Innovation, the State and Private Enterprise: A Corporate Lawyer's Perspective

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Recommended Citation
Charles M. Yablon, Innovation, the State and Private Enterprise: A Corporate Lawyer's Perspective, 40 1017 (2016).
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BOOK REVIEW

INNOVATION, THE STATE AND PRIVATE ENTERPRISE:
A CORPORATE LAWYER’S PERSPECTIVE

BY CHARLES M. YABLON

Reviewing
The Entrepreneurial State: Debunking Public vs. Private Sector Myths,
by Mariana Mazzucato (Anthem Press rev. ed. 2014)

Is the federal government primarily responsible for the foundational innovations that transform industries and promote economic growth? In her important new book, Mariana Mazzucato, whose field is the "economics of innovation," makes precisely that claim. Mazzucato details how the "entrepreneurial state" has made the critical investments in technologies that have given rise to multi-billion dollar industries. Shattering contemporary stereotypes of perennial governmental incompetence with technology (remember the Obamacare website?) she describes how the United States government was the driving force behind such path-breaking and ultimately highly profitable innovations as the Internet, the various technologies incorporated into the iPhone, and the mapping of the human genome. She also offers an economic framework for understanding investment in innovation that shows why such extensive government involvement is necessary. Mazzucato argues that only the State has the funds and incentives necessary to finance the earliest and most important phases of the innovation process—investments that the private sector cannot and will not make.

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1Professor of Law, Benjamin N. Cardozo School of Law, Yeshiva University. I wish to thank Michael Burstein and the participants in the 2015 National Business Law Scholars Conference for their helpful comments. I would also like to acknowledge the support of the Samuel and Ronnie Heyman Center on Corporate Governance at Cardozo. Finally, special thanks to the editors of the Delaware Journal of Corporate Law, who went far beyond the usual proofreading and editing of this piece to provide real and valuable research assistance, only some of which involved citations to their own journal.


3Mazzucato "holds the RM Phillips chair in the Economics of Innovation" at the University of Sussex. Short Bio, MARIANA MAZZUCATO, archived at https://perma.cc/DUJ6-6AWU (last visited Apr. 10, 2016).

4MAZZUCATO, supra note 2, at 73-110.

5Id.

6Id.

7Id. at 21-22.

8See MAZZUCATO, supra note 2, at 21-22, 24.
Key to Mazzucato's argument is the idea that truly foundational innovation is characterized by extreme and pervasive uncertainty such that private investors cannot make reasonable calculations of risk and return and therefore will not make optimal investments in innovation. The State, however, operating under a different set of concerns and incentives, is willing to make such critical investments even when the costs are substantial and the chances of success indeterminate. Her book is therefore a powerful counterargument to all those who argue for only minimal state involvement in fostering economic growth.

Mazzucato's defense of the centrality of government sponsorship of innovation is simultaneously a critique of the role of private entrepreneurs in the innovation process. Under Mazzucato's theory, private entrepreneurs, even the vaunted venture capitalists of Silicon Valley, are necessarily latecomers to the innovation process. Their business model depends on diversification, and diversification requires a reasonable estimation of the risk/return relationship of any potential business investment. Accordingly, they cannot operate successfully with the deep uncertainty that characterizes investments in foundational innovation. To be sure, Mazzucato recognizes that private capital has an important role to play in the later stages of innovation. As new technologies become better understood, the tasks of developing their commercial applications and producing and marketing them with maximum efficiency are all likely to be handled better by the private sector. Even in this secondary but critical role, however, Mazzucato is highly critical of the performance of those in the private sector, believing that they invest too late, demand results too quickly, and expect too much in the return on their investments.

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9 Id. at 47-50.
10 See id. at 62-63.
11 See id. at 73-110.
12 See MAZZUCATO, supra note 2, at 29-55.
13 See, e.g., id. at 63 (discussing how the U.S. military's defense policy of the Cold War helped foster the technological advancements of present-day Silicon Valley).
14 Id. at 24-25.
15 See infra note 126 and accompanying text.
16 MAZZUCATO, supra note 2, at 70.
17 Some of this critique is already explicit in Mazzucato's analysis. She criticizes the "financialization" of American business and the "short-termism" of most contemporary American corporate managers. See id. at 25-26. The implications of this critique for American corporate law are not explored in her book, but are a major focus of this essay. See infra Part II.
It is here where Mazzucato's analysis becomes interesting to corporate lawyers. By criticizing current private investment in innovation as sub-optimal, she raises the question whether changes to the incentives and constraints on the managers of private capital might lead to greater and more cost-effective innovation. Such concerns parallel debates among corporate lawyers and academics about current trends in investor activism and managerial attitudes towards risk. But by linking these concerns to the economics of innovation, Mazzucato raises the stakes in this debate. Her discussion of the interrelated roles of government and private investment in the innovation process suggests that by improving the rules of corporate finance and corporate governance, we can reduce costs and optimize the overall rate of innovation in our society. This intriguing idea is the subject of this essay.

Mazzucato's account stresses that investments in innovation are always made under conditions of uncertainty, and that private investors fear the radical uncertainty of the early stages of the innovation process but can handle, indeed dominate, the later stages where risks become measurable and therefore manageable. Note, however, that this shift from uncertainty to risk, while partially about the increase in knowledge gained about the innovation through development, primarily denotes a behavioral shift in the attitudes of investors. An investment in innovation changes from "fear-inducing uncertainty" to manageable risk at whatever point an investor feels comfortable making such an investment. While developing more knowledge about the innovation is an important factor in generating that change in investor attitude, it is not the only factor. Whether and when an investor is willing to invest in innovation invokes the whole panoply of incentives and constraints that operate today on corporate executives, fund managers, and venture

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18 See MAZZUCATO, supra note 2, at 195-200.
20 See MAZZUCATO, supra note 2, at 51.
21 Id. at 127, 193.
22 Id. at 100. Mazzucato notes that "[d]espite his strong opposition to tablet computers in the 1980s and 1990s, upon his return to Apple in the late 1990s, [Steve] Jobs had decided that the time was right to focus once again on tablets. Underlying this shift in perspective was the fact that technology in semiconductor devices, batteries and displays had progressed significantly." Id.
23 Id. at 70.
capitalists. If corporate managers and investors are becoming more risk averse, if they are under increasing pressure not to engage in long-term investments with uncertain prospects, then the willingness of big firms to finance fundamental research and the willingness of venture capitalists to relax or vary their criteria for acceptable investments will also be diminished. In short, the wrong corporate law rules may be inhibiting the market for innovation.

Mazzucato is an economist, not a corporate lawyer. Her critiques are directed at contemporary managerial and investor behavior, and she does not address whether the source of those questionable behaviors are to be found in law, changing market conditions, changing investor attitudes, or a combination of all of these. Moreover, her criticisms of contemporary corporate behavior are not presented systematically but incidentally to her more basic argument, which is a defense of substantial state intervention in the innovation process. This essay seeks to pick up where Mazzucato leaves off, expanding and developing her critique of contemporary managerial and investor behavior with regard to innovation risk and relating it to current debates on similar issues within corporate law.

Central to these debates is a concern that current rules and practices involving executive compensation, managerial turnover and investor activism may all be leading to "short termism," causing managers to focus on short-term financial gains at the expense of longer range development perspectives. Such critiques are controversial in the

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24See MAZZUCATO, supra note 2, at 84:

Industry generally invests only in developing cost-competitive products in the 3 to 5 year time frame. It is difficult for industry management to justify to their shareholders the large investments in long-term, fundamental research needed to make nanotechnology-based products possible. Furthermore, the highly interdisciplinary nature of the needed research is incompatible with many current corporate structures.

25Id. at 48-49.

26Short Bio, supra note 3.

27See MAZZUCATO, supra note 2, at 35-62.

28E.g., id. at 140.

corporate law literature. Investor activists can point to persuasive studies that suggest that their "short-term" strategies do not lead to any longer-term injury to shareholder value. Adding concerns about the potential loss or delay of innovation, however, changes the terms of these debates. Because foundational innovations are presumptively rare—indeed, each one is effectively unique—the loss of one or two is not likely to show up in an event study of medium-range share prices. Indeed, the event studies may well be right that most instances of investor activism or removal of managerial protective structures do, on average, increase shareholder value. But Mazzucato's book raises the disturbing possibility that in at least some instances where pursuing long-term development strategies could lead to important innovation and economic growth, such strategies are not being pursued due to shareholder threats and short-term perspectives.

This essay is divided into two parts. The first is a summary and analysis of the argument of Mazzucato's book with an emphasis on her account of the role of uncertainty in investment decisions regarding innovation. It also develops and expands Mazzucato's criticism of the current investment activities of the private sector as sub-optimal with respect to innovation. The second section relates Mazzucato's critique to current debates within corporate law. It begins with the basic question of what is the purpose of corporate law itself. It shows how "dynamic" economic models like Mazzucato's that focus on innovation and economic growth pose a challenge to traditional "static" models of corporate law, which emphasize efficient use of existing resources. It then looks at concerns about the "financialization" of private investment in innovation, relating it to contemporary corporate law debates about short-term and long-term managerial perspectives and managerial versus shareholder primacy models of corporate law. It asks what kind of corporate law rules would be most likely to foster optimal private investment in innovation and shows that these issues cannot be resolved.

30 See supra note 29.
31 See, e.g., Hannes, supra note 19, at 195 (citing Lucian A. Bebchuk et al., The Long-Term Effects of Hedge Fund Activism, 115 COLUM. L. REV. 1085, 1088-90 (2015)).
32 See MAZZUCATO, supra note 2, at 59.
33 See, e.g., Joseph Cyriac, Ruth De Backer & Justin Sanders, Preparing for Bigger, Bolder Shareholder Activists, CORP. FIN. PRAC., Mar. 2014, at 1, 1, archived at https://perma.cc/8USG-QFTU ("Shareholders generally benefit. Our analysis of 400 activist campaigns (out of 1,400 launched against US companies over the past decade) finds that, among large companies for which data are available, the median activist campaign reverses a downward trajectory in target-company performance and generates excess shareholder returns that persist for at least 36 months.").
34 See MAZZUCATO, supra note 2, at 26.
through empirical analysis of event studies. Such studies can give us little insight into investments that have not been made and innovations that have not been discovered.

This essay goes on to consider two other factors that may inhibit investment in innovation and in which corporate law may play a part. One is increasing conformity of investment perspectives among venture capitalists and corporate managers. Instantaneous global communication, increased competition among venture capital and private equity firms, the growth of shareholder activism and other factors have all tended to create an environment in which any firm pursuing an investment strategy currently deemed strange or unusual by the market consensus is likely to be challenged and financially punished in various ways. Yet the very nature of innovation is that it is likely to involve activities viewed by most as unclear, misguided, or just plain weird. Such activities are unlikely to conform to most financial professionals' idea of a "good investment." This section considers ways in which corporate law might be used to encourage investor nonconformity. The final section deals with the undeniable fact that, from a financial point of view, many of the most important investments in innovation, including those that form the primary subject of Mazzucato's book, would not have been seen as likely to be profitable. That is, financially speaking, they were not really very good investments. This last section considers the possibility that some investments in innovation might be made for a combination of pecuniary and philanthropic reasons and considers how corporate law can deal with such mixed motive investments.

I. MAZZUCATO'S THEORY OF INNOVATION: THE RESPECTIVE ROLES OF PRIVATE FINANCE AND THE STATE

Where does innovation come from? Mazzucato's answer is simple and straightforward: nobody knows.\textsuperscript{35} The fact that nobody knows where innovation comes from is central to her theory, and to fully articulate that theory, she must analyze the precise ways in which our knowledge of the sources of innovation is deficient. The framework she uses is that of "Knightian uncertainty," the distinction among different types of risks generally associated with Frank Knight.\textsuperscript{36} Knight used the term "risk" for describing situations where the probability of the occurrence of a future event can be calculated based on the distribution

\textsuperscript{35}Id. at 33-35, 58-59.
\textsuperscript{36}Id. at 58-59 (quoting FRANK H. KNIGHT, RISK, UNCERTAINTY AND PROFIT 233 (photo. Reprint 1964) (1921)) (explaining the difference between risk and uncertainty).
of the outcomes of similar events in the past—e.g., the probability of rolling seven with a pair of fair dice, or the probability that a 70-year-old male smoker in the United States will die within the next 12 months. He contrasted these with situations where no probability can be placed on the likelihood of occurrence of a future event because no event sufficiently like it has ever taken place, like contact with space aliens or the invention of flying cars. He referred to the problem of predicting such unique events as "uncertainty" rather than "risk" to distinguish between situations where we can at least know the probability of the occurrence of an uncertain future event from those where we can know nothing at all.

