allowing controllers to diversify their personal wealth (thereby potentially mitigating cross-firm externalities). We discuss possible reasons – including founders' over-optimism about their firms, the need to incentivize founders' ongoing effort, the possibility that the divergence of cash flow and control rights will lead to controllers extracting larger private benefits of control, and founders' incentives to defer capital gains taxes – why controllers nonetheless fail to diversify. We discuss possible reforms that may encourage higher levels of diversification, although their ability to yield substantial changes seems limited.

Ultimately, we conclude that the widespread prevalence of controlled firms with undiversified controlling shareholders constitutes a significant obstacle to the internalization of cross-firm externalities. For the large fraction of corporations at the global level that have a controlled ownership structure, this lack of controller diversification makes it difficult to identify mechanisms (apart from controllers' intrinsic motivation) to internalize corporate externalities in a situation of government failure. In the end, although regulation, taxes and liability present significant challenges, there may be few effective alternatives in a world of undiversified controlling shareholders.

Table 1: Descriptive Statistics for the Dataset on Index Funds' Environmental Engagements

Variable	Number of Observations	Mean	Standard Deviation
Number of "Big Three" Environmental Engagements in 2018-2019	78	25.38462	118.035
Indicator = 1 for Countries with Dispersed Corporate Ownership Structure	78	0.0897436	0.287664
Free Float (%)	54	51.94444	19.84793
Stock Market Capitalization (Billions of US\$ in 2018)	78	976.3561	3568.655
Number of Listed Firms	78	607.141	1074.167
GDP per capita in 2017 (Nominal US\$)	77	25291.8	23052.95
Population in 2017 (Millions)	77	79.6486	220.928
CO ₂ Emissions in 2017 (Millions of Tonnes)	77	403.7453	1269.021
Genetic Distance from the United States	78	474.1896	543.6179
Indicator = 1 for Europe	78	0.3974359	0.492535
Indicator = 1 for Asia	78	0.3461538	0.4788222
Indicator = 1 for Africa	78	0.1025641	0.3053524
Indicator = 1 for Americas	78	0.1282051	0.336482
Indicator = 1 for Oceania	78	0.025641	0.159085

Note: This table reports summary statistics for the variables used in the analysis of the relationship at the country level between corporate ownership structure and environmental engagements by the "Big Three" index funds (BlackRock, State Street, and Vanguard). The number of environmental engagements by country in 2018-2019 is from Azar et al. (2020), and was kindly provided by Jose Azar. Countries that do not appear in the Azar et al. (2020) data are assumed to have had zero environmental engagements. The indicator for the seven countries (Australia, Canada, Ireland, New Zealand, Taiwan, the UK and the US) with the greatest prevalence of listed firms with dispersed ownership is constructed based on data in Aminadav and Papaioannou (2020). The average free float (the percentage of common stock not owned by blockholders, strategic investors or the state) by country is from the OECD data reported in De La Cruz, Medina and Tang (2019). Stock market capitalization and the number of listed firms is from the World Bank's World Development Indicators (WDI) database, augmented by the OECD data from De La Cruz, Medina and Tang (2019). GDP per capita, population, and CO₂ emissions are from the WDI database. The genetic distance variable (measuring the distance between a country's population and that of the US, where the "Big Three" index funds are based) is from Dharmapala (2021), and is based on bilateral genetic distances between country-pairs reported in Spolaore and Wacziarg (2009). The classification of countries by continent is from Dharmapala (2021), and is based on Borcan et al. (2018). Note that the sample excludes one jurisdiction (Bermuda) for which stock market capitalization data is available, as it appears to be an outlier (as discussed in the text).

