Horizontal Shareholding and Network Theory

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This paper uses network theory to argue that the consequences of horizontal ownership by large investment institutions are more complicated than, and sometimes the complete opposite of, what conventional economic theory predicts. Horizontal ownership occurs when a large investment institution, such as Vanguard or BlackRock, simultaneously holds large stakes in many different companies in the same industry. Legal scholars and economists have argued that these large investors have little incentive to encourage competition in the industries in which they have horizontal ownership because the investors are just as likely to hold shares in companies that might lose from competition as they are to hold shares in companies that might gain.

Against this background, this paper advances two claims. First, it shows that the policy proposals that have been advanced to address the alleged anticompetitive effects of horizontal shareholding could backfire and further reduce the level of competition in the affected markets. Second, it highlights that the consequences of horizontal shareholding are nuanced because things that happen in one industry inevitably affect other industries. For instance, increased ticket prices among airlines might be good for airlines but bad for their suppliers. Therefore, determining whether reduced competition in a given industry would benefit an investor requires us to compare the gains it would generate in the relevant market with the losses it would impose on other firms in the investor's portfolio.

I work through the mechanics of these calculations and identify a method already developed in network theory that could help us perform them. I also show that in some markets (that is, "central markets"), horizontal shareholders might have greater incentives than undiversified shareholders to promote aggressive competition. I then outline a new set of regulatory tools, which I call "Network Sensitive Regulations," that

could address the anticompetitive effects of horizontal shareholding in a manner that would be sensitive to the nuances of these network effects.

Introduction

Taken together, BlackRock, State Street, and Vanguard are the largest shareholder in 88% of the S&P 500 firms.[1] Moreover, recent data show that if we draw two random firms included in the S&P 1500 that operate in the same industry, there is a 90% chance that they will have a common shareholder owning at least 5% of the shares of both firms.[2] It is

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1.   Jan Fichtner, Eelke M. Heemskerk & Javier Garcia-Bernardo, *Hidden Power of the Big Three? Passive Index Funds, Re-Concentration of Corporate Ownership, and New Financial Risk*, 19 BUS. & POL. 298, 298 (2017).

2.   José Azar, Portfolio Diversification, Market Power, and the Theory of the Firm 2 (Aug. 23, 2017) (unpublished manuscript), https://ssrn.com/abstract=2811221 [https://perma.cc/F6UU-AK8X].

thus the norm for major institutional investors to have large shareholdings in firms that are horizontal competitors.

A recent wave of articles suggests that this pattern of ownership, generally called horizontal shareholding, poses serious antitrust problems.[3] The basic hypothesis put forward in this scholarship (hereinafter, the horizontal shareholding hypothesis) is as follows: in many oligopolistic markets, large institutional investors own significant stakes in most—if not all—of the horizontal competitors; therefore, they have no interest in inducing these firms to compete aggressively. On the contrary, institutional investors would prefer a lower level of competition within each of these oligopolistic markets in order to maximize the total value of their stakes in the horizontal competitors.

An empirical study by Azar, Schmalz, and Tecu (AST) offered support for this hypothesis by showing that, in the airline industry, horizontal shareholding is associated with higher prices.[4] In response to this finding, Posner, Scott Morton, and Weyl (PSW) and Elhauge formulated proposals to limit the anticompetitive effects of horizontal shareholding.[5] In particular, PSW advocated a regulatory reform that would forbid institutional investors from owning shares in more than one horizontal competitor in each oligopolistic market.[6] Instead, Elhauge proposed that horizontal shareholding above a certain threshold should be considered quasi per se illegal.[7] According to these scholars, the benefits of limiting horizontal shareholding would be manifold, ranging from fostering economic growth to reducing wealth and income inequality.[8]

Policymakers on both sides of the Atlantic have acknowledged the relevance of this pattern of ownership for antitrust policy. In the United States, the Department of Justice (DOJ) and the Federal Trade Commission (FTC) have expressed concerns over the possible anticompetitive ef-

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3. *See, e.g.*, Einer Elhauge, *Horizontal Shareholding*, 129 HARV. L. REV. 1267 (2016); Eric A. Posner, Fiona M. Scott Morton & E. Glen Weyl, *A Proposal to Limit the Anticompetitive Power of Institutional Investors*, 81 ANTITRUST L.J. 669 (2017); Fiona Scott Morton & Herbert Hovenkamp, *Horizontal Shareholding and Antitrust Policy*, 127 YALE L.J. 2026 (2018).

4. José Azar, Martin C. Schmalz & Isabel Tecu, *Anticompetitive Effects of Common Ownership*, 73 J. FIN. 1513, 1513 (2018).

5. For a more detailed description of these proposals, see *infra* Section I.D.

6. Posner, Scott Morton & Weyl, *supra* note 3, at 708-710. Note that PSW would allow institutional investors to avoid this limitation under specific conditions; however, they emphasize how institutional investors would ultimately be pushed towards owning large stakes in one firm in each market. *See id.* at 714-715.

7. Elhauge, *supra* note 3, at 1303.

8. *See* Elhauge, *supra* note 3, at 1281-1301. Danielle Chaim suggested that common ownership could also be associated with problems of increased tax avoidance. *See* Danielle A. Chaim, The Perils of Common Ownership: The Flooding Phenomenon (Jan. 20, 2020) (unpublished manuscript), https://www.ssrn.com/abstract=3502717 [https://perma.cc/D5S7-L4JK].

fects of common ownership.[9] At the same time, the European Commission, the European antitrust watchdog, explicitly discussed AST's findings in its decision on the merger between Dow and DuPont.[10]

Against this background, I advance three claims. First, the debate on horizontal shareholding has mischaracterized the implications of widespread institutional ownership because it has failed to acknowledge the important insights of network theory. Second, the policy proposals advanced so far are ill-suited to addressing the alleged anticompetitive effects of horizontal shareholding: they might even backfire and further reduce the level of competition in product markets. Third, regulations based on network theory—hereinafter Network Sensitive Regulations (NSRs)[11]—can better address the problems posed by diffuse institutional ownership than traditional market-centric rules.

To begin, I argue that diffuse institutional ownership has more profound implications than advocates of the horizontal shareholding hypothesis believe. The problem with diffuse institutional ownership is not so much that it reduces the incentives of horizontal competitors to engage in aggressive competition, but that it results in institutional investors having a different objective function from that of other shareholders. In a seminal article, Hansmann argued that one of the advantages of investor-owned firms is that investors "generally share a single well-defined objective: to maximize the net present value of the firm's earning per dollar invested."[12] This description echoes the standard "Fisher Separation Theorem" developed by economists, which states that under perfect competition all shareholders agree with the goal of maximizing the firm's value.[13] I will define shareholders with this goal as *firm-value* maximizers.

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9.   *See* Steven Davidoff Solomon, *Rise of Institutional Investors Raises Questions of Collusion*, N.Y. TIMES (Apr. 12, 2016), https://www.nytimes.com/2016/04/13/business/dealbook/rise-of-institutional-investors-raisesquestions-of-collusion.html [https://perma.cc/79UA-TQB3] (reporting Senate testimony that the Antitrust Division was investigating effects of common ownership in the airline industry); Panel at the NYU School of Law: Competition and Consumer Protection in the 21st Century (Dec. 6, 2018) (transcript available at https://www.ftc.gov/system/files/documents/public_events/1422929/ftc_hearings_session_8_transcript_12-6-18_0.pdf [https://perma.cc/5U44-SJZB]).

10.   Commission Decision of 27.3.2017, M.7932, Dow/DuPont, 382–83, ¶¶ 2346-52, Annex 4, ¶¶ 51-60, Annex 5 (building on AST and related research to argue that traditional measures of concentration underestimate anticompetitive effects). The official summary opinion is available at Commission Decision M.7932, Dow/DuPont, 2017 O.J. (C 353) 6.

11.   *See* Luca Enriques, Alessandro Romano & Thom Wetzer, *Network-Sensitive Financial Regulation*, 45 J. CORP. L. 351 (2019) (discussing the concept of network sensitive regulations as applied to the financial sector); Alessandro Romano, Luca Enriques & Jonathan R. Macey, *Extended Shareholder Liability for Systematically Important Financial Institutions*, 69 AM. U. L. REV. 967 (2019) (proposing a network sensitive liability rule for shareholders of systemically important financial institutions).

12.   Henry Hansmann, *Ownership of the Firm*, 4 J.L. ECON. & ORG. 267, 283 (1988).

13.   *See* IRVING FISHER, THE THEORY OF INTEREST (1930); Oliver D. Hart, *On Shareholder Unanimity in Large Stock Market Economies*, 47 ECONOMETRICA 1057 (1979) (showing

The horizontal shareholding hypothesis implies that diffuse institutional ownership breaks down the Fisher Separation Theorem, and hence, that institutional investors do not act as *firm-value* maximizers. In particular, in Part III, I show that the policy proposals advanced by Elhauge and PSW presuppose that institutional investors are *market-value* maximizers and attempt to separately maximize the net present value of the firms in each market in which their portfolio companies operate. In other words, their proposals would effectively foster competition in the markets only if institutional investors engage in m separate maximization problems, where m is the number of markets in which their portfolio firms operate. Only this assumption could justify one-size-fits-all regulations, like those proposed by Elhauge and PSW, that hit all oligopolistic markets in the same way.

Nevertheless, while diffuse institutional ownership may have broken down the Fisher Separation Theorem, the characterization of institutional investors as *market-value* maximizers is implausible. Since markets are interconnected, institutional investors that own shares in firms operating in many markets are bound to account for inter-market spillovers.[14] For instance, higher prices in the airline industry have a negative impact on airline suppliers and customers that are likely to be among the portfolio companies of institutional investors.[15] Furthermore, unlike traditional monopolists, institutional investors can recapture customers across markets. Higher prices in the airline industry would push fliers to adopt other means of transportation, for example, cars. But institutional investors also own stakes in car manufacturers and oil producers; thus, they would recapture part of the lost demand with their other portfolio companies. Consequently, institutional investors might actually have *greater* incentives to raise prices in product markets than the horizontal shareholding literature predicts.

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that shareholders agree on profit maximization as the firm's goal under perfect competition). To be sure, the economics literature acknowledges that shareholders might have heterogeneous preferences. However, the Fisher Separation Theorem shows that under certain conditions, firms will aim to maximizing their own value, despite the heterogeneity of shareholders' preferences.

14. This point is discussed in greater detail *infra* Part II. *See also* Madison Condon, *Externalities and the Common Owner*, 95 WASH. L. REV. 1 (2020) (noting that very diversified institutional investors might have incentives to internalize externalities relative to climate change); Jill Fisch, Assaf Hamdani & Steven Davidoff Solomon, *The New Titans of Wall Street: A Theoretical Framework for Passive Investors*, 168 U. PA. L. REV. 17, 38 (2019) (observing that "firm-specific problems may have spillover effects on the other companies in a passive fund's portfolio").

15. *See* Edward B. Rock & Daniel L. Rubinfeld, *Defusing the Antitrust Threat to Institutional Investor Involvement in Corporate Governance* 24 (N.Y. Univ. Law & Econ. Research, Paper No. 17-05, 2017), https://ssrn.com/abstract=2925855 [https://perma.cc/LHU5-K4FE].

Due to these inter-market effects, institutional investors have every reason to engage in a single maximization problem that accounts for all firms in their portfolio (hereinafter, (weighted)[16] *portfolio-value* maximization).[17] Notably, in the presence of inter-market spillovers, Elhauge and PSW's proposals are not only ineffective, but they could backfire and further *reduce* the level of competition among horizontal competitors.[18] As recognized by the multimarket contact theory, firms that compete in many markets have incentives to soften competition.[19] The basic idea is that it is easier for firms that are in contact in many markets to sustain anticompetitive behaviors because they have more opportunities to punish deviations.[20] If PSW's proposal were implemented, the largest institutional investors would be forced to concentrate their stakes in one firm per market. Consequently, they would become *the* dominant shareholders in each of these firms. At the same time, institutional investors' portfolio companies would be interacting across every single market in the United States. Against this background, institutional investors would have both a reason and the power to further lessen competition in every U.S. market.

Importantly, institutional investors diversified across markets might have *greater* incentives to promote aggressive competition in some markets than undiversified shareholders that invest in only one firm. To appreciate why, consider that firms and shareholders have a natural tendency to prefer a lower level of competition, independent of horizontal

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16. *See infra* Section I.A. Institutional investors generally derive their profits from charging fees on the assets that they manage through their funds. Such fees are usually calculated as a percentage of the assets under management. For this reason, when the portfolio companies increase their value, institutional investors will receive higher fees. However, some of the funds managed by institutional investors charge much higher fees than others. Thus, an institutional investor might have incentives to weight the value of a portfolio company for the fee of the fund in which its stocks are held.

17. A recent economic model, developed by one of the economists who first raised awareness of the potential consequences of widespread horizontal shareholding, emphasizes the importance of inter-market spillovers. *See* José Azar & Xavier Vives, Oligopoly, Macroeconomic Performance, and Competition Policy (Dec. 18, 2018) (unpublished manuscript), https://ssrn.com/abstract=3177079 [https://perma.cc/PC54-26SS] ("When there are multiple industries, common ownership can have a positive or negative effect on the equilibrium markup: the sign of the effect depends on the relative magnitudes of the elasticities of product substitution and of labor supply."); *see also* Martin C. Schmalz, *Common-Ownership Concentration and Corporate Conduct*, 10 ANN. REV. FIN. ECON. 413, 417 ("Shareholder-value-maximizing firms should internalize all type of externalities they impose on other firms that are horizontally or vertically connected or otherwise mutually affecting each other, to the extent that their influential shareholders hold shares in these other firms.").

18. *See infra* Parts II-III.

19. *See, e.g.*, William N. Evans & Ioannis N. Kessides, *Living by the "Golden Rule": Multimarket Contact in the U.S. Airline Industry*, 109 Q.J. ECON. 341 (1994). For a more recent discussion, see Matt Schmitt, *Multimarket Contact in the Hospital Industry*, 10 AM. ECON. J. 361 (2018).

20. *See* B. Douglas Bernheim & Michael D. Whinston, *Multimarket Contact and Collusive Behavior*, RAND J. ECON. 1, 3 (1990).

shareholding. The obvious reason is that a low level of competition in the market can increase the value of all competitors, which is beneficial for shareholders as well. Notably, if a shareholder holds stock only in this one firm, it will reap the benefits of a lower level of competition without internalizing any negative externality. On the contrary, institutional investors diversified across markets must trade off the gain they make in the relevant market with the losses imposed in other portfolio companies. For markets that generate large negative spillovers onto other markets, diversified shareholders would have incentives to *prevent* anticompetitive equilibria, or at least a weaker incentive to reduce competition than undiversified shareholders. Thus, in those markets, a higher level of horizontal shareholding might result in *more* competition and might even help prevent the formation of cartels.

Nevertheless, there is empirical evidence that institutional shareholding might be reducing the level of competition in the airline industry and, possibly, in other markets.[21] If one believes that this evidence is sufficient to conclude that diffuse institutional ownership ought to be regulated, then the key questions become: (i) how to devise policies that account for inter-market spillovers, and thus better capture the incentives of institutional investors; and (ii) how to ensure that horizontal shareholding does not reduce the level of competition in the airline industry or other markets.

