

# DERIVATIVES, CORPORATE HEDGING, AND SHAREHOLDER WEALTH: MODIGLIANI-MILLER FORTY YEARS LATER

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*In this article, Professor Krawiec evaluates the relationship between derivatives hedging and shareholder wealth through an analysis of both the legal and financial academic literature. She contends that legal commentators who argue that corporate derivatives use requires a broad rethinking of traditional corporate law norms are mistaken. She further contends that if adopted by future courts judging management decisions regarding corporate hedging, such arguments raise a severe danger of undermining the business judgment rule as applied to management hedging decisions. She notes that much of the legal evaluation of derivatives hedging has focused on pure financial benefit to the corporate entity, without considering the costs and benefits to shareholders. Professor Krawiec attempts to remedy that weakness by identifying the various benefits that may accrue to shareholders from firm-level risk reduction through derivatives hedging. She suggests profiles of companies most likely to generate shareholder benefits through derivatives hedging. She then analyzes the empirical evidence of actual firm hedging practices to determine whether this behavior fits the company profiles previously developed. Professor Krawiec discusses the implications of her analysis for corporate decision-making and for legal policy. She concludes that firm-level risk reduction through derivatives hedging is a business decision, often benefitting shareholders, that should be protected by the business judgment rule as is any other disinterested, well-informed, investment or operating decision made in good faith by corporate management.*

We must admit that we too were somewhat taken aback when we first saw this conclusion emerging from our analysis. . . . By 1963, however, with corporate debt ratios in the late 1950s not much

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higher than in the low tax 1920s . . . we seemed to face an unhappy dilemma: either corporate managers did not know (or perhaps care) that they were paying too much in taxes; or something major was being left out of the model. Either they were wrong or we were.

Merton H. Miller, 1988<sup>1</sup>

## I. INTRODUCTION

Corporate America considers risk management vitally important and considers derivative financial products an indispensable tool for managing many types of financial risk regularly faced by today's corporations.<sup>2</sup> This is evidenced not only by the recent astounding growth in the derivatives markets—derivative financial products constitute one of the world's fastest growing financial markets, with an outstanding notional amount that recently topped \$55.7 trillion<sup>3</sup>—but also by the explicit statements of financial executives themselves.<sup>4</sup>

Not, perhaps, since the great leverage debate launched by Modigliani and Miller in 1958 has there been such a vast divide between the views of corporate America and those of academic America.<sup>5</sup> Not content with criticizing derivatives speculation as socially undesirable,<sup>6</sup> some academics have begun to question the seemingly more benign use of derivatives as hedging devices, arguing that under the irrelevance theorem developed by Modigliani and Miller, derivatives hedging by corporations harms diversified shareholders.<sup>7</sup> To para-

1. Merton H. Miller, *The Modigliani-Miller Propositions After Thirty Years*, 2 J. ECON. PERSP. 99, 112 (1988).

2. This article assumes that the reader possesses a basic knowledge of derivatives, their risks, and their various uses. Those without such knowledge should see generally Kimberly D. Krawiec, *More Than Just "New Financial Bingo": A Risk-Based Approach to Understanding Derivatives*, 23 J. CORP. L. 1 (1997).

3. See U.S. GEN. ACCOUNTING OFFICE, FINANCIAL DERIVATIVES—ACTIONS TAKEN OR PROPOSED SINCE MAY 1994, at 3 (1996).

4. See Kenneth A. Froot et al., *Risk Management: Coordinating Corporate Investment and Financing Policies*, 48 J. FIN. 1629, 1629 (1993) (“[R]ecent surveys find that risk management is ranked by financial executives as one of their most important objectives.”); Saul Hansell, *Diving into Derivatives Not as Dangerous as It's Portrayed*, ORLANDO SENTINEL, Oct. 9, 1994, at H1 (reporting 1993 survey by *Swaps Monitor* which found that the annual reports of over two-thirds of Fortune 500 corporations reported the regular use of derivatives).

5. See Franco Modigliani & Merton H. Miller, *The Cost of Capital, Corporation Finance and the Theory of Investment*, 48 AM. ECON. REV. 261 (1958) [hereinafter Modigliani & Miller, *Cost of Capital*].

6. See *infra* note 36 (discussing the debate among academicians as to the social utility of derivatives speculation).

7. See, e.g., Henry T.C. Hu, *Hedging Expectations: "Derivative Reality" and the Law and Finance of the Corporate Objective*, 73 TEX. L. REV. 985, 1016-17 (1995), reprinted in 21 J. CORP. L. 3, 31 (1995) [hereinafter Hu, *Hedging Expectations*] (“To the extent that corporations spend money on hedges for the purpose of eliminating unsystematic risk, the corporations are devoting real resources to get rid of something that well-diversified investors have already eliminated.”); Henry T.C. Hu, *New Financial Products, the Modern Process of Financial Innovation, and the Puzzle of Shareholder Welfare*, 69 TEX. L. REV. 1273, 1306 (1991) [hereinafter Hu, *New Financial Products*] (“[T]o the extent that a corporation is spending money to purchase hedging prod-

phrase Merton Miller, either corporate managers do not know (or care) that they are engaging in behavior that detracts from shareholder wealth, or something major is missing from the academic model. In other words, either they are wrong or we are.

Corporate America can rest easier, if in fact it was ever concerned. A careful examination of the legal and financial literature reveals that firm-level derivatives hedging can provide many potential benefits to diversified shareholders. Furthermore, although many questions remain unanswered and further research is still needed, the available empirical evidence generally supports the theory that the hedging practices of most firms are consistent with a shareholder wealth maximization rationale.<sup>8</sup>

Some legal scholars, however, should reevaluate their position on derivatives hedging. This is not to imply that all legal commentators have reacted negatively to corporate derivatives hedging. On the contrary, such respected scholars as Professors Roberta Romano and Jonathan R. Macey have long emphasized the many benefits that may accrue to the corporation and its shareholders from derivatives hedging.<sup>9</sup> However, arguments by some legal scholars that the advent of derivatives as a common firm-level hedging device requires a broad rethinking of traditional corporate law norms are erroneous.

Professor Henry T.C. Hu, for example, has argued that current corporate law norms fail to provide adequate guidance to management in a world characterized by derivatives and other novel financial

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ucts for the purpose of eliminating unsystematic risk, the corporation is in fact hurting its shareholders that happen to be diversified.”); see also Lynn A. Stout, *Betting the Bank: How Derivatives Trading Under Conditions of Uncertainty Can Increase Risks and Erode Returns in Financial Markets*, 21 J. CORP. L. 53, 56 (1995) (“[P]ublicly-held corporations, banks, and investment funds that use derivatives to hedge against alpha risk may not benefit their shareholders by doing so. Indeed, to the extent that transaction costs associated with derivatives deals reduce corporate wealth, alpha risk hedging actually leaves diversified shareholders worse off.”). Other commentators have argued that corporate level risk reduction decreases value to shareholders, but do not mention derivatives hedging specifically, although presumably derivatives hedging would be included in this generalization. See, e.g., Daniel J.H. Greenwood, *Fictional Shareholders: For Whom Are Corporate Managers Trustees, Revisited*, 69 S. CAL. L. REV. 1021, 1074 (1996) (“Corporate expenditures to achieve diversification or protection from unsystematic risks at the corporate level add no value for the diversified shareholder.”); Henry T.C. Hu, *Risk, Time and Fiduciary Principles in Corporate Investment*, 38 UCLA L. REV. 277, 324 (1990) [hereinafter Hu, *Corporate Investment*] (“Unfortunately corporate diversification is not generally beneficial for well-diversified shareholders. Shareholders do not need corporations to diversify for them.”). Although most scholars questioning the value of corporate hedging to diversified shareholders note that the economic theories on which such criticism is based are subject to many assumptions and qualifications, they do not evaluate those assumptions in any detail in an attempt to determine whether corporate hedging enhances shareholder wealth.

8. See *infra* notes 239-349 (Part IV) and accompanying text (discussing the empirical evidence of firm hedging practices).

9. See, e.g., Jonathan R. Macey, *Derivative Instruments: Lessons for the Regulatory State*, 21 J. CORP. L. 69, 70-71 (1995) (noting that derivatives have many beneficial uses); Roberta Romano, *A Thumbnail Sketch of Derivative Securities and Their Regulation*, 55 MD. L. REV. 1, 5 (1996) (“Notwithstanding the spectacular losses borne by certain investors in derivatives, these instruments serve important economic functions that cannot be overemphasized.”).

innovations.<sup>10</sup> These new financial developments, he believes, require a reevaluation of important questions such as whether corporate law should mandate that corporate management act in the best interests of diversified shareholders to the possible detriment of undiversified investors; whether management should be legally required to determine the level of shareholder diversification; and whether management should be required to assess the expectations of the corporation's shareholders with respect to the firm's hedging policies and practices.<sup>11</sup> Professor Hu has further opined that the failure of corporate law to distinguish management's duty to maximize shareholder wealth from its duty to maximize corporate wealth has led to an essential dilemma in the context of corporate derivatives hedging.<sup>12</sup> If management has a fiduciary duty principally or solely to maximize shareholder wealth, then corporate hedging will often violate that duty. If, on the other hand, corporate management's fiduciary duty is owed primarily to the corporate entity, then management may have an affirmative duty to hedge firm-level risk.<sup>13</sup>

While Professor Hu's criticisms of the failure of corporate law to distinguish management's duty to maximize shareholder wealth from its duty to maximize corporate wealth are cogent and convincing, this article will demonstrate that a broad rethinking of the basic principles of corporate law as applied to corporate derivatives hedging is neither necessary nor warranted. In fact, if adopted by future courts judging management decisions regarding corporate hedging, such arguments raise a severe danger of undermining the business judgment rule as applied to management hedging decisions.<sup>14</sup> Such inroads into one of the foundations of American corporate law should be undertaken only in the face of clear and convincing evidence that specified actions are likely to hold little or no benefit for corporate shareholders or that management interests may necessarily diverge from those of shareholders in connection with such a decision.<sup>15</sup> This article demon-

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10. See Hu, *New Financial Products*, *supra* note 7, at 1277; Hu, *Hedging Expectations*, *supra* note 7, at 51.

11. See Hu, *New Financial Products*, *supra* note 7, at 1310-16 (discussing various shortcomings of current corporate law and other questions raised by new financial instruments, including derivatives); Hu, *Hedging Expectations*, *supra* note 7, at 45-51 (same).

12. See Hu, *New Financial Products*, *supra* note 7, at 1309.

13. See *id.*

14. The business judgment rule has been defined as "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. . . . Absent an abuse of discretion, that judgement will be respected by the courts." *Aronson v. Lewis*, 473 A.2d 805, 812 (Del. 1984).

15. Although the business judgment rule is one of the foundations of corporate law, it does not protect management decisionmaking under all circumstances. See *Gries Sports Enter., Inc. v. Cleveland Browns Football Co.*, 496 N.E.2d 959, 963 (Ohio 1986) ("The business judgement rule is a principle of corporate governance that has been part of the common law for at least one hundred fifty years."). For example, where management conduct holds no potential benefit for shareholders, is tainted by self-interest, or takes place in a context, such as a takeover or sale of

strates that because many potential benefits may flow to corporate shareholders due to firm-level hedging, the corporate hedging decision is a business decision just like many other decisions impacting shareholder welfare commonly made by corporate management. Accordingly, the decision of whether and how much to hedge should be protected by the business judgment rule, so long as that decision is made in good faith by fully informed and disinterested corporate managers.

Part II of this article places derivatives hedging within the context of the many other types of risk-reducing behavior available to corporations and introduces the reader to the "insurance debate" through a discussion of both legal and economic theories of the firm, including the agency problem in corporate risk reduction.<sup>16</sup> Part III discusses two distinct types of corporate risk-reducing behavior: conglomerate mergers and derivatives hedging.<sup>17</sup> The article explains that, in addition to the theories developed by Modigliani and Miller, it is primarily the empirical evidence of the wealth reduction effects associated with conglomerate mergers that has caused academicians to question the value of derivatives hedging.<sup>18</sup> The article then discusses seven frequently overlooked means by which risk-reduction at the firm level can benefit shareholders: (1) if firm-level hedging reduces systematic risk,<sup>19</sup> (2) if there are transaction costs associated with risky firms,<sup>20</sup> (3) if the firm's investment policy fluctuates with its cash flows,<sup>21</sup> (4) if agency costs can be reduced through firm-level risk reduction,<sup>22</sup> (5) if hedging is a cost-effective substitute for vertical integration as a strategy for assuring a reliable input or output source,<sup>23</sup> (6) if there are tax savings associated with reducing firm-level risk,<sup>24</sup> and (7) if the firm's shareholders are not diversified.<sup>25</sup>

Part IV argues that, given these many beneficial effects of firm-level hedging, it is possible not only to justify derivatives hedging on a shareholder wealth maximization rationale, but to establish a "firm

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the corporation, where there is a high probability that management interests may diverge from shareholder interests, management decisions are not entitled to the protection of the business judgment rule. See *Joy v. North*, 692 F.2d 880, 886 (2d Cir. 1982) ("[I]t [the business judgment rule] does not apply in cases, e.g., in which the corporate decision lacks a business purpose, is tainted by a conflict of interest, is so egregious as to amount to a no-win decision, or results from an obvious and prolonged failure to exercise oversight or supervision.") (citations omitted); *infra* notes 76-77 and accompanying text (discussing the inapplicability of the business judgment rule in self-dealing and takeover transactions).

16. See *infra* notes 31-88 (Part II) and accompanying text.

17. See *infra* notes 89-238 (Part III) and accompanying text.

18. See *infra* notes 89-102 (Part III.A) and accompanying text.

19. See *infra* notes 106-21 (Part III.B.1) and accompanying text.

20. See *infra* notes 122-77 (Part III.B.2) and accompanying text.

21. See *infra* notes 178-97 (Part III.B.3) and accompanying text.

22. See *infra* notes 198-214 (Part III.B.4) and accompanying text.

23. See *infra* notes 215-26 (Part III.B.5) and accompanying text.

24. See *infra* notes 227-33 (Part III.B.6) and accompanying text.

25. See *infra* notes 234-38 (Part III.B.7) and accompanying text.

profile" of those corporations that are likely to derive the greatest shareholder benefits from hedging.<sup>26</sup> Part IV then analyzes the available empirical evidence of actual firm hedging practices to determine whether this observed behavior generally fits the theoretical firm profile developed in the section.<sup>27</sup> Part V explains that, given the many potential shareholder benefits associated with firm-level hedging, the corporate hedging decision should be analyzed, not as a mere financing decision, but as an investment in stability.<sup>28</sup> Consequently, the decision of whether and how much to hedge should be analyzed by corporate management as it would analyze any other investment decision—through a cost-benefit analysis. This realization leads to profound implications for corporate legal policy, which are discussed in part VI.<sup>29</sup> Specifically, calls for broad reform of current corporate legal norms governing the firm hedging decision threaten to undermine the traditional business judgment rule protection of corporate risk management decisions. The decision of whether and how much the firm should hedge should be protected by the business judgment rule, just like the numerous other well-informed, disinterested operating and financing decisions made by corporate management on behalf of the shareholders on a daily basis. Part VII thus concludes that a broad rethinking of traditional corporate law norms in the derivatives hedging context is neither necessary nor desirable.<sup>30</sup>

## II. CORPORATE-LEVEL RISK REDUCTION: AN INTRODUCTION TO THE "INSURANCE" DEBATE

### A. Corporate "Insurance"

For many years, corporate managers have engaged in a wide variety of activities that reduce firm-level risk. They diversify at the corporate level through conglomerate mergers that reduce the firm's cash-flow variability; purchase insurance against property damage or liability suits; eschew risky projects in favor of more certain ones with lower expected returns; and restrict the amount of leverage in the firm's capital structure, despite the tax advantages associated with debt.<sup>31</sup> Today, thanks to modern financial innovation, they also hedge financial risks through the use of derivatives. When debating the potential benefits to shareholders from derivatives hedging, it is thus important to remember that corporate hedging is not a new and esoteric phenomenon. Financial innovation has merely provided to the corpo-

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26. See *infra* notes 239-349 (Part IV) and accompanying text.

27. See *infra* notes 239-349 (Part IV) and accompanying text.

28. See *infra* notes 350-61 (Part V) and accompanying text.

29. See *infra* notes 362-80 (Part VI) and accompanying text.

30. See *infra* note 381 (Part VII) and accompanying text.

31. See Alan C. Shapiro & Sheridan Titman, *An Integrated Approach to Corporate Risk Management*, in *REVOLUTION IN CORPORATE FINANCE* 215, 215 (Joel M. Stern & Donald H. Chew eds., 1986).

rate entity new and arguably less expensive varieties of hedging mechanisms. Much of the analysis in this article is thus not restricted to derivatives hedging, but applies equally to other forms of corporate-level risk reduction, broadly termed "insurance."

A derivative has been defined as "a bilateral contract or payment exchange agreement whose value is linked to, or derived from, an underlying asset (such as a currency, commodity or stock), reference rate (such as the Treasury Rate, the Federal Funds Rate or LIBOR) or index (such as the S&P 500)."<sup>32</sup> Derivatives end-users can be broadly divided into two types: hedgers and speculators.<sup>33</sup> Hedgers attempt to reduce risk by using a derivative contract to offset a current or anticipated cash position. Speculators, by contrast, attempt to profit from changes in the value of the derivative contract itself by increasing risk, and thus potential return.<sup>34</sup> Many of the most widely publicized derivatives losses reported to date have been suffered by speculators,<sup>35</sup> and most of the controversy surrounding derivatives use has focused on speculators, rather than hedgers.<sup>36</sup> Other derivative uses may include arbitrage, the reduction of borrowing costs, and the avoidance of various regulations.<sup>37</sup> Although these derivative uses presumably provide benefits to corporate shareholders, the focus of this article is solely on the use of derivatives as hedging vehicles.<sup>38</sup>

Until recently, very few commentators had questioned the supposed benefits of derivatives hedging.<sup>39</sup> The traditional approach has

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32. See Krawiec, *supra* note 2, at 6.

33. In reality, it is often difficult to separate a hedge transaction from a speculative one. See Krawiec, *supra* note 2, at 16 & n.67; Hu, *Hedging Expectations*, *supra* note 7, at 12 n.39.

34. See Krawiec, *supra* note 2, at 15.

35. See Romano, *supra* note 9, at 5.

36. Although many lay observers and some academicians have criticized derivatives speculation as socially undesirable, others have noted the market liquidity benefits provided by speculators. Compare Stout, *supra* note 7, at 57-59 (arguing that while hedging and arbitrage generally leave the average hedger or arbitrageur better off and, absent significant costs to third parties, can contribute to net social welfare, derivatives speculation decreases social wealth), with Romano, *supra* note 9, at 5 ("[B]ecause the demand of business hedgers is rarely met by hedgers on the other side of the market, speculators play an essential role in derivatives markets."), and Krawiec, *supra* note 2, at 15 & n.65 (noting the market liquidity benefits provided by speculators).

37. See Krawiec, *supra* note 2, at 14-16 & n.63; Stout, *supra* note 7, at 57.

38. It should be noted, however, that the public costs and benefits of the use of derivatives to avoid taxes and other regulations is a subject of much scholarly debate. Compare, e.g., Stout, *supra* note 7, at 57 ("While conservative commentators may believe that such opportunities to do an end run around regulators are cause for celebration, observers willing to assume that existing banking, securities, and tax laws serve a public function should find the notion of 'regulatory arbitrage' far more troubling."), with Macey, *supra* note 9, at 76-78 (arguing that the use of derivatives to alter regulatory consequences can benefit borrowers and other corporate claimants that "are economically and politically weak relative to equity claimants, and where the legal system does not adequately protect the contractual rights of fixed claimants"). For more information on the various end-users of derivatives, see Krawiec, *supra* note 2, at 14-16.

39. But see *supra* note 7 (citing to legal commentators criticizing derivatives hedging by public corporations). See also Romano, *supra* note 9, at 35-40 (illustrating the irrelevance theorem as applied to derivatives hedging, but discussing several reasons why the irrelevance theorem may be inapplicable in the derivatives hedging context); Corinne M. Bronfman & Michael

been to note the many benefits that derivatives hedging provides to the "corporation," with little or no separate inquiry into whether these benefits also accrue to the corporation's shareholders.<sup>40</sup> This is consistent with the traditional approach to corporate insurance generally which assumes that firms, like their individual owners, are risk averse and, like individuals, would rationally pay a premium to reduce risk.<sup>41</sup> However, while risk aversion may be a useful assumption when analyzing individual investment activity, the risk aversion of corporate investors does not provide a workable rationale for the risk management behavior of publicly traded firms, for reasons that are discussed below.<sup>42</sup>

### B. *The Theory of the Firm*

By allowing firms to diversify and hedge against unwanted risk, derivatives enable risk-averse end-users to reduce both total risk and the possibility of financial crisis.<sup>43</sup> This benefits the firm's management, employees, suppliers, creditors, and other stakeholders with an interest in the stability and continued existence of the firm. In the absence of a constituency statute,<sup>44</sup> however, the law directs corporate

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F. Ferguson, *Don't Ask, Don't Tell and Other Contracting Considerations*, 21 J. CORP. L. 155, 170 (1995) (acknowledging the Modigliani-Miller irrelevance theory, but arguing that "[d]erivatives are valuable to a firm's shareholders because managing risk reduces contracting costs").

40. See GROUP OF THIRTY, *DERIVATIVES: PRACTICES AND PRINCIPLES* 34-41 (1993) (noting the benefits that derivatives hedging may provide to the corporate entity); U.S. GEN. ACCOUNTING OFFICE, *supra* note 3 (same); Brandon Becker & Francois-Ihor Mazur, *Risk Management of Financial Derivative Products: Who's Responsible for What?*, 21 J. CORP. L. 177, 178-79 (1995) (same).

41. See NEIL A. DOHERTY, *CORPORATE RISK MANAGEMENT* 272 (1985) ("In most insurance or risk management texts, the reason given for corporate demand for insurance is that the 'firm' is risk-averse."); DARRELL DUFFIE, *FUTURES MARKETS* 228 (1989) (describing investors' risk aversion as the usual justification for corporate hedging). A standard assumption of modern financial theory is that investors are rationally risk averse. That is, given a choice between two investments with the same expected return but different levels of risk, a rational investor will choose the less risky investment. The corollary to this assumption is that to be induced to accept a risky project over a more certain one, the investor must be offered a "risk premium." See WILBUR G. LEWELLEN, *THE COST OF CAPITAL* 8-18 (1969).

42. See *infra* notes 64-73 and accompanying text (explaining that, according to much traditional financial theory, risk reduction at the firm level reduces shareholder wealth because diversified shareholders have already eliminated unsystematic risk from their portfolios).

43. "Total risk" refers to the total amount of variability in the firm's cash flows. As discussed below, this total risk is a combination of both "unsystematic," or diversifiable, risk and "systematic," or undiversifiable, risk. See JAMES C. VAN HORNE, *FINANCIAL MANAGEMENT AND POLICY* 66 (11th ed. 1998); *infra* notes 64-66 and accompanying text (discussing systematic and unsystematic risk).

44. Constituency statutes permit (or even require) the board of directors to consider the impact of corporate action on nonshareholder constituents of the corporation, such as creditors, employees, suppliers, and the surrounding community. See, e.g., PA. STAT. ANN. tit. 15 § 1715(b) (West 1995) ("[D]irectors . . . shall not be required, in considering the best interests of the corporation or the effects of any action, to regard any corporate interest or the interests of any group affected by such action as a dominant or controlling interest or factor."); OHIO REV. CODE ANN. § 1701.59(E) (Anderson 1997) (permitting directors to consider the interests of the corporation's employees, creditors, customers, suppliers, the state and national economies, and community and social considerations when determining the best interests of the corporation); CONN. GEN.



management to operate the firm for the benefit of the shareholders, not for the benefit of other corporate stakeholders.<sup>45</sup> The relevant question, therefore, is: does corporate-level derivatives hedging hold potential benefits for the corporation's shareholders?