Mazzucato argues that the sources of important, foundational innovations are characterized by true uncertainty in the Knightian sense and accordingly cannot be generalized about or analyzed on any statistical basis. This perhaps explains the methodology of Mazzucato's book, which consists primarily of fact-based narratives of particular innovations and the role that various government agencies played in the

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37See Knight, supra note 36, at 233 (explaining that with risk, the outcome in a group of instances is known due to either calculations or statistics of past experiences).

38See id. (explaining that under uncertainty, unlike risk, a group of instances cannot be formed because the situation dealt with is unique and has not occurred before).

39For an interesting discussion on the efforts of some to invent the flying car, see Alfred v. Walt Disney Co., 2015 WL 177434, at *1 (Del. Ch. Jan. 14, 2015) ("The Plaintiff, in succinct and pith-perfect fashion, stated the gravamen of his action as follows: 'If the Plaintiff needed to sum up this entire case in one sentence, it is this: Two executives of the Disney Company are stalling the next evolution of human transportation on this planet.' In other words, the Defendants are holding back the flying car.")., reprinted in 40 Del. J. Corp. L. 709 (2016).

40See Knight, supra note 36, at 233 (providing Knight's definition of uncertainty). In some of his writing, Knight made a distinction between three types of predictions. The first type involves known distributions and unknown draws, like the roll of a pair of dice or a roulette wheel, which correspond to stochastic or classical probability. A second type involves unknown distributions and unknown draws, which corresponds to most scientific and social scientific studies and statistical probability. It is only the third type of prediction, defined as non-classifiable events with non-existent distributions, that may be considered "true uncertainty." Robert Wiltbank et al., Prediction and Control under Uncertainty: Outcomes in Angel Investing, 24 J. Bus. Venturing 116, 119 (2009) [hereinafter Outcomes in Angel Investing].

41See Knight, supra note 36, at 233 (explaining the difference between risk and uncertainty is that in the former, the probability of an occurrence can be determined, whereas in the latter, the probability of an occurrence cannot be known). Mazzucato points out that similar distinctions between uncertainty involving ascertainable and non-ascertainable probabilities may also be found in the works of John Maynard Keynes and Peter Drucker. See Mazzucato, supra note 2, at 58-59 (stating differences between uncertainty and risk that John Maynard Keynes emphasized).

42Id. at 3, 35-36.
development of those innovations. The "proof" in Mazzucato's book that the State is the indispensable source for foundational innovation in an economy is that, in fact, the State has been the indispensable source in the American economy in the post-war years. Whether it is the Internet, developed initially as a Defense Department project to develop communications that could survive a nuclear attack, the transistor, developed in the legendary Bell Laboratories cooperative venture of government, academic, and private funding, or the mapping of the human genome funded largely through NIH and other government grants to the academy, Mazzucato shows that the government has played the central role in the development of all the revolutionary technologies of the recent past. By contrast, private finance has played a relatively minor role, focusing primarily on the later stages of the innovation process, the so-called "commercialization" of the foundational innovation into marketable products of various kinds.

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43 Id. at 73-113 (discussing examples of several past innovations, and the government's role in the development of those innovations).
44 Id. at xxi-xxii, 62-64, 66-67, 69-70 (discussing the government's role in past technological innovations).
45 See MAZZUCATO, supra note 2, at xxi-xxii, 62-64, 66-67, 69-70 (discussing the State's role in past revolutionary technologies).
46 See id. at 21. The terms "invention," "innovation," and "commercialization" are subject to considerable variation in meaning. A 1995 government study helpfully defined them as follows:

Invention refers to the act of devising or fabricating a novel device, process, or service. Invention describes the initial conception of a new product, process, or service, but not the act of putting it to use. Inventions can be protected by patents, though many inventions are not patented, and most patents are never exploited commercially.

Innovation encompasses both the development and application of a new product, process, or service. It assumes novelty in the device, the application, or both. Thus, innovation can include the use of an existing type of product in a new application or the development of a new device for an existing application. Innovation encompasses many activities, including scientific, technical, and market research; product, process, or service development; and manufacturing and marketing to the extent they support dissemination and application of the invention.

Commercialization refers to the attempt to profit from innovation through the sale or use of new products, processes, and services. The term is usually used with regard to a specific technology ([e.g.,] "commercializing high-temperature superconductivity") to denote the process of incorporating the technology into a particular product, process, or service to be offered in the marketplace. The term commercialization therefore emphasizes such activities as product/process development, manufacturing, and marketing, as well as the research that supports them. More than invention or innovation, commercialization is driven by firms' expectations that they can gain a competitive advantage in the marketplace for a particular product, process, or service.
Accompanying Mazzucato’s emphasis on individual innovations and case studies of particular industries is a certain reluctance to theorize too broadly about why the government’s role has been so large in these areas and that of private finance so small.\footnote{Mazzucato, supra note 2, at 86.} In part, this is because every major innovation is unique and Mazzucato resists making the kind of generalizations about innovation that would be necessary to theorize extensively about it.\footnote{Id. at 59, 80.} She is somewhat clearer on the theoretical reasons why private finance plays such a small role or, as she puts it, why “[r]isk capital is scarce in the seed stage of firm growth.”\footnote{Id. at 47.}

The short answer is that private finance hates uncertainty (in the Knightian sense) and is not too crazy about risk either. The basic financial strategy for reducing risk is diversification, but diversification only works if one can make a reasonably certain determination of the probabilities of the risks one is undertaking.\footnote{Id. at 48.} Las Vegas casinos and life insurance companies can be reasonably assured of a profit because they know the odds involved in their businesses and they can set those odds in their favor. The venture capitalist has a similar model, in that he or she tries to invest in a portfolio of companies many of which will fail but a few of which will generate extremely high returns.\footnote{Id.} In such circumstances, private equity will tend to prefer investments that are "safer" in two different senses. First, they will prefer investments where the risk of total failure (catastrophic loss) is comparatively low (at least under 50%).\footnote{Id. at 58-59.} Second, they will avoid investments characterized by Knightian uncertainty, where the probabilities of success and failure cannot be estimated to any reasonable degree.\footnote{Id. at 58-59.} The result, as Mazzucato notes, is a scarcity of private capital in the earliest stages of innovation, and a relatively small involvement of private investors even in the next, or early commercialization stage of development.\footnote{Id. at 47.}

As a corporate lawyer, I should point out that this reluctance to engage with risk and uncertainty is not simply a lack of courage on the
part of venture capitalists; it may at least in part have a legal origin. Venture capital firms have investors, to whom they usually owe various contractual and fiduciary duties. Mazzucato notes this indirectly, citing the venture capitalists' preference for relatively safer, more predictable investments with shorter time horizons and more predictable returns. Venture capitalists need to establish a track record of success, not just to bolster their own reputation and attract more investors, but also to show that they are responsible investors who take their fiduciary duties seriously, not wild speculators taking a flyer on long shots. Mazzucato somewhat disparagingly quotes William Janeway of Warburg Pincus, a private equity firm with substantial investments in innovative technology firms. According to Mazzucato, Janeway "admits [he made millions by making an investment] after the State did the hard work." Of course making large returns while not doing the "hard work" (i.e. risking substantial capital over long time horizons) might well be the definition of a good investment. This question of whether Mazzucato and her colleagues are essentially arguing that private investors should make more "bad investments" is an important question, and one to which we will return later in this essay.

Having seen the shortcomings of private finance in the innovation cycle, we can also begin to see why Mazzucato thinks the State is indispensable. The State has all the virtues of private capital's vices. It is patient; it is courageous in the face of both uncertainty and great risk; and it doesn't care all that much about profit. One might well ask why investments that are considered "bad" by private investors are nonetheless worth taking when government money is available. Looking

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55 Venture capital funds are almost invariably structured as limited partnerships. Paul Gompers & Josh Lerner, The Venture Capital Cycle 26-27 (2d ed. 2004). The default rule is that managers owe fiduciary duties to limited partners, although some states, notably Delaware, now permit those duties to be waived by contract. See Del. Code Ann. tit. 6, § 17-1101 (2011) (a general partner's duties to a limited partnership or its unit holders, including fiduciary duties, "may be expanded or restricted or eliminated by provisions in the partnership agreement; provided that the partnership agreement may not eliminate the implied contractual covenant of good faith and fair dealing"). There does not appear to have been much effort to eliminate such duties in venture capital contracts. Rather, the parties attempt to define those obligations through covenants in the partnership agreement. See Gompers & Lerner, supra, at 72-77. Moreover, the main constraint limited partners exercise on fund managers is probably not a lawsuit, but a refusal to invest further funds or a withdrawal of existing funds. See generally Darian M. Ibrahim, The New Exit in Venture Capital, 65 Vand. L. Rev. 1, 9, 11 (2012) (discussing the impact investor lock-in has on venture capitalists).

56 Mazzucato, supra note 2, at 47.

57 For a discussion on the importance of reputation to venture capitalists, see C.N.V. Krishnan et al., Venture Capital Reputation, Post-IPO Performance, and Corporate Governance, 46 J. Fin. & Quantitative Analysis 1295, 1295-96 (2011).

58 Mazzucato, supra note 2, at 50.

59 Id. at 58.
at Mazzucato's case studies, we can begin to see some potential explanations.

The government invests in innovation for many different reasons and in many different ways, some of which may be more than a little inconsistent. The Internet started as Arpanet, a national security project designed to safeguard government communications in the event of nuclear war. More broadly, Mazzucato points out that Defense Department spending on advanced and innovative technologies grew out of the experience of World War II and the Manhattan Project, as well as the space race and other technological competitions with the Soviet Union. All of this led to investments that were exceedingly well funded, and "aggressively mission oriented," seeking to "bridge the gap between blue sky academic work, with long time horizons, and the more incremental technological development occurring within the military."

In the area of health care innovation, Mazzucato focuses primarily on the billions spent annually in grants by the NIH, most of which fund "basic science" and therefore create the knowledge base that enables pharmaceutical companies to develop new drugs. Yet she also points out that the government, through the Orphan Drug Act, targeted and fostered the creation of specific products in the health care field and that legislation in conjunction with the Small Business Innovation Research Act played an important role in the creation of start-up biotech firms like Genzyme, Amgen, and Genentech. Investment in green technology, Mazzucato notes, has been far more equivocal. In part this is because policy makers are not quite sure whether the government's goal is to foster innovative technology or to reduce carbon emissions. She also questions how committed the U.S. government really is to a policy of developing clean technology. Yet despite the State's apparent inconstancy, there is evidence that government funding is the sole source

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60 Id. at 63.
61 Id. at 74-75.
62 MAZZUCATO, supra note 2, at 75.
63 Id. at 75. For a comparison of this State investment activity with that of Angel investors, see infra text and notes.
64 MAZZUCATO, supra note 2, at 69.
67 MAZZUCATO, supra note 2, at 81.
68 Id. at 112-14.
69 Id. at 118.
70 Id. at 120.
of finance for the riskiest and most capital-intensive clean technology projects.\footnote{MAZZUCATO, supra note 2, at 127.}

The common thread behind these disparate stories is that the State does not invest in innovation in order to make a profit, but to achieve particular policy goals, usually the development of new products perceived as needed to achieve important national goals such as security, health, etc.\footnote{Id. at 195.} As such, the incentives of government actors in making such investments are totally different from that of private investors. A project directed at an important national security concern that has an estimated 50% chance of not failing would look quite promising to the Defense Department.\footnote{See id. at 133.} If the project was so new, so shrouded in Knightian uncertainty that no probability of success could be estimated, that too might make it an attractive investment because it would show that this is a relatively unexplored area in which there is potentially much to be learned.\footnote{See id. at 57-58.} Indeed, this is one of the major differences between private investors and governments (along with academic research institutions). For the latter, uncertainty itself may be a positive factor encouraging funding because the government's interest may be as much in learning about the phenomenon as in profiting from it.\footnote{For instance, if the Arpanet project had failed, and the Defense Department had concluded that a decentralized communications system could not be designed to withstand nuclear attack, that would still be useful information for the Defense Department to have (although clearly not as useful as a working Internet).\footnote{This, of course, is somewhat of an overstatement. Most managers are well aware of the importance of other stakeholder constituencies, particularly employees, to the success of their ventures, and certainly consider their interests in making important policy decisions. Indeed, many scholars reject the notion that corporations should be run primarily for the benefit of their shareholders. See E. Merrick Dodd, Jr., For Whom Are Corporate Managers Trustees?, 45 HARV. L. REV. 1145, 1148 (1932) (advocating that corporations have an interest in stakeholder concerns and social concerns, not just in the wealth maximization of shareholders); A.A. Berle, Jr., Corporate Powers as Powers in Trust, 44 HARV. L. REV. 1049, 1050 (1931); Margaret M. Blair & Lynn A. Stout, A Team Production Theory of Corporate Law, 85 VA. L. REV. 247, 250 (1999); Lynn A. Stout, Bad and Not-So-Bad Arguments for Shareholder Primacy, 75 S. CAL. L. REV. 1189, 1195-96 (2002); Andrew Keay, Tackling the Issue of the Corporate Objective: An Analysis of the United Kingdom's 'Enlightened...}}