At the outset, I am agnostic on whether structural reforms to address horizontal shareholding are desirable, and if so, how invasive they should be. But, if any such reform were to be implemented, it should account for inter-market effects and therefore be grounded in the insights of network theory. Network theory is widely used in many disciplines and is becoming increasingly popular among economists because it provides tools that allow researchers to quantify how spillovers affect interconnected systems.[22] Many mainstream economists have attempted to explain the be-

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21. *See infra* notes 29-38 and accompanying text.

22. For a general introduction to network theory, see MARK E.J. NEWMANN, NETWORKS: AN INTRODUCTION (2010). Recently, leading economists like the Nobel Prize winner Joseph E. Stiglitz and MIT Professor Daron Acemoglu have applied network theory to gain crucial insights into systemic risk and inter-market connections in the production process. *See, e.g.*, Daron Acemoglu, Asuman Ozdaglar & Alireza Tahbaz-Salehi, *Systemic Risk and Stability in Financial Networks*, 105 AM. ECON. REV. 564 (2015); Tarik Roukny, Stefano Battiston & Joseph E. Stiglitz, *Interconnectedness as Source of Uncertainty in Systemic Risk*, 35 J. FIN. STABILITY 93 (2016). With few notable exceptions, legal scholars have not yet exploited network analysis to formulate concrete policy proposals. *See, e.g.*, Anat Lior, *The AI Accident Network: Artificial Intelligence Liability Meets Network Theory*, 95 TUL. L. REV. (forthcoming 2021); Laura G. Pedraza-Fariña & Ryan Whalen, *A Network Theory of Patentability*, 87 U. CHI. L. REV. 63 (2020); Alan Schwartz & Robert E. Scott, *Third-Party Beneficiaries and Contractual Networks*, 7 J. LEGAL ANALYSIS 325 (2015); Verity Winship, *Enforcement Networks*, 37 YALE J. ON REG. 274 (2020).

havior of economic systems *solely* in terms of the incentives of their components (generally individuals or firms).[23] On the contrary, network theory emphasizes the role of interconnections and structure.[24]

I argue that network-sensitive regulations grounded in network theory would allow policymakers to account for the interconnections among markets and among institutional investors and their portfolio firms. In Part IV, I discuss in detail how an NSR can be used to mitigate the concerns raised by horizontal shareholding. In short, the policy would be structured as follows: whenever the level of horizontal shareholding in one market exceeds a certain threshold, the FTC would inform horizontal shareholders that there is a *rebuttable* presumption that the current ownership structure has anticompetitive effects (hereinafter, anticompetitive presumption). Using tools already developed by network theorists and data already collected in the past by the U.S. Bureau of Economic Analysis (BEA),[25] the horizontal shareholders would be allowed to show that higher prices in the market of interest create negative spillovers onto other markets in which they have stakes.

Two possible scenarios could result. First, these spillovers might be shown to cause losses to other firms in the portfolio of the horizontal shareholders that are larger than the possible gains accruing from the

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23.   A perfect example of this approach is the idea that macroeconomics requires microfoundations and ultimately should be reduced to microeconomics. To put it differently, this influential strand of thought postulates that it is possible to explain and predict the behavior of a macro-system (e.g., an economy) by understanding the incentives of the micro-components (e.g., the individual economic agents) by which it is formed. A champion of this extreme form of reductionism in economics is the Nobel Prize winner macroeconomist Robert Lucas. *See* Kevin D. Hoover, *Reductionism in Economics: Intentionality and Eschatological Justification in the Microfoundations of Macroeconomics*, 82 PHIL. SCI. 689, 692 (2015) (noting that "[m]ainstream economics accepts an eliminativist reductionism that, ideally, would offer an agent-by-agent account of the economy as a whole . . . Importantly, the representative-agent model is taken to be practically relevant because it is an early stage in the progressive elaboration of the microfoundational model that ultimately would reach the ideal"); *see also* Ricardo J. Caballero, *Macroeconomics After the Crisis: Time to Deal with the Pretense-of-Knowledge Syndrome*, 24 J. ECON. PERSP. 85, 92 (2010) (noting that "economics is . . . fundamentally reductionist; that is, it seeks to understand the behavior of the whole from that of the parts").

24.   The juxtaposition between these two approaches is captured by the words of two of the most cited scholars of our time, Reka Albert and Albert-László Barabási. They note that "there is an increasingly voiced need to move beyond reductionist approaches and try to understand the behavior of the system as a whole. Along this route, understanding the topology of the interactions between the components, i.e., networks, is unavoidable." *See* Reka Albert & Albert-László Barabási, *Statistical Mechanics of Complex Networks*, 74 REV. MOD. PHYSICS 47, 48 (2002). Economists have acknowledged the need to move in the direction suggested by Albert and Barabási. *See, e.g.*, Caballero, *supra* note 23, at 92 ("I suspect that embracing rather than fighting complexity and what it does to our modeling would help us make progress in understanding macroeconomic events. One of the weaknesses of the core stems from going too directly from statements about individuals to statements about the aggregate . . . . We need to spend much more time modeling and understanding the topology of linkages among agents, markets, institutions, and countries.").

25.   *See infra* Section II.B.

higher prices in the relevant market. In this case, the anticompetitive presumption should be successfully rebutted because horizontal shareholders would have no reason to prefer higher prices. Alternatively, the negative spillovers may not counterbalance the potential gains from higher prices in the market of interest. In this case, the horizontal shareholders would either need to partly divest from the market of interest or buy additional stock in firms that would be negatively affected by those high prices.

This approach is significantly less invasive than the proposals advanced by Elhauge and PSW, and it provides policymakers with the tools necessary to tailor their response to the specific circumstances of each case.

The Article is structured as follows. Part I reviews the literature on horizontal shareholding. Part II explains that the effects of horizontal shareholding—or rather, diffuse institutional ownership—have been misunderstood and that accounting for network effects is crucial to understanding the consequences of diffuse institutional ownership. Part III discusses why the previously proposed reforms would further reduce the level of competition in many markets. Part IV introduces the concept of Network Sensitive Regulation and discusses an example of an NSR that could be applied in this context. The Article then briefly concludes.

I. Horizontal Shareholding: Background and Empirical Evidence

The Berle-Means corporation characterized by dispersed shareholders is close to becoming a relic of the past.[26] At present, institutional investors own roughly 70% of the U.S. stock market.[27] Their tentacles reach into almost every corner of the U.S. economy, as they hold significant stakes in virtually all firms.[28] One corollary follows automatically: institutional shareholders often own significant stakes in firms that are direct competitors. This Part discusses this corollary.

Some scholars argue that when institutional investors own stakes in horizontal competitors they prefer a lower level of competition in the market.[29] In turn, this would translate into higher prices in the markets in which their portfolio firms operate.[30] A few empirical studies offer some

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26. *See* Ronald J. Gilson & Jeffrey N. Gordon, *The Agency Costs of Agency Capitalism: Activist Investors and the Revaluation of Governance Rights*, 113 COLUM. L. REV. 863, 863 (2013). For the traditional account of the Berle-Means corporation, see ADOLF A. BERLE, JR. & GARDINER C. MEANS, THE MODERN CORPORATION AND PRIVATE PROPERTY (1932).

27. Scott Morton & Hovenkamp, *supra* note 3, at 2029.

28. Fichtner, Heemskerk & Garcia-Bernardo, *supra* note 1, at 313-315.

29. Elhauge, *supra* note 3, at 1268-69; Posner, Scott Morton & Weyl, *supra* note 3, at 680-708.

30. *See, e.g.*, Posner, Scott Morton & Weyl, *supra* note 3, at 2.

support for this hypothesis. In the most relevant of these studies, AST investigate the relationship between common ownership and prices in the U.S. airline industry.[31] AST measure common ownership by using a modified version of the Herfindahl-Hirschman index (HHI) that also accounts for horizontal shareholding.[32] The HHI is the sum of the squares of the market shares of all the firms in the market,[33] and is often used by antitrust authorities as a crude proxy for market concentration. Higher values of HHI are associated with more concentrated markets, whereas less concentrated markets result in a lower HHI.[34] The Modified HHI (MHHI) also accounts for how connected horizontal competitors are via common ownership.[35] For a market with a given HHI, higher values of MHHI imply more interconnected horizontal competitors, whereas lower values indicate limited horizontal shareholding. In their study, AST find that higher values of MHHI are associated with prices at the route level that are three to seven percent higher.[36] Other studies found similar results in other sectors. Azar, Raina, and Schmalz found evidence that horizontal shareholding can result in higher prices in the banking sector.[37] Similarly, Torshizi and Clapp reported that horizontal shareholding might have

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31.   Azar, Schmalz & Tecu, *supra* note 4, at 1514-18.

32.   *Id.* at 1552.

33.   Formally, the $HHI = \sum_j s_j^2$, where s is the market share of the firm j.

For a more detailed description of the HHI see Stephen A. Rhoades, *The Herfindahl-Hirschman Index,* 79 FED. RES. BULL. 188 (1993).

34.   For instance, in a monopoly $HHI = 10000$, whereas in a market with 100 firms each one with a market share of 1% $HHI = 100$.

35.   This MHHI was first adapted to common ownership by Daniel P. O'Brien & Steven C. Salop, *Competitive Effects of Partial Ownership: Financial Interest and Corporate Control*, 67 ANTITRUST L.J. 559, 594-598 (2000). The key modification is the introduction of the "MHHI delta" that captures the level of common ownership. Therefore, the $MHHI = HHI + MHHI\ delta$. When there is no common ownership the $MHHI\ delta = 0$, and hence $HHI = MHHI$. On the contrary, if there is common ownership $MHHI > 0$, and hence $MHHI > HHI$. The *MHHI delta* is higher when common ownership is higher.

36.   Azar, Schmalz & Tecu, *supra* note 4, at 1517. *But see* Pauline Kennedy et al., The Competitive Effects of Common Ownership: Economic Foundations and Empirical Evidence 23 (July 2017) (unpublished manuscript), https://ssrn.com/abstract=3008331 [https://perma.cc/Y867-FCNX] (noting that since the dataset that they use is similar to the one used by AST "the difference in results is likely due to differences in methodology. AST's study is based on price regressions that relate airfares to the components of the MHHI. These equations are not derived from economic theory, and they have interpretation problems even if steps are taken to address econometric endogeneity").

37.   José Azar, Sahil Raina & Martin C. Schmalz, Ultimate Ownership and Bank Competition (May 4, 2019) (unpublished manuscript), https://ssrn.com/abstract=2710252 [https://perma.cc/DU5R-S45X]. *But see* Jacob Gramlich & Serafin Grundl, *Estimating the Competitive Effects of Common Ownership* 2 (Fed. Reserve Bd. Fin. & Econ. Discussion Series, No. 029, 2017), https://ssrn.com/abstract=2940137 [https://perma.cc/7FVR-H63S] (proposing an alternative methodology to measure common ownership and finding that the impact of common ownership on price and quantities depends on the specification of the model and is "fairly small").

contributed to the increase in the prices of soy, corn, and cotton seeds between 1997 and 2007.[38]

The claim that horizontal shareholding poses anticompetitive concerns requires that institutional investors are not *firm-value* maximizers. Thus, the fundamental question is: what are institutional investors maximizing?

Assume, for example, that BlackRock holds shares in nine companies, and that three of these companies are car manufacturers, three are airline carriers and three are smartphone producers. The traditional view is that shareholders are *firm-value* maximizers, and therefore BlackRock would face nine maximization problems, as they would attempt to maximize the value of each company separately. An alternative account is that BlackRock tries to maximize the value of its entire portfolio, and therefore would face a single maximization problem in which it includes all its portfolio firms. In this case, BlackRock would be a *portfolio-value* maximizer.

However, as I will show in Part III, the proposals advanced by Elhauge and PSW are built on the implicit assumption that institutional investors are neither *firm-value* maximizers nor *portfolio-value* maximizers. On the contrary, in their framework institutional investors are assumed to be *market-value* maximizers. Therefore, institutional investors would face m maximization problems, where m is the number of markets in which they invest. In this example m equals three, so BlackRock would face three separate maximization problems. The first partial equilibrium problem would be maximizing the joint value of the three car manufacturers, the second would be maximizing the joint value of the three airlines, and the third would be maximizing the joint value of the smartphone producers. Only this assumption justifies regulations that hit all the oligopolistic markets in the same way, as those proposed by Elhauge and PSW do.[39] I will argue that this conceptualization of institutional investors' objectives is simply implausible.

To be sure, I do not claim that because institutional investors are unlikely to be *market-value* maximizers, AST's results should be overlooked. Their work has highlighted a feature of the American economy that might have a far-reaching and profound impact on how competition unfolds in many markets. What I contest are the reforms advocated by legal scholars to address the alleged anticompetitive effects of horizontal

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38. Mohammad Torshizi & Jennifer Clapp, Price Effects of Common Ownership in the Seed Sector (Apr. 22, 2019) (unpublished manuscript), https://ssrn.com/abstract=3338485 [https://perma.cc/2ZCH-KAGL].

39. *See infra* Part II.

shareholding.[40] To frame the debate correctly, it is important to understand the structure and incentives of the most important institutional investors, namely investment funds, and to introduce some basic terminology. The next Sections take up these issues.

A. The Structure of Funds

It is sometimes assumed that investment funds like BlackRock are a single entity and that they are the direct owners of shares in their portfolio companies. This view is incorrect. Investment funds are actually characterized by a separation between the manager (or "advisor") and the funds it manages.[41]

To understand how an investment fund works, consider the process through which funds come into existence. To begin with, the advisor (for example, Fidelity) creates a fund (for example, Fidelity Magellan Fund) and then sells the fund's shares to investors.[42] The fund will then use the resources gathered to buy a diversified portfolio of assets, including the shares and bonds of various companies. Large asset managers like BlackRock, Vanguard, and State Street (hereinafter, the big three) replicate this process hundreds of times, and therefore end up managing a large number of funds (a "family" of funds). From a legal perspective, the separation between the advisors and the funds has important consequences, even if the advisors often dominate the funds they manage. Advisors owe a fiduciary duty toward each of their funds,[43] and hence cannot adopt strategies that impose losses on one fund even if they produce larger benefits for another fund. One way to frame the constraint faced by an asset manager is by saying that they can actively promote only strategies that are Pareto optimal for the funds. That is, only strategies that increase the value of at least one fund without reducing the value of any other do not constitute a breach of fiduciary duty. For this reason, some scholars have argued that the largest advisors are paralyzed by possible conflicts among the many funds they manage.[44]

The business model of asset managers revolves around attracting investors to their funds and charging them fees. The fee is generally a percentage of the assets under management. An asset manager benefits from attractive investment performance at one of its funds in two ways. First, they collect fees on the appreciated asset value. Second, funds that per-

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40.   *See infra* Section III.A.
41.   See John Morley, *The Separation of Funds and Managers: A Theory of Investment Fund Structure and Regulation*, 123 YALE L.J. 1228, 1232 (2014).
42.   *Id.* at 1238.
43.   *See* John Morley, *Too Big to Be Activist,* 92 S. CAL. L. REV. 1407, 1412 (2019).
44.   *See id.* at 1413.

form well are more likely to attract new investors and their new fee-paying capital.[45]

One important distinction is between active and passive funds. In a nutshell, the former actively pick stocks trying to predict which firms will outperform the market, whereas the latter passively track an index. Most advisors manage a combination of active and passive funds, and this mix is different from advisor to advisor.[46] Because active funds incur substantial costs to identify companies that might outperform the market, they generally charge much higher fees. The large difference in the fees charged by active and passive funds has an important corollary: stating that institutional investors systematically aim to maximize the value of their portfolio is imprecise. In some instances, an asset manager might prefer a strategy that increases the value of an active fund by $1 over one that increases the value of a passive fund by $2. Therefore, I will refer to institutional investors as (weighted) *portfolio-value* maximizers, where the term weighted refers to the fees charged by the funds that hold the stocks of the portfolio company.