### 1. *The Legal Theory*

Both in law and in financial theory, the corporation is generally presumed to be a profit-seeking entity owned by and run for the benefit of the shareholders.<sup>46</sup> Unfortunately, neither courts nor legislatures have clearly defined what it means to run a corporation "for the benefit of the shareholders." Part of this imprecision may arise from the traditional "reification" of the corporation. In other words, a corporation is traditionally viewed by the law as a fictitious legal entity, separate from its owner-shareholders.<sup>47</sup> While such an approach may provide a means of conceptually simplifying a complex set of relationships, it can also encourage a focus on "corporate welfare" without an analysis of the effects of corporate conduct on the stakeholders in the venture—the employees, creditors, customers, suppliers, and, in particular, the shareholders.<sup>48</sup> Legal scholars, noting the potential dangers of the "reification illusion" in general and of a focus on corporate, as opposed to shareholder, welfare in particular, have argued against such an entity-oriented approach,<sup>49</sup> and legal academic

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STAT. § 33-756(d) (1997) (requiring directors to consider other corporate constituencies in determining whether to sell all or substantially all of the corporation's assets).

45. Although there is much debate as to whether or not corporate law *should* place the interests of nonshareholder corporate claimants on a level of importance with those of shareholders (often referred to as "communitarianism"), it is generally accepted that, in the absence of a constituency statute, corporate law does not presently do so. See, e.g., Stephen M. Bainbridge, *In Defense of the Shareholder Wealth Maximization Norm: A Reply to Professor Green*, 50 WASH. & LEE L. REV. 1423, 1445 & n.83 (1993) (recognizing and defending the legal mandate of shareholder wealth maximization); Greenwood, *supra* note 7, at 1025 n.6 ("The 'communitarian' vision, however, appears to be normative and aspirational; even these theorists seem not to challenge the empirical assertion that as currently structured, the modern corporation is (largely) shareholder-centered."); David Millon, *Communitarians, Contractarians, and the Crisis in Corporate Law*, 50 WASH. & LEE L. REV. 1373, 1383-86 (1993) (recognizing and criticizing the legal mandate of shareholder wealth maximization). For more on the communitarianism debate and the social responsibility of corporations, see ROBERT C. CLARK, *CORPORATE LAW* 688-94 (1986).

46. See *Dodge v. Ford Motor Co.*, 170 N.W. 668, 684 (Mich. 1919) ("A business corporation is organized and carried on primarily for the profit of the stockholders."); see also *infra* notes 55-56 (showing that the law presumes the corporation to be run for the benefit of shareholders); *infra* notes 59-61 (showing that financial theory presumes that the corporation is run for the purpose of maximizing shareholder value).

47. See WILLIAM A. KLEIN & JOHN C. COFFEE, JR., *BUSINESS ORGANIZATION AND FINANCE* 108 (6th ed. 1996); Michael C. Jensen & William H. Meckling, *Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure*, 3 J. FIN. ECON. 305, 310-11 (1976).

48. See KLEIN & COFFEE, *supra* note 47, at 108-09; Jensen & Meckling, *supra* note 47, at 310-11.

49. See, e.g., KLEIN & COFFEE, *supra* note 47, at 108-09 (noting the dangers of corporate reification and urging the "decomposition" of the corporation into the participants in the venture); Hu, *Hedging Expectations*, *supra* note 7, at 30-31 (urging a shareholder-oriented, as opposed to an entity-oriented, approach); Hu, *Corporate Investment*, *supra* note 7, at 355 (promoting a shareholder wealth maximization, as opposed to a corporate wealth maximization,

literature has for some time assumed a management duty to maximize *shareholder value*.<sup>50</sup>

Corporate law, however, has generally not followed suit, stubbornly exhorting management to fulfill its fiduciary duties to the "corporation" or to the "corporation and its shareholders," seemingly oblivious to the notion that such duties may diverge in the daily management of the corporation.<sup>51</sup> Outside of the takeover context, where potential conflicts are more obvious,<sup>52</sup> courts have often equated entity welfare with shareholder welfare, implicitly assuming that any action that benefits the corporation must, by definition, benefit the shareholders.<sup>53</sup>

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standard); Jensen & Meckling, *supra* note 47, at 311 ("Viewing the firm as the nexus of a set of contracting relationships among individuals also serves to make it clear that the personalization of the firm implied by asking questions such as 'what should be the objective of the firm', or 'does the firm have a social responsibility' is seriously misleading.").

50. See MICHAEL P. DOOLEY, *FUNDAMENTALS OF CORPORATION LAW* 97 (1995) ("[I]t is generally agreed that management's principal fiduciary duty is to maximize the return to the common shareholders."); KLEIN & COFFEE, *supra* note 47, at 126 (arguing that "directors have great discretion over how to maximize return to shareholders, but not whether to"); Stephen M. Bainbridge, *Participatory Management Within a Theory of the Firm*, 21 J. CORP. L. 657, 717 (1996) ("[T]he dominant American view remains a requirement that directors maximize shareholder wealth, even if doing so comes at the expense of other corporate constituencies."); Thomas Lee Hazen, *The Corporate Persona, Contract (and Market) Failure, and Moral Values*, 69 N.C. L. REV. 273, 286 (1991) (arguing that shareholder wealth maximization is "a goal generally recognized as paramount in corporate existence").

51. See, e.g., REVISED MODEL BUS. CORP. ACT, § 8.30(a) (1984) (stating that a director shall discharge his duties "in a manner he reasonably believes to be in the best interests of the corporation"); *id.* § 8.42(a) (setting forth the same standard for officers); ALI, *PRINCIPLES OF CORPORATE GOVERNANCE* § 4.01(a) (1994) ("A director or officer has a duty to the corporation to perform the director's or officer's functions in good faith, in a manner he or she reasonably believes to be in the best interests of the corporation . . ."); *Paramount Communications, Inc. v. QVC Network Inc.*, 637 A.2d 34, 43 (Del. 1994) ("[D]irectors owe fiduciary duties of care and loyalty to the corporation and its shareholders." (quoting *Mills Acquisition Co. v. Macmillan, Inc.*, 559 A.2d 1261, 1280 (Del. 1989))); *Smith v. Van Gorkom*, 488 A.2d 858, 872 (Del. 1985) ("[D]irectors are charged with an unyielding fiduciary duty to the corporation and its shareholders."); *Francis v. United Jersey Bank*, 432 A.2d 814, 824 (N.J. 1981) ("[T]he relationship of a corporate director to the corporation and its stockholders is that of a fiduciary.") (all emphasis added).

52. Perhaps the most obvious example of the potential divergence in shareholder and entity welfare occurs when the corporation is in "Revlon mode," that is, when corporate management is faced with a choice of selling the corporation in a "bust-up" takeover and cashing out the shareholders at a premium, or preserving the corporate entity as a going concern. Clearly the corporation's welfare is enhanced through survival rather than extinction. Shareholder welfare, by contrast, may very well be served by the "bust-up." See, e.g., *Revlon, Inc. v. MacAndrews & Forbes Holdings Inc.*, 506 A.2d 173, 184 (Del. 1986).

Delaware courts have recognized and responded to the potential conflict between the corporate entity and its owners inherent in a Revlon-type situation by directing management to maximize *shareholder value* and imposing a higher standard of judicial review on management actions. See, e.g., *Revlon*, 506 A.2d at 182 ("The directors' role changed from defenders of the corporate bastion to auctioneers charged with getting the best price for the stockholders at a sale of the company."). This heightened scrutiny applies to judicial review of board decisions whenever a "sale of control" takes place, regardless of whether or not the target corporation will be liquidated and sold. See *Paramount*, 637 A.2d at 42-43.

53. See David Millon, *Redefining Corporate Law*, 24 IND. L. REV. 223, 228 (1991) ("Delaware jurisprudence makes this identity [of corporate and shareholder] interests explicit by describing management's duty as a duty owed simultaneously 'to the corporation and its share-

This does not mean that courts have openly favored entity welfare at the expense of shareholders. Rather, it seems likely that the traditional reference to the interests of the "corporation" originated prior to the teachings of modern financial theory, not out of a desire to benefit the corporate entity itself, but because the corporate entity was viewed as a vehicle through which to benefit the shareholders.<sup>54</sup> In those situations where the potential conflict is obvious, courts have, in fact, explicitly directed management to maximize shareholder welfare<sup>55</sup> and, absent a legislative mandate to the contrary, have not allowed management to favor other corporate constituencies over shareholders.<sup>56</sup> Nonetheless, the entity approach is problematic in its failure to recognize that, even in the day-to-day operation of the company when management is not faced with an obvious potential conflict, some actions may favor corporate welfare while simultaneously detracting from shareholder wealth.<sup>57</sup> This entity focus has been particularly evident in the derivatives context, with many scholars, practitioners, and judges extolling the virtues of derivatives hedging as a cash-flow variance reduction vehicle, with little or no corresponding inquiry into the costs and benefits such measures may hold for shareholders.<sup>58</sup> This article attempts to remedy that weakness by demonstrating that corporate-level hedging of financial risk through derivatives can enhance not only corporate welfare, but shareholder welfare as well.

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holders."); Lawrence E. Mitchell, *A Theoretical and Practical Framework for Enforcing Corporate Constituency Statutes*, 70 TEX. L. REV. 579, 586-87 (1992) (reasoning that despite recent reevaluations of traditional corporate law principles, the "equation of corporation and stockholder interests has remained largely intact.").

54. At least one commentator has argued that the entity approach is motivated more by historical reasons than by an actual concern for the welfare of the corporate entity. See Hu, *Hedging Expectations*, *supra* note 7, at 19-20. Another has argued that, despite frequent judicial allusions to fiduciary duties owed to the corporate entity, shareholder primacy has been a feature of American corporate law from the date corporations were first chartered in the United States. See D. Gordon Smith, *The Shareholder Primacy Norm*, 23 J. CORP. L. 277 (1998).

55. See, e.g., *Revlon*, 506 A.2d at 182 ("The duty of the board had thus changed from the preservation of Revlon as a corporate entity to the maximization of the company's value at a sale for the stockholders' benefit.").

56. See *id.* ("A board may have regard for various constituencies in discharging its responsibilities, provided there are rationally related benefits accruing to the stockholders."); *Dodge v. Ford Motor Co.*, 170 N.W. 668, 684 (Mich. 1919) ("[I]t is not within the lawful powers of a board of directors to shape and conduct the affairs of a corporation for the merely incidental benefit of shareholders and for the primary purpose of benefitting others.").

57. Even a clear legal mandate to maximize *shareholder* welfare presents potential problems. See, e.g., Hu, *Hedging Expectations*, *supra* note 7, at 18-25 (discussing "traditional," "pure," and "blissful" shareholder wealth maximization conceptions).

58. See *supra* note 40 and accompanying text (discussing the entity focus by scholars and surveyors in the derivatives context); Hu, *Hedging Expectations*, *supra* note 7, at 30 (citing examples of the entity focus in the derivatives area by practitioners and the judiciary).

## 2. *The Economic Theory*

In contrast to the entity approach that has often dominated legal discussion of the theory of the firm, financial theory assumes that the appropriate objective for corporate management is to maximize shareholder wealth;<sup>59</sup> that is, to maximize the present value of the shareholders' future earnings stream.<sup>60</sup> This value is typically assumed to be represented by the firm's share price.<sup>61</sup> According to the efficient capital markets hypothesis, the firm's share price represents the capital market's assessment of the expected future earnings of the firm given all available information, discounted to present value by a

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59. See DOHERTY, *supra* note 41, at 16 ("Thus the objective for financial management is to promote the economic welfare of the firm's shareholders by maximizing the value of their shares."); VAN HORNE, *supra* note 43, at 3 ("The objective of a company must be to create value for its shareholders.")

60. See, e.g., Shapiro & Titman, *supra* note 31, at 216 ("Modern finance theory holds that the value of a firm is equal to its expected future cash flows discounted at the appropriate discount rate.")

61. See VAN HORNE, *supra* note 43, at 3 ("Value is represented by the market price of the company's common stock."). There is, of course, significant scholarly debate as to the extent of stock market efficiency. For arguments and evidence in favor of and against the efficient capital markets hypothesis, see generally Lawrence A. Cunningham, *From Random Walks to Chaotic Crashes: The Linear Genealogy of the Efficient Capital Market Hypothesis*, 62 GEO. WASH. L. REV. 546, 551 (1994) (arguing that the efficient capital markets hypothesis (ECMH) is false, and that chaos theory is superior to both ECMH and noise theory in explaining stock market crashes and offering policy justifications for many corporate and securities law doctrines); Eugene F. Fama, *Efficient Capital Markets: II*, 46 J. FIN. 1575 (1991) (summarizing 20 years of efficient capital markets research and concluding that, while the joint-hypothesis problem makes empirical testing of ECMH problematic, the market efficiency literature "has improved our understanding of the behavior of security returns"); Eugene F. Fama, *Efficient Capital Markets: A Review of Theory and Empirical Work*, 24 J. FIN. 383 (1970) (concluding that "with but a few exceptions, the efficient markets model stands up well"); Michael C. Jensen, *Some Anomalous Evidence Regarding Market Efficiency*, 6 J. FIN. ECON. 95 (1978) (stating that "I believe there is no other proposition in economics which has more solid empirical evidence supporting it than the Efficient Market Hypothesis"); Andrei Scheifer & Lawrence H. Summers, *The Noise Trader Approach to Finance*, 4 J. ECON. PERSP. 19 (1990) (arguing that many of the assumptions on which ECMH is based are unrealistic and pursuing noise trading theory as an alternative to the efficient markets approach).

This article will show that derivatives hedging can maximize the corporation's "value" to the shareholders and then assumes that this value is efficiently reflected in the firm's per share trading price. The implications of the failure of this assumption have been discussed at length by others. See, e.g., Hu, *Hedging Expectations*, *supra* note 7, at 21-22 (discussing the distinction between "actual" shareholder wealth, as measured by the firm's actual per share trading price, and "blissful" shareholder wealth, as measured by what the firm's per share trading price would be in a perfectly informed, rational stock market); Cunningham, *supra*, at 604-05 (discussing the implications for management fiduciary duties under both noise trading and efficient views of stock market prices); Marcel Kahan, *Securities Laws and the Social Costs of "Inaccurate" Stock Prices*, 41 DUKE L.J. 977, 1028-30 (1992) (discussing the difference between fundamental and actual share value and the existence of inaccuracies that may encourage management to increase actual value without increasing fundamental value).

discount rate that reflects the riskiness of that income stream.<sup>62</sup> Therefore, to maximize share value, management must either maximize the firm's future earnings stream (the numerator in the net present value equation) or minimize the risk reflected in the discount rate (the denominator in the net present value equation).<sup>63</sup>

Modern financial theory, through both the capital asset pricing model (CAPM) and the more recently developed arbitrage pricing theory (APT), indicates that only "systematic" risks determine the appropriate discount rate.<sup>64</sup> According to both theories, investors, being rationally risk averse, demand a risk premium to compensate them for bearing higher risk. Because sophisticated investors hold a diversified investment portfolio, however, they require risk premiums only for the undiversifiable, or systematic, risk that remains in the portfolio after full diversification.<sup>65</sup> Management decisions that alter the firm-level amount of diversifiable, "unsystematic" risk will thus have no effect on the discount rate in the denominator of the net present value equation. Investors receive no premium for bearing such risks because they can be easily diversified away.<sup>66</sup>

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62. See VAN HORNE, *supra* note 43, at 49. The net present value formula is typically represented as:

$$NPV = \sum_{t=0}^n A_t/(1+k)^t$$

where NPV = Net Present Value

$A_t$  = the cash flow for period  $t$

$k$  = the required rate or return

$n$  = the last period in which a cash flow is expected

*Id.* at 141; see also RICHARD A. BREALEY & STEWART C. MYERS, *PRINCIPLES OF CORPORATE FINANCE* 13 (5th ed. 1996).

63. See DOHERTY, *supra* note 41, at 16; CHARLES W. SMITHSON ET AL., *MANAGING FINANCIAL RISK: A GUIDE TO DERIVATIVE PRODUCTS, FINANCIAL ENGINEERING, AND VALUE MAXIMIZATION* 102 (1995); Shapiro & Titman, *supra* note 31, at 216.

64. Under CAPM, this systematic risk is measured by beta—the sensitivity of a particular firm's stock price relative to the market as a whole. See VAN HORNE, *supra* note 43, at 64. Under APT, it is measured by the sensitivity of a firm's stock price relative to a number of different risk factors. See *id.* at 94. Richard Roll and Stephen A. Ross have identified five such factors: changes in expected inflation, unanticipated changes in actual inflation, unanticipated changes in industrial production, unanticipated changes in the yield differential between low- and high-grade bonds (the default risk premium), and unanticipated changes in the yield differential between long- and short-term bonds (the term structure of interest rates). See Richard Roll & Stephen A. Ross, *An Empirical Investigation of the Arbitrage Pricing Theory*, 35 J. FIN. 1073, 1073 (1980) (concluding that three, and possibly four, systematic risk factors affect security returns); Richard Roll & Stephen A. Ross, *The Arbitrage Pricing Theory Approach to Strategic Portfolio Management*, FIN. ANALYSTS J., May-June 1984, at 14, 19 (arguing that empirical research supports the theory that four systematic risk factors affect security prices); Nai-Fu Chen et al., *Economic Forces and the Stock Market*, 59 J. BUS. 383, 402 (1986) (increasing to five the number of systematic risk factors supported by the empirical evidence as affecting security returns).

65. See VAN HORNE, *supra* note 43, at 68. This proposition has come to be known as "portfolio theory" and was first introduced by Harry M. Markowitz in 1952. See BREALEY & MYERS, *supra* note 62, at 155; see also Harry M. Markowitz, *Portfolio Selection*, 7 J. FIN. 77, 77-91 (Mar. 1952).

66. See VAN HORNE, *supra* note 43, at 68.

A related financial theory is the "irrelevance theorem," first developed by Franco Modigliani and Merton Miller in connection with the effect of leverage on the firm's cost of capital.<sup>67</sup> According to the irrelevance theorem, a firm's financial policies, such as the amount of leverage in its capital structure and the decision whether or not to pay a dividend, are irrelevant to firm value, given certain assumptions such as no taxes and no transaction costs.<sup>68</sup> This is because management, by leveraging at the firm level or paying a dividend, is not providing anything of value to shareholders that they cannot accomplish on their own through direct personal borrowing or selling their shares, respectively.<sup>69</sup> Applying the irrelevance theorem to risk management, some academicians have argued that corporations that hedge unsystematic financial risk at the entity level do not add to firm value because they do not provide investors with anything that they cannot do directly themselves through holding a diversified investment portfolio.<sup>70</sup>

Modern financial theory thus holds that a wide range of actions that reduce unsystematic risk are, at best, irrelevant to firm value. At worst, to the extent that there are positive transaction costs associated with firm-level hedging, such maneuvers are actually wasteful from a shareholder's perspective.<sup>71</sup> Why then do corporations engage in conglomerate mergers, purchase insurance, pursue "prudent" debt levels, forgo risky projects, and hedge financial risk through derivatives, de-

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67. See generally Modigliani & Miller, *Cost of Capital*, *supra* note 5.

68. See *id.* at 268 (demonstrating that "the market value of any firm is independent of its capital structure"); see also Merton H. Miller & Franco Modigliani, *Dividend Policy, Growth, and the Valuation of Shares*, 34 J. BUS. 411, 414 (1961) [hereinafter Miller & Modigliani, *Dividend Policy*] ("[G]iven a firm's investment policy, the dividend payout policy it chooses to follow will affect neither the current price of its shares nor the total return to its shareholders."). Modigliani and Miller later relaxed the assumption of no taxes. See Franco Modigliani & Merton H. Miller, *Corporate Income Taxes and the Cost of Capital: A Correction*, 63 AM. ECON. REV. 433, 434 (June 1963) [hereinafter Modigliani & Miller, *Corporate Income Taxes*]; Merton H. Miller, *Debt and Taxes*, 32 J. FIN. 261, 262 (1977).

69. See Modigliani & Miller, *Cost of Capital*, *supra* note 5, at 269 (discussing the effect of leverage on firm value); Miller & Modigliani, *Dividend Policy*, *supra* note 68, at 413 (discussing the effect of dividend policy on firm value).

70. See *supra* note 7 (citing to academicians who argue that corporations that hedge unsystematic risk at the entity level detract from firm value). A variation on this theme is that the corporation, through derivatives hedging, does not add value to the shareholders because it does not provide them with anything that they could not provide for themselves through purchasing futures and options for their own accounts. See DUFFIE, *supra* note 41, at 228; FROOT et al., *supra* note 4, at 1630; Romano, *supra* note 9, at 36. This argument, however, is not as persuasive as the argument that firm-level hedging adds no value to shareholders because they are already diversified, because there are several reasons to believe that the corporation can hedge with derivatives more cheaply and efficiently than can individuals. See *infra* notes 117-20 and accompanying text (discussing the advantages the firm has over the individual investor in hedging risk through derivatives).

71. Shapiro & Titman, *supra* note 31, at 215-16 ("[T]he theory of risk in modern finance . . . seems to regard as irrelevant, if not actually wasteful, a range of corporate hedging activities designed to reduce the total risk, or variability, of the firm's cash flows."); VAN HORNE, *supra* note 43, at 563 ("With no imperfections, it would be a matter of indifference to investors whether or not the firm hedged.").

spite the fact that these actions, at least theoretically, harm shareholders? One possibility is simple ignorance. Corporate management may not realize that these actions appearing to benefit the firm may nonetheless produce no benefit for the shareholders.<sup>72</sup> A more popular explanation is that this divergence of corporate and shareholder interests results primarily from the separation of ownership from control in the publicly held corporation.<sup>73</sup>

### 3. *The Agency Problem in Corporate Risk Reduction*

Except in closely held, owner-managed corporations, corporate decisions typically are not made by the owner-shareholders of the corporation. Rather, most corporate decisions are made by management—that is, by paid employees hired by the owner-shareholders to make operating decisions (including investment decisions) for them and in their best interests. According to traditional financial theory, numerous potential problems arise from the fact that it is employee-managers, rather than the owner-shareholders themselves, who make most corporate decisions.<sup>74</sup> Obviously, management objectives do not always coincide with shareholder objectives.<sup>75</sup> Management may cause the corporation to transact with them on terms that are unfair to the shareholders, reject merger proposals that promise greater shareholder wealth but carry the threat of incumbent management unemployment, and accept or initiate proposals, such as a management-led leveraged buyout, that entail substantial monetary or employment

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72. See Hu, *Hedging Expectations*, *supra* note 7, at 38; RONALD J. GILSON & BERNARD S. BLACK, *THE LAW AND FINANCE OF CORPORATE ACQUISITIONS* 347 (2d ed. 1995) (“Sometimes this may be intentional, but we suspect that it more often results from the remarkable ability of the human animal to convince oneself that what is in one’s self-interest is good for others as well, in situations where the latter proposition is dubious.”).

73. See, e.g., KLEIN & COFFEE, *supra* note 47, at 266; Yakov Amihud & Baruch Lev, *Risk Reduction as a Managerial Motive for Conglomerate Mergers*, 12 *BELL J. ECON.* 605, 609-10 (1981); Hu, *Hedging Expectations*, *supra* note 7, at 38.

74. The extent of the divergence of shareholder and management interests has been hotly debated for 65 years. Compare ADOLF A. BERLE, JR. & GARDINER C. MEANS, *THE MODERN CORPORATION AND PRIVATE PROPERTY* 69-118 (1932) (arguing that the separation of ownership from control encourages management to act in ways that do not maximize shareholder wealth), with Jensen & Meckling, *supra* note 47, at 327-28 (arguing that market forces provide strong incentives for management to contract with shareholders to reduce management misbehavior). For more recent material addressing the potential for management-shareholder conflicts in the publicly held corporation, see generally Robert C. Clark, *Agency Costs v. Fiduciary Duties*, in *PRINCIPLES AND AGENTS: THE STRUCTURE OF BUSINESS* 55, 56-59 (John W. Pratt & Richard J. Zeckhauser eds., 1985); William W. Bratton, Jr., *The “Nexus of Contracts” Corporation: A Critical Appraisal*, 74 *CORNELL L. REV.* 407 (1989); Victor Brudney, *Corporate Governance, Agency Costs and the Rhetoric of Contract*, 85 *COLUM. L. REV.* 1403 (1985); Millon, *supra* note 43.