But the difference between State and private investment is not only over the difference in the priority given to profit over other goals; it is also a difference in the group seeking to benefit from the investment. Venture capitalists, like virtually all capitalists, operate through firms, and firms are clearly delineated between the equity participants who can expect to benefit from the firm's investments and everyone else, who have no right to expect any such benefits.\footnote{For instance, if the Arpanet project had failed, and the Defense Department had concluded that a decentralized communications system could not be designed to withstand nuclear attack, that would still be useful information for the Defense Department to have (although clearly not as useful as a working Internet).\footnote{This, of course, is somewhat of an overstatement. Most managers are well aware of the importance of other stakeholder constituencies, particularly employees, to the success of their ventures, and certainly consider their interests in making important policy decisions. Indeed, many scholars reject the notion that corporations should be run primarily for the benefit of their shareholders. See E. Merrick Dodd, Jr., For Whom Are Corporate Managers Trustees?, 45 HARV. L. REV. 1145, 1148 (1932) (advocating that corporations have an interest in stakeholder concerns and social concerns, not just in the wealth maximization of shareholders); A.A. Berle, Jr., Corporate Powers as Powers in Trust, 44 HARV. L. REV. 1049, 1050 (1931); Margaret M. Blair & Lynn A. Stout, A Team Production Theory of Corporate Law, 85 VA. L. REV. 247, 250 (1999); Lynn A. Stout, Bad and Not-So-Bad Arguments for Shareholder Primacy, 75 S. CAL. L. REV. 1189, 1195-96 (2002); Andrew Keay, Tackling the Issue of the Corporate Objective: An Analysis of the United Kingdom's 'Enlightened...}}

The State, however, operates...
for the benefit of a broader community, which means that investments that might be considered failures from the narrow perspective of a firm might not be considered a failure from the broader viewpoint of a community or a government. Consider the frequent observation that Silicon Valley is uniquely tolerant of failure because failed ventures provide useful training and experience to budding entrepreneurs and useful information about what works and does not work. Note that these benefits do not inure in any way to the financial investors in the failed enterprise, but rather go to the employees of the venture and to the Silicon Valley community at large. Similarly the State, representing the broader community, stands to gain the benefits of such failures in a way the failed firm does not.

While nobody knows where innovation comes from, Mazzucato is pretty sure it is rarely the private business firm. She points to numerous studies that show that there is no linear relationship between firm investment in research and development and commercially viable innovations. That is, a firm that doubles its investment in R&D is unlikely to get twice as many innovative products. It might get more; it might get less; it might get none at all. Mazzucato believes that this is largely because many of the factors that lead to successful innovation are outside the control of any individual firm. For her, the critical generator of innovation is not the firm but the "network," by which she means any set of institutional relations by which knowledge is circulated and diffused through the economy. Accordingly, whether a firm can

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77 See Mazzucato, supra note 2, at 194.
78 See id. at 119.
79 See id. at 36 ("The causation that occurs in the steps taken between [R&D and innovations] is not 'linear'.")
80 Id.
81 Id.
successfully generate substantial innovation through increased R&D will depend on numerous factors beyond the firm's control, namely, the other institutions and individuals that make up the innovation "network" for the technologies involved.\textsuperscript{86} Such networks also vary greatly from industry to industry. As Mazzucato points out, a country may have low R&D spending if it specializes in economic sectors that "are not sectors in which innovation occurs necessarily though R&D."\textsuperscript{87} Yet private commercial firms clearly provide an essential component to any healthy innovation network.\textsuperscript{88} Mazzucato notes, for example, the relative failure of the Soviet Union in the 1970s to generate substantial innovative technologies despite investment of over 4% of the country's GDP in research and development, primarily in military and space technology.\textsuperscript{89} She compares that with Japan in the 1970s, which spent only 2.5% of its GDP on research and development, yet managed to become a "Developmental State" known for its innovative products.\textsuperscript{90} Mazzucato attributes this to the fact that "the Soviet Union did not have, or permit, business enterprises to commercialize the technologies developed by the State," whereas the Japanese economy was characterized by "strong user-producer linkages."\textsuperscript{91}

When it comes to the United States, Mazzucato shares the view of many in her field that despite much political rhetoric decrying government interference in the free market, the United States has acted, over the past 50 years, as a "hidden Developmental State."\textsuperscript{92} That is, while the political rhetoric from both parties during this period have emphasized the importance of the private sector in economic development and claimed to reject the policy of "picking winners" for

\textsuperscript{86}Id. at 26.
\textsuperscript{87}See id. at 27 (examining the Soviet Union's slow growth in innovation by not allowing public technologies to be commercialized in the 1970s).
\textsuperscript{88}Id. at 27-38 & n.5.
\textsuperscript{89}Id. at 37.
\textsuperscript{90}Id. at 37 n.5.

The perspective is neither macro nor micro, but more meso, where individual firms are seen as part of a broader network of firms with whom they cooperate and compete. The system of innovation can be interfirm, regional, national or global. From the meso perspective the network is the unit of analysis (not the firm). The network consists of customers, subcontractors, infrastructure, suppliers, competencies or functions, and the links or relationships between them. The point is that the competencies that generate innovation are part of a collective activity occurring through a network of actors and their links or relationships.

Mazzucato, supra note 2, at 36.
government investment as Japan allegedly did in the 1970s, the reality of U.S. government policy was quite different. Ambitious projects targeting various types of technological innovation were pursued by federal agencies like ARPA with respect to computer science and the improbable partnership of the NIH and Department of Energy in mapping the human genome. These projects did indeed "pick winners" by selecting various technologies for funding as well as promoting networking and collaboration in various fields and seeking to improve productivity among the nation's scientists and engineers. The ultimate validation of this "hidden" approach has been its success. Fred Block, analyzing the "one hundred most innovative commercial products" selected every year by R&D Magazine, noted that, "In 1975, forty-seven out of eighty-six domestic innovations were produced by Fortune 500 companies." By 2006, however, "big firms were responsible for only six out of eighty-eight innovations" whereas "fifty of these innovations were the products of researchers at U.S. government laboratories, universities, or other public agencies, working alone or in collaboration with private firms."

The fact that large private firms are actively seeking government and academic partners to develop innovative commercial products strongly supports Mazzucato's view that the government is acting to make up for a private sector which is increasingly unwilling to operate under conditions of extreme uncertainty and is even reluctant to undertake more measurable risks without the promise of substantial reward.

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93 See MAZZUCATO, supra note 2, at 37 n.5.
94 See Fred Block, Swimming Against the Current: The Rise of a Hidden Developmental State in the United States, 36 POL. & SOCY 169, 174-82 (2008); OFFICE OF TECH. ASSESSMENT, supra note 46, at 34 ("Pursuit of government missions has often exerted a strong influence on commercialization of civilian technologies.").
95 See Block, supra note 94, at 174-82.
96 Id. at 187.
97 Id. For an analysis of the apparent success of government sponsored venture capital through the Small Business Innovation Research program, see GOMPERS & LERNER, supra note 55, at 309-342.
98 Effective commercialization is increasingly seen as a central factor in deriving economic benefit from innovation. See Michael J. Burstein, Exchanging Information Without Intellectual Property, 91 TEX. L. REV. 227, 230 & n.11 (2012). Indeed, a major concern of American policymakers in past decades was that other nations, notably Japan, were successfully commercializing inventions first developed in the United States. OFFICE OF TECH. ASSESSMENT, supra note 46, at 5-7.
A. The Critique of "Financialization" of Private Investment as Inhibiting Innovation

This notion that something has gone wrong in the private sector's approach to investment in innovation is a pervasive background theme in the economic literature on innovation. Mazzucato notes the problem of "increasing financialization" of the private sector, such that corporate funds that might previously have been spent on R&D now go to stock buybacks. She bemoans the loss of public-private partnerships like Bell Labs in favor of a private sector increasingly focused "only on short term profit raising areas." She thinks that venture capitalists may be seeking "not realistic" returns for innovations in certain capital-intensive technologies. All of these concerns echo criticisms that already exist in the corporate literature about short termism and the dangers of unrestrained investor activism. Mazzucato's critique is different, however, because it is tied so closely to the innovation process. Unlike other critiques, which ask whether existing resources are being efficiently utilized in the current managerial environment, Mazzucato's critique implies that new sources of economic growth are being lost or slowed in their development because of current corporate law rules.

She is not alone in her critique. Other academic commentators are also quite disparaging of the role of private finance in development of innovative products and technologies. Suzanne Berger, MIT Professor and lead author of a major recent study of the decline of manufacturing in the United States, tells the story of the activist investors who recently led a shareholder vote to break up the Timken Company. Timken was an American manufacturer of both steel and industrial components. Activist shareholders successfully sought to break it into two companies so that each would provide a financially more attractive "pure play" in its respective business. Management had opposed the move, arguing that Timken's dual competencies allowed them to fine-tune the attributes of the steel in order to make superior products. Berger views this as emblematic of the financially driven changes in

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99 Mazzucato, supra note 2, at 25.
100 Id. at 25.
101 Id. at 179.
102 Id. at 140.
105 Id.
106 Id.
107 Id.
corporate America which have impaired the incentives and reduced the ability of large firms to develop commercially innovative products while failing to develop a viable alternative system through start-ups and venture capital.\textsuperscript{108} As she states:

Today companies harness R&D to specific business divisions and to near-term product development. Most basic and precompetitive research starts out in public and private laboratories isolated from manufacturers. When cutting-edge innovations come out of such laboratories, it is not clear where to find capital to bring their new products and processes to market. Who will handle prototyping, pilot production, testing, and large-scale commercialization? When DuPont brought nylon into mass production in the 1930s and 1940s, it could draw on its own retained earnings as well as established relations with investors, bankers, factories, and suppliers. Today's innovative small company lacks virtually all of these resources. Investors excel in providing venture capital funding for startup companies, but once these companies reach the stage of commercialization and venture capital is no longer available, they find few financial backers. Now that investors have curbed their appetite for startups going public, acquisition by big companies and recourse to foreign capital seem to be the main avenues for bringing to market the innovations that begin life in university and public laboratories. Both of these routes have troubling implications for American innovation and jobs.\textsuperscript{109}

Berger's concerns echo Mazzucato's in many respects, similarly noting the failure of contemporary big firms to engage in basic research, the substitution of "university and public laboratories" as the places where cutting edge research takes place, and the inability of start-up firms to get financing all the way through the commercialization process.\textsuperscript{110}

\textsuperscript{108}Berger, \textit{supra} note 104.
\textsuperscript{109}\textit{Id}. For a discussion on the problem of diminishing IPO opportunities for start-ups, see Ibrahim, \textit{supra} note 55, at 11-14.
\textsuperscript{110}See Berger, \textit{supra} note 104; see also Michael E. Porter, \textit{Capital Choices: Changing the Way America Invests in Industry}, 5 J. APP. CORP. FIN. 4, 5 (1992). Michael Porter, writing about American competitiveness in 1992, noted that the "shortcomings" of American industry were frequently blamed on "short time horizons" among other things, but he viewed this as just
Gary Pisano and Willy Shih also decried what they perceive as the short-term focus of the investment activity of most big American firms, which led to manufacturing outsourcing and a declining ability to develop innovative new products.\textsuperscript{111} While recognizing that pressure from "Wall Street" was part of the reason for such investment decisions, Pisano and Shih argued that a relatively short-term risk averse perspective had been internalized by corporate managers themselves.\textsuperscript{112}

By utilizing analytical models that could not cope well with investments involving a high degree of uncertainty and by staffing their boards and higher managerial ranks with people whose expertise is in finance and management rather than science and technology, these businesses were losing their ability to evaluate or manage technological innovation.\textsuperscript{113}

In short, there seems to be a fairly well developed consensus among economists who study innovation that private investors, by adopting an increasingly narrow short-term approach to investing activity, are failing optimally to fund research in innovation. This critique is somewhat different for each of the two main sources of private investment capital for innovation, technologically sophisticated large firms and venture capitalists. With respect to technologically sophisticated large firms, there is often more than a hint of nostalgia in the writing of innovation economists for such enterprises as Bell Labs and Xerox PARC.\textsuperscript{114} While organized and run by private firms, these research labs are often idealized as quintessential examples of the kind of public-private partnerships that provided foundational innovation, particularly in the 1950s and 1960s.\textsuperscript{115} Yet it is also recognized that these research labs, while responsible for many important technological

\begin{footnotes}
\item[112] Id. at 124.
\item[113] Id. at 125; see also John R. Graham et al., \textit{The Economic Implications of Corporate Financial Reporting} at i (Nat'l Bureau of Econ. Research, Working Paper No. 10550, 2004), archived at https://perma.cc/H83A-M7ZR ("We find that 55% of managers would avoid initiating a very positive NPV [Net Present Value] project if it meant falling short of the current quarter's consensus earnings.").
\item[114] See MAZZUCATO, supra note 2, at 24.
\item[115] Bell Labs, of course, was funded by the huge monopoly profits generated by AT&T. Moreover, the very high marginal tax rates during this period discouraged highly profitable companies from distributing large amounts of cash to either their shareholders or executives. Reinvestment in basic research seemed to be both a worthy and potentially valuable use of such funds. For an analysis of the innovation at Bell Labs, see JON GERTNER, THE IDEA FACTORY: BELL LABS AND THE GREAT AGE OF AMERICAN INNOVATION (2012).
\end{footnotes}
innovations, were actually not very good at bringing products to market. After all, it was the Japanese who arguably recognized and exploited the commercial potential of the transistor (first developed in Bell Labs).