Table 2: Index Funds' Environmental Engagements and Corporate Ownership Structure

	(1)	(2)	(3)	(4)
	Linear Model		Poisson Model	
	Dependent Variable: Log of (1 + Number of Engagements)		Dependent Variable: Number of Engagements	
Indicator = 1 for Dispersed Ownership Structure	1.81138*** (0.479)	2.09410*** (0.420)	2.01003*** (0.516)	
Free Float (%)				0.09989*** (0.020)
(Log of) Stock Market Cap	0.45892*** (0.060)	0.15709 (0.122)	0.00006** (0.00002)	0.00007*** (0.00002)
(Log of) Number of Listed Firms		0.30338** (0.124)	0.00117*** (0.0002)	0.00051*** (0.0002)
(Log of) GDP per capita		0.60876** (0.293)	0.00003*** (0.000009)	-0.00001 (0.00002)
(Log of) Population		0.11356 (0.214)	-0.00226*** (0.001)	-0.00068 (0.001)
(Log of) CO ₂ Emissions		0.12472 (0.132)	0.00019* (0.0001)	0.00016 (0.0001)
(Log of) Genetic Distance from the US		0.07765 (0.060)	0.00085** (0.0004)	0.00011 (0.001)
Continent Fixed Effects?	N	Y	Y	Y
Constant	-1.15367*** (0.246)	-7.73421*** (2.825)	-1.35517* (0.773)	-5.16941*** (1.342)
Observations	78	76	76	53
R ² or Pseudo-R ²	0.697	0.794	0.915	0.935

Note: This table reports the results of linear and Poisson regression models of the number of environmental engagements by country in 2018-2019. This variable is from Azar et al. (2020), and was kindly provided by Jose Azar. Countries that do not appear in the Azar et al. (2020) data are assumed to have had zero environmental engagements. This variable is modeled as the natural log of (1 + the number of engagements) in Columns 1 and 2, and in levels in Columns 3 and 4. The indicator for the seven countries (Australia, Canada, Ireland, New Zealand, Taiwan, the UK and the US) with the greatest prevalence of listed firms with dispersed ownership is constructed based on data in Aminadav and Papaioannou (2020). The average free float (the percentage of common stock not owned by blockholders, strategic investors or the state) by country is from the OECD data reported in De La Cruz, Medina and Tang (2019). Stock market capitalization and the number of listed firms is from the World Bank's World Development Indicators (WDI) database, augmented by the OECD data from De La Cruz, Medina and Tang (2019). GDP per capita, population, and CO₂ emissions are from the WDI database. The genetic distance variable

(measuring the distance between a country's population and that of the US) is from Dharmapala (2021), and is based on bilateral genetic distances between country-pairs reported in Spolaore and Wacziarg (2009). Stock market capitalization, the number of listed firms, GDP per capita, population, CO₂ emissions, and genetic distance enter in log form in Columns 1 and 2 and in levels in Columns 3 and 4. The classification of countries by continent is from Dharmapala (2021), and is based on Borcan et al. (2018). Note that the sample excludes one jurisdiction (Bermuda) for which stock market capitalization data is available, as it appears to be an outlier (as discussed in the text). Robust standard errors are in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Table 3: Controller Wealth Concentration