75. It is generally agreed that the interests of management and shareholders in the publicly held corporation will often diverge. The debate, discussed *supra* note 74, primarily concerns the extent to which market and contractual forces constrain management misbehavior and act to align the interests of managers and shareholders. Compare BERLE & MEANS, *supra* note 74, at 119-25 (arguing that neither market nor legal forces adequately constrain management misbehavior), with Jensen & Meckling, *supra* note 47 at 327-28 (arguing that market forces adequately constrain management misbehavior).

benefits for management but cash out shareholders at less than fair value. To some extent, corporate law has recognized the possibility of potential conflict in these situations by exercising greater judicial oversight of these types of management decisions. For example, when reviewing allegations of management self-dealing or other breaches of the duty of loyalty, courts will carefully review the inherent fairness of the transaction to the corporation.<sup>76</sup> Recognizing the temptation for managerialist behavior in the takeover context, courts also subject many actions of directors in connection with takeover activity to heightened scrutiny.<sup>77</sup>

A less obvious area of potential management-shareholder conflict is risk management. As previously discussed, traditional corporate finance theory holds that shareholders demand a risk premium only for bearing the systematic risk associated with a firm's stock because they have already eliminated unsystematic risk by holding a diversified investment portfolio. Risk-reducing measures that affect the corporation's total risk profile thus, at best, have no impact on shareholder wealth and, at worst, reduce shareholder wealth to the extent of any transaction costs associated with such risk-reduction measures.

Management, in contrast, is generally not well-diversified. Although shareholders can own stock in numerous corporations, management is generally employed by only one firm. Furthermore, the employment compensation of most managers constitutes a significant portion of total income.<sup>78</sup> Often that income is linked to the economic performance of the firm (through profit sharing, stock options, or similar incentive compensation devices), further tying management's personal wealth to the financial well-being of the firm.<sup>79</sup> Management is therefore extremely concerned with the firm's total risk. For management, firm failure may mean job loss, financial ruin, and, because firm failure is normally attributed to management incompetence rather than to a rational decision to maximize shareholder value through riskier projects that promise a greater expected return, a severely tarnished reputation that may preclude future employment (at least on terms as favorable as those which management has come to enjoy).<sup>80</sup> Consequently, according to traditional finance theory, management is

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76. See *Bayer v. Beran*, 49 N.Y.S.2d 2, 6-7 (Sup. Ct. 1944) ("Such personal transactions of directors with their corporations . . . are, when challenged, examined with the most scrupulous care, and if there is any evidence of improvidence or oppression, any indication of unfairness or undue advantage, the transactions will be voided.").

77. See, e.g., *Reylon, Inc. v. MacAndrews & Forbes Holdings, Inc.*, 506 A.2d 173, 180 (Del. 1986); *Unocal Corp. v. Mesa Petroleum Co.*, 493 A.2d 946, 954-55 (Del. 1985).

78. See *Amihud & Lev*, *supra* note 73, at 606.

79. See *id.*

80. See *id.*



likely to be more risk averse than what is optimal for the shareholders.<sup>81</sup>

In contrast to the more familiar areas of manager-shareholder conflict, however, corporate law does not recognize the potential for managerialist behavior in the context of corporate-level risk-reduction decisions.<sup>82</sup> In fact, the business judgment rule dictates that issues of risk management, like most investment decisions, are solely within the discretion of management.<sup>83</sup> It is often argued that, as a result, managers unconstrained by either legal or market forces cause the firm to accept less risk than is optimal for the shareholders.

This has led some legal commentators to argue that management's self-serving risk reduction behavior, combined with the growing prevalence of derivatives and other new financial innovations, requires a broad rethinking of current corporate law principles.<sup>84</sup> Professor Henry T.C. Hu, for example, has argued that current corporate legal norms fail to provide adequate guidance to management in a world characterized by derivatives and other novel financial innovations.<sup>85</sup> These new financial developments, he believes, require a re-evaluation of such important questions as whether corporate law should mandate that corporate management act in the best interests of diversified shareholders to the possible detriment of undiversified investors; whether management should be legally required to determine the level of shareholder diversification; and whether management should be required to determine the expectations of the

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81. See *id.*; John C. Coffee, Jr., *Shareholders v. Managers: The Strain in the Corporate Web*, 85 MICH. L. REV. 1, 19 (1986) ("[M]anagers will be more risk averse than their shareholders."); Alan J. Marcus, *Risk Sharing and the Theory of the Firm*, 13 BELL J. ECON. 369, 373-74 (1982). But see Hu, *Corporate Investment*, *supra* note 7, at 325-26 (arguing that when it is difficult for the market to price the true risk levels of a firm's investment policies, such as when the firm is using derivatives or other novel and sophisticated financial instruments, moral hazard may lead corporate management to take on too much risk); *infra* notes 333-34 and accompanying text (explaining that managers compensated with stock options may cause the firm to pursue more risky behavior).

82. See *supra* notes 76-77 and accompanying text (discussing several situations that courts recognize as posing potential management-shareholder conflicts, leading them to exercise greater judicial oversight).

83. See *Joy v. North*, 692 F.2d 880, 885-86 (2d Cir. 1982) (holding that management determinations as to the appropriate riskiness of the corporation's investments are protected by the business judgment rule). The *Joy* court was actually arguing that management should not be penalized for causing the firm to engage in overly risky investments, because such risky investments may be more profitable for shareholders. See *id.* at 886 (noting that shareholders can reduce the risk of owning any particular stock by holding a diversified investment portfolio). The same argument, however, applies to management investment decisions (including the decision to hedge firm-level risk) that stockholders allege in retrospect were too safe. Because firm-level hedging holds many potential benefits for investors, the decision of whether and how much to hedge is properly in the hands of management and, if fully informed, disinterested, and made in good faith, deserves business judgment rule protection. See *infra* note 362 and accompanying text (discussing business judgment rule protection for management hedging decisions).

84. See, e.g., Hu, *Hedging Expectations*, *supra* note 7, at 51; Hu, *New Financial Products*, *supra* note 7, at 1277.

85. See Hu, *Hedging Expectations*, *supra* note 7, at 51; Hu, *New Financial Products*, *supra* note 7, at 1277.

corporation's shareholders with respect to the firm's hedging policies and practices.<sup>86</sup> He has further opined that corporate law's failure to distinguish management's duty to maximize shareholder wealth from its duty to maximize corporate wealth has led to an inevitable dilemma in the context of corporate derivatives hedging.<sup>87</sup> If management has a fiduciary duty principally or solely to maximize shareholder wealth, then corporate hedging will often violate that duty. If, on the other hand, corporate management's fiduciary duty is owed primarily to the corporate entity, then management may have an affirmative duty to hedge firm-level risk.<sup>88</sup> For the reasons elaborated below, however, such a broad rethinking of the basic principles of corporate law as applied to firm-level derivatives hedging is neither necessary nor warranted.

### III. CORPORATE-LEVEL RISK-REDUCING BEHAVIOR

#### A. *Conglomerate Mergers*

A frequently cited example of this conflict between management and shareholder interests in the area of risk management is the diversifying acquisition, which reached its popularity peak during the conglomeration wave of the 1960s.<sup>89</sup> When conglomerate mergers and acquisitions first made their way into academic discussion, they were praised by financial theorists as a means of reducing the firm's cash flow variability without reducing expected return, in much the same way that portfolio diversification by individual investors reduces variance.<sup>90</sup> Early discussions of conglomerate mergers, therefore, maintained that merging or otherwise combining two corporations whose earnings streams were not perfectly correlated could stabilize the earnings streams of both firms by reducing or eliminating unsystematic risk.<sup>91</sup> Because the precombination expected returns of the individual firms would not be reduced by the combination, the shares of the postcombination firm should command a premium over the shares of the individual precombination firms.<sup>92</sup>

Despite the popularity of the conglomeration phenomenon, the empirical evidence has never supported the theory that such corporate

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86. See Hu, *Hedging Expectations*, *supra* note 7, at 45-51 (discussing various shortcomings of current corporate law and other questions raised by new financial instruments, including derivatives); Hu, *New Financial Products*, *supra* note 7, at 1310-16 (same).

87. See Hu, *New Financial Products*, *supra* note 7, at 1309.

88. See *id.*

89. See F.H. Buckley, *The Divestiture Decision*, 16 J. CORP. L. 805, 808 (1991) (explaining that the conglomeration wave peaked in the 1960s, but began to fade by the mid-1970s).

90. See Amihud & Lev, *supra* note 73, at 605; Gary T. Haight, *The Portfolio Merger: Finding the Company that Can Stabilize Your Earnings*, MERGERS & ACQUISITIONS, Summer 1981, at 33; Hiam Levy & Marshall Sarnat, *Diversification, Portfolio Analysis and the Uneasy Case For Conglomerate Mergers*, 25 J. FIN. 795, 795 (1970).

91. See Haight, *supra* note 90, at 33-34; Levy & Sarnat, *supra* note 90, at 796.

92. See Levy & Sarnat, *supra* note 90, at 796.

combinations increase firm value.<sup>93</sup> Numerous empirical studies analyzing the effect of conglomerate combinations have concluded that diversifying acquisitions do not provide economic benefits to either the firm or its shareholders and, in fact, often reduce firm value.<sup>94</sup>

Why does what apparently works so well for individual investors provide such poor results at the corporate level? According to many financial theorists, the answer is that the irrelevance theorem dictates that a conglomerate combination provides nothing of value to shareholders that they cannot provide for themselves.<sup>95</sup> Although combining firm *A* with firm *B* in an acquisition can reduce variance without reducing expected return—something that normally will be valuable to shareholders and for which they will normally be willing to pay a premium—this same risk and return combination of corporations *A* and *B* can be attained by shareholders by purchasing shares of *A* and *B* separately.<sup>96</sup> Thus, according to many financial theorists, the conglomeration merger does not provide to shareholders anything of value that they cannot provide for themselves and, consequently, shareholders are unwilling to pay a premium for such a combination.<sup>97</sup> In the absence of transaction costs, shareholders will be indifferent to whether or not the corporation reduces risk at the firm level through conglomeration, and the merger will neither add nor detract value.<sup>98</sup> It is argued, however, that because the transaction costs involved in a conglomerate merger are greater than those present when shareholders purchase shares on the market, the merger actually reduces shareholder value to the extent of those costs.<sup>99</sup>

In trying to explain why this type of acquisition has remained so popular,<sup>100</sup> many corporate finance scholars have concluded that the

93. See, e.g., DAVID J. RAVENSCRAFT & F. M. SCHERER, *MERGERS, SELL-OFFS, & ECONOMIC EFFICIENCY* 75-122 (1987) (finding no evidence that conglomerate combinations increase firm value); R. Hal Mason & Maurice B. Goudzwaard, *Performance of Conglomerate Firms: A Portfolio Approach*, 31 J. FIN. 39, 47 (1976) (same); Ronald W. Melicher & David F. Rush, *Evidence on the Acquisition-Related Performance of Conglomerate Firms*, 29 J. FIN. 141, 148 (1974) (same); Ronald W. Melicher & David F. Rush, *The Performance of Conglomerate Firms: Recent Risk and Return Experience*, 28 J. FIN. 381, 387 (1973) (same); see also Buckley, *supra* note 89, at 807 n.6, 808-09 n.9 (listing numerous studies that found no evidence of value creation by diversifying acquisitions).

94. See Buckley, *supra* note 89, at 807 n.6, 808-09 n.9.

95. See Amihud & Lev, *supra* note 73, at 605; Levy & Sarnat, *supra* note 90, at 796.

96. See Levy & Sarnat, *supra* note 90, at 796.

97. See *id.*

98. See GILSON & BLACK, *supra* note 72, at 317.

99. See *id.* Although investors incur brokerage fees to buy and sell shares when diversifying, the legal and administrative costs incurred in acquiring or merging with another company are much larger. In addition, although investors can purchase a corporation's shares at the prevailing market price, corporate acquisitions nearly always take place at a substantial premium over market price. See *id.*

Other reasons also have been posited for the value decreasing effects of conglomerate mergers, including diseconomies of scale and the greater difficulty of monitoring management performance in a conglomerate firm. See Buckley, *supra* note 89, at 825-26.

100. Although the conglomeration wave peaked in the 1960s, it remained popular even in the period from 1980 to 1987. See GILSON & BLACK, *supra* note 72, at 312 (noting that only one-

most likely rationale is "managerialism" stemming from the separation of ownership from control in the public corporation. In other words, although diversifying acquisitions do not benefit the firm's diversified shareholders, they do benefit management, which is undiversified and, consequently, more risk averse than what is optimal from a public shareholder's perspective.<sup>101</sup> Proponents of this theory often cite as apparent support for their position empirical evidence that close corporations make fewer diversifying acquisitions than do manager-controlled firms.<sup>102</sup>

### B. *Faulty Assumptions Underlying the Argument Against Derivatives Hedging*

Analogizing to conglomerate acquisitions and building on the literature in that field, some scholars have argued that financial derivatives, when used to hedge against unsystematic risk, also decrease shareholder value.<sup>103</sup> There is, however, a serious problem with this analysis: it ignores one-half of the net present value equation.<sup>104</sup> While the discount rate in the denominator of that equation remains unaffected by hedging because, at least theoretically, only systematic risk is reflected in the discount rate, the numerator of the net present value equation (the firm's expected cash flows) is unaffected by the reduction of unsystematic risk only if the Modigliani-Miller assumptions hold true.<sup>105</sup> While the Modigliani-Miller irrelevance theorem

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third of all large corporate acquisitions during the period from 1980 to 1987 were between companies in the same industry). During the period from 1986 to 1990, however, few Fortune 500 companies made unrelated acquisitions. See Gerald F. Davis et al., *The Decline and Fall of the Conglomerate Firm in the 1980s: A Study in the Deinstitutionalization of an Organizational Form*, 59 AM. SOC. REV. 547, 560 (1994).

101. See Amihud & Lev, *supra* note 73, at 605. Professors Gilson and Black argue that these actions taken to benefit management at the expense of shareholder wealth may not be intentional, but rather are an example of management's firm belief that what benefits management benefits the shareholders as well. See GILSON & BLACK, *supra* note 72, at 347.

Other commentators have also argued that the conglomeration phenomenon may be explained by management's desire for growth, rather than by its desire for risk reduction. See GILSON & BLACK, *supra* note 72, at 354-55; Buckley, *supra* note 89, at 827 (arguing that management may seek greater firm size to increase its compensation or to make its removal through a hostile takeover more difficult).

102. See Amihud & Lev, *supra* note 73, at 612 (controlling for firm size and finding a negative relationship between the level of owner control and the number of diversifying acquisitions); William P. Lloyd et al., *The Effect of the Degree of Ownership Control on Firm Diversification, Market Value, and Merger Activity*, 15 J. BUS. RES. 303, 303 (1987) (finding substantial empirical evidence that manager-controlled firms engage in more diversifying acquisitions and have more diversified earnings than do owner-controlled firms).

103. See Hu, *Hedging Expectations*, *supra* note 7, at 31 ("What may be a bit more persuasive [in the case against derivatives hedging] is an increasing amount of empirical evidence suggesting that corporate-level diversification generally reduces firm value."); Hu, *New Financial Products*, *supra* note 7, at 1308 ("Empirical studies pertaining to the effects of 'conglomerate mergers' tend to suggest that such corporate-level efforts at minimizing exposure to unsystematic risk will depress the share price."); see also *supra* note 7.

104. See *supra* note 62.

105. See DOHERTY, *supra* note 41, at 16 ("Thus use of value maximization implies that corporate decisionmakers will seek to maximize the size of the firm's future-earnings stream and/or

indicates that the corporation's financing decisions should have no impact on the firm's expected cash flows, that theory, and the other financial theories discussed above, depend on a variety of limiting assumptions that do not hold up in the real world. Once these assumptions are relaxed, it becomes obvious that the failure of a corporation to hedge firm-level risk can have a significant negative impact on the firm's expected cash flows and, correspondingly, on shareholder wealth.

### 1. Most Firm-Level Hedging Reduces Unsystematic Risk

Investment portfolio diversification by individual investors eliminates only unsystematic risk.<sup>106</sup> Commentators who argue that firm-level hedging provides no benefit to diversified shareholders thus implicitly assume that most firm-level hedging reduces unsystematic risk.<sup>107</sup> Other commentators make this statement explicitly.<sup>108</sup>

It is not obvious, however, that most derivatives hedging is aimed at reducing unsystematic risk.<sup>109</sup> Although the risks that most firms hedge against may affect each firm differently, this does not necessarily mean that these risks are unsystematic.<sup>110</sup> Although systematic risk affects all firms and cannot be eliminated through diversification, systematic risk does not affect all firms equally.<sup>111</sup> This is illustrated by the fact that different firms have different betas. Some firms have betas above one (meaning that they are more sensitive to systematic risk than is the market as a whole) and others have betas less than one (meaning that they are less sensitive to systematic risk than is the market as a whole).<sup>112</sup> By holding a fully diversified investment portfolio, an investor can reduce beta toward one (the market portfolio's beta), but can never completely eliminate it.<sup>113</sup>

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minimize its level of risk."). The Modigliani-Miller assumptions include: perfect capital markets, perfect information, zero transaction costs, infinitely divisible assets, rational investors and, initially, the absence of corporate taxes. See VAN HORNE, *supra* note 43, at 255-56.

106. See *supra* notes 64-70 and accompanying text.

107. See *supra* note 7.

108. See, e.g., Hu, *New Financial Products*, *supra* note 7, at 1307 ("Many of the risks that modern hedging products are designed to deal with are, at least to some extent, unsystematic risks."); Stout, *supra* note 7, at 56 n.14 ("[M]uch, if not most, derivatives hedging involves alpha risk.").

109. See SMITHSON ET AL., *supra* note 63, at 508 (stating that "some evidence is beginning to suggest that risk management may actually have an impact on the firm's beta"); cf. DOHERTY, *supra* note 41, at 159, 259-60 (presenting empirical evidence that hedging firm-level risk by insuring against loss may decrease systematic risk).

110. *But see* Stout, *supra* note 7, at 56 n.14 ("The observation that many of the variables derivatives users hedge against . . . have different effects on different firms suggests that much, if not most, derivatives hedging involves alpha risk."). Professor Stout also argues that if firms were in fact hedging systematic risk, then the premiums charged on derivative hedges would be much higher than those currently observed. See *id.*

111. See VAN HORNE, *supra* note 43, at 64-65 (discussing systematic risk).

112. See *id.* at 66 tbl.3-1 (listing betas for sample of firms as of June 1996, ranging from 0.40 to 2.10).

113. See BREALEY & MYERS, *supra* note 62, at 162.

There are many reasons to believe that much, if not most, derivatives hedging alters systematic, rather than unsystematic risk. Recent studies have presented empirical evidence that derivatives hedging can reduce a firm's beta.<sup>114</sup> This is not surprising, given that some of the most widely used derivatives hedges are interest-rate and currency-based.<sup>115</sup> Interest-rate risk and foreign-exchange risk are each systematic market-wide phenomena that cannot easily be eliminated by investors through holding a diversified investment portfolio.<sup>116</sup> Under the Modigliani-Miller irrelevance theorem, therefore, firms can benefit their shareholders by hedging such risk if the firm can hedge more cheaply or effectively than shareholders themselves.

There are several reasons to believe that corporations have an advantage over individual investors in hedging systematic risk. First, although individual investors can directly hedge some systematic risk through, for example, the purchase of exchange-traded financial futures and options,<sup>117</sup> individuals are generally not able to participate in the over-the-counter derivatives market.<sup>118</sup> Some specialized hedges available to the corporate entity thus are not available to the individual investor. Furthermore, the transaction costs of derivatives hedging may be lower for the corporation than for the individual due to economies of scale.<sup>119</sup> Finally, the corporation has an informational advantage over its shareholders when hedging systematic risk because the firm is more aware of its financial exposures and hedging needs than are the firm's shareholders.<sup>120</sup> Because the corporation can hedge systematic risk with derivatives more effectively and cheaply than shareholders themselves, corporate management can enhance shareholder wealth by hedging systematic risk.

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114. See SMITHSON ET AL., *supra* note 63, at 508-09; cf. DOHERTY, *supra* note 41, at 159, 259-60 (presenting empirical evidence that insuring against firm-level loss may reduce systematic risk).

115. See GROUP OF THIRTY, *supra* note 40, at 55-57 tbls.2-5 (showing that there are higher outstanding notional amounts of interest rate and currency derivatives than of derivatives based on many other common underlyings); SMITHSON ET AL., *supra* note 63, at 52 (stating that "recent growth in both exchange-traded and OTC derivatives in the past five years has been dominated by the growth of interest rate products"); *id.* at 54-55 tbls.3-3, 3-4 (showing that the outstanding notional principal amount of currency swaps is much larger than the combined outstanding notional amounts of commodity (energy and metal) swaps and options).

116. See SMITHSON ET AL., *supra* note 63, at 508 (discussing empirical study showing connection between foreign exchange risk and beta); Bluford Putnam, *Managing Interest Rate Risk: An Introduction to Financial Futures and Options*, in *REVOLUTION IN CORPORATE FINANCE* 239, 241 (Joel M. Stern & Donald H. Chew, Jr. eds., 1986) (explaining that interest rate risk is systematic).

117. See Froot et al., *supra* note 4, at 1630; Romano, *supra* note 9, at 36.

118. See Krawiec, *supra* note 2, at 10 (explaining that individual investors normally do not participate in over-the-counter forward and swap activity).

119. See DUFFIE, *supra* note 41, at 230; Romano, *supra* note 9, at 36; *infra* notes 258-59 and accompanying text (discussing transactional and informational economies of scale in derivatives hedging).

120. See DUFFIE, *supra* note 41, at 230; Romano, *supra* note 9, at 36.

To the extent that corporate-level derivatives hedging reduces systematic risk, the Modigliani-Miller irrelevance theorem thus indicates that corporate management can enhance shareholder wealth by hedging systematic risk at the firm level. Some hedges, however, appear to be attempts to reduce unsystematic, rather than market, risk and cannot be explained through this rationale.<sup>121</sup> There must, therefore, be some other explanation for why firms hedge those unsystematic risks.

## 2. Transaction Costs

The Modigliani-Miller theorem makes an assumption of no transaction costs.<sup>122</sup> If, therefore, transaction costs do exist and can be reduced through derivatives hedging, then hedging will increase the firm's expected cash flows, enhancing shareholder wealth.

### a. Bankruptcy Costs

One type of transaction cost is the cost associated with bankruptcy.<sup>123</sup> Direct costs of bankruptcy include legal and administrative costs and the possibility that assets may have to be liquidated at below fair market value.<sup>124</sup> Because the direct costs of bankruptcy are less than proportional to firm size, small firms face the greatest direct costs in the event of bankruptcy.<sup>125</sup> These direct costs of bankruptcy, however, are small in relation to the value of most firms and would not, alone, provide a legitimate rationale for corporate hedging, even for most small firms.<sup>126</sup>

There are also indirect costs associated with operating a firm that is nearing bankruptcy, such as the increased costs of contracting with the firm's risk-averse stakeholders, and these indirect costs can be substantial.<sup>127</sup> Even considering that there may be large indirect costs associated with bankruptcy, however, preventing bankruptcy costs can provide only a partial explanation of firm-level derivatives hedging

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121. Some commodity hedges, for example pork belly or wheat futures, presumably affect systematic risk only minimally, if at all. Such hedging, however, may represent attempts to gain cost-effective alternatives to vertical integration. See *infra* notes 215-26 (Part III.B.5) (discussing derivatives hedging as a low-cost alternative to vertical integration).

122. See VAN HORNE, *supra* note 43, at 255; Miller & Modigliani, *Dividend Policy*, *supra* note 68, at 412.

123. See SMITHSON ET AL., *supra* note 63, at 105-06.

124. See VAN HORNE, *supra* note 43, at 266.

125. See CLIFFORD W. SMITH, JR. ET AL., *MANAGING FINANCIAL RISK* 369 (1990); Deana R. Nance et al., *On the Determinants of Corporate Hedging*, 48 J. FIN. 267, 269 (1993). Small firms, however, also face the greatest transaction costs in derivatives hedging and thus do not hedge as frequently as do large firms. See *infra* notes 256-61 (Part IV.A.1) and accompanying text (discussing the impact of firm size on derivatives hedging levels).