Today, few large firms seem to have the incentives to devote substantial funds to large-scale foundational research. As we have seen, such research is incredibly wasteful, frequently involving large expenditure of R&D with nothing to show for it. Moreover, the fact that the government, along with smaller start-ups, has largely taken up the task of developing innovative new products enables large firms to potentially pick and choose among already developed products that are much closer to commercial viability.

Another factor, not much mentioned in the literature, but which certainly seems a part of the story, is that the young scientists, engineers, and software developers who in previous generations might have sought relatively secure and well-paying employment at a large corporation are now more likely to be interested in working at their own start-up company, looking for financing and seeking to partner with a venture capital firm.

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117. See MAZZUCATO, supra note 2, at 38.

118. The frequently cited exception to this trend is Google X, the research arm of Google that is committed to a kind of "guided" basic research designed to solve big problems (like driverless cars). See Claire Cain Miller, Bell Labs for Billionaires, N.Y. TIMES MAG., June 15, 2014, at 15; Jon Gertner, What Companies Can Learn From Bell Labs, WALL ST. J. DIGITS, (Apr. 2, 2012), http://blogs.wsj.com/digits/2012/04/02/what-companies-can-learn-from-bell-labs/. Yet Google X is also trying to improve on the mediocre commercial results of Bell Labs by focusing on specific projects, which, while foundational, also have clear commercial value (like driverless cars). Id. The success of this approach remains to be seen. See Alyssa Newcomb, SXSW 2015: Why Google X Views Failure as a Good Thing, ABC NEWS (Mar. 17, 2015), archived at https://perma.cc/P6GC-YCYN.

119. See Gladwell, supra note 116. For example, many of the critical features of the personal computer were first developed at Xerox PARC, which then failed to develop them into a commercially viable product. Id.; DOUGLAS K. SMITH & ROBERT C. ALEXANDER, FUMBLING THE FUTURE: HOW XEROX INVENTED, THEN IGNORED, THE FIRST PERSONAL COMPUTER 13-14 (1988).

120. See Gertner, supra note 116. Even Google management has been challenged by investors for spending too much on R&D. Google co-founder Larry Page reportedly answered by noting first that "the amounts he was investing were modest in light of Google's profits" and then asking the financial community, "[s]houldn't they be asking him to make more big, risky, long-term investments, not fewer?" Jon Gertner, The X Factor, FAST COMPANY, June 2014, at 66, 71.
capital firm.\textsuperscript{121} Sale of the innovation to a large firm might be a last step, but not a first one.\textsuperscript{122}

Mazzucato’s critique of venture capitalists is more straightforward. It is essentially that they do not take enough risks.\textsuperscript{123} That is, they invest only in the most commercially viable innovations, after their viability has been fairly well demonstrated, and only in firms that can be sold at a substantial profit within a relatively short period of time.\textsuperscript{124} Given her theory about the essential role of the state, Mazzucato does not expect the venture capitalists to fund foundational research, but she does see their role as moving promising innovations toward commercial viability.\textsuperscript{125} That is the necessary next stage in the innovation process, and one that government, not known for avoiding waste or inefficiency,\textsuperscript{126} is not well equipped to do. This is where, according to Mazzucato, the “financialization” of investment in innovation is causing opportunities to be lost and innovation stifled.\textsuperscript{127}

Mazzucato’s concerns parallel those commentators who talk about the “Valley of Death” for start-up companies.\textsuperscript{128} This so-called “Valley of Death” has traditionally been described as the gap in available financing between the innovation or seed stage, where a product has been developed but its commercial viability has not yet been demonstrated and the stage where there is a viable cash-generating company seeking capital to develop and grow.\textsuperscript{129} That is, the innovators know how to make the product, and know that it works, but do not yet know if the product can be made and marketed at a price that will be attractive to consumers or if it will be attractive to consumers at all. This is a point at which substantial capital is required for market testing, preparation for production on a commercial scale, packaging and marketing and all the

\begin{flushleft}
\textsuperscript{121}See Yiren Lu, A Tale of Two Valleys, N.Y. TIMES MAG., Mar. 16, 2014, at 28, 31.  \\
\textsuperscript{122}See id.  \\
\textsuperscript{123}MAZZUCATO, supra note 2, at 13, 161-62.  \\
\textsuperscript{124}Id. at 48-49.  \\
\textsuperscript{125}Id. at 116.  \\
\textsuperscript{126}Id. at 193.  \\
\textsuperscript{127}MAZZUCATO, supra note 2, at 25.  \\
\end{flushleft}
other aspects of turning an idea for a product into an actual profitable business. Yet during this period the business itself will not be generating any cash flow. One might think that this is where the venture capitalists come in, finding the promising product ideas, providing the needed capital, business expertise, and reputational validation that the start-ups need, and thereby converting innovators' hopes and dreams into entrepreneurial success.

Unfortunately, the empirical studies of venture capital investments indicate that they rarely invest in that early stage in the start-up process. Rather, they prefer to wait until the start-up is actually generating cash flow or even profit and look to invest in later stage ventures that are seen to have strong potential for growth and expansion. Start-ups that have not yet reached that point must seek other, less reliable financing or succumb to the "Valley of Death." This then is the reality behind the criticism by Mazzucato and other innovation economists of the current "financialization" of corporate managers and investors and their increasing emphasis on the short term. By focusing solely on investments that are likely to show substantial returns within a few years, these shortsighted investors may be causing the economy to lose untold millions in valuable innovation that never reach the stage of commercial viability.

An important additional element in this story, and one that has received increased attention in recent years, are the so-called "angel investors." Angel investors are wealthy individuals who generally invest their own money at the early stages of the innovation process.

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131 See, e.g., Kaplan & Stromberg, supra note 130, at 9-10 (collecting data on two hundred venture-capital investments, and finding only seventy-three were "pre-revenue" or early stage); Kurtis Urien & David Groshoff, An Essay Inquiry: Will the JOBS Act’s Transformative Regulatory Regime for Equity Offerings Cost Investment Bankers’ Jobs?, 1 TEx. A&M. L. REV. 559, 568 (2014) (quotation omitted) (alteration in original) ("Venture capital funds typically restrict their investments to startups in later stage[s] and larger deals.").

132 See Zwillig, supra note 129.


134 Ibrahim, supra note 133, at 1406 n.1; see also Outcomes in Angel Investing, supra note 40, at 116-19.

135 MIT ENTREPRENEURSHIP CTR., supra note 133, at 10.
Beyond that, there is considerable diversity of approach among angel investors. Some have personal ties to the entrepreneurs; others do not. Some provide substantial managerial and financial expertise to the start-up ventures, while others take a "hands-off" approach. Some are investing purely as a profit-making venture, but many have a mix of pecuniary and non-pecuniary motives. Some are successful tech entrepreneurs seeking to "give back" to the communities that made them rich. Others are seeking to foster innovation for innovation's sake. Because angels have these mixed motives and are investing their own funds unburdened by limited partners, they behave more like Mazzucato's State in certain respects than like other venture capital investors, particularly in their willingness to invest in highly uncertain and sometimes financially questionable ventures.

Yet even though the amount of angel investing has grown substantially in recent years, experts generally agree it has not solved the problem of financing innovation that Mazzucato describes, but has, at most, just altered it somewhat. Investors at the seed stage are still faced, of course, with very substantial uncertainty, but angel investors can ameliorate the problem to some degree by investing relatively small amounts in a large number of different companies. Paradoxically, however, this seems to be creating even more companies that get through the seed stage and develop potentially commercially viable projects. However, if they subsequently seek a larger tranche of financing to move

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137 Id. at 14-15.
138 Id. at 2.
139 See id. at 17-21 (separating the "diversity" of angel investors into four categories).
140 Although many commentators have noted increased professionalization among angel investors and the formation of angel investment groups and clubs, these changes do not seem to have greatly altered the "mixed motives" of seeking to help and to profit from budding entrepreneurs that underlying investments. The New York Times, reporting recently on the exponential growth of angel investing among wealthy Silicon Valley businesspeople, noted that such investments function more as a "status symbol" than a source of income and that newcomers are told that they "should expect to lose money." Mike Issac, Where Countless Angels Tread, N.Y. TIMES, Jul. 7, 2015, at B1.
141 A recent study comparing angel and VC investing found that angel-only deals had a greater "time to resolution" than VC deals with no greater probability of success. In fact, for large investments, angel performance was poorer than that for VCs. The authors conclude that their findings are "most supportive of angel preferences aligning more with the entrepreneur and less with VCs." Brent Goldfarb et al., Are Angels Different? An Analysis of Early Venture Financing (Univ. of Md. Robert H. Smith Sch. of Bus. Research Paper No. RHS 06-072, 2013), available at http://ssrn.com/abstract=1024186.
142 See MIT ENTREPRENEURSHIP CTR., supra note 133, at 56.
into full-scale commercial development, the angels who have provided the relatively small amounts of seed financing to large numbers of projects will not usually provide the substantially greater amounts of capital these projects need.\footnote{A recent study found that at the earliest stages of investment, when small amounts of capital are sufficient, angel investors alone may supply it, but when larger investments are needed "even sophisticated angels are insufficient and VC participation is generally necessary." Goldfarb et al., supra note 142, at 3; see also Outcomes in Angel Investing, supra note 40, at 1118-19 (finding that angels who did not emphasize "prediction" tended to make smaller investments).} Venture capitalists, for the reasons Mazzucato describes, still see these companies' prospects as too uncertain and their paths to profitability too long to generate much venture capitalist interest. Similarly, in fields like biotech, where large pharmaceutical firms rather than venture capitalists are the primary source for funding, sub-optimal risk aversion and short-term perspectives may well inhibit investing activity by such firms.\footnote{Bruce Booth, The Venture Funding Boom in Biotech: A Few Things It's Not, FORBES (Jul. 23, 2015), http://www.forbes.com/sites/brucebooth/2015/07/23/the-venture-funding-boom-in-biotech-a-few-things-its-not/#44202e16439c ("The big recent uptick above the normal $1-1.5B that’s invested quarterly into biotech isn't coming from the coffers of venture capitalists, it's coming from hedge funds and public market 'crossover' investors.").}

B. The Corporate Law Debates About Short Termism

The allegation of increasing short termism rings true to corporate lawyers because we are well aware of the changes in corporate governance and managerial practices that have arguably changed the behavior of corporate managers and private investors. Until about the late 1960s,\footnote{For an interesting analysis of the American economy at this time, based on observations that the managers of large oligopolistic corporations faced no serious competitive pressures and could control demand for their products through advertising, see JOHN KENNETH GALBRAITH, THE NEW INDUSTRIAL STATE 29-31 (1967).} managers ran most publicly traded companies with little interference from anyone.\footnote{See id. at 49.} With shareholders dispersed and disaggregated and corporate boards filled with friends, acquaintances, and more junior executives, corporate CEOs had unfettered discretion to run their companies as they thought best.\footnote{See id. at 49-50.} This discretion could result in bloated staffs and corporate jets as well as relatively low shareholder returns, but in some cases, it also produced a lot of R&D spending and even unique innovation factories like Bell Labs.\footnote{See id. at 392-93.} With the development of the hostile takeover, CEOs faced the first real threat to
their managerial discretion (and their jobs).\textsuperscript{150} This threat was followed by a growing tendency both of investors and managers themselves to view managerial performance from the perspective of short-term earnings.\textsuperscript{151} Evaluations of managerial quality and movements in stock price were increasingly dependent on whether a company’s quarterly earnings reports were positive, growing, and meeting analyst expectations.\textsuperscript{152} While some of this short-term perspective has been blamed on institutional investors pushing corporate governance reforms and activist fund managers seeking short-term market gains,\textsuperscript{153} it appears that the more powerful factors have been the changes in executive compensation, CEO turnover, and board composition, as well as the increased financial reporting and dissemination of quarterly financial results.\textsuperscript{154}