Company	Founder/ Controller	Controller's % Share of Company (z_f)	Controller's Company Wealth ($z_f V_f$)	Controller's Personal Wealth (W_z)	CWC ($\frac{z_f V_f}{W_z}$)
Alphabet	Larry Page	7%	\$35.5	\$66.5	53%
	Sergey Brin	7%	\$35.5	\$64.1	55%
Amazon	Jeff Bezos	11.1%	\$131.68	\$143	92%
Atlassian	Scott Farquhar	23%	\$8.65	\$9.9	87%
Dell	Michael Dell	54%	\$19	\$32.1	59%
Facebook	Mark Zuckerberg	29.3%	\$68	\$72.3	94%
Foxconn	Terry Gou	12%	\$4.5	\$6.2	73%
Intuit	Scott Cook	3%	\$2.3	\$3.6	64%
Lenovo	Yang Yuan Qing	5.96%	\$0.47	\$1.25	38%
LG	Koo Gwang-Mo	15%	\$1.53	\$1.6	95%
Microsoft	Bill Gates	1.4%	\$14.46	\$110	13%
Netflix	Reed Hastings	1.3%	\$2.35	\$4.6	51%
NVIDIA	Jensen Huang	3.43%	\$5.8	\$5.59	96%
Oracle	Larry Ellison	28%	\$64.4	\$68.4	94%
Qualcomm	Irwin Jacobs	1%	\$1.03	\$1.2	86%
Salesforce.com	Marc Benioff	4.14%	\$4.33	\$6.5	67%
Samsung Electronics	Lee Kun Hee	4.18%	\$11.74	\$20.6	57%
SK Holdings	Chey Tae-won	18.4%	\$2.57	\$3.8	68%
Snap	Evan Spiegel	5.59%	\$1.16	\$3.7	31%
Tata Consultancy Services	Ratan Tata	0.83%	\$0.93	\$1	93%
Tencent	Ma Huateng	8.53%	\$39.13	\$44.7	88%
Tesla	Elon Musk	18.5%	\$27.3	\$40.1	68%
Twitter	Jack Dorsey	2.05%	\$0.5	\$4.2	12%
VMware	Michael Dell	14%	\$2.42	\$32.1	8%
Xiaomi	Lei Jun	73.4%	\$9.89	\$11.7	85%

Note: Wealth is in billions of US \$. The data are for various recent years (2017 to 2019). The sources are the following:

List of 25 largest technology firms by market capitalization:

<https://www.globaldata.com/globaldata-presents-top-25-global-technology-companies-by-market-capitalization-in-q3-2019/>; Alphabet:

and: <https://www.quora.com/Larry-Page-has-almost-40B-but-only-60M-75-000-shares-of-that-is-in-GOOG-stock-According-to-sources-Sergey-Brin-has-nearly-21-million-shares-of-GOOG-stock-yet-both-are-worth-almost-40B-Where-is-the-rest-of-Page%E2%80%99s-money-invested>;

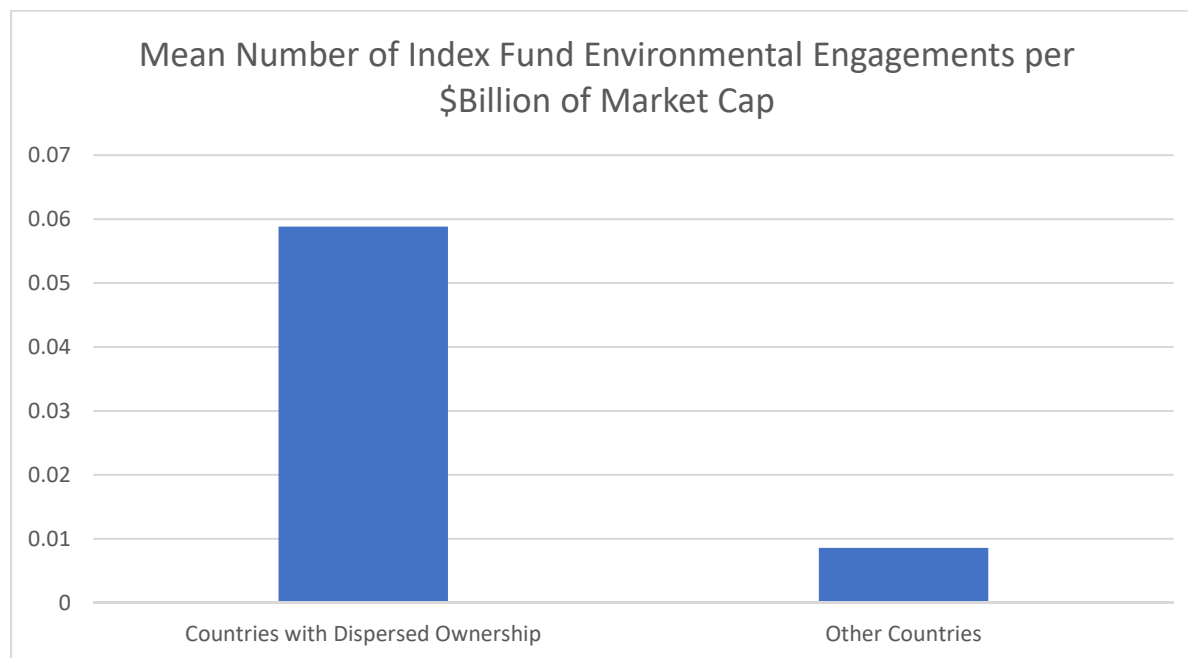
Amazon:

<https://www.forbes.com/profile/jeff-bezos/#40bd5fab1b23>; Atlassian:
<https://www.forbes.com/profile/scott-farquhar/#2c41f5166362>; Facebook:
<https://www.investopedia.com/articles/insights/082216/top-9-shareholders-facebook-fb.asp> and:
<https://www.cnbc.com/2019/08/22/mark-zuckerberg-has-sold-296-million-of-facebook-shares-in-august.html>; Foxconn:
and: <https://www.bloomberg.com/quote/2317:TT>; Lenovo:
<https://www.forbes.com/profile/yang-yuanqing/#11a83b3a61ae>; LG:
https://www.forbes.com/lists/2012/83/korea-billionaires-12_Koo-Bon-Joon_M3B5.html and:
<https://www.forbes.com/profile/koo-kwang-mo/#3dbd841b3988>; Microsoft:
<https://www.investopedia.com/articles/investing/122215/top-4-microsoft-shareholders.asp>;
Oracle: <https://www.bloomberg.com/news/articles/2017-09-29/oracle-s-ellison-adds-2-9-billion-to-fortune-on-pledged-shares> and: <https://www.businessinsider.com/rise-of-oracle-founder-larry-ellison-2017-1>; Samsung:<https://business.inquirer.net/286397/samsung-chairman-retains-top-spot-as-wealthiest-businessman-in-s-korea>; SK:
theinvestor.co.kr/people_detail.php?q=Chey%20Tae-won&mode=rich&num=5; Snap:
<https://www.forbes.com/profile/evan-spiegel/#2579ffde529c>; Tesla:
<https://www.forbes.com/profile/elon-musk/#10d31efe7999>; Twitter:
<https://www.forbes.com/profile/jack-dorsey/#70861f8f2372>; VMWare:
<https://finance.yahoo.com/quote/VMW/key-statistics/>; Xiaomi:
<https://www.forbes.com/profile/lei-jun/#141e005b6e64>; Other firms' data are from
www.cnbc.com for stock quotes, outstanding shares, and some controlling shareholders.

Table 4: Firm and Portfolio Value in Each Contingency, given Firm F's Choice of Activity Level