126. See DOHERTY, *supra* note 41, at 273-74; SMITH ET AL., *supra* note 125, at 369.

127. See VAN HORNE, *supra* note 43, at 267; *infra* notes 129-77 (Part III.B.2.b) and accompanying text (discussing risk premiums imposed by a financially distressed firm's risk-averse stakeholders).

because many firms that are unlikely to have serious concerns about bankruptcy still hedge with derivatives.<sup>128</sup> Prevention of bankruptcy costs thus cannot fully explain why firms hedge.

b. Costs of Contracting with the Firm's Risk-Averse Stakeholders

Another type of transaction cost is the cost of contracting with the firm's risk-averse stakeholders. Expected future cash flows can be increased through derivatives hedging because decreasing the firm's total risk decreases the firm's costs of contracting. The corporation is often referred to as a "nexus of contracts," with employees, managers, suppliers, and others.<sup>129</sup> Each of these parties who contract, implicitly or explicitly, with the firm demands a risk premium to compensate for the riskiness of the contract.<sup>130</sup> The riskiness of the contract does not necessarily depend on the likelihood of bankruptcy because corporate layoffs and customer and supplier anxiety frequently occur in the absence of a bankruptcy threat. Risk-averse stakeholders who contract with the firm will impose these costs whenever the firm is perceived as risky, financially unstable, or prone to financial distress, even if that perception is misguided. Hedging can thus act as a signaling device, alerting stakeholders that the corporation is financially solid.<sup>131</sup>

Because nonhedging firms must remain competitive (in terms of expenses and earnings) with other firms, there is a limit to the amount of the risk premium that a firm can afford to pay. When the risk premium offered by the firm no longer adequately compensates for the risk of doing business with the enterprise, the firm's undiversified stakeholders exit the firm.<sup>132</sup> When risk-averse stakeholders exit a firm, the firm, and therefore the shareholders, must incur costs to replace them. These costs include hiring and training new personnel, embarking on advertising campaigns to attract new customers, and replacing distributors, suppliers and other outside contractors that may have terminated relationships with the firm. Each of these costs reduce cash flows and competitiveness and consequently reduce the value of the firm as an ongoing enterprise.<sup>133</sup>

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128. See Romano, *supra* note 9, at 37 (arguing that many corporate hedgers are not seriously concerned with bankruptcy).

129. See Jensen & Meckling, *supra* note 47, at 311.

130. See DOHERTY, *supra* note 41, at 21; David Mayers & Clifford W. Smith, *On the Corporate Demand for Insurance*, 55 J. BUS. 281, 284 (1982).

131. Because corporate disclosure of hedging practices is often poor and, even if accurate, may not be fully understood by investors, this signaling effect will most likely occur through the firm's stable earnings pattern rather than through the direct disclosure of hedging practices in the firm's financial reports. See Krawiec, *supra* note 2, at 49-50 (discussing the traditionally poor corporate disclosure of derivatives use); *infra* notes 247-48 and accompanying text (same).

132. See Shapiro & Titman, *supra* note 31, at 220.

133. See *id.* at 221.



*i. Employees*

The relationship between the firm and its employees, including management, is governed by the employment contract. Although the specifics of the contract will be governed by many factors, including supply and demand, the perceived riskiness of the contract also plays an important role.<sup>134</sup> As previously discussed, managers and employees are generally not well diversified and are, therefore, rationally risk averse.<sup>135</sup> This is especially true for older workers who may have limited opportunities for subsequent rehire by another firm, and during recessionary periods when employment opportunities may be scarce for workers of all ages.<sup>136</sup> If the employee perceives employment with the firm to be risky in terms of security of employment or on-the-job injury, she will require a risk premium as inducement to accept the job.<sup>137</sup>

The risk premium may come in the form of demands for higher wages that reduce the firm's cash flows.<sup>138</sup> The risk premium may also be reflected through other risk-reducing contractual devices such as layoff compensation, golden parachutes, special disability provisions, and similar employee protection mechanisms.<sup>139</sup> The cost outlay by the firm when one of these contractual devices is invoked will reduce the firm's cash flows. Furthermore, the transaction costs involved in creating, interpreting, and enforcing these special contractual provisions (bargaining, legal drafting, and perhaps, litigation) will also reduce the firm's expected future cash flows. Firms that are unable or refuse to pay a risk premium through either higher wages or additional contractual protections will be uncompetitive in attracting and retaining the most qualified labor, again reducing corporate cash flows.<sup>140</sup>

Employee turnover, particularly in upper management, occasioned by financial instability in the corporation can be very costly to the firm's shareholders. Empirical studies show that top management turnover is substantially higher at firms with weak financial performance.<sup>141</sup> Although management turnover is also higher at firms near-

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134. See DOHERTY, *supra* note 41, at 274; Shapiro & Titman, *supra* note 31, at 220.

135. See *supra* notes 78-81 and accompanying text.

136. See DOHERTY, *supra* note 41, at 274.

137. See *id.*

138. See *id.* at 20-21.

139. See *id.*

140. See *id.*

141. See Eugene P. H. Furtado & Vijay Karan, *Causes, Consequences, and Shareholder Wealth Effects of Management Turnover: A Review of the Empirical Evidence*, J. FIN. MGMT., Summer 1990, at 60, 61 (reviewing studies of CEO turnover); Jerold B. Warner et al., *Stock Prices and Top Management Changes*, 20 J. FIN. ECON. 461, 463 (1988) (presenting study of "top management" departure, defined as CEO, president, and chairman of the board). Of course many top management departures due to weak firm performance are not voluntary. Many studies do not distinguish between voluntary and involuntary departures and, in fact, it is generally difficult to determine from departure announcements whether the departure is voluntary or

ing bankruptcy, severe financial distress of this sort is not necessary for increased management turnover to take place.<sup>142</sup> Studies have found, for example, that firms are more likely to change CEOs following four or more years of declining profits and that there is an inverse relationship between stock price performance and CEO turnover.<sup>143</sup>

Of course when poor firm performance is due to mismanagement, management departure is healthy for the firm. Because firm performance is often a noisy indicator of management performance, however, top management performance tends to be difficult to evaluate.<sup>144</sup> As a result, when a firm suffers financial loss due to a failure to hedge firm-level risk rather than due to mismanagement, the firm may experience forced management departure due to "scapegoating," or voluntary management departure due to management attempts to protect its reputation.<sup>145</sup>

Although empirical studies have produced conflicting results, it appears likely that such departures of competent management can be costly to the firm.<sup>146</sup> For example, if the departing manager has firm-specific skills or knowledge, if adequate replacements for the departing manager are scarce, or if contracting costs are high for other reasons, then the departure should negatively affect firm value.<sup>147</sup> This appears to be supported by empirical evidence that firms experiencing voluntary management departures suffer significant negative abnormal returns.<sup>148</sup>

In addition to the costs suffered by firms on the departure of competent management, some firms may suffer losses from the departure of other employees as well. For example, the contracting costs

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forced. *See id.* at 469-70. For purposes of this paper the difference is unimportant. Poor firm performance leads to management departure, whether voluntary or forced, and when this departure is caused by forces other than mismanagement, the loss is costly to the firm.

142. *See* Furtado & Karan, *supra* note 141, at 61.

143. *See id.* at 61-62; Warner et al., *supra* note 141, at 487.

144. *See* Furtado & Karan, *supra* note 141, at 62; Warner et al., *supra* note 141, at 464. The noise inherent in firm performance itself provides another rationale for firm hedging: firm hedging eliminates much of the noise in firm performance, allowing shareholders to more easily observe management competence. *See* Romano, *supra* note 9, at 37-38. This can reduce monitoring costs and allow shareholders to replace inefficient management while retaining those that are competent. It also makes the incentive compensation devices typically used to align management and shareholder interests more effective. *See infra* notes 212-14 (Part III.B.4.c) and accompanying text (discussing the value of derivatives hedging as a means of reducing agency costs).

145. *See* Furtado & Karan, *supra* note 141, at 62.

146. *See id.* at 68. These conflicting results could be due to the failure of most studies to distinguish between forced and voluntary departures. *See id.* at 69-70. Alternatively, the mixed results could be due to the mixed signals that a management departure sends to the marketplace. For example, the change may signal that management performance and firm outlook are worse than what the market had priced for, or the change could signal the replacement of inefficient management, the departure of good management from a deteriorating firm, a shift in investment policy, or any number of other signals. *See id.* at 69; Warner et al., *supra* note 141, at 466.

147. *See* Furtado & Karan, *supra* note 141, at 69.

148. *See id.* at 71 (discussing several such studies).

incurred in the replacement of firm-specific human capital are much greater than those incurred in the replacement of general human capital.<sup>149</sup> Firms that use specialized labor or spend large resources on employee education and training thus have larger contracting costs and will suffer larger losses due to employee turnover.<sup>150</sup> The costs from such a lack of continuity in personnel are particularly high for firms whose value derives primarily from intangible, rather than tangible, assets. Such intangible assets may include the firm's reputation, service and product quality, and knowledgeable personnel. These costs from employee departure are particularly high in corporations with valuable intangible assets because high personnel turnover often results in reduced product and service quality, harm to product development and marketing, and loss of touch with the firm's customer base.<sup>151</sup> In addition, many firms operate in industries that require salespersons to develop a relationship with customers. For example, medical, computer, and equipment salespersons, stockbrokers, and investment bankers, to name just a few, often develop such relationships with customers. Financial distress may cause these employees to move to a less risky firm, taking customers with them.<sup>152</sup>

## ii. Customers

The firm also has "contracts" with its customers. Because financial distress creates incentives for firms to produce lower quality products,<sup>153</sup> customers will demand a risk premium before purchasing goods from a firm believed to be financially unstable.<sup>154</sup> This is particularly true for purchasers of credence goods—goods the quality of which is very important but difficult to determine *ex ante*, such as airline travel and medications.<sup>155</sup> Airlines believed to be in danger of financial distress, for example, have been further damaged by customers unwilling to fly due to fears that the risky airline will cut corners on safety.<sup>156</sup>

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149. See *id.* at 69. The replacement of general human capital is assumed to be zero when contracting costs are zero and thus to have no effect on firm value. See *id.* Contracting costs, however, are never really zero, and there is always some cost involved in identifying and hiring a new employee. Nonetheless, these costs are very small in comparison to the costs of replacing firm-specific human capital.

150. See SMITH ET AL., *supra* note 125, at 370.

151. See *id.*

152. See *id.*

153. See *infra* notes 190-91 and accompanying text (discussing incentives for financially distressed firms to reduce expenditures in certain areas, including the provision of high-quality products and services).

154. See SMITHSON ET AL., *supra* note 63, at 107 illus.4-2 ("[T]he biggest challenge any marketer can face [is] selling the products of a company that is on the ropes." (quoting the *Wall Street Journal*)); Shapiro & Titman, *supra* note 31, at 217.

155. See SMITHSON ET AL., *supra* note 63, at 107; Shapiro & Titman, *supra* note 31, at 222.

156. See Shapiro & Titman, *supra* note 31, at 222.

Customers may also charge a premium to compensate for the perceived danger that a risky company may go out of business. This is particularly true if the goods or services offered by the company require service contracts, warranties, upgrades, or other future performance by the firm or by after-market sales and service providers.<sup>157</sup> For example, customers will not purchase insurance from a company perceived to be at risk of financial distress unless premiums are sufficiently low to compensate for this risk.<sup>158</sup>

Many companies, such as car and computer manufacturers, depend on services and compatible products produced by after-market providers. The appearance of financial stability can encourage these third parties to invest the time and capital necessary to form this type of synergistic relationship.<sup>159</sup> For example, software providers first market programs compatible with computers that command the largest market share.<sup>160</sup>

Recognizing the importance of these types of relationships, customers are reluctant to do business with a firm that has not attracted sufficient after-market providers or with firms that may be at risk of losing after-market providers due to real or perceived financial instability. This is because, if the original producer goes out of business, the demand volume for complementary products and replacement parts decreases, causing reduced economies of scale in production and making those replacement or complementary parts and products more expensive and difficult to obtain.<sup>161</sup> Similarly, fewer service providers will find it worthwhile to become trained and knowledgeable about the product once it is no longer being produced.<sup>162</sup> Any owner of a rare foreign car who has broken down in a strange area of the country and faced the difficulty of locating a mechanic and spare parts on short notice knows this phenomenon well.<sup>163</sup>

For example, auto purchasers, fearing lack of performance on after-sale service contracts, appear to have reacted negatively to Chrysler Corporation's financial distress in the late 1970s and early 1980s. The company was forced to compensate with various incentives as a risk premium.<sup>164</sup> As Lee Iacocca stated when asked about Chrysler's financial difficulties:

Our situation was unique. . . . It wasn't like the cereal business. If Kellogg's were known to be going out of business, nobody would say: 'Well, I won't buy their cornflakes today. What if I

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157. See DOHERTY, *supra* note 41, at 21; SMITHSON ET AL., *supra* note 63, at 106.

158. See DOHERTY, *supra* note 41, at 21.

159. See Shapiro & Titman, *supra* note 31, at 222.

160. See *id.* at 218.

161. See *id.*

162. See *id.*

163. See *id.*

164. See DOHERTY, *supra* note 41, at 21; Shapiro & Titman, *supra* note 31, at 217-18.

get stuck with a box of cereal and there's nobody around to service it?"<sup>165</sup>

These problems are also common in the computer industry.<sup>166</sup> Customers of such an expensive item that will require service and upgrades or hardware and software in the future naturally prefer to do business with a well-known company whose future existence is more assured than with a more risky, unknown firm.<sup>167</sup> IBM exploits this fear through advertising: "What most people want from a computer company is a good night's sleep."<sup>168</sup>

Firms that act as suppliers, rather than as direct retailers, are also hurt by total risk. Because firms need to be assured of a stable supply source, they will avoid suppliers whose future viability appears risky. When Wheeling-Pittsburgh Steel Corporation filed for bankruptcy in 1985, for example, the company was forced to substantially reduce prices to attract customers, most of whom reduced or eliminated orders with Pittsburgh Steel.<sup>169</sup> This risk aversion is most pronounced when there are substantial costs involved in substituting suppliers ("switching costs"). These costs may arise, for example, from the need to learn the operation of new systems, software, machinery or equipment, and when other products or equipment must be modified or replaced to ensure compatibility with the product.<sup>170</sup>

### iii. Suppliers

Finally, the firm's suppliers also charge a risk premium. If a firm is perceived as risky, suppliers may trade with that firm only on less beneficial terms, saving the most sought after contractual terms for their preferred customers. For example, suppliers may refuse to extend trade credit to a firm perceived to be at risk of financial distress.<sup>171</sup> These demands for cash payments are particularly costly because they are likely to come at a time when the firm is already strapped for cash. Other "premia" exacted by suppliers may include

165. Walter Guzzardit Jr., *The Two Iacoccas*, FORTUNE, Nov. 26, 1984, at 221, 224.

166. See SMITHSON ET AL., *supra* note 63, at 107 illus.4-2; Jensen & Meckling, *supra* note 47, at 341-47; Shapiro & Titman, *supra* note 31, at 218.

167. See SMITHSON ET AL., *supra* note 63, at 107 illus. 4-2 (stating that "customers . . . want to be sure that their suppliers . . . will be around to fix bugs and upgrade computers for years to come" (quoting the *Wall Street Journal*)); Jensen & Meckling, *supra* note 47, at 341-42; Shapiro & Titman, *supra* note 31, at 218.

168. Shapiro & Titman, *supra* note 31, at 218. This is illustrated by the experience of the computer company Wang, whose leverage at one point raised earnings volatility considerably. Consistent with the theories espoused in this section, Wang's sales fell. See SMITHSON ET AL., *supra* note 63, at 107 illus.4-2. A customer who decided not to purchase from Wang explained her decision this way: "[B]efore the really bad news, we were looking at Wang fairly seriously [but] their present financial condition means that I'd have a hard time convincing the vice president in charge of purchasing . . . . At some point we'd have to ask 'How do we know that in three years you won't be in Chapter 11?'" *Id.*

169. See Shapiro & Titman, *supra* note 31, at 218.

170. See *id.*

171. See *id.* at 219.

refusals to invest in the development or supply of goods or services designed particularly for the risky customer, or the provision of inferior service and delivery schedules.<sup>172</sup> Actions such as these make it more difficult for the firm to acquire the goods and services it needs (particularly specialized goods and services) and further reduces the firm's ability to compete with industry rivals. This, in turn, decreases firm profits and makes financial distress more likely.<sup>173</sup> The risk premia imposed by suppliers will be particularly costly for firms that require customized goods and services from their suppliers and for firms that have fewer sources of supply.<sup>174</sup>

#### *iv. Conclusion*

Financial instability reduces confidence in the firm, making the long-term investment of either human or financial capital in the firm less valuable and causing the imposition of costly risk premia or an exodus of the firm's undiversified stakeholders. When risk-averse stakeholders exit a firm, the firm (and therefore the shareholders) must incur costs to replace them. These costs include hiring and training new personnel, embarking on advertising campaigns to attract new customers, and replacing distributors, suppliers and other outside contractors that may have terminated relationships with the firm. Each of these expenditures decreases cash flows and reduces the value of the firm as an ongoing enterprise.<sup>175</sup> The danger of financial distress thus becomes a self-fulfilling prophecy: as stakeholders exit the firm due to fears of financial distress, the firm's cash flows are reduced, making financial distress more likely.

All of a firm's contracts thus tend to adjust for total risk, through either a risk premium or termination.<sup>176</sup> The degree of risk aversion of the parties, supply and demand, and the relative bargaining strength of the parties will all determine the level of adjustment. These adjustments reduce the corporation's expected cash flows, which in turn are impounded in share price in an efficient market.<sup>177</sup>

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172. See SMITH ET AL., *supra* note 125, at 370; Shapiro & Titman, *supra* note 31, at 218-19.

173. See Shapiro & Titman, *supra* note 31, at 218-19. The problem with risk-averse supply sources will be most severe during times of supply shortage, when all firms must struggle for needed resources. See *id.*

174. See CLIFFORD W. SMITH, JR. ET AL., *Five Reasons Why Companies Should Manage Risk*, in THE HANDBOOK OF CURRENCY AND INTEREST RATE RISK MANAGEMENT 19-11 (Robert J. Schwartz & Clifford W. Smith, Jr. eds., 1990).

175. See Shapiro & Titman, *supra* note 31, at 221.

176. Perfect adjustments, of course, require perfect markets. In an imperfect market, there is likely to be a mispricing of some risk. Employees and other corporate stakeholders, for example, may not have full knowledge of a firm's risk management policies. See DOHERTY, *supra* note 41, at 23. As previously discussed, however, corporate stakeholders are likely to observe the financial stability that results from corporate hedging. See *supra* note 131. It is thus the firm's stable earnings pattern, rather than the direct observation of firm hedging activity, that acts as a signal to corporate stakeholders.

177. See *id.* at 21.

The converse is also true: activities that reduce the firm's total risk reduce the risk premium required by other corporate stakeholders. This increases the firm's cash flows and share price. The shareholders have thus benefitted from actions that reduce the total risk of the firm, but not because they directly benefit from reduced total risk. As correctly noted by commentators criticizing corporate derivatives hedging, a reduction in unsystematic risk does not alter the discount rate used by diversified shareholders. Rather, the increase arises because the cash flows included in the numerator of the net present value equation have increased, not because the discount rate contained in the denominator of that equation has decreased.

### 3. *The Firm's Investment Policies*

Modigliani and Miller assumed that firms have unlimited access to external financing and that the firm's investment policy, therefore, remains fixed.<sup>178</sup> If, in fact, the firm's investment policy fluctuates with cash flows, then stabilizing the firm's cash flows through hedging can have a positive impact on the firm's investment policies. This increased investment, in turn, can result in increased expected future cash flows. To illustrate, if a firm does not hedge, it will experience some amount of variance in its net cash flows. This must result in either a reduction in investment or an increase in externally generated funds. A reduction in investment normally is not desirable for a company with positive growth opportunities. A decrease in net cash flow need not result in decreased investment, however, if the firm is willing and able to replace the lost cash flows through the external capital markets. If corporate management was willing to replace lost internal cash flows with external financing, the firm could simply leave its financial exposures unhedged and correct any shortfalls in cash flow through an increase in external funds.<sup>179</sup>

Evidence indicates, however, that management does not replace all lost internal cash flows with external funding. This managerial reluctance to rely on the external capital markets may be attributable to costs associated with external funding.<sup>180</sup> The costs of external financing include direct costs, such as the issuance costs associated with a new bond or equity offering, as well as indirect costs, such as the increased probability of bankruptcy and financial distress (if debt is raised), or from negative signals to the marketplace (if equity is raised).<sup>181</sup>

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178. See Bruce C. Greenwald & Joseph E. Stiglitz, *Asymmetric Information and the New Theory of the Firm: Financial Constraints and Risk Behavior*, 80 AM. ECON. REV. 160, 160 (1990); Miller & Modigliani, *Dividend Policy*, *supra* note 68, at 424.

179. See Froot et al., *supra* note 4, at 1630.

180. See *id.* at 1633.

181. See *id.* at 1633-34. Equity issuances are generally considered to signal negative information to the marketplace, such as that the firm's equity is overvalued or that the firm is not

On the other hand, management's reluctance to rely on the external capital markets may be due to factors other than cost. For example, managers may be reluctant to raise external funds due to the increased monitoring that takes place when management is forced to enter the capital markets. Alternative explanations more favorable to management are that management nearly always regards its shares as undervalued or may feel that recourse to the capital markets will be perceived as mismanagement or misjudgment of the firm's financial requirements.<sup>182</sup> In addition, there is evidence that the costs associated with external funds may be more than offset by benefits to shareholders and much financial literature indicates that the costs of internally generated funds may exceed the costs associated with externally generated funds.<sup>183</sup> Regardless of whether external funds are more expensive than internal funds, if management prefers internal funds and is reluctant to enter the external capital markets, it will not seek outside funding and will not invest at an optimal level, leading to reduced cash flows and potential market share loss.<sup>184</sup> There is substantial empirical evidence that managers prefer to rely on internally generated funds and that investment levels are, in fact, impacted by variance in cash flow levels.<sup>185</sup>

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financially stable enough to issue more debt. See VAN HORNE, *supra* note 43, at 275-76. This is supported by empirical evidence of positive abnormal returns to shareholders around the time of debt issuance announcements and negative abnormal returns to shareholders around the time of announcements of equity issuances. See *id.* at 276; see also Greenwald & Stiglitz, *supra* note 178, at 160 (1990) ("If information is asymmetrically distributed between the buyers and sellers of financial instruments, then certain financial markets, such as that for equities, may break down . . . and accordingly the free access to all forms of financing envisaged by Modigliani-Miller may not exist.").

182. See GORDON DONALDSON, *MANAGING CORPORATE WEALTH* 54-56 (1984). One very notable exception to this common tendency of management to feel that its corporation's shares are undervalued at any price is Warren Buffett, the Chairman of Berkshire Hathaway. Mr. Buffett stated in connection with a recent offering of Berkshire Hathaway shares that he did not believe that Berkshire stock was undervalued at the then-current price and that he personally would not purchase stock of Berkshire at that price. See Lawrence A. Cunningham, *Introduction to Warren E. Buffett, The Essays of Warren Buffett: Lessons for Corporate America*, 19 CARDOZO L. REV. 5, 20 (Lawrence A. Cunningham ed., 1997).

183. Management's preference for internal over external cash flows is central to Jensen's "free cash flow" theory. See Michael C. Jensen, *Agency Costs of Free Cash Flow, Corporate Finance and Takeovers*, 76 AM. ECON. REV. 323, 323-25 (1986). Under this theory, the use of the corporation's free cash flow (that is, all excess cash flow that cannot be reinvested by the firm at a rate at least equal to the company's cost of capital) is a frequent source of tension between management and shareholders. Shareholder wealth is maximized if management pays out to the shareholders all corporate funds that cannot be reinvested by the firm at the cost of capital. Management, however, prefers to retain free cash flow. See *id.* (explaining that management likes to retain internal cash flows in order to enhance its own wealth, power or stability); *supra* note 182 and accompanying text (discussing potential reasons for management's preference for internal financing). In addition, if management pays out all excess funds, it will be forced to enter the external capital markets when additional funding is needed. This subjects management to greater marketplace monitoring and is believed to further enhance shareholder wealth. See Jensen, *supra* this note at 323-25.