One open question is to what extent this maximization takes place at a centralized level and to which extent it is carried out at the level of the individual funds. As discussed in Section I.B, institutional investors differ in terms of how much autonomy over corporate governance decisions they leave to fund managers. Therefore, it is likely that the answer to this question differs among institutional investors.

Moreover, it is worth noting that institutional investors operate under two constraints. On the one hand, navigating the interdependencies among portfolio firms is a complex and costly endeavor. Consequently, they might often prefer to act as passive owners. On the other hand, they ought to keep their customers satisfied, and this might sometimes limit their ability to act as *portfolio-value* maximizers. Customers (particularly for index funds) are generally interested in paying lower fees. This limits the incentives for and ability of asset managers to invest in their own corporate governance.[47]

While most of the largest institutional investors are characterized by this division between managers and funds, there are significant differences among them. The next Section explores such differences.

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45.   *See* Jonathan B. Berk & Richard C. Green, *Mutual Fund Flows and Performance in Rational Markets*, 112 J. POL. ECON. 1269, 1270 (2004).

46.   See *infra* Section I.B for a more detailed discussion of the differences among investment funds.

47.   *See* Gilson & Gordon, *supra* note 26.

B. Heterogeneity of Institutional Investors

Institutional investors are heterogeneous along many dimensions that affect the way and extent to which they get involved in the corporate governance of their portfolio firms.[48] First, institutional investors differ in the mix of funds that they manage. State Street has almost 96.9% of its assets under management in passive funds, whereas BlackRock and Vanguard have 81.3% and 81.1%, respectively, in such funds.[49] For this reason they are generally considered "passive" investors. Other institutional investors such as Fidelity (16.9%), Invesco (22.5%), and T. Rowe Price (8.9%) place a much smaller fraction of their assets under management in passive funds,[50] and are generally labelled as "active" investors. This difference is very important because the fees that are charged for active funds are significantly higher than the fees charged for passive funds. For instance, BlackRock earns almost as much from the fees of its active funds as from its passive funds, despite the fact that only 26.7% of its assets under management are in active funds.[51] Therefore, depending on their mix of active and passive funds, institutional investors may have different incentives to engage in corporate governance.

Second, actively managed funds tend to buy large positions in a relatively smaller number of firms.[52] The three largest passive fund managers, BlackRock, Vanguard, and State Street, have holdings larger than 3% in 3,648, 2,821 and 1,113 firms, respectively. However, they own over 10% of the shares in relatively few firms. BlackRock crosses the 10% threshold in 10% of cases, Vanguard in 6%, and State Street in only 1% of its portfolio firms. Compare these numbers with the three biggest active institutional investors: Fidelity, T. Rowe Price and Invesco. These institutional investors exceed the 10% threshold in 25.9%, 18.1% and 14.1% of their portfolio firms respectively. Institutional investors that concentrate larger stakes in fewer companies have—*ceteris paribus*—greater incentives to engage in corporate governance.

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48.   *See* C. Scott Hemphill & Marcel Kahan, *The Strategies of Anticompetitive Common Ownership*, 129 YALE L.J. 1392, 1448 (2020) (noting that the empirical literature has paid too little attention to the heterogeneity of institutional investors).

49.   Fichtner, Heemskerk & Garcia-Bernardo, *supra* note 1, at 304. The line between passive and active funds, however, is often blurred. *See* Adriana Z. Robertson, *Passive in Name Only: Delegated Management and Index Investing*, 36 YALE J. ON REG. 795, 797 (2019).

50.   Fichtner, Heemskerk & Garcia-Bernardo, *supra* note 1, at 304.

51.   *See* Chris Flood, *BlackRock's Rivers of Gold from Active Management*, FIN. TIMES (Oct. 14, 2017), https://www.ft.com/content/f62edoc2-adal-1le7-beba-552c73abf4 [https://perma.cc/6UKY-9SYG].

52.   *See* Fichtner, Heemskerk & Garcia-Bernardo, *supra* note 1, at 306-312 (reporting statistics on the holdings of the 15 largest U.S. and U.K. institutional investors).

Third, institutional investors are heterogeneous with respect to their size. Large institutional investors tend to have larger stakes in their portfolio firms. Therefore, they exercise their voice more often, and their voice is louder. Fourth, institutional investors differ with respect to their investment horizon. In most cases, passive institutional investors like BlackRock, Vanguard, and State Street tend to be quasi-permanent shareholders,[53] whereas large active institutional investors like Fidelity have traditionally relied more on the "Wall Street Walk."[54] That is, instead of engaging in the corporate governance of their portfolio firms, active institutional investors might sell their shares when they are dissatisfied with the management.

Another important dimension on which institutional investors differ is how they structure their voting process and the degree of freedom granted to fund managers in casting their proxy votes.[55] For instance, Vanguard has created the Investment Stewardship Oversight Committee to which all Vanguard's mutual funds delegate their voting authority.[56] BlackRock centralizes its voting decisions as well, but at least formally its fund managers have ultimate voting authority.[57] Despite these differences in the voting process, the largest passive investors tend to vote all their shares in the same direction.[58] On the other hand, active institutional investors like T. Rowe Price and Fidelity are characterized by much higher

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53. The CEO of Vanguard stated: "Our favourite holding period is forever. We're going to hold your stock when you hit your quarterly earnings target. And we'll hold it when you don't. We're going to hold your stock if we like you. And if we don't. We're going to hold your stock when everyone else is piling in. And when everyone else is running for the exits." F. William McNabb III, *Getting to Know You: The Case for Significant Shareholder Engagement*, HARV. L. SCH. F. ON CORP. GOVERNANCE (June 24, 2015), https://corpgov.law.harvard.edu/2015/06/24/getting-to-know-you-the-case-for-significant-shareholder-engagement/ [https://perma.cc/H7XD-8Y3R]; *see also* Giovanni Strampelli, *Are Passive Index Funds Active Owners? Corporate Governance Consequences of Passive Investing*, 55 SAN DIEGO L. REV. 803, 816 (2018) (noting that "passive investors are, by definition, permanent shareholders").

54. Fichtner, Heemskerk & Garcia-Bernardo, *supra* note 1, at 306.

55. *See id.* at 317; *see also* Stephen Choi, Jill Fisch & Marcel Kahan, *Who Calls the Shots? How Mutual Funds Vote on Director Elections*, 3 HARV. BUS. L. REV. 35, 47-48 (2013) (discussing the different degrees of centralization of the various mutual fund families).

56. Vanguard Funds, *Proxy Voting Guidelines for U.S. Portfolio Companies*, VANGUARD 2 (2019), https://about.vanguard.com/investment-stewardship/portfolio-company-resources/proxy_voting_guidelines.pdf [https://perma.cc/XXU9-WKWH].

57. *See* Fisch, Hamdani & Solomon, *supra* note 14, at 45. They note that "BlackRock has a centralized voting function, but individual fund managers retain ultimate voting authority to depart from the 'BlackRock' view." However, Fichtner, Heemskerk, and Garcia-Bernardo note that all BlackRock funds voted their shares in the same way in 99.982% of the cases, which suggest that the authority of fund managers has a practically limited relevance. Fichtner, Heemskerk & Garcia-Bernardo, *supra* note 1, at 317.

58. *Id.* at 317 (reporting that the big three virtually each always cast all their votes in the same direction, whereas Fidelity has a much higher rate of internal disagreement).

rates of internal disagreement.[59] T. Rowe Price leaves to fund managers the ultimate authority on how they vote their shares, but it has established a proxy committee that provides recommendations on how shares should be voted on some specific issues.[60] Fund managers that decide to deviate from such suggestions have a duty to explain the reasons behind their choice.[61] Fidelity is the only very large institutional investor that entirely delegates voting management (namely, to its subadvisor Geode).[62]

The different degree of autonomy that institutional investors grant to fund managers suggests that in some instances the (weighted) *portfolio-value* maximization might be taking place at the fund level. That is, each fund manager would be acting in a way that maximizes the value of its own portfolio. While this is an important distinction, it makes little difference with respect to the main claim advanced in this Article. Because funds invest in shares of companies operating in different markets, fund managers have similar incentives to account for inter-market spillovers as institutional investors. Therefore, regardless of where the maximization takes place, *market-value* maximization remains an implausible strategy.

Finally, the way institutional investors engage in corporate governance is affected by their connections with other actors.[63] For instance, mutual funds that have stronger business ties with their portfolio companies tend to side with management more often.[64] This suggests, for example, that a conflict of interest might induce an institutional investor to oppose

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59.   *See id.* at 316; *see also* Donna Anderson, *T. Rowe Price's Investment Philosophy on Shareholder Activism*, HARV. L. SCH. F. ON CORP. GOVERNANCE (June 18, 2018), https://corpgov.law.harvard.edu/2018/06/18/t-rowe-prices-investment-philosophy-on-shareholder-activism/ [https://perma.cc/Y7RC-ZVJR] ("It is not uncommon for T. Rowe Price portfolios to cast different votes on proxy matters.").

60.   *Proxy Voting Guidelines*, T. ROWE PRICE (2020), https://www.troweprice.com/content/dam/trowecorp/Pdfs/51326_TRP_Proxy_Voting_Guide_EN_PE_0220_HI_NC.pdf [https://perma.cc/ZB2F-MAGR].

61.   *See* Fisch, Hamdani & Solomon, *supra* note 14, at 45 n.147 ("The centralized recommendations of T. Rowe Price's proxy committee are limited, however, and leave a substantial number of issues including say on pay, separating the chair and CEO positions and ESG issues to a case-by-case determination in which the portfolio managers play a substantial role in making company-specific determinations and may ultimately decide to vote their shares differently.").

62.   *See Passive Fund Providers Take Active Approach to Investment Stewardship*, MORNINGSTAR 11 (Dec. 6, 2017), https://www.morningstar.com/lp/passive-providers-active-approach [https://perma.cc/XX84-K338].

63.   *See* Luca Enriques & Alessandro Romano, *Institutional Investor Voting Behavior: A Network Perspective*, 2019 U. ILL. L. REV. 223, 241-260 (discussing the role connections among institutional investors, and between institutional investors and other agents, have in shaping the voting behavior of institutional investors).

64.   *See* Dragana Cvijanović, Amil Dasgupta & Konstantinos E. Zachariadis, *Ties That Bind: How Business Connections Affect Mutual Fund Activism*, 71 J. FIN. 2933, 2934 (2016) (finding that mutual fund families that are connected via business ties with a corporation vote with the management more often in contested situations).

a shareholder-sponsored proposal, even if it is in the best interest of its portfolio firm.[65]

Since institutional investors are heterogeneous, and their level of involvement in corporate governance varies depending on their specific characteristics,[66] it cannot be assumed that they all engage in the corporate governance of their portfolio firms in the same way.

C. The Debate on the Mechanisms

An important question concerns what mechanism might allow common ownership to produce anticompetitive effects, given that antitrust law prevents shareholders from explicitly promoting collusion among horizontal competitors. That is, assuming that it is in their best interest, how can horizontal shareholders reduce the level of competition in the markets?

One potential culprit is executive pay design. The basic idea is as follows. A large part of executives' compensation is tied to the performance of their firm.[67] However, because a firm's performance also depends on sector-wide shocks beyond the control of executives, compensation contracts can be improved by tying the compensation to relative performance measures of peer firms (RPE).[68] In this way, the compensation of executives would depend not only on the performance of their firms, but also on how the firm performed compared to its competitors. This kind of compensation arrangement increases the incentives of executives to engage in aggressive competition and to outperform peer firms. In an important study, Anton, Ederer, Gine, and Schmalz (AEGS) hypothesize that horizontal shareholders might use RPE measures to signal to the managers of their portfolio firms when they should lessen the level of

65.   *See* Lucian A. Bebchuk, Alma Cohen & Scott Hirst, *The Agency Problems of Institutional Investors*, 31 J. ECON. PERSP. 89, 90 (2017) (noting that investment managers might side excessively with managers of corporations to obtain business); Sean J. Griffith & Dorothy S. Lund, *A Mission Statement for Mutual Funds in Shareholder Litigation*, 87 U. CHI. L. REV. 1149, 1213 (2020).

66.   *See, e.g.*, MORNINGSTAR, *supra* note 62, at 2 (finding that stewardship practices among institutional investors vary depending on their "scale, predominant investment style (passive or active), philosophy, region, and history").

67.   *See* Alex Edmans, Xavier Gabaix & Dirk Jenter, *Executive Compensation: A Survey of Theory and Evidence*, *in* 1 THE HANDBOOK OF THE ECONOMICS OF CORPORATE GOVERNANCE 383, 405 (Benjamin Hermalin & Michael Weisbach eds., 2017) ("In principle, pay should be based on any signal that is incrementally informative about whether the executive has taken actions that maximize shareholder value.").

68.   *Id.* at 450 ("When deducing executive actions from firm performance, the principal should ignore, or filter out, performance components caused by factors beyond the executive's control, such as the state of the overall economy . . . . Hence, if CEOs' performance is affected by common exogenous shocks, CEOs should be evaluated on the basis of their performance relative to their peer group.").

competition.[69] Therefore, firms operating in markets with higher levels of horizontal shareholding should rely less on RPE than firms that are in markets with lower levels of common ownership. AEGS find evidence to support this claim, and hence conclude that there could be a causal link between common ownership and compensation packages that give executives fewer incentives to compete.[70] However, other empirical studies have cast doubts on this finding.[71]

Compensation is not the only mechanism that horizontal shareholders could use to reduce the level of competition in product markets.[72] For instance, Elhauge suggests that managers who care about director elections would take into account the weighted preferences of their shareholders.[73] Thus, managers would spontaneously consider the performance of the competing firms if their shareholders hold stakes in horizontal competitors.[74] An alternative hypothesis is what Hemphill and Kahan call "selective omission."[75] That is, institutional investors would demand increased competition when it increases their fees, whilst refraining from any intervention when increased competition is not in their interest.[76]

To summarize, the debate on the mechanisms that might link horizontal shareholdings to anticompetitive effects is not settled. And yet, undisputable evidence of a causal mechanism might not be necessary. Existing laws, and in particular Section 7 of the Clayton Act,[77] are based on

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69.   Miguel Antón, et al., *Common Ownership, Competition, and Top Management Incentives* (Ross Sch. of Bus., Paper 1328, 2018), https://ssrn.com/abstract=2802332 [https://perma.cc/AU39-KGHX]. In a recent version of the working paper, Anton et al. replace relative performance measures of peer firms (RPE) with indicators of an executive's wealth. The underlying hypothesis, however, remains the same: when horizontal shareholding is higher, firms will choose compensation packages that reduce executives' incentives to compete.