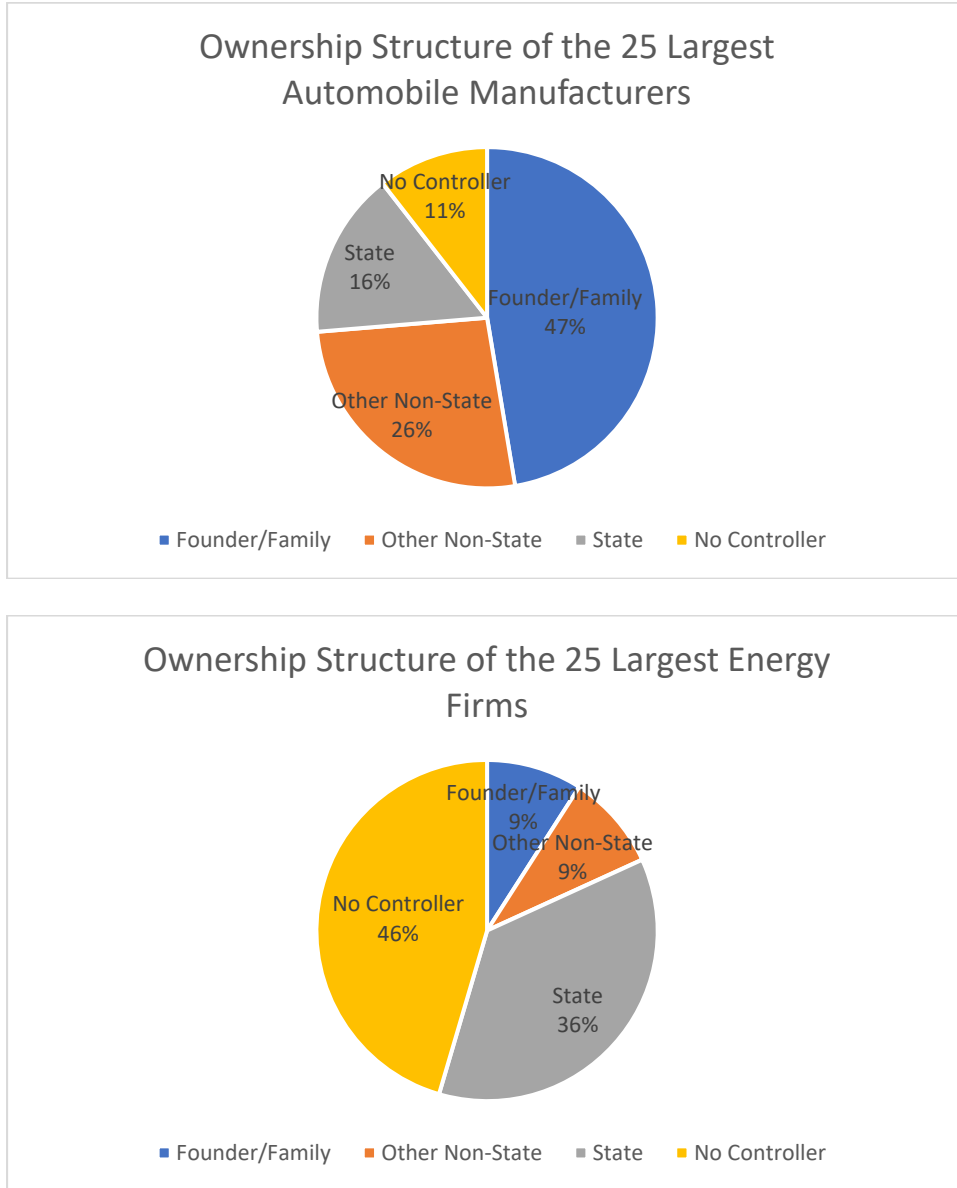
		Firm F's Choice	
		High Activity (H)	Low Activity (L)
Contingency	1 (probability $\frac{1}{2}$)	12, 998	10, 1000
	2 (probability $\frac{1}{2}$)	0, 998	0, 1000

Note: The first number in each cell is F's value and second number is the value of the market portfolio P (consisting of all firms other than F).

Figure 1: Index Fund Environmental Engagements and Corporate Ownership Structure

Note: This graph depicts – on the left - the mean number of environmental engagements by the “Big Three” index funds (BlackRock, State Street, and Vanguard; from Azar et al. (2020)), scaled by stock market capitalization (in billions of US\$), for a group of seven countries (Australia, Canada, Ireland, New Zealand, Taiwan, the UK and the US) identified in Aminadav and Papaioannou (2020) as having the greatest prevalence of listed firms with dispersed ownership. The bar on the right represents the mean number of environmental engagements by these index funds, scaled by stock market capitalization (in billions of US\$), for the other 71 countries in the sample. Stock market capitalization is from the World Bank’s World Development Indicators (WDI) database, augmented by the OECD data from De La Cruz, Medina and Tang (2019). Note that the sample excludes one jurisdiction (Bermuda) for which stock market capitalization data is available, as it appears to be an outlier (as discussed in the text).