The most important evidence (as well as the most important effect) of such short termism is the trend away from capital expenditures by large firms (including investment in research and development) in favor of using excess cash for massive stock buybacks.\textsuperscript{155} As the economists of innovation and others have amply documented, there has been a substantial decline at large private firms in R&D with respect to basic science and innovative technology.\textsuperscript{156} Such firms are frequently generating large amounts of profit and free cash flow but are spending it primarily on stock buybacks that enhance shareholder wealth but do nothing for innovation.\textsuperscript{157} Nor is it reasonable to expect fundamentally different investment strategies from venture capitalists. Venture capitalists, after all, are expected by investors to provide greater returns

\textsuperscript{151}See MAZZUCATO, supra note 2, at 108.
\textsuperscript{152}See id.
\textsuperscript{153}See, e.g., Martin Lipton, The Threat to the Economy and Society from Activism and Short-Termism Updated, HARV. L. SCH. F. ON CORP. GOVERNANCE & FIN. REG. (Jan. 27, 2015), archived at https://perma.cc/TG79-JF8T.
\textsuperscript{156}Matthew Philips & Peter Coy, Look Who’s Driving R&D Now, BLOOMBERG (June 4, 2015, 12:14 PM), archived at https://perma.cc/7AVM-HJ6W.
\textsuperscript{157}MAZZUCATO, supra note 2, at 26.
than they could get by simple market investments in S&P 500 firms.\textsuperscript{158} Accordingly, the venture capitalists cannot allocate many investment slots to "longshots" that are likely to diminish their total portfolio returns but must allocate almost all of their investment capital to startups that are at least promising and perhaps already on the verge of success.\textsuperscript{159}

The fear and criticism of the perceived growing tendency toward "short termism" among corporate managers has been a substantial concern of corporate lawyers and academics for many years, and has engendered numerous debates over whether various aspects of corporate law should be changed to promote and enable corporate managers to more easily implement long-term strategies.\textsuperscript{160} Very broadly speaking, most, but by no means all, corporate law theorists agree that the appropriate goal of corporate management should be to maximize long-term shareholder welfare.\textsuperscript{161} This implies, of course, that pressure to adopt short-term strategies that diminish long-term value to shareholders should be discouraged, perhaps by measures that insulate managers from shareholder pressure. Unfortunately, deciding when short-term strategies are detrimental to long-term welfare and when managerial insulation is beneficial to long-term value are highly controversial questions. Debates rage on controversial features of contemporary corporate law from board classification to investor activism to dual class stock.\textsuperscript{162} The basic problem is that almost every provision that can protect management's long-term investment strategies can also foster managerial overreach and mismanagement.

Concern about fostering innovation does not play a major role in these debates. Legal scholars tend to assume that if any laws play a role in fostering innovation, they are the laws of intellectual property that protect inventors, modified perhaps by an appropriate dose of industrial

\textsuperscript{158}Why Private Equity Will Keep Beating the S&P 500, KNOWLEDGE @ WHARTON (Oct. 15, 2014), archived at https://perma.cc/MNF4-MV72.

\textsuperscript{159}For a discussion of the concerns about "grandstanding" among venture capitalists, see GOMPERS & LERNER, supra note 55, at 377-89.


\textsuperscript{161}See infra Part II.B.

policy in the form of antitrust or federal administrative agency regulation.\textsuperscript{163} At the core of Mazzucato's book, however, is the potent but ultimately unprovable assertion that relatively recent changes in the financial sector have reduced the scope and effectiveness of private investment in innovation.\textsuperscript{164}

The assertion is ultimately unprovable in that we can never know what innovations would have been discovered and developed but for the financialization and short termism of the private investment sector that Mazzucato decries. Yet there is substantial evidence that is consistent with Mazzucato's thesis, notably (1) the massive increase in the amount of corporate profits spent on stock buybacks rather than capital investments in recent years;\textsuperscript{165} (2) a growing recognition of the power of investor activism to influence managerial decision-making and the growing expressions of concern by corporate managers that their ability to make optimal long-term investments for the company is being impaired;\textsuperscript{166} (3) considerable use of managerial protective devices like dual class stock and staggered boards in technological and other innovation-oriented industries;\textsuperscript{167} (4) a general consensus among economists of innovation that the private sector is not investing optimally in innovative technologies;\textsuperscript{168} and (5) the objective facts, set forth by Mazzucato and others, that most of the major commercially important innovations of the last half century have been the result of government or government/academic projects.\textsuperscript{169}

It is useful, therefore, to consider whether current investment behavior by the private sector could be modified to encourage greater investment in innovation and the role that corporate law could play in such modification. That is the focus of the following section.

\textsuperscript{164}MAZZUCATO, supra note 2, at 47-50.
\textsuperscript{165}Id. at 26.
\textsuperscript{167}See Paul A. Gompers, Joy Ishii & Andrew Metrick, Extreme Governance: An Analysis of Dual-Class Firms in the United States, 23 REV. FIN. STUD. 1051, 1053-55 (2010) (finding in dual-class firms that insider share ownership is associated with increased firm value, but in contrast, insider vote ownership is associated with decreased firm value).
\textsuperscript{168}Steve Denning, Why Can't the Private Sector Innovate Anymore?, FORBES (Feb. 25, 2013), http://onforb.es/15K5Poa (presenting a general critique of private sector capital allocation arguing in part that this misallocation is behind stagnant innovation and growth).
\textsuperscript{169}MAZZUCATO, supra note 2, at 79-80.
II. INNOVATION PROMOTION AS THE GOVERNING NORM OF CORPORATE LAW

A. The Case for Growth Over "Static" Efficiency

Like Mariana Mazzucato, Robert Cooter is an economist with a strong interest in innovation. But while Mazzucato's method is empirical and historical, Cooter's work is highly abstract and theoretical. Also unlike Mazzucato, Cooter is deeply involved in the field of law and economics and is very concerned with the specific effects that legal rules have on growth and innovation. His most recent book, *The Falcon's Gyre: Legal Foundations of Economic Innovation and Growth*, is a theoretical analysis of law's impact on innovation and economic growth and a normative argument that fostering such innovation should be a primary goal of lawmakers and judges.  

The first chapter of Cooter's book is a powerful critique of traditional law and economics (which he refers to as "static economics") in favor of a norm that "prioritizes growth economics." Central to Cooter's argument is the "overtaking principle," the idea that because rapid economic growth is exponential, its beneficial effects will in most cases rapidly outpace any benefits that can be derived simply by utilizing existing resources more efficiently. As he says:

> Which was more important to agricultural production, inventing a tractor or using horses more efficiently? A better allocation of horses for plowing the fields increases agricultural production marginally, whereas inventing the tractor caused a jump in production. Once you appreciate

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170Broadly speaking, Cooter and Mazzucato can be viewed as representing two ends of a spectrum of approaches economists use when studying innovation. Mazzucato, following an evolutionary Schumpeterian approach, resists generalizations and emphasizes the disruptive, disequilibrating effects of innovation that can best be studied on a case-by-case basis. See JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM AND DEMOCRACY 83 (3d ed. 1950). Economists like Cooter, while recognizing the inadequacy of static efficiency-based models, look to replace them with more dynamic but still highly abstract models of the innovation process. See, e.g., Richard R. Nelson & Paul M. Romer, *Science, Economic Growth & Public Policy*, CHALLENGE, Mar.-Apr. 1996, at 9, 14.


172Id. at 1.17.

173Id. at 1.17-18.
exponential growth, it's hard to care about static efficiency for its own sake.\textsuperscript{174}

As this example illustrates, Cooter believes that exponential economic growth is most likely to be brought about by innovation.\textsuperscript{175} Not only does innovation use resources in substantially different and more efficient ways, but the ideas which constitute the core of most successful innovations are not depleted by being shared\textsuperscript{176} so they may be widely disseminated and produce even greater increases in wealth.\textsuperscript{177} Given these considerations, it is hard to argue with Cooter's conclusion that to the extent law can be used to foster innovation and economic growth, that should be a lawmaker's first priority.\textsuperscript{178} I suspect that Mazzucato would wholeheartedly agree.

There remains the question, of course, as to what types of laws actually do foster innovation. In his book, Cooter focuses almost exclusively on intellectual property law.\textsuperscript{179} It is intellectual property law that creates the rights innovators receive to benefit exclusively from their innovations and thereby arguably creates the incentive for innovation itself.\textsuperscript{180} Cooter is well aware of the ongoing debates about the dangers of over or under protection of patent rights and develops a model in which different types of innovations would get different levels of legal protection in an effort to maximize incentives to innovate.\textsuperscript{181}

With respect to the role of corporate law in fostering innovation and economic growth, however, Cooter has much less to say. He is aware of the enabling aspects of contract and corporate law and writes approvingly of the way contract terms and corporate structures can be used to address what he views as the central problem in financing innovation, the "double trust dilemma."\textsuperscript{182} This is a form of prisoner's

\textsuperscript{174}Id. at 1.17.
\textsuperscript{175}FALCON'S GYRE, supra note 171, at 1.8-1.9.
\textsuperscript{176}In economic terms, they are "nonrival goods." Nelson & Romer, supra note 170, at 15-16.
\textsuperscript{177}Cooter also notes some empirical studies that conclude that "[i]n the last 100 years, innovation caused more economic growth than anything else, including using more resources." FALCON'S GYRE, supra note 171, at 1.6.
\textsuperscript{178}See id. at 1.16-17.
\textsuperscript{179}In an earlier piece on growth economics co-authored with Aaron Edlin, the authors also used examples from antitrust and tort law. Robert Cooter & Aaron Edlin, Law and Growth Economics: A Framework for Research 21-24 (Berkeley Program in Law & Econ., Working Paper Series, 2011), archived at https://perma.cc/E54N-M56F.
\textsuperscript{180}For a discussion of the ongoing debate whether intellectual property (primarily patent) law creates the proper incentives for optimal innovation, see Michael J. Burstein, Patent Markets: A Framework for Evaluation, 47 ARIZ. ST. L.J. 507, 512-14 (2015).
\textsuperscript{181}FALCON'S GYRE, supra note 171, at 6.1.
\textsuperscript{182}Id. at 3.1.
dilemma in which the innovator must reveal his idea to the financier to obtain capital but fears his idea will then be appropriated. In turn, the financier must provide capital to the innovator to obtain her expertise in developing the product but fears her capital will be appropriated. The imperfect but adequate solution, in Cooter's account, is the standard venture capital agreement, buttressed by legally enforceable contractual and fiduciary duties.

Cooter says little about the dilemma that is central to Mazzucato—the failure of finance capital adequately to fund the earlier stages of development and commercialization of innovation. On Cooter's model, financiers not only evaluate the ideas presented to them but can make reasonably accurate predictions of the likely financial outcomes of their commercialization. This may well reflect what venture capitalists are actively trying to do and generally succeed in doing for innovations that are well along in the development process or whose commercial potential can be adequately ascertained and evaluated. But Mazzucato also describes a whole universe of other ideas, half formed, less well developed, most of which will be never be commercially viable. However, a few, if properly developed, could contribute enormously to economic growth (as well as making the developers very rich). At the time such ideas are initially presented for financing, however, there is no way to determine their likely commercial value. Reaching the point where such a determination can be made will itself require substantial expenditures. On this point, Cooter's model and Mazzucato's empirical account agree as to the result. Since such ideas cannot be shown to be readily profitable for the financiers, they do not get financed.