184. See Froot et al., *supra* note 4, at 1634.

185. See, e.g., DONALDSON, *supra* note 182, at 46-47 (arguing that managers prefer internal funds); Froot et al., *supra* note 4, at 1635 (explaining that investment levels are impacted by



As discussed, customers, suppliers, and employees may be reluctant to do business with a firm perceived to be at risk of financial distress.<sup>186</sup> This perception, therefore, even if false, may cause a firm to suffer a disruption in its trading patterns.<sup>187</sup> A disruption in the firm's trading patterns is likely to cause a reduction in cash flows, lowering the present value of the shareholders' investment.<sup>188</sup> More importantly, unless replaced by external funds, the decreased corporate expenditures and negative publicity associated with a disruption of trading may result in an industry restructuring, leading to a permanent loss of market share for the risky corporation.<sup>189</sup>

Firms facing cash flow and liquidity problems, for example, may be inclined to allow product and service quality to decline and to cut back on research and development, marketing efforts and expenditures, inventory, or any other area where cutbacks are not visible in the short term but are likely to harm the firm in the long run.<sup>190</sup> In a severely distressed firm, even if that distress is short-lived and does not ultimately lead to bankruptcy, the normal incentives that encourage management to maximize the long-term profitability of the firm are no longer compelling. Other stakeholders in the company, recognizing these dangers, become less willing to do business with the firm, further reducing cash flows and market share.<sup>191</sup>

The amount of potential market share loss is related to the type of industry in which the corporation operates. In highly competitive industries, challengers may take advantage of the corporation's financial distress through predatory pricing, increased expansion, and other attempts to lure customers and seize market share. Practices such as these may make it difficult for the firm to recover and may even lead to its permanent collapse.<sup>192</sup>

Ample empirical and anecdotal evidence of this phenomenon can be found from the leveraged restructurings of the late 1980s. While the highly leveraged companies needed all excess cash flow to cover interest and debt payments, their competitors could use excess internal funds to expand production or distribution facilities or to cut

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internal cash flow); Greenwald & Stiglitz, *supra* note 178, at 163 (demonstrating that research investment and productivity growth are impacted by internal cash flow).

186. See *supra* notes 129-77 (Part III.B.2.b) and accompanying text (discussing the reactions of customers, suppliers, and employees to firms perceived to be at risk of financial distress).

187. See DOHERTY, *supra* note 41, at 401; Shapiro & Titman, *supra* note 31, at 216.

188. See Shapiro & Titman, *supra* note 31, at 216.

189. See DOHERTY, *supra* note 41, at 401. The importance of market share to a firm's profitability should not be underestimated. See Buffett, *supra* note 182, at 77 (discussing the importance of Coca-Cola's 44% and Gillette's 60% world market shares).

190. See Shapiro & Titman, *supra* note 31, at 217. The firm may also be tempted to allow workplace conditions and employee benefits to deteriorate, harming the firm's reputation and ability to attract qualified personnel in the future. See *id.*

191. See *id.*

192. See DOHERTY, *supra* note 41, at 405.

prices.<sup>193</sup> For example, when several major players in the supermarket industry underwent restructurings that resulted in highly leveraged capital structures, nonleveraged rivals profited at their leveraged competitors' expense. Nonleveraged Albertson's, for example, could underprice its highly leveraged competitors such as American Stores, Ralph's, and Vons. At the same time, Albertson's doubled its rate of new store expansion. Its leveraged rivals, which needed excess cash flow to repay debt, could not compete.<sup>194</sup> Furthermore, nonleveraged supermarket companies profited from lower borrowing and leasing costs and from the ability to outperform their leveraged rivals in terms of customer service, employee compensation and retention, and remodeling and upgrading of stores.<sup>195</sup> As a result, nonleveraged supermarket companies were able to capture market share from their leveraged competitors, resulting in important market share shifts.<sup>196</sup> Similar events took place in the retail clothing, paper products, and tobacco industries.<sup>197</sup>

A similar decrease in investment and subsequent market share loss can occur when a firm suffers financial losses due to an economic event, such as energy price or interest rate fluctuations, that its competitors have hedged against. Unless willing and able to turn to external sources of funding, the firm will not have the spare cash to compete against opportunistically timed expansions and price wars.

#### 4. Agency Costs

Agency costs literature indicates that when the Modigliani-Miller assumptions of perfect information and costless contracts are relaxed, hedging can reduce agency costs and increase the firm's cash flows.

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193. See Norm Alster, *One Man's Poison . . . (Who Benefits from Leveraged Buyouts)*, FORBES, Oct. 16, 1989, at 38-39.

194. See *id.* This anecdotal evidence in the supermarket industry is supported by empirical evidence. Several studies show that supermarket industry firms that had not recently undergone a leveraged restructuring experienced positive abnormal returns when their competitors underwent leveraged buy-outs, and that competitors tended to "prey" on leveraged rivals through price cuts and store expansion. Judith A. Chevalier, *Capital Structure and Product-Market Competition: Empirical Evidence from the Supermarket Industry*, 85 AM. ECON. REV. 415, 433 (1995); Judith A. Chevalier, *Do LBO Supermarkets Charge More? An Empirical Analysis of the Effects of LBOs on Supermarket Pricing*, 50 J. FIN. 1095 (1995).

195. See Alster, *supra* note 193, at 39.

196. See *id.* For example, nonleveraged Giant Food Inc. was able to increase its market share in the Washington, D.C. area from 43% to 48% in three years due largely to expansion at the expense of leveraged competitors. See *id.*

197. See *id.* (discussing market share shifts in the retail clothing and paper products industries); BRYAN BURROUGH & JOHN HELYAR, BARBARIANS AT THE GATE 511 (1990) (noting that after the Kohlberg Kravis Roberts (KKR) buyout of RJR Nabisco, Phillip Morris expanded its sales force, cut prices, and developed new product lines, increasing its market share lead over RJR Nabisco by seven to eight percentage points).

a. Agency Costs Associated with Debt

A firm facing immediate cash flow problems is more likely to make decisions that maximize short-term cash flows at the expense of long-term value.<sup>198</sup> This includes decisions that impair the firm's long-term credit reputation. Under normal circumstances, a firm that expects to continue operations in the future will take care to protect its credit reputation in the realization that it will be benefitted by cheaper interest rates in the future. A sterling reputation with creditors, however, is less valuable to a firm facing immediate cash flow problems.<sup>199</sup> Such firms are thus more likely than financially stable firms to take actions that harm creditors and transfer wealth from bondholders to shareholders.

These wealth transfers may include switching to more risky assets that increase creditor risk. To illustrate, Black and Scholes argued that the option pricing model they developed could be used to analyze the shareholders' equity claim as a call option on the entire firm.<sup>200</sup> Equity can thus be valued as an option to repurchase the firm from the bondholders at the maturity date of the debt issue.<sup>201</sup> Because option value increases with variance in the underlying asset, reference rate or index, the stockholders of financially distressed firms have an incentive to switch to risky projects.<sup>202</sup> This incentive is exacerbated in financially distressed firms due to the "underinvestment problem."<sup>203</sup>

Recognizing that risky firms entail greater agency costs, creditors will pass those costs on to shareholders in various ways.<sup>204</sup> These costs

198. See *supra* notes 190-91 and accompanying text.

199. See Shapiro & Titman, *supra* note 31, at 219.

200. See Fisher Black & Myron Scholes, *The Pricing of Options and Corporate Liabilities*, 81 J. POL. ECON. 637, 649-50 (1973).

201. See *id.*

202. See SMITHSON ET AL., *supra* note 63, at 108; see also Krawiec, *supra* note 2, at 11 & n.87 (demonstrating that option value increases with increased variance in the underlying).

203. Traditional finance theory dictates that to maximize firm value, a corporation should accept all positive net present value projects. See VAN HORNE, *supra* note 43, at 273. During periods of financial distress, however, shareholders have an incentive to cause the firm to reject some positive net present value projects the benefits of which accrue primarily to bondholders. See Daniel R. Fischel, *The Economics of Lender Liability*, 99 YALE L.J. 131, 134-35 (1989); Stewart C. Myers, *Determinants of Corporate Borrowing*, 5 J. FIN. ECON. 147, 149 (1977). Financial distress leads to the underinvestment problem because as the borrower's equity cushion decreases, a greater portion of the benefits of any positive net present value project accrue to the lender. See Fischel, *supra*, at 134-35. For example, consider a firm with a net asset value of \$100, aggregate outstanding debt equal to \$100 and an investment opportunity with an expected return of \$20. Because the firm's equity cushion is equal to the amount of debt outstanding, any increased value accrues to the shareholders and there is an incentive to accept the project. Now suppose the firm's net asset value drops to \$50. Because the entire \$20 from the project would accrue to the bondholders, the shareholders have an incentive to forgo the project and instead either pay out any excess funds as a dividend or seek an investment with a higher expected return and correspondingly higher risk. See *id.* For a more elaborate example illustrating the underinvestment phenomenon, see SMITHSON ET AL., *supra* note 63, at 110-12.

204. See Jensen & Meckling, *supra* note 47, at 342 (demonstrating that these agency costs are ultimately borne by the shareholders).

may include higher interest rates that increase the firm's cost of capital and more restrictive lending terms.<sup>205</sup> Restrictive lending terms allow the firm less flexibility and freedom in operations and investments and can prove especially costly to high-growth firms with many opportunities for profitable reinvestment.<sup>206</sup> Decreasing total risk can thus provide firms not only with lower funding costs, but also with less restrictive debt covenants, leading to increased future cash flows and greater shareholder wealth.

The agency costs associated with debt are thus exacerbated by financial distress.<sup>207</sup> Because hedging decreases variance in the firm's earnings and makes default less likely, hedging can reduce the agency costs associated with the differing investment objectives of shareholders and creditors.<sup>208</sup> Because this shareholder-creditor conflict is a greater problem for firms with more debt in their capital structure and for firms with more positive net present value investment opportunities, the shareholders of more leveraged firms and of firms with more growth options should benefit the most from firm-level hedging.<sup>209</sup>

#### b. Relationship with Leverage

Because leverage increases the probability of financial distress and hedging decreases that probability, firm-level hedging allows the use of more debt in the firm's capital structure.<sup>210</sup> If there are benefits to having leverage in the firm's capital structure due, for example, to taxes or the reduction of agency costs associated with free cash flow, then hedging provides a benefit to shareholders by increasing debt capacity.<sup>211</sup> Firms with greater leverage in their capital structures,

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205. See DOHERTY, *supra* note 41, at 21; Nance et al., *supra* note 125, at 269-70; Shapiro & Titman, *supra* note 31, at 219-20.

206. See SMITHSON ET AL., *supra* note 63, at 108; Shapiro & Titman, *supra* note 31, at 219-20.

207. See Fischel, *supra* note 203, at 134-35.

208. See Hendrik Bessembinder, *Forward Contracts and Firm Value: Investment Incentive and Contracting Effects*, 26 J. FIN. & QUANTITATIVE ANALYSIS 519, 531 (1991); Shehzad L. Mian, *Evidence on Corporate Hedging Policy*, 31 J. FIN. & QUANTITATIVE ANALYSIS 419, 422 (1996); Nance et al., *supra* note 125, at 270.

209. See Nance et al., *supra* note 125, at 270.

210. See Froot et al., *supra* note 4, at 1632. For example, both Kaiser and Kohlberg Kravis Roberts (KKR) have used derivatives to increase debt capacity. See SMITHSON ET AL., *supra* note 63, at 109, illus.4-3.

211. See Froot et al., *supra* note 4, at 1632. Miller has argued that, given both personal and corporate taxes, capital structure is irrelevant to firm value. Miller, *supra* note 68, at 267-68. Others disagree, however. See, e.g., VAN HORNE, *supra* note 43, at 265-66 ("My own view is that . . . there is a tax advantage to borrowing for the typical corporation."). Free cash flow has been described as "cash flow in excess of that required to fund all projects that have positive net present values when discounted at the relevant cost of capital." See Jensen, *supra* note 183, at 323. The use of free cash flow is a frequent source of tension between management and shareholders. Principles of corporate finance dictate that management should pay out all excess cash flow that cannot be reinvested at the cost of capital. Management, however, likes to retain free cash flow in order to enhance its own wealth, power or stability. The use of debt in the capital structure forces management to pay out some portion of free cash flow in the form of interest

therefore, may have greater hedging incentives consistent with shareholder wealth maximization than relatively unleveraged firms.

### c. Noise Reduction

Another potential benefit of corporate hedging is that it eliminates much of the “noise” in firm performance caused by extraneous events, allowing shareholders to more easily observe management competence.<sup>212</sup> This reduced noise can decrease monitoring costs and allow shareholders to replace inefficient management while retaining those who are competent. Furthermore, hedging increases the effectiveness of the incentive compensation devices typically used to reduce agency costs and align shareholder and management interests.<sup>213</sup> To the extent that management is compensated through incentive programs that depend on firm performance, hedging thus ensures that management is rewarded (or penalized) only for its own skill (or incompetence) rather than for extraneous events that may affect firm performance.<sup>214</sup>

## 5. Vertical Integration

Some firms may hedge in an attempt to assure a stable and affordable supply or output source. For these firms, hedging may produce some of the same wealth enhancement effects as vertical integration—an acquisition or other business combination between two parties in a buyer-seller relationship.<sup>215</sup> For example, the Metropolitan Atlanta Rapid Transit Authority (MARTA) and the state of Delaware both use derivatives to lock in or cap fuel costs.<sup>216</sup> Similarly, Ametek, a manufacturer of precision tools and electric motors, employs commodity hedges to lock in prices on nickel and copper because both metals are widely used in the corporation’s manufacturing operations.<sup>217</sup> The hedging motivations of each of these firms are similar to those of the downstream partner in a vertical combination. In other words, these corporate hedgers seek to ensure a reliable supply

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and principal payments, thus reducing the agency costs associated with free cash flow. *See id.* at 323-25.

212. *See Romano, supra* note 9, at 37-38.

213. *See id.* at 38.

214. *See id.*

215. Although commentators seem to agree that vertical integration can create efficiency benefits for the combined firms, there is substantial debate as to the existence and degree of potential anticompetitive effects on the marketplace. *See Alan J. Meese, Price Theory and Vertical Restraints: A Misunderstood Relation*, 45 UCLA L. REV. 143, 146-47 (1997) (discussing the evolution in judicial views on the economic effects of vertical mergers); Michael H. Riordan & Steven C. Salop, *Evaluating Vertical Mergers: A Post-Chicago Approach*, 63 ANTITRUST L.J. 513, 513-14 (1995); *see also id.* at 515 n.15 (listing law and economics articles analyzing anticompetitive issues in vertical mergers).

216. *See GROUP OF THIRTY, supra* note 40, at 39.

217. *See THE ECONOMIST INTELLIGENCE UNIT, STRATEGIC FINANCIAL RISK MANAGEMENT* 196-97 (1993).

or "input" market, as does the downstream partner in a vertical merger.

Other firms may hedge in order to attain a reliable "output" source. For example, a gold or oil producer may sell forward contracts if its management believes that gold or oil prices will decline in the future. The hedging motivations of these firms are thus similar to those of the upstream partner in a vertical combination. For these types of firms, hedging may produce some of the same wealth enhancement effects as vertical integration, such as providing an assured source of supply or output at predictable prices.<sup>218</sup> For example, vertical integration can reduce the transaction costs of contracting for both the upstream and downstream firms in a vertical combination. These costs include negotiation with new partners, legal drafting and enforcement, potential information asymmetries between the contracting parties, and the possibility that contracting partners will behave opportunistically.<sup>219</sup> Firms may also vertically integrate to improve coordination in product design and production,<sup>220</sup> or to avoid the costs of market failure associated with procuring goods, services, or market access externally.<sup>221</sup>

There are also potential costs to vertical integration, however, including the diseconomies of scale that often result when an enterprise becomes too large and complex.<sup>222</sup> In addition, upstream firms may lose some customers after a vertical combination if those customers are competitors of the downstream firm that is the merger partner.<sup>223</sup> Finally, the creation of a captive customer may cause some postcombination upstream firms to become uncompetitive in the absence of market incentives.<sup>224</sup>

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218. See Riordan & Salop, *supra* note 215, at 522.

219. See Meese, *supra* note 215, at 168. Derivatives hedging in the exchange-traded market may provide these same reductions in transaction costs due to the standardization, price-transparency, and fungibility of exchange-traded contracts, combined with the fact that the counterparty to such contracts is the exchange clearinghouse itself, rather than another derivatives dealer or end-user. See Krawiec, *supra* note 2, at 46 (discussing standardization and fungibility of exchange-traded derivatives); *id.* at 32 (explaining that the exchange clearinghouse is the counterparty on all exchange-traded derivatives contracts); *id.* at 30 (discussing price-transparency of exchange-traded derivatives market).

220. See Riordan & Salop, *supra* note 215, at 523-24.

221. See Meese, *supra* note 215, at 185-86; Riordan & Salop, *supra* note 215, at 524-25. For example, manufacturers that do not engage in their own distribution efforts but instead rely on the market to distribute their products leave to the discretion of dealers and retailers many decisions regarding product marketing. See Meese, *supra* note 215, at 165. Because dealer marketing efforts are a collective good, some dealers may free-ride on another's marketing efforts, meaning that these marketing efforts tend to be underprovided. See *id.* This market failure can be avoided by vertical integration, as well as by other methods. See *id.* at 185-86 (arguing that vertical integration, exclusive dealer territories, and minimum price restrictions are each methods by which this type of market failure can be avoided).

222. See GILSON & BLACK, *supra* note 72, at 276.

223. See *id.*

224. See *id.*

Derivatives hedging, however, is not a perfect substitute for vertical integration. There is no exchange-traded market, for example, in some types of inputs and outputs. Such derivative contracts could thus be attained only in the over-the-counter market at potentially prohibitive cost.<sup>225</sup> Furthermore, some benefits of vertical integration may not be duplicated through derivatives hedging.<sup>226</sup> Nonetheless, by assuring a stable and affordable output or supply source for some corporations, derivatives hedging may replicate some of the same positive shareholder wealth effects associated with vertical integration but without the related costs.

### 6. *The Impact of Hedging on Taxes*

The irrelevance theorem as applied to derivatives hedging assumes a world without taxes.<sup>227</sup> If taxes do exist and are impacted by hedging, then hedging will affect the firm's cash flows. If the tax schedule is convex, firm-level hedging can reduce expected taxes.<sup>228</sup> A convex tax schedule is one in which the marginal tax rate exceeds the average tax rate.<sup>229</sup> An increase in the progressivity of the tax rate and tax preference items (such as tax loss carry forwards, investment tax credits (ITCs) and similar tax benefits) leads to a more convex tax schedule.<sup>230</sup> Corporations with more pretax income in the progressive region of the tax schedule and firms with more tax preference items thus potentially may gain the most shareholder value from hedging.<sup>231</sup> However, the portion of the U.S. corporate tax schedule that is progressive is relatively small and thus is not a major factor motivating the hedging decisions of most corporations.<sup>232</sup> Furthermore, many

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225. See *infra* note 353 (discussing the costs involved in derivatives hedging and, in particular, the greater costs associated with over-the-counter, as opposed to exchange-traded, derivatives).

226. For example, derivatives hedging is not likely to improve coordination in product design and development or avoid the costs associated with some types of market failure.

227. Although Modigliani and Miller initially assumed the absence of taxes in their theory that capital structure is irrelevant to firm value, they later relaxed this assumption. See Modigliani & Miller, *Cost of Capital*, *supra* note 5, at 272-73 (proposing the irrelevance theorem under an assumption of the absence of taxes); Modigliani & Miller, *Corporate Income Taxes*, *supra* note 68, at 433-34 (relaxing the assumption of no taxes and concluding that there may be a substantial advantage to the use of debt in the corporation's capital structure); Miller, *supra* note 68, at 262 (arguing that, even in a world with corporate and personal taxes, capital structure is irrelevant to firm value).

228. See SMITHSON ET AL., *supra* note 63, at 102; Nance et al., *supra* note 125, at 268.

229. See SMITH ET AL., *supra* note 174, at 19-9.

230. See SMITH ET AL., *supra* note 174, at 19-9; Nance et al., *supra* note 125, at 268. For example, under a progressive tax structure, an individual taxpayer with a total gross income of \$120,000 over a two-year period may have a lower tax burden if she earns \$60,000 in each of those two years than if she earns \$120,000 in the first year and zero in the second. Because of the higher marginal tax rate on the \$120,000, the more stable earnings pattern of \$60,000 per year results in a lower tax burden.

231. See Nance et al., *supra* note 125, at 268.

232. See SMITHSON ET AL., *supra* note 63, at 105. For subchapter C corporations, the U.S. tax rate is currently progressive for income up to \$10 million. See 26 U.S.C. § 11(b) (1994). For subchapter S corporations, where income normally passes through to the individual shareholder-

large corporations that hedge do not have income in the progressive portion of the tax schedule and do not have tax losses or ITCs.<sup>233</sup> For most public corporations, therefore, tax-based explanations do not provide a workable rationale for the firm's hedging practices.

### 7. *Shareholder Diversification*

The argument against derivatives hedging assumes that shareholders are diversified.<sup>234</sup> While shareholders actually may be undiversified for several reasons, the presumption of shareholder diversification is nonetheless not a serious weakness in the argument against derivatives hedging.<sup>235</sup> First, corporations that engage in derivatives hedging are generally large and publicly held, rather than closely held.<sup>236</sup> Second, studies indicate that a large portion of publicly traded shares in the United States are owned by institutional investors.<sup>237</sup> Because institutional investors are generally well-diversified, one can conclude that a large portion of public shareholders in the United States are, in fact, diversified.<sup>238</sup> The assumption of shareholder diversification thus is not a serious weakness in the argument against derivatives hedging.

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ers, the tax implications of firm hedging depend primarily on the progressivity of the individual tax rate. For individuals, the U.S. tax code is currently progressive for income up to \$250,000 (for married couples filing jointly and single taxpayers). See 26 U.S.C. §§ 1(a)-(c). The alternative minimum tax also leads to greater tax schedule convexity. See SMITH ET AL., *supra* note 174, at 19-9; SMITHSON ET AL., *supra* note 63, at 105.

233. See Romano, *supra* note 9, at 37.

234. Although even undiversified shareholders can hedge directly through the purchase of exchange-traded options and futures, as previously discussed, this argument is unpersuasive because the firm can hedge with derivatives more effectively and cheaply than can shareholders themselves. See *supra* notes 117-20 and accompanying text.

235. Owners of closely held corporations, in contrast to shareholders of publicly held corporations, tend to have a large portion of both their human and financial capital invested in one firm and thus are not diversified. See SMITHSON ET AL., *supra* note 63, at 102. In addition, there is rarely a market for close corporation shares, and there are often restrictions on the resale of such stock, making the investment illiquid. See GILSON & BLACK, *supra* note 72, at 318-19. As a result, shareholders of close corporations generally are not well diversified and have not eliminated unsystematic risk from their portfolios. Furthermore, some shareholders may be undiversified due to ignorance or legal restrictions. See Hu, *Corporate Investment*, *supra* note 7, at 365-66; Hu, *Hedging Expectations*, *supra* note 7, at 45 n.223.

236. See *infra* notes 260-61 and accompanying text (noting that large firms hedge more than small firms, due to transactional and informational economies of scale).

237. See Bernard S. Black, *Shareholder Passivity Reexamined*, 89 MICH. L. REV. 520, 567-68 (1990) (discussing the high level of institutional ownership in U.S. corporations).