Figure 2:



Note: Authors' calculations, based on various publicly available sources, including company websites, company proxy statements, <https://money.cnn.com> and <https://finance.yahoo.com>.

Figure 3: Illustration of Ownership Structures and Controller Wealth Concentration

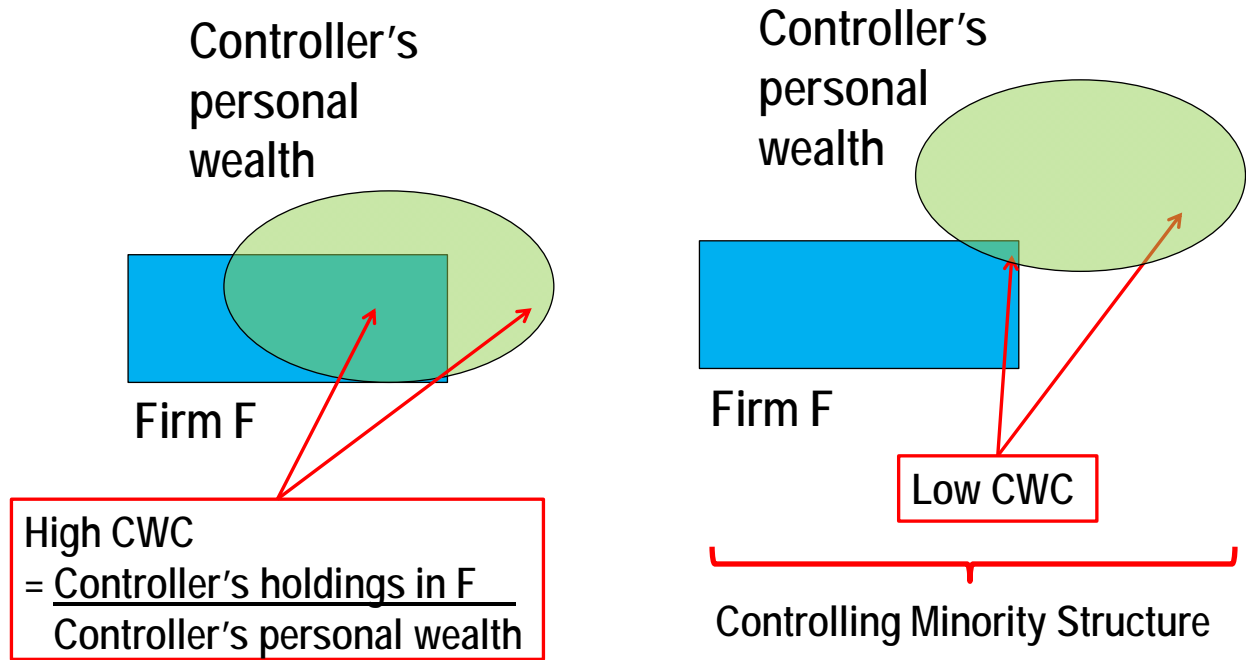


Figure 4: Controller Wealth Concentration (CWC) and Controller Shares of Firms

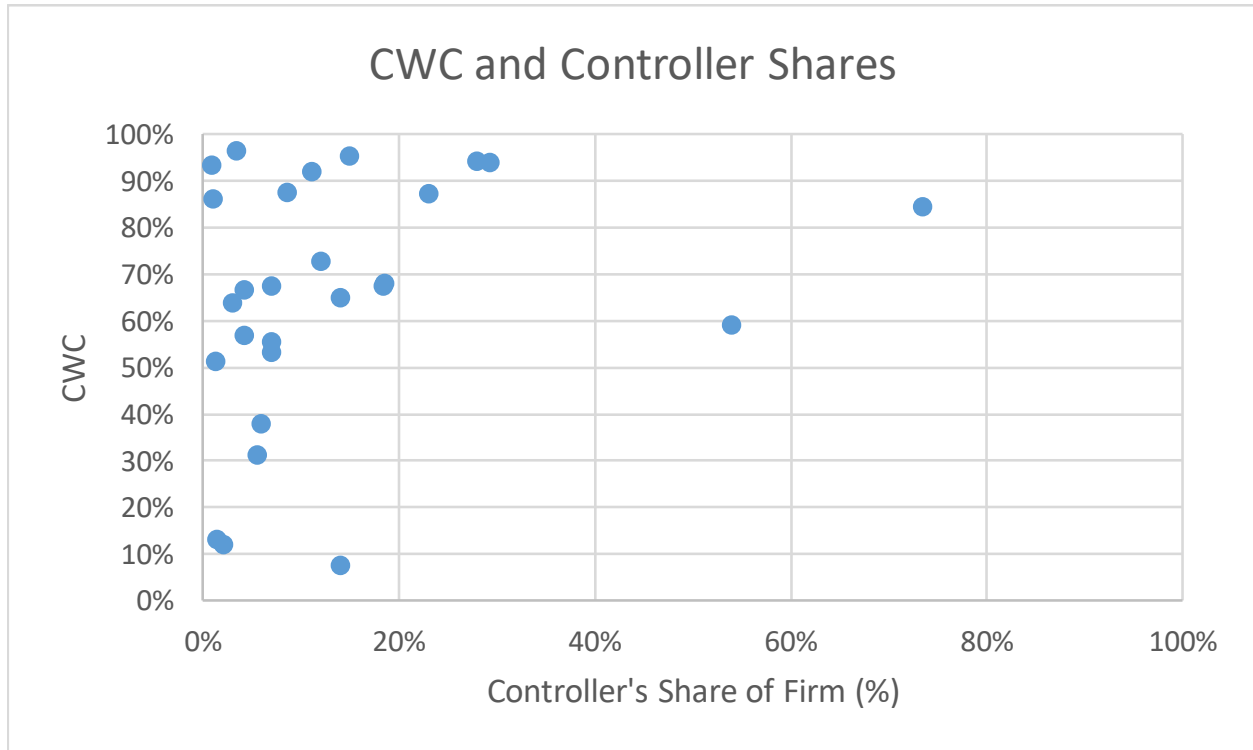
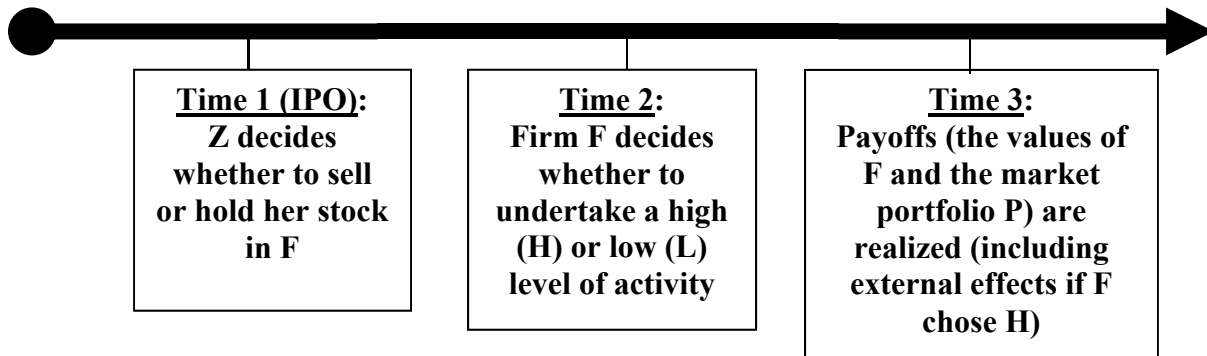


Figure 5: Timing of the IPO and Firm F's Choices

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