70.   *Id.*

71.   Kwon finds that higher common ownership leads to more extensive use of RPE. Heung Jin Kwon, Executive Compensation Under Common Ownership (2016) (unpublished manuscript)   http://www.fmaconferences.org/Boston/ExecutiveCompensationunder CommonOwnership.pdf [https://perma.cc/95VH-GM84]; *see also* David I. Walker, *Common Ownership and Executive Incentives: The Implausibility of Compensation as an Anticompetitive Mechanism*, 99 B.U. L. Rev. 2373, 2377 (2019) (casting doubts on the plausibility of the link between executive pay and common ownership).

72.   For a complete list, see Einer Elhauge, *The Causal Mechanism of Horizontal Shareholding*, 82 Ohio St. L.J. (forthcoming 2021) (manuscript at 7-17), https://ssrn.com/abstract=3370675 [https://perma.cc/J5LU-GJLF].

73.   *Id.* at 10. This argument is based on the formal proof offered by José Azar. Azar, *supra* note 2.

74.   Elhauge, *supra* note 72, at 7. *But see* Edward B. Rock & Daniel L. Rubinfeld, *Antitrust for Institutional Investors*, 82 Antitrust L.J. 221, 239 (2018) (arguing that shareholders voting is unlikely to be an effective channel to reduce the level of competition in the market).

75.   Hemphill & Kahan, *supra* note 48, at 1427-29.

76.   *Id.*

77.   Section 7 of the Clayton Act provides that "No person . . . shall acquire, directly or indirectly, the whole or any part of the stock or other share capital . . . or any part of the assets of another person . . . where in any line of commerce or in any activity affecting commerce in any

"effect[s]" and not on mechanisms.[78] Therefore, the legality of horizontal shareholding does not depend on the identification of a mechanism through which horizontal shareholders can lessen competition.[79]

D. The Proposed Solutions

Building on the findings of Azar and his coauthors, leading legal scholars have proposed significant changes to the status quo. Two main paths are worth mentioning. The first relies on the application of Section 7 of the Clayton Act to horizontal shareholding,[80] the second is an invasive and radical regulatory reform.[81] This Section will explore these two paths.

Section 7 of the Clayton Act is generally used for mergers and can be invoked by an antitrust authority or by those who have been injured by stock acquisitions that harm competition "in any line of commerce."[82] Professor Elhauge argues that this framework should be extended to anticompetitive problems associated with horizontal shareholding.[83] His idea is simple, yet powerful. The MHHI should be used as a screening device, and antitrust authorities should investigate any horizontal acquisition that increases the MHHI by 200 or more in any market in which the MHHI is already above 2,500.[84] Elhauge's proposal comes close to rendering quasi per se illegal the acquisitions that cross these thresholds. He argues that institutional investors should not be able to avoid antitrust liability by committing not to engage in corporate governance (that is, putting their shares in a drawer).[85] Moreover, he suggests that stock acquisitions resulting in horizontal shareholdings are very unlikely to produce any efficiency gains that might offset the harm they cause.[86] Thus, while he does not rule out the possibility that a stock acquisition that increases

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section of the country, the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly." 15 U.S.C. § 18 (2018).

78. *Id.*

79. *See* Scott Morton & Hovenkamp, *supra* note 3, at 2034.

80. *See* Elhauge, *supra* note 3, at 1303-04.

81. *See* Posner, Scott Morton & Weyl, *supra* note 3, at 708-710.

82. Clayton Act § 7, 15 U.S.C. § 18 (2018).

83. Elhauge, *supra* note 3, at 1302-09.

84. *Id.* at 1303.

85. *Id.* at 1305-09. However, Rock and Rubinfeld argue that eliminating this "passive investor exception" ignores the plain statutory language. Rock & Rubinfeld, *supra* note 74, at 261.

86. Elhauge, *supra* note 3, at 1303 ("The grounds for challenging horizontal shareholdings are in one important sense stronger than the grounds for challenging mergers. A true merger creates integrative efficiencies that might offset any anticompetitive effect from increasing concentration. In contrast, stock acquisitions that create horizontal shareholdings generate no such offsetting integrative efficiencies. There is thus little reason to allow horizontal shareholdings if they have any significant anticompetitive potential.").

the MHHI by more than 200 in a market in which the MHHI is above 2,500 could be welfare-enhancing, he suggests that this possibility is extremely remote.[87]

PSW instead opt for a drastic and invasive regulatory reform. According to them, institutional investors should be allowed to own shares in only a single effective firm in an oligopoly.[88] Institutional investors could bypass this limitation by either committing to purely passive ownership (that is, putting their shares in the drawer) or by owning at most 1% of the total market.[89]

A common objection to these proposals is that it would constraint the ability of institutional investors to diversify.[90] However, most of the benefits deriving from diversification can be obtained by diversifying investments across markets.[91] Thus, requiring institutional investors to hold shares in only one firm in each market would only marginally impair their ability to diversify. In this Article, I will criticize these proposals for a different reason. Namely, I will argue that they are unlikely to increase the level of competition in the markets and might even lower it.

II. A Misconceived Problem: The Role of Network and Inter-Market Spillovers

The key question to correctly frame the debate on the horizonal shareholding hypothesis is: what are institutional investors maximizing? To put it differently, one should understand whether institutional investors are acting as *firm-value* maximizers, as *portfolio-value* maximizers, or as *market-value* maximizers.

In this Part, I will argue that the latter characterization is implausible. However, Elhauge and PSW's proposals are built exactly on the idea that institutional investors are *market-value* maximizers. Only in this case could their policy proposals be effective in increasing the level of competition in the product markets.

Institutional investors can be assumed to adopt only one of the two following strategies. First, they could be assumed to face *n* maximization problems, where *n* is the number of firms in their portfolio. Under this

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87.   *Id.*

88.   Posner, Scott Morton & Weyl, *supra* note 3, at 708-10.

89.   *Id.*

90.   *See id.* at 710-12.

91.   *See* John Y. Campbell et al., *Have Individual Stocks Become More Volatile? An Empirical Exploration of Idiosyncratic Risk*, 56 J. Fin. 1, 40 (2001); Posner, Scott Morton & Weyl, *supra* note 3, at 710 ("[A] *randomly* chosen portfolio of any 49 stocks—one from each industry—would achieve more than 90% of the available diversification (reduction in the standard deviation of a portfolio) in the market.") (emphasis added).

assumption, institutional investors would be *firm-value* maximizers, horizontal shareholding would not constitute a problem, and hence the proposals by Elhauge and PSW would be a solution to a non-problem. Second, institutional investors might be assumed to face *one* maximization problem, so that they maximize the aggregate value of all the firms in their portfolio (weighted by the fees of the funds that hold these firms). In this case, as I will show in Part III, the proposals of Elhauge and PSW would be a non-solution to a misconceived problem.

The following Sections discuss why institutional investors cannot be assumed to act as *market-value* maximizers, but first I introduce some basic concepts of network theory.

A. Network Theory: Basic Concepts

Network theory constitutes a departure from the reductionism of traditional economic analysis.[92] In particular, while many traditional economists used to postulate that the functioning of a system should be explained *solely* in terms of the incentives of the agents that form the system, network theory also accounts for the interconnections between the agents.[93] Nowadays, network theory plays a key role in economic thought, and articles applying its insights to analyze fundamental economic problems (for example, systemic risk)[94] are mushrooming. While there are a handful of empirical studies suggesting that horizontal shareholding might have a negative impact on competition, there are thousands of works showing that network effects play a crucial role in shaping economic incentives.

The building blocks of a network are the agents (nodes) and the connections among them (edges or ties). Taken together, the nodes and the ties form the topology of the network. For instance, one can look at a network of friends in which people are nodes and the friendship relationships among them are the connections.

A key concept in network theory is *centrality*, which aims to determine the importance of a node within a network. The most basic measure

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92. *See* Alessandro Romano, *Micro-*Meso-*Macro Comparative Law: An Essay on the Methodology of Comparative Law*, 17 CHI.-KENT J. INT'L. & COMP. L. 1, 5 (2016) (discussing the role of reductionism in economic theory and more specifically in the economic analysis of law).

93. *See supra* notes 23-24 and accompanying text; *see also* Geoffrey Brennan & Gordon Tullock, *An Economic Theory of Military Tactics: Methodological Individualism at War*, 3 J. ECON. BEHAV. & ORG. 225, 225 (1982) ("[T]he *ultimate* unit of analysis is always the individual; more aggregative analysis must be regarded as only provisionally legitimate.").

94. *See, e.g.*, Acemoglu, Ozdaglar & Tahbaz-Salehi, *supra* note 22, at 564 ("Since the global financial crisis of 2008, the view that the architecture of the financial system plays a central role in shaping systemic risk has become conventional wisdom."); Roukny, Battiston & Stiglitz, *supra* note 22.

of centrality is the *degree centrality*, which is the number of connections ("neighbors") a node has.[95] Assume that in our network of friendship individual *A* has two friends while individual *B* has only one friend. Then, *A* has a degree centrality of two, whereas *B* has a degree centrality of one. Hence, *A* is more central than *B*. While relatively straightforward and easy to calculate, this measure has an important limitation. In practice, the importance of a node in a network depends not just on the number of its connections, but also on how well-connected its neighbors are.[96] A node that has few well-connected neighbors might be significantly more important than a node with many neighbors that are peripheral in the network. To address this shortcoming, economists often use measures like the *eigenvector centrality* that also allows them to account for the importance of the neighbors.[97] To see the difference between these two measures of centrality consider the following scenario. Assume that *A*'s friends do not have any other friends. Assume, instead, that *B*'s only friend is *C*, but that *C* has over fifty friends. In this network of friendship, the degree centrality of *A* is higher than that of *B* because she has two friends while *B* is only friends with *C*. However, the eigenvector centrality of *B* is higher because she is connected to an extremely central node while *A* is not. Consequently, if we want to circulate information in this network and we can reach only one of *A* or *B*, our best bet would be to communicate it to the latter, even if the former has a higher degree centrality.

Economists have shown that centrality measures, and in particular eigenvector centrality, are a fundamental indicator of the relevance of a sector within an economy.[98]

With these concepts in mind, I now turn to some of the most fundamental forms of inter-market effects that are likely to influence the behavior of institutional investors. To be sure, this is not an exhaustive list of possible inter-market spillovers since any externality—positive or negative—can be studied using network theory. In this Article, I focus on a subset of externalities that have the following two characteristics: (i) cross market boundaries; and (ii) are widely recognized as relevant to antitrust analysis.

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95.   *See* SANJEEV GOYAL, CONNECTIONS: AN INTRODUCTION TO THE ECONOMICS OF NETWORKS 16 (2012).

96.   *See* Vasco M. Carvalho, *From Micro to Macro via Production Networks*, 28 J. ECON. PERSP. 23, 36 (2014).

97.   *See id.* at 37 (discussing eigenvector centrality and some of its most popular variants including Google's PageRank algorithm).

98.   *See infra* Section II.B.

B. Vertical Spillovers: Input-Output Linkages

Discussing the potential effects of horizontal shareholdings on prices in the airline industry, Rock and Rubinfeld remark that institutional investors own shares in airline suppliers (for example, Exxon and Boeing) and airline customers (such as GE, GM and IBM).[99] Thus, they note, high prices in the airline sector might harm some of the firms in the portfolio of the horizontal shareholders.[100] In itself, while obviously true, this claim is not enough to disprove the idea that institutional investors might prefer higher prices in some markets. It is ultimately an empirical matter whether the extra profits made in one market are sufficient to compensate for the eventual losses suffered by the portfolio companies operating in upstream and downstream markets.

Elhauge takes the opposite position and argues that theory and empirical evidence do not provide any grounds to conclude that vertical spillovers will prevent horizontal shareholding from resulting in higher prices.[101] He bases his assertion on three claims: (i) horizontal shareholders generally do not have identical stakes in vertically connected firms; (ii) even when institutional investors have identical stakes in vertically connected firms, the anticompetitive effects will simply compound; and (iii) vertical shareholding can also create anticompetitive effects.[102] The second and the third argument are only tangential to the debate on horizontal shareholding. They refer to vertical shareholding and there is nothing in the proposals advanced by Elhauge and PSW preventing institutional investors from concentrating stakes in vertically connected firms. Hence, even taken at face value, these assertions would not justify Elhauge and PSW proposals.

The first claim refers to a case akin to the following hypothetical. Assume that each of the big three owns 15% of the shares in each firm operating in market *A* and 7.5% of the shares in each firm operating in market *B*. Assume also that market *A* and market *B* are vertically connected, so that firms in *B* are suppliers of firms in *A*. Elhauge's hypothesis is that institutional investors will prefer a lower level of competition in market *A*, regardless of the negative spillovers on *B*.[103] In fact, since institutional investors have smaller stakes in market *B*, the negative vertical

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99.   Rock & Rubinfeld, *supra* note 74, at 236.

100.   *Id.*

101.   Elhauge, *supra* note 72, at 36.

102.   *Id.*

103.   For the sake of simplicity, I am assuming that the two markets produce similar profits and generate comparable spillovers. Introducing asymmetries across markets would further reinforce the idea that one-size-fits-all regulations are unwarranted.

spillovers will not neutralize the gains obtained in market *A* where they have larger stakes.

Using the exact same logic, however, one should conclude that institutional investors will *not* prefer lower competition in market *B*. Because they own more shares in market *A*, the gains derived by reducing competition in *B* will be outweighed by the losses in *A*. In other words, Elhauge's argument provides a perfect reason to *avoid* the one-size-fits-all regulations that he advocates.

To summarize, it is incorrect to postulate that horizontal shareholders will always prefer a lower level of competition despite vertical spillovers. However, it is equally incorrect to postulate that vertical spillovers will always prevent horizontal shareholders from preferring a lower level of competition. Then, the key question becomes under what circumstances vertical spillovers can prevent anticompetitive effects. The framework to answer this empirical question is network theory.

In network parlance, vertical spillovers are captured by studies of input-output networks.[104] There is an input-output edge when one sector uses the output of another as an input for its production. The intensity of this connection is given by the dollar value of the input used. The Bureau of Economic Analysis has collected data on input-output linkages from 405 industries within the United States,[105] and economists have used these data to study the effects of input-output linkages among U.S. firms operating in different industries.[106] The interesting property of such networks is that they give a precise sense of how and with what intensity shocks propagate across sectors. Within the framework of input-output networks, a lower level of competition in a given market caused by horizon-

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104. The theoretical roots of input-output studies are noble because they extend to the works of the Nobel-Prize winning economist Wassily W. Leontief. *See* Wassily W. Leontief, *Quantitative Input and Output Relations in the Economic Systems of the United States*, 18 REV. ECON. STAT. 105, 105 (1936) (calling for the development of methodologies that allows economists to study interconnections among parts of the economic system). Leontief famously stated: "The idea of general interdependence existing among the various parts of the economic system has become by now the very foundation of economic analysis. And yet, when it comes to the practical application of this theoretical tool, modern economists must rely exactly as Quesnay did upon fictitious numerical examples." *Id.*

105. For a detailed account of how input-output tables are developed, see Karen J. Horowitz & Mark A. Planting, *Concepts and Methods of the U.S. Input-Output Accounts*, BUR. ECON. ANALYSIS (Apr. 2009), https://www.bea.gov/sites/default/files/methodologies/ IOmanual_092906.pdf [https://perma.cc/A3T7-AZE4]. The tables are available at https://www.bea.gov/industry/io_annual.htm.