238. Moreover, even if some investors remain undiversified due to ignorance or legal constraints, the presumption of shareholder diversification may still be useful. See Hu, *Corporate Investment*, *supra* note 7, at 293 n.32 (“[T]his [potential lack of diversification] does not necessarily mean that one should avoid using this presumption.”). Professor Hu argues that failures by uninformed individual shareholders to diversify are more properly addressed through suitability rules and public education than through changes in corporate investment policy. See *id.*



## IV. EMPIRICAL EVIDENCE

The foregoing discussion demonstrates that the costs of a failure to hedge are likely to be higher for some firms than for others. Firms for which a failure to hedge is particularly costly may substantially benefit their shareholders by reducing risk at the corporate level. The foregoing materials thus not only demonstrate that firm-level risk reduction can have many benefits for the corporation's shareholders, but also lay the foundation for constructing a profile of those firms that should derive the greatest shareholder wealth benefits from hedging. This firm profile can then be compared to empirical evidence of actual firm hedging behavior to determine whether the hedging behavior of corporations is most consistent with shareholder wealth maximization or with some other motivation, such as managerialism.

The analysis in part III.B indicates that some firms may generate shareholder wealth through the use of derivatives to reduce systematic risk, substitute for vertical integration, or generate tax savings. The shareholder benefits to be gained from firm-level derivatives hedging are thus partly a function of the firm's need for such advantages, combined with the firm's ability to profitably employ derivatives to capture these advantages. Part III.B also indicates that a firm in financial distress, or a firm that is perceived by its creditors and risk-averse stakeholders as being more susceptible to financial distress, will suffer higher costs than will a firm that is, or is perceived to be, more stable. The benefits to be gained from firm-level risk reduction are thus also a function of: (1) the probability that a firm will encounter financial distress or will be perceived by its creditors and risk-averse stakeholders as more likely to experience financial distress, and (2) the costs the firm will incur if financial distress does occur or if stakeholders and creditors do impose risk premia or additional agency costs due to the perception of riskiness.<sup>239</sup>

The probability of financial distress is positively related both to leverage and to the variance of a firm's earnings pattern.<sup>240</sup> If the hedging behavior of most firms is consistent with shareholder wealth maximization, therefore, we should expect firms that have higher earnings variance to hedge more frequently than firms with more stable earnings. Although we might also expect to observe more hedging by firms that are leveraged, countervailing factors make such a prediction problematic.<sup>241</sup>

The costs that a given firm will experience if it encounters financial distress or is perceived by its creditors and risk-averse stakeholders as more likely to encounter financial distress depend on numerous

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239. See Nance et al., *supra* note 125, at 269.

240. See SMITHSON ET AL., *supra* note 63, at 105-06.

241. See *infra* notes 268-78 (discussing the complex relationship between leverage and hedging).

factors, some of which have been empirically examined. Finally, hedging is only one of many means of reducing the likelihood of financial distress and the agency costs associated with debt. Firms could, therefore, reduce the probability of financial distress by reducing the level of debt in the firm's capital structure (perhaps financing with preferred stock instead),<sup>242</sup> investing in less risky assets, purchasing liability or property insurance, merging with another firm,<sup>243</sup> or using on-balance sheet hedging strategies.<sup>244</sup> Similarly, the firm could reduce the agency costs associated with debt through the use of convertible bonds, more restrictive debt covenants or investment in less risky or more liquid assets.<sup>245</sup> Firms that employ one or more of these alternative strategies may, therefore, utilize derivatives hedging programs less frequently than firms that do not use alternative agency cost or risk reduction strategies.<sup>246</sup>

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242. See Nance et al., *supra* note 125, at 270. Whereas the interest payments due on debt are a fixed obligation, the dividends due on preferred stock are merely a preference. In other words, common shareholders may not be paid a dividend until preferred shareholders have been paid the dividend owed to them. Although the failure to make an interest payment on debt thus constitutes a default that can lead to bankruptcy, a skipped dividend on preferred shares means only that common shareholders may not receive a dividend. On the other hand, like debt, preferred stock is normally entitled only to a fixed payment and does not generally share in the corporation's upside earning potential with the common shareholders. Preferred stock thus allows common shareholders to raise funds without increasing the probability of bankruptcy and without being forced to share the benefits of continued corporate growth.

243. See *supra* notes 89-102 (Part III.A) and accompanying text (discussing conglomerate mergers).

244. See Nance et al., *supra* note 125, at 267, 270-71. To illustrate on-balance sheet hedging, suppose that for the coming year a firm is subject to a risk of loss from an increase in gold prices. The firm could hedge this risk through the purchase and storage of sufficient gold reserves to last for one year. This strategy, however, is expensive as it involves a large initial cash outlay and storage costs. The firm is more likely, therefore, to hedge its exposure to gold prices through the use of off-balance sheet transactions, such as the purchase of a forward contract.

245. See SMITHSON ET AL., *supra* note 63, at 108; Nance et al., *supra* note 125, at 270-71. Convertible bonds may reduce the agency costs associated with debt by reducing the incentives for shareholders to switch to riskier projects or underinvest, because the profits from such activities will ultimately be shared with convertible bondholders should firm value reach a level that makes conversion profitable. See VAN HORNE, *supra* note 43, at 543; Jensen & Meckling, *supra* note 47, at 354. Convertible bonds thus act to align the interests of shareholders and bondholders and reduce monitoring costs. See VAN HORNE, *supra* note 43, at 543; Jensen & Meckling, *supra* note 47, at 354. Restrictive debt covenants can reduce the agency costs associated with debt by limiting the opportunities for shareholder wealth transfers. See SMITHSON ET AL., *supra* note 63, at 108. This can be accomplished in a variety of ways, including by restricting dividends and other distributions to equity owners, restricting the firm's allowable investments and providing standards relating to the firm's financial condition.

246. See Nance et al., *supra* note 125, at 271 (observing that convertible debt and preferred stock may operate as substitutes for corporate hedging); Peter Tufano, *Who Manages Risk? An Empirical Examination of Risk Management Practices in the Gold Mining Industry*, 51 J. FIN. 1097, 1107 (1996) (hypothesizing that diversification and cash balances may operate as substitutes for corporate hedging). *But see* Christopher Géczy et al., *Why Firms Use Currency Derivatives*, 52 J. FIN. 1323, 1329 (1997) (arguing that, because convertible debt and preferred stock are additional leverage, financial theory predicts a positive relationship between corporate hedging and the use of convertible debt or preferred stock in the corporation's capital structure rather than the negative relationship predicted by many researchers).

Empirical evidence as to the derivatives hedging practices of firms has traditionally been difficult to obtain because public disclosures were often poor and did not accurately distinguish between hedging and purely speculative transactions.<sup>247</sup> Most studies that have attempted to evaluate the hedging practices of publicly traded corporations, therefore, have resorted to surveys.<sup>248</sup> In at least some studies, many of the firms surveyed did not respond or did not respond completely,<sup>249</sup> causing problems with the reliability of the empirical results. In others, the survey questions were not framed so as to elicit the most useful responses.<sup>250</sup> Nonetheless, these studies can afford some initial insight into the hedging practices and motivations of firms, and the results have been included in this section.

In recent years, derivatives disclosures have improved greatly, allowing more recent studies to analyze publicly reported data and avoid the nonresponse bias and other empirical shortcomings of prior studies.<sup>251</sup> Even recent studies, however, present difficult empirical problems. For example, there is significant correlation among variables<sup>252</sup> and the predicted impact of some variables is mixed, depend-

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247. See Walter Dolde, *Hedging, Leverage, and Primitive Risk*, J. FIN. ENGINEERING 187, 197 (1995) (discussing poor derivatives disclosure by nonfinancial firms and the difficulty in interpreting the limited hedging data that is disclosed by such firms); Géczy et al., *supra* note 246, at 1323 (stating that “empirical evidence on the characteristics of derivatives users is limited”); Mian, *supra* note 208, at 419 (“The lack of publicly available information on corporate hedging activity severely limited previous empirical research in this area.”).

248. See SMITH ET AL., *supra* note 125, at 376 (explaining that because public data on hedging techniques is limited “empirical studies have had to resort to surveys”); Henk Berkman & Michael E. Bradbury, *Empirical Evidence on the Corporate Use of Derivatives*, 25 FIN. MGMT. 5, 5 & n.2 (1996) (using publicly available data from audited financial statements of 116 New Zealand firms, but noting that “earlier empirical research has used survey and field study data to describe the corporate use of derivatives”); James R. Booth et al., *Use of Interest Rate Futures by Financial Institutions*, 15 J. BANK RES. 15, 16 (1984) (using survey data); Dolde, *supra* note 247, at 189 (1995) (same); Mian, *supra* note 208, at 419 (using publicly reported data but noting that “previous empirical work on hedging has relied primarily on survey-based data”); Nance et al., *supra* note 125, at 271 (using survey data due to lack of publicly available derivatives information).

249. See, e.g., Nance et al., *supra* note 125, at 271.

250. See SMITH ET AL., *supra* note 125, at 376.

251. See Géczy et al., *supra* note 246, at 1324 (using annual report disclosures); Mian, *supra* note 208, at 420 (using publicly available derivatives data); Tufano, *supra* note 246, at 1098 (using public reports of 50 firms in the gold mining industry). Despite the great improvements in derivatives disclosure in recent years, most observers believe that substantial improvements are still needed. See, e.g., Krawiec, *supra* note 2, at 61 (discussing studies and reports stressing the need for improved derivatives disclosure and recent FASB proposals to improve derivatives accounting standards).

252. See Nance et al., *supra* note 125, at 275. See, e.g., *infra* notes 272-74 and accompanying text (discussing the correlation among leverage, growth opportunities and hedging); *infra* notes 256-59 and accompanying text (discussing the correlations among taxes, firm size, and hedging). Even multivariate analyses do not fully alleviate the problem of correlations among variables. See, e.g., Jennifer Francis & Jens Stephan, *Characteristics of Hedging Firms: An Empirical Examination*, in *ADVANCED STRATEGIES IN FINANCIAL RISK MANAGEMENT* 615, 629 (Robert J. Schwartz & Clifford W. Smith, Jr. eds., 1993) (stating that “[t]he explanatory power of the [multivariate] models is less than 2 percent; this is not surprising given the correlations between the proxy variables and the hedge decision variable”).

ing on the firm characteristic for which the variable is a proxy.<sup>253</sup> Furthermore, calculating an accurate and unbiased measure of derivative usage is problematic, even for firms that publicly report derivative activity.<sup>254</sup> Finally, many of the factors discussed in part III that may enable firms to generate shareholder wealth through hedging remain untested and are, perhaps, untestable.<sup>255</sup>

Despite these shortcomings, this article presents a compilation and review of these studies in an attempt to draw preliminary conclusions from the reported results. Specifically, although many questions remain unanswered and further research is still needed, the empirical evidence available to date is generally consistent with a shareholder wealth maximization rationale.

### A. *Firm Characteristics Consistent with Shareholder Wealth Motivated Hedging*

#### 1. *Firm Size*

The analysis in part III.B indicates that small firms have more hedging incentives consistent with shareholder wealth maximization than do large firms due to small firms' greater likelihood of undiversified shareholders, and income in the progressive region of the tax code and their proportionally higher direct costs of bankruptcy.<sup>256</sup> One might, therefore, predict a negative relationship between firm size and hedging activity, meaning that small firms should be more likely to hedge than large firms. Such a prediction, however, is problematic for several reasons. First, the direct costs of bankruptcy are small in relation to firm size and, therefore, are not likely to be a major factor motivating hedging, even for small firms.<sup>257</sup> Second, there are significant economies of scale in the transaction costs of deriva-

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253. See, e.g., *infra* notes 256-61 (Part IV.A.1) and accompanying text (discussing the predicted impact of firm size on hedging); *infra* notes 268-78 (Part IV.A.3) and accompanying text (discussing the complex relationship between leverage and hedging).

254. See, e.g., Berkman & Bradbury, *supra* note 248, at 8-9 (discussing various shortcomings of derivative usage measures).

255. For example, to this author's knowledge, no studies have empirically tested whether firms producing goods that require after market sales or service, act as suppliers of goods involving "switching costs," require specialized goods or services in order to operate, have fewer sources of supply, operate in highly competitive industries, use specialized labor, spend large resources on employee education and training, derive value primarily from intangible assets, operate in industries that require salespersons to develop relationships with customers, or are not vertically integrated are more likely to hedge than are other firms. See *supra* notes 106-238 (Part III.B) and accompanying text (discussing firms most able to enhance shareholder wealth through derivatives hedging).

256. See Nance et al., *supra* note 125, at 272-74 (stating that firms with income in the progressive region of the tax code are smaller); *supra* note 235 and accompanying text (explaining that shareholders of close corporations are more likely to be undiversified); *supra* note 125 and accompanying text (demonstrating that because the direct costs of bankruptcy are less than proportional to firm size, small firms can benefit more from reductions in direct bankruptcy costs than can large firms).

257. See *supra* note 124 and accompanying text (discussing direct bankruptcy costs).

tives, implying that it is less expensive for large firms to hedge with derivatives than it is for smaller ones.<sup>258</sup> In addition, there are informational economies of scale associated with derivatives, meaning that large firms are more likely to employ managers with the knowledge and experience to manage a derivatives hedging program.<sup>259</sup>

The available empirical evidence indicates that large firms, in fact, are more likely to hedge than small firms.<sup>260</sup> This positive empirical relationship between firm size and hedging indicates that economies of scale outweigh the impacts of direct bankruptcy costs, tax motivations, and undiversified shareholders on firms' hedging policies.<sup>261</sup>

## 2. *Income Volatility*

The analysis in part III.B indicates that because firms with greater earnings variance are more likely to experience financial distress, hedging is most likely to benefit the shareholders of firms with more volatile earnings patterns.<sup>262</sup> If, therefore, corporate hedging policies are consistent with a shareholder wealth maximization rationale, we should expect to see a positive empirical relationship between hedging and earnings variance, meaning that firms with more volatile earnings should be more likely to hedge than firms with relatively stable earnings. This theory was supported by an empirical study of the derivatives hedging practices of banks and savings and loans (S&Ls) conducted by Professor James R. Booth. Professor Booth found that the S&Ls were much more likely to hedge than were the banks.<sup>263</sup> He concluded that one reason for this finding was that the S&Ls had a higher probability of encountering financial distress than did the banks, due to greater mismatches between the maturities of assets and liabilities.<sup>264</sup>

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258. See Nance et al., *supra* note 125, at 269. For example, it is generally not cost effective for firms to hedge exposures of less than \$5 to \$10 million. See Mian, *supra* note 208, at 424.

259. See Mian, *supra* note 208, at 424; Nance et al., *supra* note 125, at 269.

260. See Berkman & Bradbury, *supra* note 248, at 9 (finding a significant positive empirical relationship between firm size and hedging); Stanley B. Block & Timothy J. Gallagher, *The Use of Interest Rate Futures and Options by Corporate Financial Managers*, 15 FIN. MGMT. 73, 75 (1986) (same); Booth et al., *supra* note 248, at 17 (same); Dolde, *supra* note 247, at 191 ("All empirical tests to date have found a significantly positive relationship between size and hedging."); Mian, *supra* note 208, at 429 (finding a positive relationship between firm size and hedging); Nance et al., *supra* note 125, at 274 (same).

261. See Mian, *supra* note 208, at 424.

262. See *supra* notes 239-41 and accompanying text (explaining that shareholders of firms with relatively more volatile earnings patterns will be benefitted by firm-level hedging more than shareholders of firms with more stable earnings). Firm level hedging can also be of greatest benefit to the managers of such firms, implying that managerialist explanations may also motivate the hedging practices of firms with high earnings variability. See *supra* notes 78-81 and accompanying text (discussing management risk aversion).

263. See Booth et al., *supra* note 248, at 17.

264. See *id.* Another possible factor posited by the surveyors was that the S&Ls were larger. See *id.*

The results of a study conducted by Professor Deana R. Nance, however, conflict with Professor Booth's findings. Professor Nance found no difference in the volatilities of the pretax income of hedging and nonhedging firms.<sup>265</sup> She concluded that this result should be expected in any survey of ex-post income volatilities because a firm's income volatility is reduced as it hedges.<sup>266</sup> This would render the ex-post income volatilities of hedgers and nonhedgers indistinguishable.<sup>267</sup> Future studies, therefore, should attempt to study firms' prehedging income volatility to determine whether corporate hedging policies are consistent with shareholder wealth maximization.

### 3. *Leverage*

The analysis developed in part III.B predicts a strong positive relationship between leverage and hedging. In other words, because leverage increases both the likelihood of financial distress and the agency costs associated with a firm perceived to have a high probability of experiencing financial distress, leveraged firms should be more likely to hedge than relatively unleveraged firms.<sup>268</sup> Furthermore, because hedging decreases the likelihood of financial distress, it allows the use of more leverage in the firm's capital structure, again indicating a potential positive relationship between hedging and leverage.<sup>269</sup> Many studies found this predicted positive relationship.<sup>270</sup>

Interestingly, however, many other researchers have found no significant relationship between leverage and hedging, contrary to the predictions developed in part III.B.<sup>271</sup> These unexpected results, however, could be due to countervailing factors that complicate the relationship between leverage and corporate hedging practices. For example, the analysis in part III.B predicts that firms with more investment opportunities are more likely to hedge.<sup>272</sup> Empirical evi-

265. See Nance et al., *supra* note 125, at 274-75.

266. See *id.*

267. See *id.*

268. See *supra* notes 129-77 (Part III.B.2.b) and accompanying text; notes 178-97 (Part III.B.3) and accompanying text (discussing the costs associated with financial distress); notes 198-209 (Part III.B.4.a) and accompanying text (discussing the agency costs associated with financial distress).

269. See *supra* notes 210-11 (Part III.B.4.b) and accompanying text (explaining that hedging allows the use of greater leverage in the firm's capital structure, generating potential tax savings and reducing the agency costs associated with free cash flow).

270. See Dolde, *supra* note 247, at 206 (finding the predicted positive relationship after controlling for primitive risk); Berkman & Bradbury, *supra* note 248, at 12-13 (finding the predicted positive relationship); Géczy et al., *supra* note 246, at 1339 (same); Tufano, *supra* note 246, at 1118 (finding a slight positive relationship).

271. See Block & Gallagher, *supra* note 260, at 75 (finding no significant relationship between hedging and leverage); Mian, *supra* note 208, at 434 (same); Nance et al., *supra* note 125, at 274 (same); Francis & Stephan, *supra* note 252, at 634 (finding no relationship between derivative hedging and leverage in multivariate tests, but some evidence of a positive relationship in time series tests).

272. See *supra* notes 178-97 (Part III.B.3) and accompanying text.

dence demonstrates that firms with more investment options also employ less debt in their capital structure.<sup>273</sup> Using leverage as a proxy for the number of the firm's investment options, therefore, leads to a predicted negative relationship between hedging and leverage, rather than the positive relationship predicted by many researchers. In other words, because firms with higher leverage have fewer investment options, they may hedge less than relatively unleveraged firms, not more.<sup>274</sup> The connection between hedging and leverage is thus more complex and indeterminate than anticipated.

In addition, both leverage and hedging are affected by primitive risk levels.<sup>275</sup> Professor Walter Dolde reasoned that firms with higher exposures to risk had incentives to forgo leverage and hedge more in an attempt to control variance, implying a *negative* relationship between hedging and leverage for certain higher-risk firms rather than the positive relationship predicted by most researchers.<sup>276</sup> He presented evidence that, after controlling for primitive risk levels, the statistically significant positive relationship predicted by the theoretical model did exist between hedging and leverage.<sup>277</sup> A study by Professor Shehzad L. Mian provided some support for this theory by finding that hedgers issue more long-term debt than do nonhedgers.<sup>278</sup> Therefore, while some empirical studies, particularly more recent and complex ones, support the conclusion that leveraged firms hedge more than relatively unleveraged ones, further research in this area would be valuable. Specifically, studies controlling for the number of available investment options, risk levels, and type of hedging activity could shed more light on the apparently complex relationship between leverage and hedging.

#### 4. *Other Factors Affecting the Likelihood of Financial Distress*

The analysis in part III.B demonstrates that firm-level hedging will be of greatest benefit to the shareholders of firms more likely (or perceived to be more likely) to experience financial distress.<sup>279</sup> In a recent study of the gold mining industry, Professor Peter Tufano used "cash costs" as a proxy for the likelihood of financial distress, on the

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273. See Nance et al., *supra* note 125, at 274.

274. See *id.*

275. See Dolde, *supra* note 247, at 212. Professor Dolde defined primitive risk as the "standard deviation of the ratio of operating income before depreciation to book value of assets." *Id.* at 199.

276. See *id.* at 212.

277. See *id.* at 188. A study by Professor Mian, although not controlling for risk, found that interest-rate hedgers had higher leverage than did nonhedgers of interest rate risk, while currency-price hedgers had lower leverage than did noncurrency-price hedgers. See Mian, *supra* note 208, at 436. Grouping these two types of hedgers into one category, Professor Mian concluded, caused these two correlations to cancel each other out and lead to the finding of no significant relationship between hedging and leverage common among such studies. See *id.*

278. See Mian, *supra* note 208, at 434.

279. See *supra* notes 239-41 and accompanying text.

rationale that gold mining firms will experience financial distress whenever the price of gold is less than cash costs.<sup>280</sup> If the hedging behavior of gold mining firms is consistent with a shareholder wealth maximization rationale, we should expect to see a positive empirical relationship between cash costs and hedging—that is, firms with greater cash costs should hedge more than firms with lower cash costs.<sup>281</sup> Instead, Professor Tufano found no relationship between cash costs and hedging, leading him to conclude that the empirical evidence did not support the theory that firms in the gold mining industry hedge to avoid financial distress.<sup>282</sup>

Professor Tufano theorized, however, that avoidance of financial distress may provide less of an incentive for hedging in the gold mining industry than in other industries. Professor Tufano speculated that the gold mining industry may be unique in that gold mines own tangible assets that require no after-market sales or service. Furthermore, gold mining companies can halt production during times of financial distress, resuming later at relatively low cost and no loss of franchise value.<sup>283</sup> If these characteristics are not present in other industries, future studies may reach different results. Future researchers, therefore, should study the relationship in other industries between hedging and the probability of financial distress to determine whether the positive relationship predicted by part III.B withstands empirical testing.

### 5. *Available Investment Opportunities*

The analysis developed in part III.B predicts a positive relationship between the number of available investment opportunities and hedging for several reasons. First, a reduction in the firm's cash flows, if not replaced in the external capital markets, is likely to cause reductions in investment.<sup>284</sup> Thus hedging, by reducing the likelihood of an unexpected reduction in cash flows, can be of greatest benefit to the shareholders of firms that will need internal cash flow to take advantage of investment and growth opportunities. Second, firms that do elect to replace lost internal cash flows through the external capital

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280. See Tufano, *supra* note 246, at 1106. Professor Tufano defined cash costs as the direct and indirect costs of producing gold, excluding non-cash items such as depletion and depreciation. See *id.*

281. See *id.* at 1108.

282. See *id.* at 1117. This is generally supported by the research of Professors Francis and Stephan, who found no support in univariate and multivariate tests for the hypothesis that firms hedge in order to avoid bankruptcy, but found some support for that hypothesis in time series tests. See Francis & Stephan, *supra* note 252, at 634. Professors Francis and Stephan used an "Altman's Z-score" to test for the likelihood of bankruptcy. See *id.* at 624.

283. See Tufano, *supra* note 246, at 1117 n.21. See *supra* notes 186-92 and accompanying text (discussing market share and franchise value loss during times of financial distress).

284. See *supra* notes 178-97 (Part III.B.3) and accompanying text (discussing the impact of financial distress on the firm's investment policies).



markets typically do so by issuing debt securities.<sup>285</sup> Debt securities frequently contain restrictive debt covenants that limit the investment options of management. These restrictive debt covenants (and, consequently, recourse to the external capital markets) will be most costly for firms with many investment opportunities.<sup>286</sup> We should thus expect to see more hedging by firms with many investment opportunities than by firms with fewer growth options for whom recourse to the debt markets is less burdensome. Finally, the underinvestment problem and the incentives for shareholders to switch to more risky assets imply that the agency costs associated with debt are most severe in firms with many investment opportunities.<sup>287</sup> Because the agency costs associated with debt are exacerbated by financial distress, firms with many investment opportunities (and correspondingly high agency costs) are likely to hedge firm-level risk in an attempt to avoid financial distress.