Cooter does mention angel investors and recognizes the role they can play in developing ideas whose economic value may not yet be subject to reasonably accurate determination. As he describes it, angels are usually family or friends who, because they have confidence in the innovator, "invest without fully understanding the innovation's market

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183 See Kenneth J. Arrow, Economic Welfare and the Allocation of Resources for Invention, in THE RATE AND DIRECTION OF INVENTIVE ACTIVITY 609, 615 (1962). In a recent article, Michael Burstein traces the history of this problem and criticizes some of its basic assumptions about information in order to provide a more nuanced and heterogeneous account of the various forms information exchange can take. See Michael J. Burstein, Exchanging Information Without Intellectual Property, 91 TEX. L. REV. 227, 255 (2012).
184 Id. at 3.12-13.
185 Id. at 3.8.
186 See MAZZUCATO, supra note 2, at 193-98.
187 See id. at 139-40.
188 See id. at 161-62; FALCON'S GYRE, supra note 171, at 2.6.
value.\footnote{FALCON'S GYRE, supra note 171, at 3.11.} Cooter's characterization of these investors as semi-rational and semi-knowledgeable indicates that he does not see their role as pivotal in the financing of innovation. Unlike venture capitalists, they have no real incentive or ability to develop potentially valuable innovations.\footnote{Id. at 3.11-12} Rather, it is up to the innovators to convince the venture capitalists of the value of their ideas, and the venture capitalists who are presumed to have a special expertise in evaluating and fostering such ideas.\footnote{Id. at 3.12.}

Nonetheless, the normative aspects of Cooter's work make a compelling case for rethinking corporate law. If we import into Cooter's model the basic points of Mazzucato's critique: (1) that potentially valuable innovations are not being developed because the time horizons of investors are too short; (2) that those time horizons are not chosen to maximize successful investment in innovation, but are the product of financial pressures and concerns of exogenous groups (like shareholders) with little interest in or understanding of innovation; and (3) that such groups are empowered to constrain investor action by various aspects of contemporary corporate law,\footnote{See MAZZUCATO, supra note 2, at 48-49.} then the conclusion is clear. Contemporary corporate law is suboptimal with respect to encouraging economic growth and needs to be changed.

This conclusion follows directly from Cooter's "overtaking" principle, which privileges increases in innovation and economic growth over mere increases in static efficiency.\footnote{FALCON'S GYRE, supra note 171, at 1.17.} Accordingly, arguments that laws empowering shareholders decrease agency costs and lead to a more efficient use of corporate funds can have little impact once it is recognized that those same laws are also reducing managerial ability to invest corporate cash flow in innovations leading to economic growth. Reduction of agency costs is exactly the kind of rearrangement of existing resources that Cooter argues can never compete, in the long run, with the benefits conferred by fostering innovation.\footnote{See Michael C. Jensen & William H. Meckling, Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure, 3 J. FIN. ECON. 305, 308 (1976). Since the seminal work of Jensen and Meckling, reduction of agency costs has been seen as a fundamental goal of both corporate governance and corporate law.} For that same reason, it is useless to try to measure or compare the efficiency gains obtained by reduction of agency costs against the loss of valuable innovation investments. Not only does the non-linear nature of the results of investment in innovation make it impossible to predict the
value or even the amount of innovations lost by suboptimal corporate law rules, it is also a comparison of apples to oranges. Reductions of agency costs are certainly beneficial to the firm and its shareholders, but the benefits conferred do not increase over time. Quite the contrary, as a firm's operations become more efficient, it will likely become more difficult to find equivalent efficiency gains in subsequent periods. An innovation, on the other hand, as it grows in popularity and diverse applications, is likely to provide increasing benefits not only to the firm but to society as well. Accordingly, application of Cooter's principles seem to require a complete reorientation of corporate law away from agency cost reduction and toward encouragement of innovation.

B. Innovation Maximization Through Managerial Primacy and Long-Term Perspectives

Such a reorientation would resolve many of the debates that have roiled corporate law scholarship in recent years, particularly involving the related questions of long-term versus short-term managerial perspectives and managerial versus shareholder primacy. For those who have argued in favor of corporate law rules that encourage managerial primacy and a long-term perspective, the impact of these rules on innovation provides a powerful new argument in their favor. Proponents have long argued that managers will act differently if the law promotes managerial discretion to act in the long-term best interests of the company, and one of the major differences will be greater freedom and incentives to undertake longer-term investments with riskier payoffs and less certain impacts on share price, precisely the characteristics of investments in innovation. In traditional corporate law debates, these presumed benefits have been "weighed" against the downsides of the managerial primacy model, managerial overreaching, mismanagement, and increased agency costs. Moreover, many questioned whether managing for the long and short term were really so different, or whether most of the same actions promoting firm value maximization would be undertaken under either legal regime.
On the latter point, the difference between long- and short-term perspectives, Mazzucato's argument concerning the informational uncertainty inherent in investments in innovation suggests that, for those investments at least, the differences in time perspective have real consequences.199 Developing a new product, determining whether it is commercially viable and how best to market it can take a considerable period of time. During that time, a manager, even if she believes the product is likely to be highly profitable in the long run, may be unable to credibly convey that belief to the public and the public stock markets, both because of the uncertainty inherent in innovation development and concerns about prematurely revealing proprietary information. Accordingly, such managers may be subject to substantial criticism and even potential loss of their jobs from outside investors (or even outside directors) concerned with short-term corporate performance.200 Ex ante, the increased ability of shareholders to pressure management to maximize short-term share value will have the effect of discouraging investments in innovation, even if they might lead to greater long-term firm value.201

The usual response of the shareholder empowerment proponents is to "balance" such costs against the powerful evidence of efficiency gains due to increased constraints on managerial waste and misconduct.202 But Cooter's argument for privileging rules fostering innovation places a powerful thumb on the scale.203 Given Cooter's "overtaking" principle, the benefits of exponential economic growth promoted by giving managers greater freedom to invest in innovation will ultimately far outweigh the more limited savings brought about through reduction of agency costs. Cooter's argument also calls into question a fundamental premise of the existing corporate law debate, that the question at issue is an empirical one and the relative costs and benefits of shareholder and managerial primacy can be resolved, or at least illuminated, by event studies relating to stock prices and firm value.204

199 Mazzucato, supra note 2, at 3.
200 Id. at 178.
201 Id. at 49.
202 Even Lucien Bebchuk, probably the foremost proponent of increased shareholder empowerment, recognizes that, as a theoretical matter, insulating management from short-term pressures might have some beneficial effects. See Lucian A. Bebchuk, The Myth That Insulating Boards Serves Long-Term Value, 113 Colum. L. Rev. 1637, 1643 (2013). He questions whether "these benefits might be outweighed by significant countervailing costs." Id.
203 See Falcon's Gyre, supra note 171, at 1.6-1.16.
In a recent essay, Professor Lucian Bebchuk explains the role he thinks such empirical studies play in these ongoing debates. His argument is not that the empirical work disproves or even contradicts the claims of those expressing concerns about short termism. Rather, he argues that "[those advocating that managers be insulated from short-term pressures] should recognize that they have been making contestable empirical claims that must be backed up by evidence," and that the empirical work "does not support the claims of insulation advocates..." In short, this is a failure-of-proof argument that finds the evidence of presumed benefits from provisions protecting managers (or presumed losses from provisions empowering shareholders) to be lacking.

Leaving aside (for now) the question of who should have the burden of proof when all that can be shown is a lack of evidence, consider what the empirical studies actually show. They are attempts to measure the costs and benefits of various management-protective or shareholder-empowering provisions or actions taken by real companies as reflected in their stock prices over time. For example, many of the important studies are of the effects on stock prices or firm value of staggered boards, which, as Bebchuk notes, "is widely regarded as a key provision for determining the extent to which a board is insulated." A number of empirical studies of the effects of adoption of such staggered board provisions by public companies found that they were significantly associated with decreases in firm value. During this same period (and certainly not by coincidence), there was growing institutional

205 Bebchuk, supra note 202, at 1645.
206 Id. at 1643-45.
207 Id. at 1643.
208 Id.
209 Most of these studies seek to measure costs and benefits by reference to changes in the market price of stocks or Tobins Q (which is itself dependent on market price). See, e.g., Bebchuk, supra note 202, at 1670-72, 1685.
210 Id. at 1685.

We will have more to say about these event studies in the next section, but for now, it is worth noting that they are unlikely to shed much light on the effects of various corporate governance devices on innovation. As Mazzucato emphasizes, successful innovation is rare and only very loosely related to capital expenditure in any event.\footnote{See id.} These event studies involve generalizations about large numbers of publicly traded companies, most of which are not engaged in significant innovation or product development.\footnote{See supra note 2, at 59.} Accordingly, studies that seek to measure effects of a particular corporate governance mechanism on firm value are going to be measuring almost exclusively what Cooter would call the static efficiency effects of such provisions, the fact that, for example, staggered boards make agency-cost-reducing takeovers less likely. While there could conceivably be some companies in the staggered board group whose stock price increased as a result of successful investment in innovation, the impact of any such results would be swamped by the vastly larger number of companies whose stock price would presumably all show the effect of the decreased likelihood of takeovers. In short, the rarity of significant innovation and the long time frames associated with its successful commercial implementation make it highly unlikely that significant effects of such innovation will be seen in event studies involving all publicly traded firms.

There are two other problems with trying to test the innovation economists' critique of short termism using an event study methodology. First, as noted previously, an innovating firm or its shareholders may not capture much of the value of a particular innovation.\footnote{See id. at 69-70.} Another firm may come up with a more commercially viable application, or a non-patentable idea may be widely copied and exploited on an industry-wide basis. Second, event studies require an assumption of relative uniformity
among firms, at least insofar as the effects of a given event may be averaged and generalized among firms to give us a coherent result. To study innovation in this way requires us to assume that innovation itself is a repetitive process, caused, or at least encouraged by various inputs whose effects can be isolated and studied over time. While to some degree it is necessary to make such assumptions in order to think theoretically at all about innovation, both Mazzucato's case studies and the history of innovation itself cast doubt on our ability to predict where new ideas come from and who is in the best position to develop and exploit them. Recognizing the contingency of such innovation, however, also puts us in the difficult position of acknowledging that we can never really know the value of the innovations that have been lost if our investments in innovation have indeed been suboptimal. One cannot easily study what has not occurred.

Has Cooter therefore solved the problem of corporate law? Does his privileging of innovation promotion and economic growth provide a meta-principle that justifies constraining shareholder interference in managerial decision-making and requiring managers to adopt a long-term perspective? Not necessarily. Cooter himself recognizes that legal rules are two-edged swords. The same patent law rules that create incentives to invest in innovation may also, in other contexts, be overbroad and discourage valuable additional innovations. What is needed, he argues, is a careful fine tuning of the legal rules that seeks to promote the basic goals of innovation promotion and economic growth while remaining sensitive to differences in context and application.

With respect to corporate law, I think Cooter would conclude that a similar sort of fine tuning is needed. When it comes to defining and limiting the respective powers of innovators and those who invest in innovation, Cooter believes that fiduciary duties provide a solution. It

\[\text{216} \text{See FALCON'S GYRE, supra note 171, at 3.10.}\]
\[\text{217} \text{Id. at 3.17-3.18.}\]
\[\text{218} \text{Some scholars have identified specific situations where governance mechanisms usually considered detrimental to firm value may play a positive role. For example, Mira Ganor points out that a company with dual class stock probably obtains no greater takeover deterrent effect by adopting a staggered board, but such an arrangement might empower outside directors relative to incumbent management. See Ganor, supra note 212, at 18-19; Mark Humphery-Jenner, Takeover Defenses, Innovation, And Value-Creation: Evidence From Acquisition Decisions, 35 STRATEGIC MGMT. J. 668, 668 (2014). "Hard-to-value" companies may derive particular benefits from anti-takeover provisions. Id.}\]
is that set of corporate law rules which he believes helps solve the "double trust problem" by ensuring that courts will punish any manager of a start-up company who tries to appropriate more than his bargained-for share of the profits by preventing mismanagement and overreaching. Structural corporate law rules that empower investors can help as well, by providing them with board seats mandating periodic reporting and allowing them to enforce standards of candor and accuracy with respect to such reporting.

Accordingly, a corporate law designed to optimize investment in innovation and economic growth would not be one that removed all constraints on managerial discretion. Ideally, such law would distinguish managerial actions that promoted innovation investment and long-term growth from those involving self-dealing, misappropriation of firm assets, mismanagement, oppression of minority shareholders, empire building, and all the other forms of managerial malfeasance that tend to decrease rather than increase long-term firm value. With respect to the many firms that have no incentive or ability to engage in significant innovation investment, the governing corporate law rules might look no different than current law.