106. *See, e.g.*, Daron Acemoglu et al., *The Network Origins of Aggregate Fluctuations*, 80 ECONOMETRICA 1977 (2012); Daron Acemoglu, Ufuk Akcigit & William Kerr, *Networks and the Macroeconomy: An Empirical Exploration*, 30 NBER MACROECONOMICS ANN. 273 (2016); Kenneth R. Ahern & Jarrad Harford, *The Importance of Industry Links in Merger Waves*, 69 J. FIN. 527 (2014). Scholars have also investigated the functioning of international input-output networks. *See* Federica Cerina et al., *World Input-Output Network*, 10 PLOS ONE 1 (2015).

tal shareholding has two effects. First, it creates a supply-side effect because the output of the sector will be lower. Second, it creates a demand-side effect because the sector will need less input to produce the new level of output. The literature on input-output networks shows that demand and supply side shocks can propagate through the network and have a sizeable impact on other sectors.[107] One important caveat is that the definition of sector adopted until now by network scholars does not perfectly overlap with the definition of relevant market used by antitrust authorities. This is not surprising, given the limited use of network theory in antitrust cases. Section IV.D discusses how to connect the two concepts in a way that allows regulators to use network sensitive regulations.

Crucially, network theory shows that the ability of a sector to impose spillovers on the neighboring sectors[108] and on the economy as a whole[109] depends on its centrality, *and* that there is significant heterogeneity between sectors in terms of centrality.

For instance, according to the most recent data currently available, the most central industries have over 300 substantial connections with other sectors (see Table 1), whereas the least connected sectors have only 4 or 5 substantial connections (for example, Investigation and security services has only 5 connections).[110] A connection between two industries is defined as substantial when one supplies 1% or more of the total inputs of the other.

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107. Acemoglu, Akcigit & Kerr, *supra* note 106, at 273 ("A shock to a single firm (or sector) could have a much larger impact on the macroeconomy if it reduces the output of not only this firm (or sector), but also of others that are connected to it through a network of input-output linkages.").

108. *See* Daniel Aobdia, Judson Caskey & N. Bugra Ozel, *Inter-Industry Network Structure and the Cross-Predictability of Earnings and Stock Return*, 19 REV. ACCT. STUD. 1191, 1193 (2014) ("[T]he association between central industries' ROA [Returns On Assets] changes and ROA changes of the industries they trade with is over two times greater than that of noncentral industries.").

109. *See* Daron Acemoglu, Asuman Ozdaglar & Alireza Tahbaz-Salehi, *Microeconomic Origins of Macroeconomic Tail Risks*, 107 AM. ECON. REV. 54, 54 (2017); Carvalho, *supra* note 96, at 36-38 (2014). Other studies concentrate on firms instead of industries and confirm that a small subset of firms can produce disproportionately large spillovers. *See, e.g.*, Xavier Gabaix, *The Granular Origins of Aggregate Fluctuations*, 79 ECONOMETRICA 733, 736 (2011) (showing that that idiosyncratic shocks hitting the top 100 firms account for one third of GDP aggregate fluctuations).

110. *See* Theodoros Evgeniou et al., *Network Centrality and Managerial Market Timing Ability: Evidence from Open-Market Repurchase Announcements* 38-39 (INSEAD, Working Paper No. 51, 2016), https://ssrn.com/abstract=2801993 [https://perma.cc/8PHA-DK2Z].

Table 1: The ten industries with most substantial connections[111]

Ranking	Degree	Industry
1	338	Wholesale trade
2	314	Management of companies and enterprises
3	215	Truck transportation
4	115	Real estate
5	112	Iron and steel mills and ferroalloy manufacturing
6	92	Monetary authorities and depository credit intermediation
7	92	Electric power generation, transmission, and distribution
8	80	Petroleum refineries
9	79	Paperboard container manufacturing
10	78	Lessors of non-financial intangible assets

Table 1 shows that the centrality distribution of industries is highly skewed even at the very top: the five most connected industries have a total of 1,094 substantial connections, whereas the industries from the 6th to the 10th have 421 substantial connections.[112] The centrality of the various sectors remains highly heterogeneous even when adopting more refined measures like eigenvector centrality (or its variants).[113] Consequently, some firms and sectors produce significantly larger spillovers across the production network. Ample empirical evidence corroborates this conclusion. For instance, Aobdia and his coauthors show that changes in the Returns of Assets (ROA) of central industries have a very large impact on the ROA of connected industries.[114] Moreover, Acemoglu et al. show that when a shock hits a well-connected sector it can generate "sizable aggregate effects,"[115] and affect many sectors of the economy.[116] Finally, Gabaix finds that idiosyncratic shocks hitting the top 100 firms account for one-third of GDP aggregate fluctuations,[117] thus suggesting that

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111.   *Id.* at 38.
112.   *Id.* at 20.
113.   *See* Carvalho, *supra* note 96, at 38 ("Through the lenses of our model, sectors such as real estate, management of companies and enterprises, advertising, wholesale trade, telecommunications, iron and steel mills, truck transportation, and depository credit intermediation alongside a variety of energy-related sectors—petroleum refineries, oil and gas extraction, and electric power generation and distribution—are seemingly key to US aggregate volatility as they sit at the center of the production network.").
114.   Aobdia, Caskey & Ozel, *supra* note 108, at 1193.
115.   Acemoglu et al., *supra* note 106, at 1978.
116.   Acemoglu, Ozdaglar & Tahbaz-Salehi, *supra* note 109, at 54, 56.
117.   Gabaix, *supra* note 109, at 736.

a few firms generate extremely large spillovers that impact the entire economy.

The view that horizontal shareholding never results in higher prices because of vertical spillovers seems contrary to AST's findings, yet studies on input-output linkages suggest that, especially in central markets, lower levels of input and output can backfire and harm other firms in the portfolio of institutional investors. Therefore, a plausible hypothesis—discussed more extensively in Part IV—is that horizontal shareholding can produce anticompetitive effects in peripheral sectors, or in sectors that sell directly to end users.

C. Research and Development

Knowledge and ideas are non-rivalrous and imperfectly excludable, and hence they produce externalities that cannot be captured by the innovator.[118] Even in the presence of a strong patent system there is "a technological 'neighborhood' illuminated by the innovation that is not foreclosed by the patent, so the externality problem remains."[119] These externalities cross market boundaries and can have a significant impact on the value of firms operating in different markets. For instance, advances in semiconductors increase the productivity of industries that use chips (computers and telecommunications), but also lead to the development of more advanced computer-aided engineering and computer-integrated manufacturing.[120] In turn, advances in these industries produce positive spillovers that are very hard to capture for the semiconductor producers and that reach almost every sector of the economy. In a seminal paper, Bloom et al. find that the (gross) social rate of return to research and development (R&D) exceeds the private return by a very large margin, 34.3%.[121] As a consequence, they estimate that the socially optimal level of R&D investment is over twice the level of R&D investment currently observed.[122]

The idea that knowledge is only partially excludable is already enough to support the narrow claim advanced in this Section: the nature of the innovation process makes it unreasonable for institutional investors to be *market-value* maximizers. To the extent that the spillovers cre-

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118.   *See* Paul M. Romer, *Endogenous Technological Change*, 98 J. POL. ECON. S71, S75 (1990) (recognizing the possibility of knowledge spillovers).

119.   David J. Teece, *Competition, Cooperation, and Innovation: Organizational Arrangements for Regimes of Rapid Technological Progress*, 18 J. ECON. BEHAV. & ORG. 1, 4 (1992).

120.   *See id.* at 14.

121.   Nicholas Bloom, Mark Schankerman & John Van Reenen, *Identifying Technology Spillovers and Product Market Rivalry*, 81 ECONOMETRICA 1347, 1384 (2013).

122.   *Id.* at 1349.

ated by technological innovations can cross market boundaries, institutional investors have every incentive to consider the impact of an R&D project on their whole portfolio of firms. The current situation with the coronavirus disease 2019 (COVID-19) vaccine is a case in point.

Currently, COVID-19 is ravaging the United States, causing an unprecedented economic and health crisis. Against this background, a COVID-19 vaccine is the Holy Grail of any pharmaceutical company, and hence big pharma could have incentives to compete aggressively. However, from a social perspective, it might be preferable if pharmaceutical companies share their information and collaborate to avoid duplication costs and accelerate the development of a vaccine. A COVID-19 vaccine would allow the U.S. economy to reopen, bringing immense benefits for most of the firms that are in the portfolio of the big three. Thus, institutional investors that are not blind to inter-market spillovers would push firms to collaborate on the development of a vaccine. Incidentally, this is exactly what we observe as institutional investors like BlackRock and Fidelity openly stating that their portfolio firms should collaborate in the development of a vaccine.[123] Institutional investors "want a cure, not a winner."[124]

Once again, network theory offers a way to quantify the relevance of technological spillovers from one sector to another. By defining the technology sector as a node and the amount of knowledge spillover (generally measured using indicators that are functions of the number of patent citations)[125] as the edge, it is possible to map the technological knowledge flows between sectors.[126] An important feature of these networks is that they allow researchers to identify the core sectors (nodes) that produce the most relevant technology spillovers. This information is especially important because there is empirical evidence that institutional owner-

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123. *See* Attracta Mooney & Donato Paolo Mancini, *Drugmakers Urged to Collaborate on Coronavirus Vaccine*, FIN. TIMES (Apr. 23, 2020), https://www.ft.com/content/b452ceb9-765a-4c25-9876-fb73d736f92a [https://perma.cc/G2AU-3QN7].

124. Matt Levine, *Investors Want a Cure, Not a Winner*, BLOOMBERG (Apr. 24, 2020), https://www.bloomberg.com/opinion/articles/2020-04-24/investors-want-a-cure-not-a-winner [https://perma.cc/8245-CGLE].

125. Measuring the intensity of knowledge spillovers is clearly a very complex endeavor, and patent citations can at times be a very crude measure. For this reason, the literature often suggests combining different indicators. *See, e.g.*, Andrew J. Nelson, *Measuring Knowledge Spillovers: What Patents, Licenses and Publications Reveal About Innovation Diffusion*, 38 RES. POL'Y 994, 994 (2009) (noting that all the indicators used are imperfect thus suggesting to employ different indicators in the analysis).

126. *See generally, e.g.*, Hyunseok Park & Janghyeok Yoon, *Assessing Coreness and Intermediarity of Technology Sectors Using Patent Co-Classification Analysis: The Case of Korean National R&D*, 98 SCIENTOMETRICS 853 (2014) (building a network of directed knowledge flows among Korean technology sectors).

ship per se is conducive to more and *better* innovation,[127] and that horizontal shareholding correlates with higher R&D investment when there are significant technological spillovers.[128] In this vein, knowing which sectors create key knowledge spillovers is important when balancing the costs and benefits of horizontal shareholding.

D. Diversion Ratios

Assume that there is only one airline company, called FlySafe, connecting New York and Boston. Being a monopolist, FlySafe will raise its prices above competitive levels and enjoy monopoly profits. However, its monopoly profits are constrained by the elasticity of demand. If FlySafe raises its prices too much, its customers will eventually decide to travel by car or by train. Alternatively, if the travelers were planning to visit their relatives, they might give up the trip and call their relatives on the phone. Thus, FlySafe's ability to raise prices is constrained by the fact that other firms provide customers with alternative means to satisfy their needs.

This constraint operates very differently for large institutional investors. Recall that BlackRock, State Street, and Vanguard together are the largest shareholder in 88% of S&P 500 firms. They do not just own shares in airline companies, but also in car manufactures, oil producers, and phone companies. In other words, unlike traditional monopolists, institutional investors can recapture customers across many markets. For this reason, institutional investors may have even more incentive to lower competition than a traditional monopolist, at least when most of the demand comes from end users. For instance, if the profits that can be exact-

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127.   The idea is that innovating is by definition a risky endeavor. If all the shareholders evaluate the performance of the management based only on short-term revenues, the managers will not have sufficient incentives to innovate. Instead, many institutional investors have a long-term horizon and are considered sophisticated enough to assess the capabilities of managers without clinging exclusively to short-term monetary performance. *See* Philippe Aghion, John Van Reenen & Luigi Zingales, *Innovation and Institutional Ownership*, 103 AM. ECON. REV. 277, 277-78 ("We show that there is a robust positive association between innovation and institutional ownership even after controlling for firm fixed effects and other confounding influences. Institutional owners have a small and positive impact on R&D, but a larger positive effect on the productivity of R&D (as measured by future cite-weighted patents per R&D dollar)."); *see also* Li Li Eng & Margaret Shackell, *The Implications of Long-Term Performance Plans and Institutional Ownership for Firms' Research and Development (R&D) Investments*, 16 J. ACCT. AUDITING & FIN. 117, 117 (2001) ("We do find evidence that holdings by institutional investors are positively associated with the level of R&D spending in the firm. These results indicate that the horizon of institutional investors may influence managers' planning horizons and how they decide on long-term investments.").

128.   *See* Miguel Anton et al., Innovation: The Bright Side of Common Ownership? 17 (Sept. 25, 2018) (unpublished manuscript), https://ssrn.com/abstract=3099578 [https://perma.cc/ZW5Y-XQAE] ("Empirically, we found that common ownership has a positive effect on innovation input and output when innovation spillovers to other firms are relatively large compared to the firms' distance in the product market.").

ed from car travelers are higher than those that can be obtained from fly-ers,[129] institutional investors will prefer prices in the airline industry that are *above* the single-market monopoly price to induce more people to travel by car. Similarly, if the margins in the airline industry are higher, institutional investors might prefer prices below the otherwise optimal ol-igopoly price to persuade drivers to fly. To be sure, it is well recognized by antitrust scholars that the possibility of recapturing demand across products affects firms' incentives to reduce competition.[130] Accounting for these effects is even more important in the context of institutional in-vestors, since they can recapture demand across multiple markets and product lines.

But this is not the end of the story. Recall that institutional investors compete on *relative* performance.[131] If BlackRock has fewer shares in FlySafe and more shares in car manufacturers than Vanguard, its pre-ferred strategy might be to maximize the value of car manufacturers to the detriment of FlySafe. In contrast, Vanguard could prefer a strategy that favors FlySafe over car manufacturers.

In principle, the best way to capture these inter-market effects is a diversion-ratio network. Diversion ratios are extensively used in merger assessment and aim to answer the question: if the price of Brand *A* were to rise, what fraction of the customers leaving Brand *A* would switch to Brand *B*?[132] While there are different interpretations of the diversion ra-tio,[133] in this context the most appropriate version is the value capture ra-tio. This ratio expresses the "[i]ncrease in value captured by Product *B* as a fraction of Product *A*'s loss of sales in value."[134] To return to our exam-ple, the value-capture ratio expresses the value captured by a railway op-erator when FlySafe increases its prices.