Several studies have attempted to evaluate the relationship between profitable growth opportunities and firm hedging practices. Three studies used the firm's research and development (R&D) expenditures as a proxy for the firm's investment opportunity set and found a statistically significant positive relationship between high R&D expenditures and hedging.<sup>288</sup>

Professor Mian used a different measure, the ratio of the firm's market value to book value of total assets ("market-to-book ratio"), as a proxy for the firm's investment opportunity set, on the assumption that firms with more growth opportunities should have higher market-to-book ratios than firms with fewer growth options.<sup>289</sup> He, therefore, predicted that firms with higher market-to-book ratios should hedge more than firms with lower such ratios. Contrary to the predictions of a shareholder wealth-based hedging strategy, Professor Mian found no evidence that hedgers had higher market-to-book ratios than nonhedgers.<sup>290</sup> Professor Mian's results are contradicted by the research of Professor Christopher Géczy who found a statistically significant positive relationship between hedging and market-to-book ratio.<sup>291</sup>

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285. See DONALDSON, *supra* note 182, at 46-56 (noting that, when corporate management is forced to raise external funds, it does so through debt, rather than equity). This managerial preference for debt over equity may be due to the negative marketplace signals associated with equity issuances. See *supra* note 181 (discussing the negative signals associated with equity issuances). It may also stem from a common view among management that its firm's shares are undervalued. See DONALDSON, *supra* note 182, at 54-56.

286. See Nance et al., *supra* note 125, at 269-70.

287. See *supra* notes 198-209 (Part III.B.4.a) and accompanying text (discussing the agency costs associated with debt).

288. See Dolde, *supra* note 247, at 201; Géczy et al., *supra* note 246, at 1339; Nance et al., *supra* note 125, at 274.

289. See Mian, *supra* note 208, at 422.

290. See *id.* at 428.

291. See Géczy et al., *supra* note 246, at 1338-39.

Professors Hank Berkman and Michael E. Bradbury used the firm's earnings-to-price ratio as a proxy for the investment opportunity set, on the assumption that firms with high earnings relative to price have more long-term growth prospects and, therefore, should be more likely to hedge than firms with lower such ratios.<sup>292</sup> Consistent with their predictions, Professors Berkman and Bradbury found a statistically significant positive relationship between hedging and the firm's earnings-to-price ratio.<sup>293</sup>

The level of industry regulation also affects a firm's investment options and has been used in at least one study as a proxy for the firm's investment opportunity set. Professor Mian theorized that firms in regulated industries are likely to have less discretion over investment policies and, consequently, fewer investment options than firms in unregulated industries.<sup>294</sup> Firms in regulated industries should thus have fewer hedging incentives and should hedge less than firms in unregulated industries.<sup>295</sup> Comparing regulated utilities with firms in unregulated industries, Professor Mian found that regulated utilities were less likely to hedge than firms in nonregulated industries, consistent with a shareholder wealth-based hedging strategy.<sup>296</sup>

Exploration expenditures and acquisition activity have also been used as proxies for the investment opportunity set.<sup>297</sup> Professor Tufano, for example, used these proxies to test the gold mining industry. Contrary to the predictions of a shareholder wealth-based hedging model, Professor Tufano found no relationship between acquisition activity and hedging, and found a *negative* relationship between exploration expenditures and hedging.<sup>298</sup> Professor Tufano noted, however, that there were several potential explanations for this observed negative relationship. For example, he hypothesized that there may be an inverse relationship between gold prices and exploration such that, when gold prices are low, firms hedge more and scale back on exploration activity because finding new gold at such times is less valuable.<sup>299</sup> In addition, management expectations of future gold

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292. See Berkman & Bradbury, *supra* note 248, at 10.

293. See *id.* at 12-13 (finding a statistically significant (at 10% level) positive relationship between corporate hedging and the firm's earnings-to-price ratio when using fair value as the measure of derivative usage, but not when using contract amount as the measure of derivative usage).

294. See Mian, *supra* note 208, at 422.

295. See *id.*

296. See *id.* at 428.

297. See Tufano, *supra* note 246, at 1108. Professor Tufano defined acquisition activity as the dollar value of attempted acquisitions over the most recent three year period. See *id.*

298. See *id.* at 1117. Both variables were scaled by firm value. See *id.*

299. See *id.* at 1117 n.23; see also Froot et al., *supra* note 4, at 1638 (stating that "a company engaged in oil exploration and development will find that both its current cash flows (i.e., the net revenues from its already developed fields) and the marginal product of additional investments (i.e., expenditures on further exploration) decline when the price of oil falls. For such a company, hedging against oil price declines is less valuable—even without hedging, the supply of internal funds tends to match the demand for funds.").

prices may affect both hedging and exploration appropriations, such that managers who expect rising gold prices may be likely to hedge less and explore more.<sup>300</sup>

To summarize, the theoretical model developed in part III.B of this article predicts a positive empirical relationship between the firm's investment opportunity set and hedging, meaning that firms with more investment options should be more likely to hedge than firms with fewer investment opportunities. While the available empirical evidence is generally supportive of this proposition, the actual relationship between hedging and investment options depends on the proxy used to represent the firm's opportunity set. For example, all studies reviewed by this author using R&D expenditures to represent the firm's opportunity set found a statistically significant positive relationship between hedging and the investment opportunity set, consistent with the theoretical model. Studies using the firm's market-to-book ratio to proxy for available investment opportunities, however, produced mixed results: one study supported the theory that firms with a relatively large number of investment options are more likely to hedge firm-level risk than firms with fewer growth opportunities, while another study did not support that theory. Two researchers also used the firm's earnings-to-price ratio as a proxy for the investment opportunity set and, consistent with a shareholder wealth-based hedging strategy, found a statistically significant positive relationship between hedging and the firm's earnings-to-price ratio. Another study relied on the level of industry regulation as a proxy for the number of available investment options and found the predicted positive relationship between investment opportunities and hedging. Finally, a study of the gold mining industry used exploration expenditures and acquisition activity to represent the firm's opportunity set and found no statistically significant relationship between acquisition activity and hedging, but found a negative relationship between exploration expenditures and hedging. Both of these findings are contrary to the predictions of the theoretical model. As discussed in section 6 below, however, studies of the relationship between investment opportunities and hedging may be of limited utility, regardless of which proxy is used to represent the firm's investment opportunity set.

## 6. *Internally Generated Cash Flows*

Numerous studies have examined the empirical relationship between hedging and available investment opportunities on the theory that firms with more investment options can generate greater shareholder wealth through the reduction of firm-level risk and, therefore,

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300. See Tufano, *supra* note 246, at 1117 n.23. Although Professor Tufano did not propose an explanation for the lack of an observed relationship between acquisition activity and hedging, it seems reasonable that both of these explanations could apply to acquisition activity as well.

should be more likely to hedge than firms with fewer investment options. Other researchers have opined that such studies are of limited utility because it is not solely the size of the firm's investment opportunity set that affects the need to hedge. Rather, the availability of internally generated funds necessary to exploit those investment opportunities is also relevant.<sup>301</sup> Therefore, some researchers argue that regardless of the proxy chosen to represent the firm's opportunity set, a study of corporate hedging practices must include a measure of the firm's internal cash flows in order to be useful.<sup>302</sup>

Professor Géczy attempted to test the cash availability of firms on the theory that firms with substantial excess cash flow would have more cash on hand to take advantage of available investment opportunities and, consequently, had less need to hedge.<sup>303</sup> This theory was supported by empirical findings that firms with higher quick ratios (the ratio of cash and short-term investments to current liabilities) were less likely to hedge than firms with lower quick ratios.<sup>304</sup> Professors Berkman and Bradbury attempted to study the same hypothesis using a more sophisticated measure, however, and found no relationship between firm hedging and the ability of firms to fund current investment plans.<sup>305</sup>

The theory that firms hedge to preserve cash flows for future investment opportunities is also supported by individual survey answers. For example, Merck has described one of the factors affecting its hedging decisions as the "potential effect of cash flow volatility on our ability to execute our strategic plan—particularly, to make investments in R&D that furnish the basis for future growth."<sup>306</sup> Similarly, a Unocal executive noted that "one possible added value of hedging is to continue on a capital program without funding and defunding."<sup>307</sup>

To summarize, anecdotal evidence indicates that corporate management considers the preservation of internal cash flows to fund desired investment activity an important factor motivating firm hedging. The empirical evidence, however, is mixed with respect to the relationship between internal cash flows and hedging. Future empirical research should explore this inconsistency.

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301. See Berkman & Bradbury, *supra* note 248, at 7; Froot et al., *supra* note 4, at 1655 ("Firms will want to hedge less, the more closely correlated are their cash flows with future investment opportunities.").

302. See Berkman & Bradbury, *supra* note 248, at 7.

303. See Géczy et al., *supra* note 246, at 1339.

304. See *id.*

305. See Berkman & Bradbury, *supra* note 248, at 12-13 (using the ratio of asset growth to cash flow as a proxy for the firm's ability to fund current investment projects).

306. See Froot et al., *supra* note 4, at 1652 (quoting Judy C. Lewent & A. John Kearney, *Identifying, Measuring and Hedging Currency Risk at Merck*, CONTINENTAL BANK J. APPLIED CORP. FIN. 1, 19-28 (1990)).

307. Froot et al., *supra* note 4, at 1652 (quoting from Matthew Burkhart, *Shareholders Applaud Risk Management*, CORP. FIN. (June/July 1992)).

### 7. *Production of Credence Goods*

Credence goods are goods for which quality is important, but difficult to determine *ex ante*, such as airline travel and medications.<sup>308</sup> Because purchasers of credence goods are likely to charge a risk premium before dealing with a firm perceived as risky, producers of credence goods are likely to derive greater shareholder benefits from firm-level hedging than other firms.<sup>309</sup> We should expect, therefore, to find that producers of credence goods are more likely to hedge than firms that do not produce credence goods. This has been supported by at least one empirical test.<sup>310</sup> Because drawing definitive conclusions based on a single study is difficult, further research is needed to determine whether producers of credence goods are more likely to hedge than other firms.

### 8. *Information Asymmetries Between Potential Investors and Management*

The analysis in part III.B demonstrated that firms for which the external capital markets are particularly costly can generate potential shareholder wealth through firm-level hedging. Entrance to the external capital markets is likely to be most costly to firms with greater information asymmetries between potential investors and management.<sup>311</sup> These firms thus have a greater incentive to hedge to decrease the probability of resorting to the external capital markets.<sup>312</sup> Professor Mian theorized that there is likely to be greater information asymmetries for firms with greater market values relative to book values (high "market-to-book ratios") and for firms in nonregulated industries.<sup>313</sup> Professor Mian reasoned that these firms thus have the greatest incentive to hedge. Accordingly, he predicted a negative relationship between the level of industry regulation and hedging, meaning that firms in regulated industries should be less likely to hedge than firms in unregulated industries. He further predicted a positive relationship between market-to-book ratio and hedging, meaning that firms with higher market-to-book ratios should be more likely to hedge than firms with lower such ratios.<sup>314</sup> Although Professor Mian's research supported the predicted negative relationship between regulated firms and hedging, he also found a negative relationship between market-to-book ratio and hedging rather than

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308. See SMITHSTON ET AL., *supra* note 63, at 107; Shapiro & Titman, *supra* note 31, at 222.

309. See *supra* notes 153-56 and accompanying text (discussing credence goods).

310. See SMITH ET AL., *supra* note 125, at 377-78 (discussing one study that found a positive statistical relationship between hedging and the production of credence goods).

311. See Mian, *supra* note 208, at 423; see *supra* notes 180-85 and accompanying text (discussing reasons for management's reluctance to enter the external capital markets, including potential information asymmetries between corporate management and prospective investors).

312. See Mian, *supra* note 208, at 423.

313. See *id.*

314. See *id.*

the positive relationship predicted by his theoretical model.<sup>315</sup> Professor Mian's findings on market-to-book ratio, however, are contradicted by the research of Professor Géczy and, to a lesser extent, by the research of Professors Berkman and Bradbury. Both of these studies found a statistically significant positive relationship between hedging and market-to-book ratio.<sup>316</sup>

Professor Géczy also used the number of analysts following a company as a proxy for informational asymmetry, on the theory that fewer informational asymmetries between company insiders and potential investors should exist for firms with a greater analyst following. Professor Géczy thus predicted a negative relationship between hedging and analyst following, meaning that firms with a greater analyst following should be less likely to hedge than firms without such a following. The prediction was not supported by the empirical results.<sup>317</sup> The empirical research, therefore, is mixed with respect to the proposition that firms with the greatest informational asymmetries between management and potential investors are more likely to hedge than are other firms.

### 9. *Shareholder Diversification*

The analysis in part III.B indicates that firms with undiversified shareholders have greater hedging incentives consistent with shareholder wealth maximization than firms with diversified shareholders because undiversified shareholders have not eliminated unsystematic risk from their investment portfolios.<sup>318</sup> If, therefore, firm hedging practices are consistent with shareholder wealth maximization, we should observe a negative relationship between shareholder diversification levels and corporate hedging, meaning that firms with undiversified shareholders should be more likely to hedge than firms owned by diversified investors. Studies of the impact of undiversified shareholders on a firm's derivatives hedging policies are problematic, however, because firms with undiversified shareholders tend to be smaller and, due to economies of scale, firm size greatly impacts the firm's hedging decision.<sup>319</sup>

Studies that control for economies of scale or firm size, however, have found the predicted negative relationship. For example, a study of reinsurance practices (where the economies of scale affecting deriv-

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315. See *id.* at 428.

316. See Berkman & Bradbury, *supra* note 248, at 12-13 (finding a statistically significant (at 10% level) positive relationship between corporate hedging and the firm's earnings to price ratio when using fair value as the measure of derivative usage, but not when using contract amount as the measure of derivative usage); Géczy et al., *supra* note 246, at 1338-39.

317. See Géczy et al., *supra* note 246, at 1340.

318. See *supra* notes 234-38 (Part III.B.7) and accompanying text (discussing the benefits of firm hedging when shareholders are undiversified).

319. See *supra* note 260 and accompanying text (citing studies finding that large firms are more likely to hedge than small firms).

atives hedging are less marked) found that insurance firms with less diversified owners were more likely to reduce unsystematic risk than were insurance companies owned by well-diversified stockholders.<sup>320</sup> This finding is supported by a study of the derivatives hedging practices of firms in the gold-mining industry conducted by Professor Tufano. Professor Tufano found that large block ownership by diversified institutions was negatively correlated to firm hedging.<sup>321</sup> The available empirical evidence, therefore, generally supports the theory that firms with undiversified shareholders are more likely to hedge firm-level risk than firms owned by diversified investors.

### 10. Tax Schedule Convexity

The analysis in part III.B indicated that firms with a convex tax schedule have more hedging incentives consistent with shareholder wealth maximization than firms without convex tax schedules.<sup>322</sup> If, therefore, firm hedging practices are consistent with shareholder wealth maximization, we might expect to observe a positive relationship between hedging and tax schedule convexity, meaning that firms with convex tax schedules should be more likely to hedge than firms without convex tax schedules. The analysis in part III.B also indicated, however, that countervailing factors make tax savings an unlikely rationale for the hedging behavior of most firms.<sup>323</sup> This is reflected in the empirical evidence, which generally does not support the theory that firms hedge to generate tax savings.

A progressive tax rate and tax preference items, such as tax credits and tax loss carry forwards, lead to a more convex tax schedule.<sup>324</sup> Researchers evaluating the relationship between hedging and tax savings, therefore, have primarily studied these three variables. Of the numerous empirical studies reviewed by this author, only the study by Professor Nance found a significant positive relationship between tax schedule progressivity and derivatives hedging.<sup>325</sup> Because Professor

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320. See SMITH ET AL., *supra* note 125, at 377 (citing David Mayers & Clifford W. Smith, *On the Corporate Demand for Insurance*, 55 J. BUS. 281, 281-96 (1982)); Nance et al., *supra* note 125, at 281 (same). This finding is weakly supported by the research of Professor Dolde who found that, among firms that did hedge, smaller firms hedged more fully and frequently than did large ones. Dolde, *supra* note 247, at 191, 201. The relationship, however, was not considered statistically significant. See *id.*

321. See Tufano, *supra* note 246, at 1119-20.

322. See *supra* notes 227-33 (Part III.B.6) and accompanying text (discussing the impact of hedging on a firm's tax liability).

323. See *supra* notes 232-33 and accompanying text (noting that tax-based explanations do not provide a workable rationale for the hedging behavior of most firms).

324. See *supra* notes 227-33 (Part III.B.6) and accompanying text (discussing the potential impact of hedging on a firm's tax liability).

325. See Nance et al., *supra* note 125, at 272. *But see, e.g.*, Francis & Stephan, *supra* note 252, at 634 (finding no relationship in univariate and multivariate tests between derivatives hedging and the average tax rate, but finding some evidence of such a relationship in time series tests); Mian, *supra* note 208, at 431 (finding a negative relationship between tax rate progressivity and hedging).

Nance did not control for firm size, however, her results are questionable.<sup>326</sup> The empirical support with respect to tax credits is equally weak. Only Professor Nance found a positive relationship between investment tax credits (ITCs) and hedging, although Professor Mian found a significant positive relationship between foreign tax credits and hedging.<sup>327</sup> The evidence in support of a positive empirical relationship between tax loss carry forwards and hedging is stronger, but mixed.<sup>328</sup>

The empirical results, therefore, are generally not supportive of the hypothesis that firms hedge to gain tax savings. These results may be of limited utility, however, because the range of taxable income in the progressive region of the tax schedule and the number of tax preference items may incorporate other variables that make drawing conclusions difficult.<sup>329</sup> For example, firms with more income in the progressive region are also smaller, and, due to economies of scale, small firms hedge less than larger firms.<sup>330</sup> Studies that do not scale for size, therefore, are of questionable reliability. In addition, only certain types of activities give rise to ITCs. There may be something unique to these activities, other than the generation of ITCs, that affects firm hedging.<sup>331</sup> Finally, many large corporations that hedge do not have income in the progressive portion of the tax schedule and do not have tax losses or ITCs.<sup>332</sup> Even if the empirical evidence were supportive of tax-motivated hedging, therefore, tax-based explanations would not reconcile the hedging activities of most firms with the desire to maximize shareholder wealth.

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326. See Nance et al., *supra* note 125, at 280.

327. See *id.* at 272 (finding a significant positive relationship between ITCs and hedging); Mian, *supra* note 208, at 431 (finding a significant positive relationship between foreign tax credits and hedging). Professor Mian theorized, however, that the observed positive empirical relationship between foreign tax credits and hedging could be due to a connection between foreign operations and hedging, rather than to a connection between tax schedule convexity and hedging. The positive statistical correlation between foreign tax credits and hedging could thus indicate an attempt by firms to hedge foreign-currency risk, rather than an attempt to gain tax advantages. See *id.*

328. See Géczy et al., *supra* note 246, at 1338, 1340 (finding no relationship between tax loss carry forwards and hedging); Mian, *supra* note 208, at 431 (same); Nance et al., *supra* note 125, at 272 (same); Tufano, *supra* note 246, at 1109, 1117 (same). *But see* Berkman & Bradbury, *supra* note 248, at 12 (finding a significant positive relationship between tax loss carry forwards and hedging); Dolde, *supra* note 247, at 203 (same). Professor Mian posited that the lack of an observed empirical relationship in his study between tax loss carry forwards and hedging could be due to the fact that, while tax loss carry forwards are a good proxy for a low marginal tax rate, they are a poor proxy for convexity of the tax schedule. See Mian, *supra* note 208, at 431 n.15.

329. See Nance et al., *supra* note 125, at 272-74. Even multivariate analyses do not fully alleviate this cross-correlation problem. See, e.g., Francis & Stephan, *supra* note 252, at 629 (stating that "the explanatory power of the [multivariate] models is less than 2 percent; this is not surprising given the correlations between the proxy variables and the hedge decision variable").

330. See Nance et al., *supra* note 125, at 272-74 (stating that firms with income in the progressive region of the tax code are smaller).

331. See *id.*

332. See Romano, *supra* note 9, at 37.



### B. Firm Characteristics Consistent with Managerial Explanations for Hedging

If firms hedge to protect risk-averse managers, then we should expect to see more hedging by firms whose managers own large stock holdings than by firms whose managers own large option holdings.<sup>333</sup> This is due to the fact that, because option value is increased with greater volatility in stock value, managers with large option holdings can personally benefit from greater volatility in the firm's stock price and, therefore, have less incentive to hedge firm-level risk.<sup>334</sup> This hypothesis was tested by Professor Tufano and found to be supported by the empirical evidence. The level of management's option ownership was negatively correlated with firm hedging, while the level of management stock ownership was positively correlated with firm hedging.<sup>335</sup> Professors Berkman and Bradbury, however, used director stock ownership levels as a proxy for management diversification and found very little support for this hypothesis.<sup>336</sup> Similarly, Professor Géczy found no support for the hypothesis that firms hedge to protect undiversified managers.<sup>337</sup> The empirical evidence, therefore, is generally mixed with respect to the theory that firms hedge in order to protect risk-averse managers.

### C. Hedging Substitutes

Convertible debt, preferred stock, asset liquidity, and diversifying mergers can each operate as a substitute for firm hedging.<sup>338</sup> We might, therefore, predict an inverse relationship between the use of each of these devices and firm-level derivatives hedging. At least three studies tested for a relationship between firm hedging levels and the presence of convertible debt or preferred stock in the firm's capital structure and found none.<sup>339</sup> Only Professor Géczy attempted to reconcile this empirical finding with the theoretical prediction. He theorized that convertible debt and preferred stock could operate as

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333. See Tufano, *supra* note 246, at 1119.

334. See Krawiec, *supra* note 2, at 19 n.87 (demonstrating that option value increases with underlying volatility).

335. See Tufano, *supra* note 246, at 1118. This is in contrast to stock ownership by large nonmanagement block holders (defined as shareholders that own more than 10% of the firm's outstanding stock), which Professor Tufano found to be negatively correlated with firm hedging. See *id.* at 1119-20. See *supra* notes 78-81 and accompanying text (discussing reasons for potential management risk aversion, including high levels of stock ownership in the firm).

336. See Berkman & Bradbury, *supra* note 248, at 12-13 (finding a positive relationship (but at slightly less than a 10% significance level) between director share ownership and hedging when using fair value as a measure of derivative usage, but no relationship when using contract amount as the measure of derivative usage).

337. See Géczy et al., *supra* note 246, at 1340.

338. See *supra* notes 242-46 or *infra* notes 341-46 and accompanying text (discussing hedging substitutes).

339. See Berkman & Bradbury, *supra* note 248, at 12-13; Géczy et al., *supra* note 246, at 1334, 1336 (table); Nance et al., *supra* note 125, at 274.

additional leverage, meaning that their greater use in a firm's capital structure should result in more hedging, not less.<sup>340</sup> Another possible explanation is that hedging is primarily employed for other purposes, such as reducing the noise in firm performance, hedging systematic risk, or substituting for vertical integration, not served by the use of convertible debt or preferred stock in the firm's capital structure.

At least three studies have found that firms using derivatives to hedge risk exposure have significantly less liquid assets than nonhedging firms, consistent with the predictions of the theoretical model.<sup>341</sup> In addition, the retention by a firm of large cash balances relative to current needs can operate as protection against potential financial distress and act as a substitute for hedging.<sup>342</sup> We might expect, therefore, to see a negative relationship between large cash balances and firm hedging, meaning that firms with large cash balances should be less likely to hedge than firms with smaller cash balances. This theory was supported by the research of Professor Tufano, who found that firms that carry large cash balances relative to current needs are in fact less likely to hedge than firms without such cash reserves.<sup>343</sup> Professors Berkman and Bradbury also used the dividend payout ratio, defined as dividends per share divided by earnings per share, to proxy for firm liquidity levels, on the assumption that firms that pay out a large portion of their income as dividends will have lower cash reserves. Consistent with their predictions, they found a statistically significant positive relationship between dividend payout rates and derivatives hedging.<sup>344</sup>

Finally, because firms can diversify as a substitute for hedging, we might expect to see a negative correlation between firm-level diversification and hedging, meaning that less diversified firms should hedge more than other firms.<sup>345</sup> Professor Tufano used the percentage of firm assets outside the gold mining industry as a proxy for firm-level diversification and found no significant relationship with hedging.<sup>346</sup> The empirical evidence is thus generally supportive of asset liquidity

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340. See Géczy et al., *supra* note 246, at 1329; *supra* notes 268-69 and accompanying text (predicting a positive relationship between hedging and leverage).