For firms seeking to promote and invest in innovation, however, optimizing corporate law rules will require a searching inquiry into all aspects of contemporary corporate law and practice, seeking to determine the ways they affect managerial incentives and ability to invest in innovation. Again, I would expect that many legal rules, like those strongly discouraging self-dealing and oppression of minorities, would remain largely unchanged. Those more likely to directly affect managerial investment incentives, like performance-based pay,

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220 See id.
221 See Stegemeier v. Magness, 728 A.2d 557, 562 (Del. 1999) ("The absolute prohibition under common law against self-dealing by a trustee has been modified in the corporate setting to offer a safe harbor for the directors of a corporation if the transaction is approved by a majority of disinterested directors."); Weinberger v. UOP, Inc., 457 A.2d 701, 710 (Del. 1983) ("When directors . . . are on both sides of a transaction, they are required to demonstrate their utmost good faith and the most scrupulous inherent fairness of the bargain"); DEL. CODE ANN. tit. 8, § 144 (2011).
The tools of good corporate practice are designed to give a purchasing minority stockholder the opportunity to bargain for protection before parting with consideration. It would do violence to normal corporate practice and our corporation law to fashion an ad hoc ruling which would result in a court-imposed stockholder buy-out for which the parties had not contracted.
223 See Susan J. Stabile, Motivating Executives: Does Performance-Based Compensation Positively Affect Managerial Performance?, 2 U. PA. J. LAB. & EMP. L. 227, 229-30 (1999). Performance-based pay is seen as a way to motivate and reward executives. Id. Moreover, it "provid[es] incentive for executives to perform in ways that maximize
shareholder voting rights, and takeover defenses, are likely to be subject to more rethinking and refinement, and, at least in some cases, a nudge in the direction of greater protection of managerial discretion to make long-term investments in innovation.

At least as important as striking the right balance between shareholder and managerial power, however, is determining the optimal level of generality at which these rules should apply. Most corporate law rules currently make no distinction between different types of businesses in which corporations may be engaged. Implicit in Cooter's principle of privileging innovation investment is the prospect that different firms with different likelihoods of contributing to economic innovation should be treated differently. This could take the form of creating new and distinct corporate law rules for certain types of companies—technology, pharmaceutical, venture capital, etc. It might also take the form of allowing any firm that can credibly show a commitment to innovation investment to "opt into" various managerial protective provisions, like dual class stock and staggered boards. Or it might take the form of case-by-case adjudications in which justifications of managerial conduct based on credible showings of an innovation investment motive are given greater weight or deference by courts than other managerial motives like cost cutting or expansion of existing businesses.

In short, it is hard to say at this point how much of corporate law would actually change if academics, lawmakers, and judges heeded the economists' call to make innovation promotion the first priority of corporate law. What seems clearer is that it would change the discourse and the thinking with which corporate lawyers approach these issues.

corporate/shareholder wealth and/or as a way of paying executives commensurately with their contribution to a corporation's growth and performance." Id.

224See Simone M. Sepe, Corporate Agency Problems and Dequity Contract, 36 J. CORP. L. 113, 138 (2010) (discussing how shareholders have the ability to "improve managerial performance and accountability through active voting"). See generally Stephen M. Bainbridge, The Case for Limited Shareholder Voting Rights, 53 UCLA L. REV. 601, 602 (2006) (stating that "many observers believe that shareholder voting is an integral component of corporate governance. Even sophisticated corporate law experts, such as those on the Delaware courts, say so: 'The shareholder franchise is the ideological underpinning upon which the legitimacy of directorial power rests'").

225See John C. Coates IV, Explaining Variation in Takeover Defenses: Blame the Lawyers, 89 CAL. L. REV. 1301, 1302-03 (2001) (explaining how some argue that "[takeover] defenses reduce firm value[] by increasing agency costs between shareholders and managers[,]" while, on the other hand, others argue that "[takeover] defenses have largely positive effects on firm value [by increasing bargaining power or overcoming some market failure.")

226DELCODE ANN. tit. 8, § 122 (2011).

227FALCON'S GYRE, supra note 171, at 4.8.
C. Promotion of Diverse Investor Perspectives

Perhaps even more important to the promotion of innovation, however, is encouragement and preservation of different perspectives and approaches to investment in innovation. The basic Schumpeterian theory of innovation requires that unusual ideas generate enough interest among at least some investors to get financed and commercially developed.\(^{228}\) It is then that innovations are subject to the Darwinian test of the market and their success or failure can be truly determined.\(^{229}\) Most will fail.\(^ {230}\) Some will succeed modestly, and a few will provide the wild and unexpected success that will disrupt industries and form the basis for further exponential economic growth.\(^ {231}\)

Mazzucato’s critique, as we have seen, is that private investors are not funding enough ideas, and thus are not bringing enough ideas to commercial development where their success of failure can be definitively determined.\(^ {232}\) This is not because there is insufficient private investment capital,\(^ {233}\) nor is it because private investors are not seeking potentially lucrative investments in innovation. It is because they are all seeking the same exact type of potentially lucrative investments—companies with an identifiable product or business that is at or close to the stage where it is generating positive cash flow, is ready for market testing and commercial production and has a good chance of being highly profitable and potentially saleable within five to seven years.\(^ {234}\) Investments that are generally thought to meet these criteria are highly sought after in Silicon Valley and beyond.\(^ {235}\)

The problem, as Mazzucato sees it, is that these criteria are too narrow and too uniform.\(^ {236}\) More investment in innovation would take place, and importantly, more investment in different types of innovation would take place, if at least some investors could adopt a fifteen-year time frame for commercial success, or be willing to accept a business

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\(^{228}\) See supra note 85 and accompanying text.

\(^{229}\) See MAZZUCATO, supra note 2, at 34-36.

\(^{230}\) See MAZZUCATO, supra note 2, at 58, 161.

\(^{231}\) See id. at 47-50.

\(^{232}\) See MAZZUCATO, supra note 2, at 47-50.

\(^{233}\) See supra note 85 and accompanying text.

\(^{234}\) See supra note 2, at 47-50.

\(^{235}\) See GOMPER & LERNER, supra note 55, at 23.

\(^{236}\) See MAZZUCATO, supra note 2, at 41-44.
that was likely to generate only modest returns for many years, or invest in a potential business whose product was still under development and the commercial form it would take was still unknown. Such an increase in the types of investments being made is the most likely way to generate more successful innovations being presented to the market and to generate more economic growth.

But is the tendency of most innovation investors to think alike and evaluate investments in similar ways a corporate law problem and does it have a corporate law solution? The answer to both questions is a qualified and limited "yes." Even if we believe, as many critics of innovation investment do, that the fundamental problem of conformity among investors is the similarity in the way they analyze and evaluate investment opportunities, it is still helpful to examine the objective external factors that may foster such conformity. For corporate managers such incentives include quarterly reports and the need to "make the numbers" in their quarterly projections, performance based pay (usually based on a "one size fits all" model for aligning managerial and shareholder interests), the growth of boards filled with independent directors less likely to defer to management and more likely to question managerial strategies that appear unusual and not obviously share-value-maximizing, institutional shareholders (and institutional shareholder services) with good corporate governance templates that they apply uniformly to firms seeking to adopt or reject various corporate governance measures. The venture capitalists' incentives toward conformity are about their reputation and the need to produce results as good or better than competing firms.

On the other hand, corporate managers and venture capitalists tend to be dynamic and strong willed individuals with considerable confidence in their own good judgment. While corporate law cannot and should not create non-conformity of viewpoint where it does not

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237 See Burstein, supra note 98, at 247-74.
238 See id. at 255-58. Theorists are just beginning to recognize the importance of heterogeneity in both the sources of innovation and their commercialization. The Silicon Valley venture capital model is not the norm in all innovative industries. See id. at 232-34 (describing differences between the way information is exchanged and contracting takes place between biotech and large pharmaceutical firms, and the standard model derived from venture capital contracts); see also Ronald J. Gilson, Locating Innovation: The Endogeneity Of Technology, Organizational Structure, And Financial Contracting 110 COLUM. L. REV. 885, 888 (2010) (seeking to understand "why particular types of innovative activity take place in different locations corresponding to different combinations of technology, the organizational structure in which the technology is developed, and the financing mode.").
239 See supra Part I.B.
240 See Gilson, supra note 238, at 905.
otherwise exist, corporate law can be helpful in reassuring large firm managers and venture capitalists that should they choose to follow a somewhat atypical investment strategy they will not be unduly punished for it if the strategy fails. Many of the traditional features of corporate and limited partnership law are designed to provide precisely such assurance. The business judgment rule and the potential to opt out of duty of care liability completely should protect most unusual investment strategies.

Yet one can easily imagine ex ante concerns by managers that they will be second-guessed and subject to potential litigation if a nonconforming investment strategy fails and costs the firm substantial capital. Even if the chances of actually losing such a lawsuit are slim, the very existence of such suits can be time consuming and embarrassing, and it is not at all inconceivable that a lawsuit challenging a controversial and unsuccessful investment strategy might at least withstand a threshold motion, subjecting management and the firm to burdensome discovery and settlement pressure. One possible way to alleviate some of these concerns for corporate managements would be to get an "innovation opinion letter" similar to the "fairness opinion" that accompanies most M&A deals. Before embarking on a nonconforming investment strategy involving substantial capital, companies might hire an outside "technology advisory firm" consisting perhaps of scientists, patent lawyers, and semi-retired tech entrepreneurs, who would investigate the proposal, write a report and determine that it was a reasonable investment strategy in light of the current state of the technology and law involved, and one that, if successful, had potential to generate substantial value for the investor. Like fairness opinions, such letters would provide further protection to managers and board members facing an important business decision and would presumably receive

241 See Lyman Johnson, Unsettledness in Delaware Corporate Law: Business Judgment Rule, Corporate Purpose, 38 Del. J. Corp. L. 405, 411 (2013) (discussing the business judgment rule). The business judgment rule is an example of traditional corporate law that provides assurance because it is "a presumption that in making a business decision the directors of a corporation acted on an informed basis, in good faith and in the honest belief that the action taken was in the best interests of the company." Id.


substantial deference by the courts in any subsequent lawsuit challenging such investment decisions. 244

Perhaps greater than the fear of litigation, however, is a managers' or venture capitalists' fear of adverse business or personal consequences if a nonconforming investment strategy fails. 245 Failed investments lead to reputational loss, lower stock prices, difficulties raising new capital, takeover threats, and shareholder challenges of various sorts. 246 This is where the enabling features of corporate law become important, permitting companies to opt into corporate structures that insulate management from the more immediate effects of shareholder disapproval—structures like dual class stock and staggered boards. 247 As previously noted, such structures are highly controversial because they can just as easily protect managerial misconduct as managerial nonconformity. 248 Yet, in this area, there is at least some empirical work that suggests that these protective measures may be value-enhancing for at least some subset of firms in technology fields. 249 Such studies provide some support for an individualized case-by-case approach to evaluating

244 Id. at 1599-1602 (discussing how Delaware courts frequently state that fairness opinions are not necessary yet look "to these opinions as a substantive determinator that can guide them in their own fairness determinations" and remain "resolutely confident in the worth of the valuation processes underlying a fairness opinion").

245 Gregory Todd Jones, Trust, Institutionalization, & Corporate Reputations: Public Independent Fact-Finding From a Risk Management Perspective, 13 U. MIAMI BUS. L. REV. 121, 135-36 (2005) (discussing how reputation and trust are more effective than law and regulation "to constrain the way that people, and the corporations that they manage, behave").

246 ECONOMIST INTELLIGENCE UNIT, REPUTATION: RISK OF RISKS 2, 4, 7, 9 (2005) (discussing how failure or a perception of failure can lead to reputation loss resulting in a domino effect on investors and other sources of financial gain).