Ideally, mapping value-capture ratios among products would show the topology of the diversion-ratio network in which the edges measure the value that would be captured by each product from a price increase in another product. This network would allow policymakers to determine

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129.   Traveling by car generates costs like purchasing and repairing the car, buying gas, paying tolls and so on. All these expenses generally increase with the miles traveled. Many of these expenses borne by travelers will be to the benefit of companies that have institutional in-vestors among their shareholders.

130.   *See, e.g.*, Joseph Farrell & Carl Shapiro, *Recapture, Pass-Through, and Market Definition*, 76 ANTITRUST L.J. 585, 587-88 (2010).

131.   A similar example is discussed also in Enriques & Romano, *supra* note 63, at 261-265.

132.   *See* Carl Shapiro, *Mergers with Differentiated Products*, 10 ANTITRUST 23, 24 (1996).

133.   *See* Adriaan ten Kate, Sr. & Gunnar Niels, *The Diversion Story: Resolving the Ambiguities Surrounding the Concept of Diversion Ratio*, 10 J. COMPETITION L. & ECON. 361, 363-66 (2014).

134.   *Id.* at 365.

with precision when higher prices in a market characterized by high levels of horizontal shareholding would benefit firms operating in other markets where those horizontal shareholders have significant stakes. To be sure, it is unlikely that policymakers will ever be able to precisely reconstruct the topology of the diversion-ratio network at the product level. However, it is possible to obtain some indicative value-capture ratios at the market level (that is, if the price of flight tickets went up by ten percent how much value would be captured by railway operators?), and such data can still offer very important insights into the nature of inter-market spillovers.

E. Institutional Investors and Corporate Governance

The previous Sections have discussed some important forms of inter-market effects that network theory can help capture. Such inter-market effects are important for institutional investors that own stakes in firms operating in many markets. Therefore, it is implausible that institutional investors are *market-value* maximizers. It is inconsistent to assume that institutional investors are sufficiently sophisticated and powerful to devise strategies that go beyond maximizing the net present value of the single company, while suggesting that they are naïve enough to ignore the possibility of spillovers across markets.

Nevertheless, Elhauge and PSW ground their arguments in a theoretical framework developed by O'Brien and Salop in 1999 that does not consider network effects.[135] In their work, O'Brien and Salop show that cross-ownership can reduce the incentives of firms to engage in competition.[136] However, there are two problems with using the O'Brien and Salop framework as the theoretical basis for the claim that horizontal shareholding reduces the level of competition in all oligopolies. To begin with, cross-ownership involves a firm owning stocks in a competitor, whereas in the case of horizontal shareholding an institutional investor has a non-controlling position in two competitors.[137] The extent to which these situations can be considered similar is unclear.[138] In addition, because the relevance of institutional investors has grown exponentially over the last two decades, Salop and O'Brien wrote their article in a different era. El-

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135.   *See* O'Brien & Salop, *supra* note 35.

136.   *Id.; see also* David Gilo, Yossi Moshe & Yossi Spiegel, *Partial Cross Ownership and Tacit Collusion*, 37 RAND J. ECON. 81 (2006) (showing that under certain conditions partial cross ownership can increase the chances of tacit collusion).

137.   *See* Rock & Rubinfeld, *supra* note 74, at 238-39. Cross-ownership has been extensively studied as a source of anticompetitive concerns and as a possible cause of management entrenchment. *See, e.g.*, Marc Levy & Ariane Szafarz, *Cross-Ownership: A Device for Management Entrenchment?*, 21 REV. FIN. 1675 (2017).

138.   *See* Rock & Rubinfeld, *supra* note 74, at 238-39.

hauge himself notes that the levels of institutional shareholding and horizontal shareholding increased dramatically between 1999 and 2014.[139] Thus, Salop and O'Brien had every reason to model the dynamics taking place *within* markets, without considering ownership connections *across* market boundaries. Yet, this approach is inconsistent with current patterns of ownership. Economists used to have an atomistic view of the world, with firms and markets considered as "isolated atoms."[140] This conceptualization might have been an adequate heuristic in a pre-institutional-investors world, but it misrepresents the modern U.S. economy. This is the era of networks and interconnections, not the age of atoms.

Having ruled out the hypothesis that institutional investors act as *market-value* maximizers, it is helpful to introduce a taxonomy of the possible approaches that institutional investors could adopt when engaging with the corporate governance of their portfolio firms. The ultimate goal of institutional investors is to maximize their profits, but they may adopt different strategies to achieve this goal. In particular, they can act as: (i) *firm-value* maximizers, (ii) (weighted) *portfolio-value* maximizers, or (iii) passive owners.

First, consider a case where institutional investors are *firm-value* maximizers. Although at first glance this strategy might seem irrational, it could be very appealing for a number of reasons. To begin with, the problem of estimating inter-firm and inter-market spillovers is extremely complex, so institutional investors might find it reasonable to adopt the simplest heuristic possible. Additionally, this strategy can be extremely cost effective because it allows institutional shareholders to rely on the information produced by proxy advisory firms and activists (with which they would share the same goal).[141] For instance, activist hedge funds can acquire significant stakes in a given company and then present institutional investors with information on how to increase the value of *that*

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139.   Einer Elhauge, *The Growing Problem of Horizontal Shareholding* 2 (Harvard Pub. Law, Working Paper No. 17-36, 2017), https://ssrn.com/abstract=2988281 [https://perma.cc/WRW4-X2NE] ("The evidence also shows that in recent decades the level of institutional shareholding passed a tipping point, such that the probability that two competing firms have a common shareholder holding at least 5 percent of each has increased from 16 percent in 1999 to 90 percent by the end of 2014.").

140.   Competition necessarily implies some interaction; therefore, this claim should not be understood in a literal sense. The gist of the argument is that economics has traditional been extremely reductionist and emphasized the incentives of individuals rather than interconnections among them.

141.   *See* Fisch, Hamdani & Solomon, *supra* note 14, at 50 ("[I]ndividual fund complexes interact and rely upon not only proxy advisory firms but shareholder activist hedge funds to supplement their voice, monitoring and information gathering processes."); Gilson & Gordon, *supra* note 26, at 867 (documenting how hedge funds can lower the cost of becoming informed for institutional investors).

company.[142] Activists have no interest in maximizing the value of other firms in the market, as they generally have no significant stakes in horizontal competitors.[143] Thus, institutional investors can benefit from the cost saving associated with relying on the information unearthed by activists if and only if they act as *firm-value* maximizers.[144] Moreover, institutional investors may act as *firm-value* maximizers to avoid conflicts between the funds they manage. By engaging in strategies that deviate from *firm-value* maximization, institutional investors may harm some of the funds they manage and hence breach their fiduciary duty.[145] If institutional investors are *firm-value* maximizers, then horizontal shareholding does not constitute a problem and no reform is required.

Alternatively, institutional investors can optimize the (weighted) value of their entire portfolio by engaging in a single maximization problem. If institutional investors engage in a single maximization problem, then horizontal shareholding can be a problem. However, as I will show in Part III, PSW and Elhauge's proposals would only worsen it.

There is an additional possibility that part of the literature on horizontal shareholding has surprisingly ignored: regardless of their proclaimed engagement, most institutional investors might still be passive owners.[146] Ample empirical evidence suggests that a relatively large group of institutional investors belongs to this category. For example, Iliev and Lowry studied how often institutional investors blindly follow the recommendations of the main proxy advisor, the Institutional Shareholder Services (ISS). They observed that 25% of funds voted *all their shares* in line with the suggestions of the ISS during the five years included in their

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142.   *See id.* at 896 (noting that activists "acquire a position in a company with governance-related underperformance, and then . . . present reticent institutions with their value proposition: a specified change in the portfolio company's strategy or structure").

143.   *See* Hemphill & Kahan, *supra* note 48, at 1415 n.73 (noting that hedge funds are generally not "common concentrated owners").

144.   In line with this observation, Fisch, Hamdani, and Davidoff Solomon noted, "A well-documented highway of information runs between activist shareholders and the Big Three . . . ." Fisch, Hamdani & Solomon, *supra* note 14, at 41-42; *see also* David R. Beatty, *How Activist Investors Are Transforming the Role of Public-Company Boards*, MCKINSEY (Jan. 3, 2017), https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/how-activist-investors-are-transforming-the-role-of-public-company-boards [https://perma.cc/AE2S-UNHV] (arguing that "[c]ollaboration between activists and traditional asset managers is changing the boardroom").

145.   *See* Hemphill & Kahan, *supra* note 48, at 1438 (noting that "from the perspective of fiduciary duty, the safest solution is for the voting group to base its recommendations on what vote maximizes the value of a portfolio company").

146.   *See, e.g.*, Jennifer G. Hill, *The Conundrum of Common Ownership*, 53 VAND. J. TRANSNAT'L L. 881, 890 (2020); Dorothy S. Lund, *The Case Against Passive Shareholder Voting*, 43 J. CORP. L. 493, 495 (2018) (suggesting that institutional investors hardly get involved in corporate governance).

sample.[147] This suggests that a large fraction of institutional investors are simply uninterested in the corporate governance and strategies of their portfolio firms. This leads to one obvious question: why would managers consider the preferences of shareholders that are entirely uninformed? Moreover, the governance groups of the largest institutional investors are extremely small.[148] For instance, the big three have an average of 16 employees to oversee an average of 12,000 companies.[149] The small size of these governance groups suggests that the involvement of large institutional investors' in portfolio companies has been grossly overstated by part of the literature. A handful of employees cannot effectively monitor thousands of companies.

If institutional investors are passive owners, institutional shareholding constitutes a very different problem from what PSW and Elhauge envisaged, and policymakers should consider corporate governance reforms aimed at *increasing* the level of involvement of institutional investors, instead of looking at antitrust law. Many scholars have taken exactly this path and discussed reforms that would facilitate institutional investors' participation in corporate governance.[150]

The existing empirical evidence is not sufficient to quantify the relative frequency and relevance of these three approaches to corporate governance. We can only speculate on how often institutional investors act as *firm-value* maximizers, portfolio maximizers, or passive owners.

III. Non-Solutions to a Misconceived Problem

In this Part, I discuss how the PSW and Elhauge proposals fare in light of the discussion on inter-market spillovers. For the sake of argument, I will assume that institutional investors can influence the behavior of portfolio firms to the extent required by the horizontal shareholding hypothesis. I will show that even under this assumption their policy proposals are unwarranted and could backfire.

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147.   *See, e.g.*, Peter Iliev & Michelle Lowry, *Are Mutual Funds Active Voters?*, 28 REV. FIN. STUD. 446, 454 (2015).

148.   *See* Sarah Krouse, David Benoit & Tom McGinty, *The New Corporate Power Brokers: Passive Investors*, WALL ST. J. (Oct. 24, 2016) https://www.wsj.com/articles/the-new-corporate-power-brokers-passive-investors-1477320101 [https://perma.cc/7NX9-YQ8V].

149.   *See* Sean J. Griffith, *Opt-In Stewardship: Toward an Optimal Delegation of Mutual Fund Voting Authority*, 98 TEX. L. REV. 983, 1001 (2020); Krouse, Benoit & McGinty, *supra* note 148 ("Vanguard has 15 people overseeing work on about 13,000 companies based around the world. BlackRock has about two dozen people who work on governance issues at some 14,000 companies . . . . State Street Global Advisors, another large passive-fund manager, part of State Street Corp., has fewer than 10 employees devoted to issues at around 9,000 companies . . . .").

150.   *See, e.g.*, Lund, *supra* note 146, at 523-35.

PSW's proposal of allowing institutional investors to own stakes only in one firm in each oligopolistic market has three fundamental problems. First, it focuses exclusively on intra-market structure when inter-market connections are also relevant. Second, and strictly connected, under this proposal institutional investors would still have different goals than those of *firm-value* maximizers. Thus, the cost of ownership of investor-owned firms would still be high due to the coexistence of shareholders with different objectives. Third, it could push institutional investors back into passive ownership. Alternatively, it would *increase* the likelihood of collusion between horizontal competitors.

Elhauge's proposal does not fare better, as it shares the first two problems identified in PSW's proposal. Most importantly, his proposal is affected by what I call the fallacy of "case by case adjudication."[151]

I will now discuss the limitations of the two proposals in more detail.

A. Market Structure

PSW would give institutional investors three options: they can (i) own shares in only a single effective firm in an oligopoly, (ii) commit to put their share in a drawer (for example, passive ownership), or (iii) own at most 1% of the total market share.[152] There are strong reasons to believe that institutional investors would systematically opt for option (ii);[153] however, PSW extensively discuss option (i), so I will explore that option first.

To simplify the exposition, let us return to the example discussed in Part I: that BlackRock owns shares in nine companies, and that three of these companies are car manufacturers, three are airline carriers, and three are smartphone producers. For the sake of simplicity, let us assume that Vanguard and State Street have identical portfolios. In other words, we assume that Vanguard and State Street own roughly the same number of shares in the same nine companies as BlackRock.[154] Let us recall that institutional investors cannot be assumed to face three different maximization problems (one for each market). Instead, institutional investors

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151. The fallacy I describe would fall under the umbrella of the fallacies of exclusion—that is, when evidence which would change the outcome is excluded from consideration.

152. Posner, Scott Morton & Weyl, *supra* note 3, at 708-10.

153. Section III.D explains why the most likely choice of institutional investors would be reverting to passivity and discusses the consequences of this choice.

154. Note that if this assumption does not hold, and institutional investors do not own comparable stakes in the same firms, then horizontal shareholding cannot constitute a problem. For instance, assume that an institutional investor is overweight one car manufacturer and has negligible shares in the other two. Such institutional investors would have incentives that are similar to those of an investor that only has a position in one of the car manufactures. Hence, this is a necessary assumption for PSW.

face either nine maximization problems (one for each firm in their portfolio) or a single maximization problem. If the former is true, then the PSW policy proposal is a solution to a problem that does not exist because institutional investors would already be acting as *firm-value* maximizers.

Thus, to have a claim that horizontal shareholding ought to be regulated, it must be assumed that institutional investors concentrate on the single problem of maximizing the value of their entire portfolio. Moreover, it has to be optimal for institutional investors that horizontal competitors set prices above competitive levels in all three markets, otherwise there would be no need for regulation of the kind proposed by PSW that indiscriminately targets all oligopolies in the same way. It is unclear that the PSW's proposal would change anything, even under all these heroic assumptions necessary justify it. If institutional investors thought that lessening competition between horizontal competitors was the optimal strategy before the reform, it is very likely that it will remain the optimal strategy for them after the reform as well. However, as revealed by the multimarket contact theory,[155] after the reform institutional investors would have far stronger means to achieve their goal.

The basic idea of the multimarket contact theory is that firms that compete in many markets can better sustain anticompetitive equilibria. Assume that firms A and B are competing in one market and decide to lessen the level of competition to increase their profits. If A decides to deviate from this anticompetitive arrangement, B can retaliate only in that market. On the contrary, if A and B compete in many markets, B's threat of retaliation becomes more credible, since it can take place in any of the markets in which the two firms are in contact. Thus, A has less incentive to deviate and the anticompetitive arrangement would be more stable.