341. See Berkman & Bradbury, *supra* note 248, at 12-13 & tbl.5 (defining liquidity as the "log of current assets minus inventory over current liabilities"). Professors Berkman and Bradbury found the relationship between asset liquidity and firm hedging to be statistically significant (at 5% level) when using fair value as the measure of derivative usage, but not when using contract amount as the measure of derivative usage). See *id.*; Mian, *supra* note 208, at 434 (finding that firms that hedge have lower liquidity levels); Nance et al., *supra* note 125, at 274 (using the average of the firm's current ratio (i.e., current assets divided by current liabilities) over the course of the study period as a proxy for asset liquidity and finding that firms that hedge have less liquid assets).

342. See Tufano, *supra* note 246, at 1121.

343. See *id.*

344. See Berkman & Bradbury, *supra* note 248, at 12-13 (finding a statistically significant (at 10% level) positive relationship).

345. See Tufano, *supra* note 246, at 1112.

346. See *id.* at 1121.

as a substitute for firm hedging, but not supportive of the use of convertible debt, preferred stock, or firm-level diversification as hedging substitutes. Further research, therefore, should seek to determine whether there are special functions served by derivatives hedging that are not equally served by convertible debt, preferred stock, or firm-level diversification.

#### D. Summary of Findings

To summarize, although many questions remained unanswered and further research is still needed, the available empirical evidence, while mixed, generally supports the theory that corporate hedging practices are consistent with shareholder wealth maximization. It should be noted, however, that much of the empirical evidence is also consistent with managerial-based motives for corporate hedging. For example, some researchers found empirical support for the hypothesis that managers with large option holdings, as opposed to large stock holdings, can gain personally from greater variance in their firms' earnings and that such firms, therefore, are less likely to hedge than firms with managers having large stock holdings.<sup>347</sup> Other researchers, however, found no support for this hypothesis.<sup>348</sup> Furthermore, some empirical evidence that is consistent with shareholder wealth maximization, for example that firms with higher earnings variance or that have a high probability of experiencing financial distress for other reasons are more likely to hedge, is equally consistent with a managerialist explanation for hedging. Finally, many of the factors discussed in part III.B that may enable firms to generate shareholder wealth through hedging remain untested and are, perhaps, untestable. For example, to this author's knowledge, no studies have empirically tested whether firms producing goods that require after market sales or service; act as suppliers of goods involving "switching costs;" require specialized goods or services in order to operate; have fewer sources of supply; operate in highly competitive industries; use specialized labor; spend large resources on employee education and training; derive value primarily from intangible assets; operate in industries that require salespersons to develop relationships with customers; or are not vertically integrated are more likely to hedge than are other firms.<sup>349</sup>

### V. IMPLICATIONS FOR CORPORATE DECISIONMAKING

The analysis in part III.B indicates that there are numerous potential benefits that may accrue to shareholders through firm level

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347. See *supra* notes 333-35 and accompanying text.

348. See *supra* notes 336-37 and accompanying text.

349. See *supra* notes 103-238 (Part III.B) and accompanying text (discussing firms most able to enhance shareholder wealth through derivatives hedging).

hedging. Given these benefits, hedging can be analyzed, not as a mere financing decision, but as an investment in firm stability. Consequently, the decision of whether and how much to hedge can be analyzed as would any other investment decision. In other words, firms should weigh the costs of hedging against the potential benefits of reducing firm-level risk. The firm should hedge up to the point where the cost of reducing additional risk is equal to the cost of forgoing further risk reduction.<sup>350</sup>

The costs of hedging include direct costs, such as the premium paid for the hedge, as well as forgone upside profit.<sup>351</sup> There are also indirect costs involved in hedging, including the hiring and training of personnel knowledgeable about advanced financial instruments, the purchase of computer equipment and software, and the often substantial costs of monitoring the hedging program.<sup>352</sup> There are significant transactional and informational economies of scale associated with these costs, and the indirect costs tend to be higher for over-the-counter (OTC) derivatives than for exchange-traded derivatives.<sup>353</sup>

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350. See Shapiro & Titman, *supra* note 31, at 229. In this sense, the decision of whether to hedge firm-level risk depends on whether the transaction costs associated with hedging are greater than the transaction costs associated with variability in input or output prices. The following illustrative example was provided by Professor Paul Mahoney:

Assume that a company makes a simple product (widgets) using a single commodity (corn) as an input. The price of corn varies; it is \$1 per unit half of the time and \$2 per unit half of the time. It is only profitable to manufacture widgets when the price of corn is less than, say \$1.75. The firm thus has a choice. It could choose to operate half of the time and shut down half of the time. Alternatively, it could (by incurring some transaction cost) enter into a forward contract to buy corn at \$1.50 per unit, and therefore operate all the time. If starting up and shutting down periodically were costless, shareholders would prefer to do so rather than incur the transaction cost associated with hedging. In most industries, however, there are significant transaction costs associated with the start-and-stop production method because it would result in inefficient use of other inputs, such as labor, and other supplies, etc.

See e-mail message from Paul G. Mahoney, Professor of Law, University of Virginia School of Law to Kimberly D. Krawiec, Assistant Professor, University of Oregon School of Law (July 9, 1998) (on file with the *University of Illinois Law Review*). Professor Tufano has theorized, however, that starting and stopping production in this manner may be relatively low-cost for firms in the gold-mining industry. See *supra* note 283 and accompanying text.

351. Because derivatives hedging reduces earnings variance, both corporate losses and profits are reduced. See Krawiec, *supra* note 2, at 9. Just as an insurance purchaser pays a premium to avoid the risk of loss, this forgone profit represents the price derivatives hedgers are willing to pay to avoid what they consider to be unacceptable risk levels. See *id.* at 15 n.65. Lost upside potential is a major factor that must be considered in any firm hedging decision. For example, Professor Stephen Figlewski's survey of financial derivatives use by life insurance firms revealed that 50% of the larger and 82% of the smaller derivatives nonusers surveyed listed "too much return has to be given up for the amount of risk reduction that is possible" in response to a query of their reasons for not using derivatives. See STEPHEN FIGLEWSKI, *THE USE OF FINANCIAL FUTURES AND OPTIONS BY LIFE INSURANCE COMPANIES* 6 (Solomon Bros. Ctr. for the Study of Fin. Insts. Working Paper Series No. 469, 1988).

352. See Mian, *supra* note 208, at 424. Although there are costs associated with monitoring the credit, legal and operational risk of a derivatives portfolio, the largest costs appear to be associated with monitoring market risk. For a discussion of the methods, technology, and costs involved in market risk management, see Krawiec, *supra* note 2, at 20-23.

353. The lower costs of monitoring an exchange-traded, as opposed to an OTC, derivatives portfolio stem from various factors, including the greater liquidity of exchange-traded derivatives due to their standardization and smaller contract size, their greater price transparency due

There may also be less obvious costs of derivative hedging. For example, the failure to acquire the technical and informational upgrades necessary to hedge adequately and prudently has proven to be an extraordinarily costly mistake for some firms.<sup>354</sup> In addition, Professor Lynn A. Stout has persuasively argued that the lack of financial sophistication of many derivatives end-users may combine with the “winner’s curse” and lead hedgers to overestimate the benefits of their hedging programs.<sup>355</sup>

Finally, it should be remembered that derivative hedging is only one of many means of reducing firm-level risk and the agency costs associated with debt. Nonetheless, corporate management may determine that derivatives are one of the most effective and least expensive of these methods. For example, firms can reduce the probability of financial distress by reducing the level of debt in the firm’s capital structure, investing in less risky assets, purchasing liability or property insurance, merging with another firm, or using on-balance sheet hedging strategies.<sup>356</sup> However, diversifying acquisitions and on-balance sheet hedging are each expensive methods of corporate risk reduction, and a firm that reduces the leverage in its capital structure may gain a reduced likelihood of financial distress, but it may lose tax advantages and increase other agency costs in the process.<sup>357</sup> Similarly, a firm

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to an active trading market, their lower credit risk due to exchange-imposed credit enhancements, and their relative structural simplicity as compared with OTC derivatives. *See generally* Krawiec, *supra* note 2 (comparing OTC and exchange-traded derivatives).

354. *See* Krawiec, *supra* note 2, at 24-30 (discussing large derivatives losses by Gibson Greetings Inc., Proctor & Gamble Company, and Orange County, California), 40-42 (discussing large derivatives losses by Barings, plc).

355. *See* Stout, *supra* note 7, at 56 n.15.

356. *See supra* notes 242-45 and accompanying text (discussing hedging substitutes that reduce the likelihood of financial distress).

357. *See supra* notes 93-94, 99 and accompanying text (discussing the shareholder wealth reduction effects of diversifying acquisitions); *supra* note 244 (discussing on-balance sheet hedging); *supra* notes 210-11 (Part III.B.4.b) and accompanying text (discussing the relationship between leverage and both taxes and agency costs).

The realization that diversifying acquisitions are an expensive means of reducing firm-level risk is extremely important to the derivative hedging debate and helps resolve a recurring puzzle in the corporate finance literature. Recall that in addition to the Modigliani-Miller irrelevance theorem, it is primarily the empirical evidence of the wealth reducing effects of conglomerate mergers that have led critics to question the shareholder benefits of derivative hedging. *See supra* notes 93-94 and accompanying text. Traditional corporate finance theory has often assumed that, under the Modigliani-Miller theorem, the wealth reduction effects of diversifying acquisitions must be attributable to the fact that diversified shareholders have already eliminated systematic risk from their investment portfolios. *See supra* notes 95-99 and accompanying text. Given the evidence of the beneficial effects of firm-level risk reduction on shareholder wealth that are analyzed in this paper, however, it seems more likely that the costs of diversifying acquisitions merely outweigh the potential benefits. This could be due both to the large premiums often paid in corporate combinations and to the possibility that large, highly diverse firms are more difficult to manage. *See GILSON & BLACK, supra* note 72, at 317 (discussing the legal and administrative costs and the large premiums typically paid in a corporate acquisition); Buckley, *supra* note 89, at 825 (discussing potential diseconomies of scale of large conglomerates). Large, diverse firms may also have higher monitoring costs. This is because a conglomerate firm’s stock price reflects the value of all divisions, making shareholder monitoring of individual division managers’ performance more difficult. *See id.* at 826.

could reduce the agency costs associated with debt through the use of convertible bonds, more restrictive debt covenants, or investment in less risky or more liquid assets. Each of these methods, however, may impose substantial costs as well. For example, the use of convertible bonds will force current owners to share upside profit with convertible bondholders, reducing shareholders' equity interest.<sup>358</sup> Likewise, restrictive debt covenants and restrictions on the liquidity or risk levels of potential assets may impose costs by restricting the firm's investment options.<sup>359</sup> Furthermore, derivatives hedging may serve functions unrelated to risk reduction that are not well served by other alternatives. For example, derivatives hedging may decrease the noise in firm performance, reduce systematic risk, or operate as an inexpensive alternative to vertical integration.<sup>360</sup>

It is not my intent in this article to argue that all firms should hedge or that those firms choosing to hedge should hedge fully. Many corporate managers will no doubt determine after conducting a cost-benefit analysis that the costs of hedging outweigh any risk reduction benefits that may accrue to the firm. Rather, my purpose is to suggest that the corporate hedging decision should be undertaken along with and in the same manner as other decisions affecting shareholder wealth that the firm's management is commonly required to make, such as deciding whether to build a new factory, sell a division of marginal profitability, or embark on a new line of business.<sup>361</sup>

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358. In a public corporation where shareholders typically are not concerned about maintaining their percentage ownership interest, this cost may be negligible. In a smaller corporation or in a corporation with a controlling shareholder or group, however, these concerns may be more significant.

359. See *supra* text accompanying note 286 (discussing the potential costs of restrictive debt covenants).

360. See *supra* notes 106-21 and accompanying text (Part III.B.1) (discussing hedging of systematic risk); notes 215-26 (Part III.B.5) and accompanying text (discussing vertical integration).

361. Although each of these actions may profoundly affect shareholder wealth, corporation statutes typically leave these and similar decisions to the corporation's board of directors and management. See, e.g., DEL. CODE ANN. tit. 8, §141(a) (1974) ("The business and affairs of every corporation organized under this chapter shall be managed by or under the direction of a board of directors, except as may be otherwise provided in this chapter or in its certificate of incorporation."); REVISED MODEL BUS. CORP. ACT § 8.01(b) (1998) ("All corporate powers shall be exercised by or under the authority of, and the business and affairs of the corporation managed under the direction of, its board of directors, subject to any limitation set forth in the articles of incorporation or in an agreement authorized under section 7.32."); HARRY G. HENN & JOHN R. ALEXANDER, LAWS OF CORPORATIONS § 71, at 128 (3d ed. 1983) ("The corporation is managed by its board of directors, who are elected by the shareholders. Otherwise, the shareholders' management functions are usually limited to approval of extraordinary matters."). Shareholder control of the corporation is usually restricted to election of directors; adoption, amendment, and repeal of by-law provisions; approval of amendments to the articles of incorporation; adoption of shareholder resolutions; the sale of all or substantially all of the corporation's assets other than in the ordinary course of business; and the merger, consolidation or dissolution of the company. See, e.g., *id.* § 188, at 490, § 195, at 517.

## VI. IMPLICATIONS FOR LEGAL POLICY

The realization that the corporate hedging decision is a business decision, just like many other decisions impacting shareholder wealth regularly made by corporate boards of directors and managements, has profound implications for the appropriate legal policy that should govern the firm hedging decision. Specifically, the decision of whether and how much to hedge should be protected by the business judgment rule, as are most other well-informed, disinterested management decisions that may impact shareholder wealth.<sup>362</sup> Calls for an extensive re-evaluation of current legal norms governing the corporate hedging decision are thus misplaced and unwarranted.

Professor Hu, for example, has argued that the failure of corporate law to differentiate management's duties to the shareholders from management's duties to the corporate entity has led to an intolerable dilemma in the derivatives hedging context.<sup>363</sup> If management owes a fiduciary duty primarily or exclusively to the shareholders, then hedging firm-level risk in a large, public corporation with diversified shareholders violates that duty.<sup>364</sup> If, on the other hand, management's fiduciary duty is owed primarily to the corporate entity itself, then management would breach that fiduciary duty by failing to hedge.<sup>365</sup> While this author agrees with Professor Hu's assertion that corporate law should be clarified to specify precisely to whom management does and does not owe a fiduciary duty, this dilemma is neither unique to the corporate hedging decision nor a more serious concern in that context than in the context of the other investment and operating decisions regularly made by firm management. In fact, as previously indicated, the assertion that corporate hedging undermines shareholder wealth to the benefit of other corporate constituencies, including management, is unsupported. Rather, the theoretical and empirical evidence indicates that derivatives may be a low-cost and effective method of aligning the often conflicting interests of shareholders and other corporate constituents with respect to risk management. By reducing the possibility of financial distress, derivative hedging benefits customers, suppliers, creditors, employees, management, and other stakeholders with an interest in the continued viability of the firm. By reducing the contracting and agency costs borne by the shareholders in transacting with these stakeholders, derivatives hedging also enhances shareholder wealth.

In addition, Professor Hu has expressed concern that the advent of widespread derivatives hedging raises important questions and po-

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362. See *supra* notes 14-15, 83 (discussing the business judgment rule); *infra* note 375 and accompanying text (same); *supra* note 361 and accompanying text (discussing the limited role of shareholders in managing the corporation).

363. See Hu, *New Financial Products*, *supra* note 7, at 1308-09.

364. See *id.*

365. See *id.*

tential conflicts between management duties to diversified and undiversified shareholders.<sup>366</sup> For example, if some shareholders are undiversified, then the law should address whether management can or should hedge in order to benefit these undiversified investors, despite the fact that such action, in his view, may harm diversified shareholders.<sup>367</sup> This raises questions as to whether and how management should be required to gauge the level of shareholder diversification to determine the risk preferences of individual shareholders.<sup>368</sup>

Again, corporate law modifications such as these are neither desirable nor required. Even assuming that derivatives hedging harms diversified shareholders, a contention for which there is little or no supportive evidence, Merton Miller's investor clientele theory indicates that a corporation's hedging policy is a commodity like any other.<sup>369</sup> To sell their "product" for the maximum amount possible, corporations will either hedge or not hedge, depending on which investor clientele preferences are undersupplied. Corporations will hedge if there is an unsatisfied demand for the securities of corporations that hedge and will not hedge if there is an unsatisfied demand for the securities of corporations that do not hedge. In other words, once the corporation settles on a hedging policy and discloses those intentions, investors will sort themselves out according to risk preference by buying and selling securities until the market approximates an equilibrium point.<sup>370</sup> In this regard, legal scholars who have advocated greater disclosure of corporate derivatives usage are on the right track.<sup>371</sup>

Finally, some commentators have expressed concern that the 1992 Indiana case of *Brane v. Roth*<sup>372</sup> may be read to impose on all boards of directors a fiduciary duty to adequately hedge firm-level

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366. See Hu, *Hedging Expectations*, *supra* note 7, at 48; Hu, *New Financial Products*, *supra* note 7, at 1309.

367. See Hu, *Hedging Expectations*, *supra* note 7, at 48 ("In evaluating hedging alternatives, corporate managers and boards of directors need to supplement norm functions with considerations pertaining to shareholder expectations."); Hu, *New Financial Products*, *supra* note 7, at 1309 ("If many shareholders (or a few particularly large shareholders) hold undiversified portfolios through ignorance or legal constraint, should directors be required to act as trustees and thus mandate diversification at the corporate level?").

368. See Hu, *New Financial Products*, *supra* note 7, at 1309 ("How would a corporation know how diversified or sophisticated its shareholders are, other than through crude measures like the extent of institutional investor holdings?"); Hu, *Hedging Expectations*, *supra* note 7, at 48 (arguing that "managements should try to make reasonable assumptions regarding whether or not actual or potential shareholder[s] expect them to engage in hedging . . . [A] high level of institutional ownership typically suggests less of a need to reduce risk at the corporate level because of the presumptively well-diversified nature of the investor.").

369. See VAN HORNE, *supra* note 43, at 264-65; Miller, *supra* note 68, at 268-69.

370. See VAN HORNE, *supra* note 43, at 568; Hu, *Hedging Expectations*, *supra* note 7, at 48; Miller, *supra* note 68, at 268-69.

371. See Hu, *Hedging Expectations*, *supra* note 7, at 49; Krawiec, *supra* note 2, at 59-61.

372. See *Brane v. Roth*, 590 N.E.2d 587 (Ind. 1992).



risk.<sup>373</sup> This interpretation reads more into the court's opinion than is warranted. Although the court's reasoning is disturbingly unclear, the case should properly be read not to impose a fiduciary duty to hedge, but to impose a duty to be fully informed and to properly supervise employees once hedging has been undertaken.<sup>374</sup> This is just an extension of the traditional corporate law rule that, in order to enjoy the protection of the business judgment rule, management must not be grossly negligent in failing to fully inform itself prior to making a business decision or in failing to properly supervise employees.<sup>375</sup>

In *Brane*, the court found that the board of directors, after determining to hedge the corporation's risk of loss from fluctuations in grain prices, hired an employee who was inexperienced and unknowledgeable about derivatives, failed to inform itself of even the basics of derivatives hedging and then failed to properly supervise the employee.<sup>376</sup> If the board's lack of knowledge and oversight had caused the cooperative to lose money on the employee's speculative or unauthorized derivatives trades, the decision to hold the board of directors responsible would have been uncontroversial.<sup>377</sup> The court found, however, that the cooperative suffered losses due to the employee's failure to hedge a large portion of the cooperative's risk exposure, presumably because he did not adequately understand hedging strategy and lacked oversight from a competent board.<sup>378</sup> Unfortunately, the court did not sufficiently clarify that the board's liability stemmed

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373. See, e.g., Hu, *Hedging Expectations*, *supra* note 7, at 30 (discussing reactions of practicing bar to *Brane v. Roth*); Gerry W. Markham, *Fiduciary Duties Under the Commodity Exchange Act*, 68 NOTRE DAME L. REV. 199, 201 n.8 (1992) (citing *Brane v. Roth* and stating that "[t]he failure to hedge may be a violation of the fiduciary duties of the directors of a company with hedgeable price risks."); Philip M. Johnson, *Is Failing to Hedge a Legal Virus?*, FUTURES, Nov. 1993, at 18, 18 (questioning whether, in light of *Brane v. Roth*, management may face per se liability for failures to hedge avoidable risk).

374. See *Brane*, 590 N.E.2d at 589-90 (upholding lower court decision that grain cooperative board of directors, after determining to hedge, failed to adequately inform itself of the fundamentals of hedging, hired an employee to oversee the program who had insufficient knowledge and experience in derivatives hedging and then failed to supervise him properly); see also Elizabeth A. Smith, *Recent Developments in Corporation Law*, 26 IND. L. REV. 781, 795 (1993) ("The court [in *Brane*] noted that the business judgment rule protects directors from liability, but only if their decisions are informed ones.").

375. See *Joy v. North*, 692 F.2d 880, 886 (2d Cir. 1982) ("[The business judgment rule] does not apply in cases, e.g., in which the corporate decision . . . results from an obvious and prolonged failure to exercise oversight or supervision."); *Smith v. Van Gorkom*, 488 A.2d 858, 873 (Del. 1985) ("We think the concept of gross negligence is also the proper standard for determining whether a business judgement reached by a board of directors was an informed one.").

376. See *Brane*, 590 N.E.2d at 589-90.

377. Many derivatives end-users have suffered losses due to an employee's unauthorized trades or from ill-informed speculations by inadequately supervised employees. See, e.g., Krawiec, *supra* note 2, at 40-43 (discussing losses of \$1 billion at Barings, plc due to unauthorized trades by 27-year old "rogue trader" Nicholas Leeson); *id.* at 24-30 (discussing large losses at Gibson Greetings, Inc., Proctor & Gamble Company, and Orange County, California, due to failures by employees to control market risk in each organization's derivatives portfolio and failures by boards of directors (and, in the case of Orange County, county government officials) to properly oversee derivatives activity).

378. See *Brane v. Roth*, 590 N.E.2d 587, 589-90 (Ind. 1992).

from its failure to be informed and vigilant, rather than from its failure to fully hedge the cooperative's risk exposure, leading to potential misinterpretation.<sup>379</sup> Corporate management should not be held liable for a good faith, well-informed decision not to hedge corporate risk, and courts citing to *Brane* have not done so for the purpose of imposing on management an affirmative duty to fully or partially hedge price risk.<sup>380</sup>

## VII. CONCLUSION

This article attempts to rectify a previous weakness in derivatives legal scholarship by extensively analyzing the potential impact of derivatives hedging on shareholder value. This is in contrast to much previous legal scholarship, which focused instead on the benefits accruing to the corporate entity from derivatives hedging. Contrary to the assertions of some legal commentators who have analyzed this issue,<sup>381</sup> this author concludes, based on both a theoretical and an empirical analysis, that there are numerous potential benefits that may accrue to corporate shareholders from risk reduction at the firm level. There are, however, costs associated with the use of derivatives as well. This implies that the decision of whether and how extensively to hedge risk at the firm level should be made in the same manner and along with the many other decisions corporate management is commonly required to make regarding how to best maximize shareholder wealth.

The realization that the firm hedging decision is merely a business decision like any other has profound implications for corporate legal policy. Specifically, calls by some legal scholars for a broad rethinking of traditional corporate legal norms in the derivatives hedging context are misplaced. Rather, the firm hedging decision, just like the numerous other investment and operating decisions commonly made by management on behalf of the shareholders, should be protected by the business judgment rule, so long as that decision is disinterested, well-informed, and made in good faith.

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379. *See id.* at 591-92.

380. In fact, as of the date of this article, all cites to *Brane* were in connection with other issues decided in the case. None of the opinions citing *Brane* related to corporate use of derivatives.

381. *See supra* note 7.