247 Larry Page, co-founder of Google, one of the leading technology firms to adopt a dual class structure, said, "A management team distracted by a series of short-term targets is as pointless as a dieter stepping on a scale every half hour." Larry Page & Sergey Brin, Letter from the Founders--"An Owner's Manual" for Google's Shareholders, Google Inc., Registration Statement (Form S-1) at ii (Apr. 29, 2004), archived at http://perma.cc/HZG5-CWWY. It should be noted that the limited partnership structures of venture capital firm (as well as capital lock-in features) give their general partners much of the same protections as dual class preferred. See Elizabeth S. Miller, Are There Limits on Limited Liability? Owner Liability Protection and Piercing the Veil of Texas Business Entities, 43 TEX. BUS. L. 405, 406 (2009) ("A corporation is well-recognized for its complete liability shield."); Claudia H. Allen, Bylaws Mandating Arbitration of Stockholder Disputes, 39 Del. J. Corp. L. 751, 793 (2009); Rivka Weill, Declassifying the Classified, 31 Del. J. Corp. L. 891, 896 (2006).


such measures, with a careful consideration of what, if any, presumptions should apply in any particular case.250

Dual class stock arrangements, in which management retains majority voting control while giving up substantial rights to cash flow, has often been considered the ultimate form of managerial protection from second guessing by public shareholders.251 Such arrangements are not particularly rare. In a recent study, 6% of all publicly traded U.S. companies were found to have more than one class of common stock,252 a structure said to make them "virtually immune to a hostile takeover."253 Studies of the overall effects of such dual class structures on firm value are mixed.254 While some cross sectional studies have shown diminished firm value is related to separation of voting rights from cash flow rights,255 other studies have found that announcements of dual class stock recapitalizations are associated with positive abnormal returns.256 Commentators stress the "endogenous" nature of the decision to utilize dual class shares.257 That is, management may prefer dual class shares for many different reasons, some beneficial to long-term value and some injurious to it.258 The role of dual class shares in encouraging nonconformity of investment perspectives, however, seems much clearer. Many scholars agree it provides both legal and psychological insulation from shareholder pressure.259

Indeed, it may well be that for some managers the adoption of a dual class structure is a way of announcing their nonconformity and faith in their own good judgment.260 While such beliefs in one's own genius

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250 See McKinnon, supra note 249, at 90-91. A majority of studies have found dual-class stock negatively impacting the firm, while others show positive effects. Id. The larger the difference between control and cash-flow rights, the lower the value of the firm. Id. Paul A. Gompers et al., Extreme Governance: An Analysis of Dual-Class Firms in the United States, 23 REV. FIN. STUD. 1051, 1084 (2010) (finding that "firm value is positively associated with insiders' cash-flow rights and negatively associated with insiders' voting rights, and negatively associated with the wedge between the two").
251 McKinnon, supra note 249, at 81-82.
252 Gompers et al., supra note 250, at 1052.
253 Id.
255 Gompers et al., supra note 250, at 1084.
256 Adams & Ferreira, supra note 254.
258 See McKinnon, supra note 249, at 83 (using an acquisition in a dual class firm as an example of a transaction ripe for managerial self-dealing, resulting in either potential long-term value or disaster); Jordan et al., supra note 257, at 2.
259 See e.g., Jordan et al., supra note 257, at 24.
260 See, e.g., Page & Brin, supra note 247, at i, iii.
may frequently turn out to be self-serving and exaggerated, any legal regime which seeks to promote nonconformity of investor perspectives must at least be extremely wary of "one-size-fits-all" proposals to ban all dual class structures.  

Nonconforming investors in innovation who cannot or do not want to utilize the dual class structure may seek the more limited but still substantial insulation of the staggered board. This is another institution that studies have shown, on average, does more harm than good to shareholder value. Some recent studies, however, suggest that with respect to investments in innovation, the protection against shareholder interference offered by the staggered board may have some beneficial effects. A corporate law which sought to encourage  

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263 See, e.g., Guhan Subramanian, Delaware's Choice, 39 DEL. J. CORP. L. 1, 19 & n.91 (2014); Weill, supra note 247, at 898 n.25 (citing Bebchuk & Cohen, supra note 211, at 410).

264 In December 2014, Daniel Gallagher, a sitting Commissioner of the SEC, and Professor Joseph Grundfest released a paper arguing that the Harvard Shareholder Rights Project's statements in support of various "de-staggering" proposals violated federal securities laws. Daniel M Gallagher & Joseph Grundfest, Did Harvard Violate Federal Securities Law? The Campaign Against Classified Boards of Directors 3-5 (Rock Ctr. for Corp. Governance at Stanford Univ., Working Paper No. 199, 2014), available at http://ssrn.com/abstract=2536586. Gallagher and Grundfest's main argument was that Harvard omitted any reference to a "larger body" of "far more substantial" academic research which contradicted Harvard's position. Id. at 3. This "omitted research" consisted primarily of five recent papers, some of which had not yet formally appeared in journals but all of which were available on the Internet. See Cremers et al., supra note 262; Weili Ge et al., supra note 262; William C. Johnson et al., The Bonding Hypothesis of Takeover Defenses: Evidence from IPO Firms, 117 J. FIN. ECON. 307 (2015); Seoungpil Ahn & Keshab Shrestha, The Differential Effects of Classified Boards on Firm Value, 37 J. BANKING & FIN. 3993 (2013); Augustine Duru et al., Staggered Boards, Corporate Opacity and Firm Value, 37 J. BANKING & FIN. 341 (2013). Discounting Gallagher and Grundfest's somewhat dubious claim of securities violations, their paper can be seen as an attempt to focus attention on a set of new and very interesting empirical studies. These new studies do not actually refute the Harvard cited studies, but
nonconformity in innovation investment would at least ensure that such structures were potentially available to managers and firms who could explain and defend their use of such structures based on the particular circumstances of each individual firm. Such justifications could be considered both by courts and institutional shareholders on a case-by-case basis.

The final difficulty in encouraging greater investment in innovation is the most intractable of all. It is the fact, frequently alluded to but rarely confronted directly, that expanding investment in innovation, particularly in the way Mazzucato seeks to do, is effectively asking investors to make a larger number of bad investments. Mazzucato wants firms to invest in innovation at an earlier stage in the commercialization process, before the commercial viability of the innovation can be reliably evaluated. She wants investors to accept a longer time horizon before they receive return on their investment, and she wants them to accept lower profits. It is hard to see how changes in corporate law could encourage such extraordinary changes in investor behavior. Yet the fact is that while it might seem bizarre at first to ask capitalists to reduce their profit motive, they do so all the time through various philanthropic and altruistic endeavors. There is no reason why expenditures for philanthropy cannot be considered investments of a sort, with returns that consist partially of financial returns (i.e. tax deductions) but primarily provide non-monetary benefits.

The motivations of angel investors, as described by many analysts, involve precisely such mixed profitmaking and philanthropic motives. They are "[f]amily and friends [who] have confidence in the innovator[s] rather provide more detailed and nuanced information about the use and effects of staggered boards on specific types of companies. For example, Cremers, Litov, and Sepe find that there is a "significantly stronger" positive association between the adoption of a staggered board and firm value for firms with higher R&D expenses as a fraction of their revenue, among firms with more intangible assets, among firms that are more successful in innovation (as measured by their patent citation counts) and among firms with larger size. Cremers et al., supra note 262, at 7. Data from Weili Ge, Tanlu and Zhang show that "investment in R&D decreases after the decision to destagger" in a manner "consistent with the reduced incentive horizon for directors following destaggering. Weili Ge et al., supra note 262, at 4. Duru, Wang and Zhao find an "increasingly positive association between staggered boards and firm value as opacity increases" and that relation is "partly the outcome of the increasingly positive association between staggered boards and R&D investments as opacity increases." Duru et al., supra, at 350.

265 Mazzucato, supra note 2, at 69, 186-87.
266 Id. at 186-87.
267 Id.
269 See id.
... so they invest without fully understanding the innovation's market value." Many invest for "nonfinancial as well as financial reasons, and, in fact, many angels do have personal reasons for investment." Most angels are successful ex-entrepreneurs who miss the excitement of new venture development or wish to give back to the entrepreneurial community through "for-profit philanthropy." They operate through a personal "network of trust" generally in their own geographic area. To be sure, the trend in angel investing seems to be toward greater professionalization and the formation of angel-investor groups to pool investment capital and utilize greater expertise in the selection of investments. Yet there appear to be many individuals who, like the State as Mazzucato describes it, are willing to invest in innovation for a variety of motives, of which profit maximization may not be the most important.

In addition to motive, the techniques of traditional angel investing also resemble in many ways the characteristics Mazzucato describes as belonging to State investments in innovation. Angel investors tend to be patient, with longer time horizons than those of venture capitalists. They also tend to specialize in investments of particular interest to them, defined by the particular industry or product involved, or the geographic area affected, or both. They tend to provide innovators with some level of technical support and counseling, but do not seek actual control or

270FALCON'S GYRE, supra note 171, at 3.11.
271See Ibrahim, supra note 133, at 1408.
272Id. at 1409.
274Id. at 129, 131-32.
275Similarly, consider Joan Heminway's description of the motives of crowdfunders in what she calls, "unequity," investments in companies that offer some possibility of a payment, but no control and no equity. See Joan MacLeod Heminway, How Congress Killed Investment Crowdfunding: A Tale of Political Pressure, Hasty Decisions, and Inexpert Judgments that Begs for a Happy Ending, 102 KY. L. J. 865, 878 (2013-14):

[T]he typical unequity offering is not intended to (and may not) result in pecuniary gain to the investor. Rather, the gain comes in part from financial return and in part from other return, often in the form of a tangible reward (i.e., a good or service) or altruism (e.g., for social enterprise investments or for funding the little guy with the creative idea who otherwise would not be able to execute on his idea), happiness or pride (e.g., by developing a two-way relationship with an entrepreneur—being able to say that you contributed to and received proceeds from a startup's business), or other emotional satisfaction.

276MAZZUCATO, supra note 2, at 10.
277Ibrahim, supra note 133, at 1416-18.
veto power over operations in the way many venture capitalists do.\textsuperscript{278}

And, as we have seen, like the government investors described by Mazzucato, they are at least as motivated by desire to see innovation itself and the social benefits it can bring to their community and the broader society as they are in making a profit.\textsuperscript{279} They are, in short, at least amenable to the prospect of making some number of the right kind of "bad investments."\textsuperscript{280}

To be sure, there seem to be at least two trends occurring currently in the world of angel investing. One is an increase in professionalization, with an increased use of angel groups, many of which have professional managers and seek a more rigorous and informed approach to early stage investments in innovation.\textsuperscript{281} At the same time, largely through the Internet and the institution of crowdfunding, there is also an increased interest in innovation investment by large numbers of people with a mix of profit making and alternative motives.\textsuperscript{282}

Ideally, both these trends will have a positive effect on the state of innovation investing. The professionalized, informed and sophisticated investors of the new angel groups will find ways to evaluate and profitably invest in innovations that had previously been overlooked by the more narrow investment criteria of the traditional venture capitalists. At the same time, new (and perhaps some of the old) angel type investors will be willing to expand the pool of capital available to invest in the "questionable" to "bad" investments that cannot be justified on the basis of profit alone, motivated by friendship, curiosity, and a desire to promote beneficial change.

There is one potential corporate law problem standing in the way of a large expansion in the investment capital available for such mixed motive investing: the doctrine of fiduciary duty.\textsuperscript{283} Angel investors have traditionally preferred to invest their own money, and one of the primary reasons given has been their desire to avoid the complications, obligations, and problems they would have if they assumed fiduciary

\textsuperscript{278}Andrew Wong et al., Angel Finance: The Other Venture Capital, 18 STRATEGIC CHANGE 221, 225, 227 (2009).

\textsuperscript{279}Ibrahim, supra note 133, at 1408-09, 1440.

\textsuperscript{280}See Fred Wainwright, Note on Angel Investing 11-12 (Tuck Sch. of Bus. at Dartmouth: Ctr. for Private Equity and Entrepreneurship, Case Study No. 5-0006, 2005), archived at https://perma.cc/74ZC-JGML (advising angel investors to limit their investments to less than 10% of their portfolio due to potential losses).

\textsuperscript{281}Ibrahim, supra note 133, at 1408-09, 1440.


\textsuperscript{283}See Ibrahim, supra note 133, at 1437.
duties in investing other people's money. But recent corporate law developments actually provide a very convenient answer to this problem in the form of the "public benefit corporation." The managers of such corporations are expressly authorized to "balance" the "stockholders' pecuniary interests," with two other factors: (1) "the best interests of those materially affected by the corporation's conduct," and (2) "the public benefit or public benefits identified in its certificate of incorporation." The Delaware statute provides managers with even greater protection against potential breach of fiduciary duty claims than those provided to ordinary for-profit companies under Delaware law.

Such corporations could turn out to be very useful vehicles for investors who wish to support various types of innovative enterprises under the guidance and direction of the kind of experienced entrepreneurs who make up a large portion of angel investors. Freeing them of many of the concerns that go with traditional fiduciary duties (while simultaneously committing them to a public-benefit motive) might make such entrepreneurs more willing to expand their capital pools by seeking out such investors.

III. CONCLUSION

Amid growing concerns about the slowing pace of innovation and its deleterious effects on economic growth, Professor Mazzucato's
account of the State's role in the most important innovations in recent history should cause us to think more broadly and creatively about where real innovation comes from and how it can be encouraged. Such thoughts can lead those of us who are corporate lawyers to new perspectives and revised judgments concerning critical policy questions in our own field. It might even lead to more innovation.