To clarify how this point would apply to the PSW proposal, let us return to our previous example. If the PSW proposal were introduced, each institutional investor would have to decide which portfolio company to invest in within each industry. There are strong reasons to believe that institutional investors would ultimately split among different firms within each market. If all the institutional investors attempted to buy shares in the same firm in each market, while simultaneously divesting from all the other firms in that market, the effect on prices would be enormous. The share price of the divested firms would drop dramatically, while the share price of the company chosen by the institutional investors would skyrocket. This is especially true because the market would know in advance that institutional investors were being forced to sell *all* their shares from

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155.   For a general discussion of multimarket contact theory, see Bernhelm & Whinston, *supra* note 20, and Evans & Kessides, *supra* note 19.

all of the firms in a market apart from one. Clearly, the effect on share prices would not reflect the real value of the companies, as it would merely be the consequence of regulation. For these reasons, the scenario in which institutional investors concentrate their stakes in different companies seems to be the most plausible alternative.

In our simplified example, it can be assumed that each of the big three will hold a significant number of shares in one airline company, one car manufacturer, and one smartphone producer. As there is no reason to assume that one large institutional investor is systematically more sophisticated than the others, over a large number of markets the distribution of competition-leading firms among the three investors will be roughly even. Therefore, we will assume they each have the best positioned firm in one market. Thus, in our example, each of the big three will have the winning horse in one of the three markets. For instance, BlackRock will own shares in the most competitive car manufacturer, State Street will own shares in the most competitive airline carrier, and Vanguard will own shares in the most competitive smartphone producer. In this situation, however, engaging in fierce competition in the market in which an institutional investor believes to have bet on the right horse would most likely backfire.

First, the exit option is *de facto* prevented by the PSW reform, and hence losing a bet would be costly.[156] Institutional investors could hardly divest the enormous number of shares they would now own and migrate to a new firm in the same market without suffering tremendous losses. Second, institutional investors would be interacting in many different markets. Therefore, deviating from the anticompetitive equilibrium in one market would most likely cause retaliation by the other institutional investors in all the other markets. If BlackRock decided to engage in fierce competition in the car industry, State Street could retaliate in the airline industry and Vanguard could retaliate in the smartphone industry. Thus, BlackRock would lose in two out of three markets. By engaging in aggressive competition in the market in which it controls the winning horse, an institutional investor would trigger a reaction from the other institutional investors in the other markets in which it is weaker. As every institutional investor would only have the winning horse in a minority of markets (in our example one-third), it would be wiser to preserve any anticompetitive equilibrium that might exist before the reform. Moreover, institutional investors are repeated and experienced players, and there-

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156.   *See* Hemphill & Kahan, *supra* note 48, at 1451 (defining as a "logistical nightmare" switching from one stock to another under PSW's proposal).

fore, the likelihood that cooperation (that is, keeping prices above the competitive levels in the various markets) could be sustained is high.[157]

The effects of Elhauge's proposal are harder to predict with certainty because of the fallacy of the case-by-case adjudication discussed in Section III.C. However, a similar logic would apply. To the extent that his reform induces institutional investors to concentrate ownership in one firm in each market (while making the exit option very costly), preserving collusive equilibria would be a safer option.

These considerations imply that the PSW and Elhauge proposals would not only be ineffective, but they would likely backfire. Until now we have assumed that institutional investors have the power and interest to reduce the competition between their portfolio companies that are horizontal competitors. However, this is not necessarily the case. Institutional investors generally try to maximize their profits by minimizing costs and reducing the fees charged to the investors in order to attract new assets; therefore, they have limited incentive to engage in extensive and costly monitoring, and to a certain extent, they are paralyzed by free riding and collective action problems.[158] Yet, if PSW's reform were implemented, institutional investors would own significantly more shares in each of their portfolio firms and would be less affected by free-riding problems. Indeed, PSW conclude that their reform would likely expand the role played by institutional investors in corporate governance.[159]

This is an understatement. If BlackRock concentrated all the assets it owned in each market in a single firm operating in that market, it would become *the* dominant force in almost all its portfolio companies. Vanguard, State Street and Fidelity would find themselves in a very similar situation. Thus, the vast majority of American firms would be dominated by *one or two* institutional investors. PSW do not recognize this as a problematic outcome due to their atomistic focus on single markets. Their proposal might have been effective if markets were not intertwined, and hence institutional investors faced *m* maximization problems. If one focuses only on the airline industry, a situation in which each of the largest institutional investors owns 30-40% of the shares in one airline company could promote competition.

However, unlike traditional firms competing in only one market or in a few markets[160] institutional investors would be playing the same game with the same few large and sophisticated players in every existing

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157.   *See* Enriques & Romano, *supra* note 63, at 253-60.
158.   *See* Gilson & Gordon, *supra* note 26, at 865.
159.   Posner, Scott Morton & Weyl, *supra* note 3, at 712-16.
160.   Even firms that compete in different markets often face different competitors on each market.

market. As noted above, under these circumstances every institutional investor has an incentive to avoid triggering competition across all markets and to cooperate and preserve anticompetitive equilibria in each market. Since institutional investors are large, repeated, sophisticated, and experienced players, cooperation (that is, prices above the competitive levels in the various markets) is likely to be sustainable.[161]

B. Shareholders' Goals

As it is implausible that institutional investors act as market-value maximizers, horizontal shareholding is a problem only if they act as portfolio-value maximizers. Their coexistence with firm-value maximizers would then increase the costs of managing the firms, as different goals have to be accommodated.[162] The Elhauge and PSW solutions would not solve this problem. Since institutional investors would still own a broad portfolio of firms, they would have different goals from firm-value maximizers. Importantly, each institutional investor would still have a different portfolio, and so each institutional shareholder would have a different objective function and different goals. To the extent that Elhauge and PSW are attempting to align the objectives of institutional investors to those of firm-value maximizers, their solutions would be ineffective.

C. Fallacy of Case by Case Adjudication

Describing with precision the consequences of Elhauge's proposal is harder because it is difficult to predict the role that courts would play and the degree of discretion that they would enjoy. Two scenarios are possible: (i) the MHHI thresholds he identifies are *de facto* binding or (ii) courts are given some freedom to deviate from them. Opting for scenario (i) would open Elhauge's proposal to the exact same problems that haunt PSW's proposal. However, it seems that Elhauge prefers to leave some discretion to the courts. He opposes the predefined thresholds imposed by PSW's proposal considering them both over-inclusive and under-inclusive. Thus, he argues, these thresholds would cause false positives and false negatives.[163] However, a case-by-case adjudication to assess whether a certain level of horizontal shareholding creates anticompetitive effects would also cause false positives and false negatives, unless the following three assumptions hold: (a) the optimal MHHI threshold is identical for all markets; (b) the MHHI is a perfect screening device, otherwise

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161. *See* Enriques & Romano, *supra* note 63, at 253-60.
162. *See* Hansmann, *supra* note 12, at 268 (noting that "large costs can be engendered by conflicting interests when the ownership class is heterogeneous").
163. Elhauge, *supra* note 139, at 14.

some anticompetitive horizontal shareholding will not be analyzed by the court; and (c) courts always make the correct decision. Assumption (a) is arbitrary, and the existence of network effects strongly suggests that it might be false.[164] Assumption (b) is questionable. In fact, in a recent article Menesh Patel explains in great detail why the MHHI is an imperfect screening device.[165] Assumption (c) exhibits the fallacy of case-by-case adjudication. If one assumes that courts can always decide optimally, then it is necessarily optimal to let them decide. This argument travels a circle, and thus proves nothing. Diffuse institutional shareholding is an extremely complex problem, and it is unreasonable to assume that courts have the tools to discriminate perfectly between good and bad horizontal shareholding.

D. Monitoring and Passive Ownership

PSW conjecture that institutional investors will opt for owning large stakes in a single firm in each market instead of simply putting shares in the drawer.[166] This conjecture runs counter to the basic features of institutional investors' business models. Institutional investors compete on cost reductions, tracking errors, and consumer service, and therefore they have little incentive to invest heavily in monitoring to begin with.[167]

PSW's reform would confront institutional investors with a choice between performing a gigantic and extremely costly restructuring of their portfolio and being allowed to return to their natural business model. The latter seems an easy winner.[168] In other words, PSW's reform would undo decades of political suasion and regulatory reforms that have induced institutional investors to partially deviate from their basic business model and get marginally more involved in corporate governance. The problem is that if seventy percent of U.S. shares ended up in a drawer, the voting power of the remaining thirty percent would become disproportionately large and the relationship between control rights and cash flows would break down.

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164.   *See supra* Part II.

165.   Menesh S. Patel, *Common Ownership, Institutional Investors, and Antitrust*, 82 ANTITRUST L.J. 279 (2018); *see also* Jacob Gramlich & Serafin Grundl, *Estimating the Competitive Effects of Common Ownership* 2-4 (Fed. Reserve Bd. Fin. & Econ. Discussion Series, No. 29, 2017) https://ssrn.com/abstract=2940137 [https://perma.cc/29R6-CE3F] (criticizing the MHHI and proposing an alternative methodology to measure common ownership).

166.   Posner, Scott Morton & Weyl, *supra* note 3, at 714 ("Our proposal will encourage large institutional investors to shift holdings so that they have larger stakes in individual firms-for example, a large stake in GM rather than smaller stakes in GM, Ford, and Chrysler.").

167.   *See id.*

168.   *See* Hemphill & Kahan, *supra* note 48, at 1401 (describing greater shareholder passivity as one of the most likely consequences of the reform advocated by PSW).

One obvious question remains open. AST found that horizontal shareholding is associated with higher prices in the airline industry. Is this finding consistent with the idea that institutional investors do not devise strategies around the concept of market? The answer is yes. To the extent that institutional investors are attempting to maximize the total value of their portfolio, they will prefer *some* of their portfolio companies to raise their prices. Yet, this is very different from saying that institutional investors always want all their portfolio companies operating in oligopolies to raise prices.

IV. Network Sensitive Regulations

This Part explores that practical policy implications of the analysis carried out in this Article.

A. A Network Sensitive Regulation

If one believes that institutional investors are different from traditional investors, one might also believe structural reforms are necessary. I am agnostic about whether such structural reforms are desirable and how invasive they should be, yet if any such reform were to be implemented, it should incorporate the insights of network theory. This Section describes the first example of Network Sensitive Regulation (NSR) in antitrust.

An analogy with merger assessment can help illustrate how an NSR would be structured. In a traditional merger assessment, a high concentration—generally measured using HHI—creates a rebuttable presumption that the merger might have anticompetitive effects.[169] Merging firms can rebut this presumption in two ways[170]: First, they can show that the merger creates significant efficiencies that balance any anticompetitive effects. Second, firms can point to factors—chiefly potential competition—that prevent anticompetitive effects.[171]

A similar logic should apply in the case of horizontal shareholding: The FTC would identify relevant thresholds of horizontal shareholding for each oligopolistic market and then monitor the level of common ownership in such markets. Such thresholds could be defined in terms of MHHI or another measure of market concentration incorporating common ownership and, as discussed in Section IV.B, they should depend on the centrality of the market and the characteristics of the horizontal

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169. *See, e.g.*, Herbert J. Hovenkamp & Carl Shapiro, *Horizontal Mergers, Market Structure, and Burdens of Proof*, 127 YALE L.J. 1996, 1997 (2018).

170. *See id.* at 2008-17 (describing how the merging firms can contest the market definition).

171. *See id.* at 1997.

shareholders. If one of these thresholds were crossed, the FTC would inform the horizontal shareholders that the current pattern of ownership might create anticompetitive problems (anticompetitive presumption). Horizontal shareholders should then be allowed to rebut this presumption by demonstrating one of the following: (i) the challenged horizontal shareholding produces significant efficiencies, or (ii) there are factors preventing horizontal shareholding from resulting in higher prices. While the literature has discussed at great length the extent to which efficiency gains can result from horizontal shareholding,[172] it has overlooked the role played by network effects on the second point. And yet, correctly framing this second defense in network terms is key to preventing overly invasive reforms that interfere with the functioning of all markets and the business model of institutional investors.

Just as potential new entrants can prevent a merger from creating anticompetitive effects, so can network effects prevent horizontal shareholding from resulting in higher prices. Large enough negative spillovers from the problematic market to other markets in which the horizontal shareholders have large enough stakes ought to rebut the anticompetitive presumption. For instance, assume that artificially high prices in the airline industry increase the value of airline carriers by $1,000, of which $100 are captured by BlackRock. Assume, however, that higher prices in the airline industry cause a harm equal to $500 to one of its main suppliers (for example, Exxon) and to one of its main customers (for example, GE).[173] If BlackRock has sufficiently large stakes in Exxon and GE, it might suffer a loss greater than the $100 it gains from higher airline prices. In such circumstances, BlackRock will prefer that airline companies compete aggressively, and therefore the anticompetitive presumption (regarding BlackRock) should be rejected. If the anticompetitive presumption is rebutted, no structural intervention should be prescribed.

The key question is what happens when the anticompetitive presumption cannot be rebutted. Or, to return to the previous example, when BlackRock would bear less than 10% (that is, less than $100) of the losses suffered by GE and Exxon as a consequence of higher prices in the airline industry. In this case, BlackRock should be given a choice. First, it could increase its position in GE and Exxon to the point that it would bear a loss larger than $100 if the prices in the airline industry increased. Alternatively, BlackRock could divest from airline carriers of its choice until its gains from prices that are above competitive levels in the airline industry are smaller than the losses it would suffer in Exxon and GE.

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172.   *See, e.g.*, Elhauge, *supra* note 3, at 1303-04.
173.   For the sake of simplicity, I am describing an economy in which the spillovers from the airline industry only effect one supplier and one consumer.

Granting institutional investors the opportunity to defend themselves and choose how to comply with the regulation allows policymakers to reduce the negative effects of horizontal shareholding, while minimizing the interference with institutional investors' strategies.

The mathematical tools to perform quantitative and rigorous analyses of inter-market spillovers have already been developed by leading economists,[174] and the relevant data on the structure of the network has already been collected in the past by the U.S. Bureau of Economic Analysis (that is, input-output tables).[175]

Notably, network effects can also work in the opposite direction and increase the net profitability of high prices in a given market. Assume that the value-capture ratio from the airline industry to car manufacturers is very high and that BlackRock owns significant stakes in all the main firms operating in both sectors. In this case, BlackRock will find high prices in the airline industry even more profitable, because it can recapture part of the value lost in the airline industry via car manufacturers.

This proposal also has an important and beneficial side effect: to rebut the presumption that high levels of horizontal shareholding in a given market are associated with anticompetitive effects, an institutional investor has to produce evidence that it finds higher prices in that market to be undesirable due to network effects. By doing so, it will unearth important information on the structure and functioning of the network it is embedded in. In turn, this information will allow policymakers to devise more effective and less intrusive NSRs.

B. Heterogeneity of Markets and Institutional Investors

A clear advantage of NSRs is that they can account for differences among institutional investors and markets that are due to network effects. To begin with, there is significant heterogeneity among horizontal shareholders.[176] For instance, both BlackRock and Berkshire Hathaway have acquired significant stakes in many of the largest U.S. airlines.[177] However, while the former has stakes in virtually all U.S. companies, the latter concentrates its investments in a much smaller number of firms.

Markets are similarly heterogeneous. Take, for instance, the case of vertical spillovers. It is likely that a reduction in the levels of input and

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174. *See infra* Section IV.C.
175. *See supra* Section II.B.
176. *See* Hemphill & Kahan, *supra* note 48, at 1392, 1400 (discussing the importance of accounting for investor type).
177. *See* Martin C. Schmalz, *Common Ownership and Competition: Facts, Misconceptions, and What to Do About It*, OECD 4 (2017), https://one.oecd.org/document/DAF/COMP/WD(2017)93/en/pdf [https://perma.cc/2RXE-KCKK].

output in the most central industries (for example, petroleum refineries) has a negative impact on a large number of other sectors. Conversely, the spillovers from less central industries (for example, investigation and security services) might be less relevant.

Understanding the interplay between the heterogeneity of markets and institutional investors is key to developing effective and unintrusive policies. However, until now, the empirical literature on horizontal shareholding has largely overlooked the differences between institutional investors;[178] therefore, there is limited information on how different kinds of institutional investors affect competition in product markets.

Consider first a case in which it is assumed that highly diversified shareholders like BlackRock are the most effective at reducing the level of competition within markets. Since BlackRock is highly diversified, it will be forced to internalize a very significant fraction of the input-output spillovers from a sector with reduced competition. In this vein, it will have less incentive to reduce competition in sectors that are able to produce the largest input-output (IO) spillovers (that is, central sectors). At the same time, BlackRock might be able to recapture more value across markets, and hence it might prefer low competition in sectors that are connected with markets characterized by high diversion ratios (provided it owns enough stocks in the firms operating in the connected markets). The incentives of highly diversified shareholders like BlackRock are summarized in Table 2.

Table 2: Incentives to reduce competition of highly diversified institutional investors based on IO spillovers and diversion ratios.

	High Diversion Ratios	Low Diversion Ratios
High IO spillovers	Medium	Low
Low IO Spillovers	High	Medium

Thus, BlackRock's incentives to reduce competition are maximal when IO spillovers are low and diversion ratios are high. When IO spillovers are low, its portfolio firms operating in upstream and downstream markets will suffer limited harm. When diversion ratios are high, some of its portfolio firms operating in other markets will be able to recapture a significant part of the lost demand.

In contrast, BlackRock's incentives to reduce competition are minimal when the IO spillovers are high and diversion ratios are low. In this

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178.   *See* Martin C. Schmalz, *Common-Ownership Concentration and Corporate Conduct*, 10 ANN. REV. FIN. ECON. 413, 432 (noting that existing quantitative studies do not allow us to identify which horizontal shareholders cause anticompetitive effects).

case, IO spillovers would impose significant losses on the firms connected—even indirectly—with the relevant market via IO ties, while BlackRock would recapture a small part of the lost demand. This leads to a key insight. Firms have a natural tendency to collude and reduce competition, independent of horizontal shareholding. If diversified institutional investors have to bear large negative spillovers from a lower level of competition in the relevant market, they would attempt to prevent anticompetitive equilibria. Thus, in those markets, a higher level of horizontal shareholding might result in more competition and might even help prevent the formation of cartels.

Therefore, if one believes that highly diversified institutional investors drive the effects of horizontal shareholding on competition, then higher levels of horizontal shareholding should be tolerated in central sectors than in peripheral sectors.

Similarly, a less diversified investor like Berkshire Hathaway is likely to be less affected by IO spillovers or by diversion ratios. If one believes that it is institutional investors like Berkshire Hathaway that cause the most significant anticompetitive effects, then lower levels of horizontal shareholding should be tolerated in sectors that are central in the IO network. In fact, while Berkshire Hathaway is as likely to prefer lower competition in central and peripheral sectors alike, central sectors have a much greater ability to generate negative spillovers. Thus, the FTC should pay extra attention to the fact that the level of competition in those markets is not hindered by horizontal shareholders.

An additional factor to consider is the effect of institutional ownership on R&D. From this perspective, studies on R&D networks help identify sectors that contribute most to the creation of knowledge within the U.S. economy.[179] And since institutional ownership supports innovation, it might be desirable to preserve a higher level of horizontal shareholding in these sectors to ensure higher investments in R&D.[180]

C. How to Rebut the Presumption

Discussing in detail how institutional investors might rebut the anticompetitive presumption lies beyond the scope of this Article. The reason is twofold. First, one of the proposed NSR's advantages is that it places the burden of rebutting the anticompetitive presumption on sophisticated

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179.   *See* Carvalho, *supra* note 96, at 37 (finding a relationship between the centrality of a technology and of the sector that uses it).
180.   Note, however, that using R&D spillovers in other markets to counterbalance possible anticompetitive effects created by horizontal shareholding might be problematic under existing antitrust doctrine. *See* Elhauge, *supra* note 3, at 1304 (noting that "efficiency benefits in one market cannot offset anticompetitive effects in another market").

institutional investors that can dedicate significant resources to understanding the functioning of the network in which they are embedded. Second, it is likely that the mathematical details of the network model employed must be adapted to the circumstances of particular cases. Nevertheless, it is important to sketch what the procedure might look like, to better frame the functioning of the NSR.

As noted in Section II.B, a lower level of competition produces a shock on the supply side and the demand side. Firms that do not compete aggressively will earn extra profits but generally also produce a lower level of output and require a lower level of input. In turn, this will harm other firms to which they are connected—even indirectly—and final consumers. Some of these firms that are harmed are likely to be in the portfolio of the horizontal shareholders. The key question then is whether the extra profits made in the relevant market are higher than the losses suffered by the other firms in the horizontal shareholders' portfolio.

To answer this question, it is useful to divide the harm into two components. For the sake of simplicity, the discussion will focus on downstream firms, but a similar logic applies to upstream firms. First, when there is less competition in the relevant market the quantity of output produced goes down. Consequently, at least some downstream firms will suffer an injury from the loss of sales volume. Second, when the relevant market is less competitive the inputs of downstream firms will cost more; thus, their margins will also shrink if they are not able to pass on the higher cost.

The methodology developed by network theorists is applicable to investigate the extent of the first kind of harm. Since network models generally study how changes in the quantity produced in one sector affect the level of input and output of other sectors, they can provide guidance on the injury caused by loss of sales volume. Therefore, calculating this component of the harm requires a simple multiplication, provided that information on the gross margins in the affected markets is available. Because this information is routinely obtained by antitrust authorities and is generally reliable,[181] this part of the analysis is relatively straightforward. To be sure, when mathematical models are introduced in antitrust litigation the parties will disagree on some features of the model. For instance, the parties could disagree on the best way to represent the production

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181.   *See* Farrell & Shapiro, *supra* note 130, at 594 ("Gross margins are regularly estimated in antitrust analysis; for instance, to perform critical loss analysis. In our experience, the antitrust agencies often can reliably estimate gross margins based on materials received from the merging parties.").

process of the sectors involved.[182] Or litigation might revolve around the value of the elasticities of substitution in production—that is, the ability of firms to change their input mix in response to changes in relative prices. In this regard, works that estimate the production elasticities of substitution can offer guidance.[183] In any case, since leading antitrust scholars consider the harm caused by the loss of sales volume most relevant,[184] the ability of network models to provide information on how changes in the output of one market affect the input and the output of other markets is invaluable.

Estimating whether downstream firms suffer a harm because their margins shrink is more complex. This situation is akin to the traditional debate on how damages are passed on between firms that are vertically connected, and ultimately to consumers.[185] Assume that due to horizontal shareholding the firms in the relevant market increase the price of their product by one dollar. Downstream firms could either see their profit margin shrink by one dollar, or they could pass on all, or part of, the higher cost to their customers. While possible,[186] determining how the extra dollar is allocated along the production chain and to the final consumers can be complex. A relatively simple approach is introducing a baseline presumption that the firms in the supply chain can pass on the entire surcharge to the final consumers. This approach has two advantages. First, in many circumstances, the surcharge *is* passed on to the consumers.[187] Second, it makes the application of the NSR relatively straightforward. In any case, horizontal shareholders should be allowed to avail themselves of the tools developed by antitrust experts[188] and economists[189] to rebut the presumption that all the extra costs are passed on to the final consumers.

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182. For instance, many network economists rely on the Cobb-Douglas production function. *See* Acemoglu, Ozdaglar & Tahbaz-Salehi, *supra* note 109, at 59; Carvalho, *supra* note 96, at 26.

183. For a recent attempt that builds on network theory, see Enghin Atalay, *How Important Are Sectoral Shocks?*, 9 AM. ECON. J. 254 (2017).

184. *See* Herbert Hovenkamp, Apple v. Pepper*: Rationalizing Antitrust's Indirect Purchaser Rule*, 120 COLUM. L. REV. F. 14, 22 (2020) ("The real injury to direct purchasers and other intermediaries in the distribution chain is *not from the overcharge at all*; rather, it is from the loss of sales volume.").

185. For an overview of the debate, see PHILIPP E. AREEDA & HERBERT HOVENKAMP, ANTITRUST LAW ¶ 346 (4th ed. 2015).

186. *See id.* ¶ 346k1; Hovenkamp, *supra* note 184, at 19-20.

187. *See* Hovenkamp, *supra* note 184, at 22 ("[I]n many cases the largest losses are those absorbed by end users, and often they absorb the entire overcharge.").

188. *See, e.g.*, AREEDA & HOVENKAMP, *supra* note 185, ¶ 346.

189. The literature on tax incidence can provide useful guidance on this point. *See, e.g.*, Don Fullerton & Gilbert E. Metcalf, *Tax Incidence*, *in* 4 HANDBOOK OF PUBLIC ECONOMICS 1787 (Alan J. Auerbach & Martin Feldstein eds., 2002).

Additionally, whenever possible, the analysis of input-output spillovers should be accompanied by information on the network of diversion ratios. Until now, there have been no attempts to build the network of diversion ratios, but placing the burden of proof on institutional investors could spur the production of relevant information. Because the largest institutional investors own stakes in thousands of firms, the baseline assumption should be that they are able to recapture a large fraction of the lost demand with their other portfolio firms. This baseline assumption would make it harder for institutional investors to rebut the anticompetitive presumption. Consequently, institutional investors will have incentives to show that a significant fraction of the lost sales will be diverted to firms that are not in their portfolio. In turn, this will generate information on the diversion ratio network that will allow policymakers to improve the NSR.

These considerations lead to a more general point: The information produced by scholars and the data collected by public authorities is at least partly a consequence of demand-side factors. Since NSRs have not been used in antitrust, there has been no demand for the data on which they can be built. Despite this, NSRs can already provide quantitative answers on input-output dynamics across sectors. If NSRs become a reality, the demand for the data they require will grow. Hence, it will become possible to measure with more precision input-output spillovers and to include factors relative to the diversion-ratios network. From this perspective, the proposal advanced in this Article should be seen not as a point of arrival, but as a point of departure.

D. Possible Counterarguments to NSR

At least three criticisms can be raised against the idea of network-sensitive rules: (i) they are overly vague, (ii) the tools used to measure spillovers are inherently imperfect, and (iii) the concept of market or industry used in network studies is different from that of the relevant market in antitrust cases. I will discuss each of these counterarguments in turn.

First, this Article argues for the need to incorporate network effects in the analysis of horizontal shareholdings and identifies the required mathematical tools for doing so. However, general formulas cannot replace detailed case-by-case analyses. Because markets and institutional investors are heterogeneous, one-size-fits-all solutions and binding quantitative thresholds defined *a priori* are undesirable. This is not to argue that once an NSR is implemented, false positives and false negatives will be avoided. Instead, the claim is merely that allowing courts and regulators to rely on the sophisticated tools of network theory can improve the quality of decision making.

Second, it can be argued that studies that measure network structure are inherently imperfect because capturing inter-market spillovers is extremely complex. This objection is especially valid for R&D spillovers, given that patent citations which are commonly used are a very rough measure of knowledge spillovers and cannot capture many informal knowledge flows. But using imperfect measures in antitrust is inevitable, and non-network studies implicitly set the relevance of inter-market spillovers to zero. No matter how imperfect the measures adopted to quantify the spillovers are, it will be better to rely on them than to pretend that network effects do not exist.

Third, it could be argued that the idea of the relevant market in antitrust is different from that of the market or industry used in most studies that adopt network theory. Addressing this objection requires spelling out in more detail how the proposed NSR might be applied. As for most antitrust investigations, the first step would be to define the relevant market. Three different scenarios can emerge: (i) the relevant market and the industry coincide; (ii) the relevant market is a subset of the industry; (iii) the firms included in the relevant market operate in different industries. The first scenario, while very unlikely, poses no methodological problems. The second scenario, possibly the most frequent, also requires no adjustments. As the entire spillover would be originating from the industry where all the firms included in the relevant market operate, the analysis can be carried out normally. In the third case, however, the spillover would have to be "allocated" to the industries in which the firms included in the relevant market operate. Say, for instance, that in a given case the relevant market includes firms A, B, and C that have the following market shares: 0.6, 0.3 and 0.1. Now let us further assume that A is included in the "legal services" industry whereas firms B and C are included in the "architectural, engineering, and related services" industry. Then, 60 percent of the spillover will be attributed to the former sector and 40 percent to the latter.

This solution implies that the input-output connections are based on the definition of industry adopted in network studies, and once the structure of the network is defined, one incorporates the traditional antitrust concept of relevant market. However, if NSRs are implemented, it is likely that institutional investors that want to rebut the anticompetitive presumption will produce more granular information that could allow policymakers to directly identify the interconnections of the firms in the relevant market.

Conclusion

The AST study of the airline industry and the subsequent literature have raised the possibility that investment funds, the dominant players in

the U.S. equity market, might not be acting as firm-value maximizers. In this Article, I argue that this finding is incredibly important for antitrust and corporate law, and yet it has been misinterpreted by legal scholars. Therefore, we should not rush to implement invasive reforms. This is not because we do not have all the answers, but because we have not even started asking many of the relevant questions. This Article is a first attempt at filling that void.

In principle, large institutional investors that have stakes in many corporations have strong incentives to account for inter-firm spillovers. In this regard, I agree with the supporters of the horizontal shareholding hypothesis. However, they do not acknowledge that market boundaries are an artificial construct that have little relevance for an investment fund that holds shares in firms operating in different markets. And for this reason, it is implausible to assume that investment funds are market-value maximizers. Instead, investment funds aim to maximize their fees and the value of the assets under management, and hence they can only be assumed to be (weighted) portfolio-value maximizers. The implication of this is straightforward: regulations aimed at influencing the behavior of institutional investors must account for inter-firm spillovers that cross market boundaries. In this Article, I suggest that the most straightforward way to achieve this goal is by developing Network Sensitive Regulations that incorporate insights from network theory. Moreover, I develop an example of Network Sensitive Regulation to show how this kind of tool could be used in the context of horizontal shareholding (or rather, diffuse institutional ownership).