IPO LIABILITY AND ENTREPRENEURIAL RESPONSE

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This Article explores how legal liability in the IPO context can affect an entrepreneur's decision of whether and how to take a firm public. Liability under the Securities Act of 1933 effectively embeds a put option in an IPO security, forcing the entrepreneur to insure shareholders against poor firm performance, inflating the price of the security, and exposing the entrepreneur to risk. This may cause IPO firms to appear to underperform relative to non-IPO firms as the option value decays, and may lead the entrepreneur to undertake strategic (but destructive) responses to minimize the put value and his exposure to risk. Because of the value-destroying characteristics of these responses—which include initial underpricing, entrenchment, lower net present value projects, asset partitioning, and reduced disclosure—the present state of affairs is inefficient compared to a system where the entrepreneur can simply allocate the risk to shareholders.

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INTRODUCTION

Mandatory disclosure rules are often perceived as a no-lose quick fix. After all, what's the harm in simply requiring one party to a transaction to give information already in her possession to another party? Such a requirement appears to promote fairness with little, if any, overall social cost, and, based largely on this premise, disclosure rules are a popular choice among academics and legislators. But there is a fallacy here: information is costly to obtain, and certainty may be impossible to achieve. There are thus hidden costs to disclosure rules: when information is incomplete or uncertain, the party burdened with making accurate disclosure is made to bear the risk that those disclosures will prove incorrect. Bearing that risk may well affect the party's substantive behavior in socially undesirable ways.

Such a situation arises in the securities context, which is the focus of this Article. Sellers of securities—such as founding entrepreneurs—are required under the Securities Act of 1933 to make full and complete disclosure to purchasing investors (the public shareholders) in public offerings.[1] As I will show, the imposition of this disclosure requirement apportions risk in a way that the parties to the transaction—the shareholder and the entrepreneur—likely find suboptimal, and this distorts their incentives in undesirable ways.

To begin with the basic framework, consider the stylized "bargaining" that takes place between a selling entrepreneur and purchasing shareholders. When an entrepreneur who has founded a firm and developed its business decides to take it public in an initial public offering (IPO), he gets to choose many things about the firm's initial setup. For instance, he may decide to embed takeover protection in

[1] Securities Act of 1933 § 11(a), 15 U.S.C. § 77k(a) (2000). Throughout, the Securities Act of 1933 will he referred to simply as the "Securities Act."

the firm's charter, retain voting control and issue only nonvoting stock, or partition the firm's assets and sell only a part thereof to the public shareholders. These choices are subject to the shareholder's valuation of the resulting structure: a shareholder will he willing to pay more or less for the firm's shares depending on whether she finds the entrepreneur's choices agreeable. With this ability to "bargain," in general we expect to see the selling entrepreneur and purchasing shareholders reach efficient outcomes in the structure and form of the firm and the firm's IPO.

One such area of bargaining between entrepreneur and shareholder involves the assignment of risk. Because the entrepreneur lacks the ability to diversify away idiosyncratic risk, while the shareholder can diversify completely, the firm is actually worth more in the hands of the shareholder than it is in the hands of the entrepreneur.[2] Thus, when the entrepreneur sells a share of the firm to the shareholder, one basic area of agreement between the two is that the shareholder will bear the risk on the shares that she purchases. This is perhaps such an obvious concept as to appear almost trivial: we suppose that when a shareholder purchases shares of, say, IBM on the open market, the shareholder is fully aware that she bears the risk of a decline in the value of those shares.

The argument of this Article, however, is that the U.S. securities laws do not allow this simple risk-sharing bargain to be struck in the IPO context,[3] with negative consequences for shareholder and entrepreneur alike. The reason is that the material misstatement or omis-

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[2] "Idiosyncratic," "unique," "firm-specific," or "diversifiable" risk is risk that is particular to that specific firm, whereas "systemic" or "market" risk is risk present in the market generally. *See* RICHARD A. BREALEY & STEWART MYERS, PRINCIPLES OF CORPORATE FINANCE 168 (7th ed. 2003) (distinguishing between "unique risk" and "market risk"). For example, a gold mining firm has idiosyncratic risk in that its properties may or may not contain any gold; it also has systemic risk in that the market price of gold may rise or fall (this risk is systemic because it derives from economy-wide factors that affect *all* firms in the industry). Because idiosyncratic risks among many firms should, by definition, tend to cancel one another out, an investor holding a diverse portfolio of securities escapes much exposure to idiosyncratic risk. See, for example, *Wisconsin Real Estate Investment Trust v. Weinstein*, 781 F.2d 589, 598 (7th Cir. 1986), for a discussion by Judge Frank Easterbrook of shareholder diversification.

[3] While "seasoned" issuers—those that are already public companies—are also subject to Securities Act liability for the public sale of securities, the rules that apply to them are somewhat different, and much more limited in practical application, than the rules that apply to IPO firms. *See infra* notes 26, 63, and accompanying text (describing the greater level of protection that seasoned issuers enjoy for forward-looking statements).

sion liability standard of section 11 of the Securities Act[4] effectively grants the shareholder the right to "put" back the shares to the entrepreneur for their purchase price in the bad state of the world in which the firm performs poorly.[5] The shareholder relies on information provided by the entrepreneur—including the entrepreneur's expectations about future performance—to make her purchase decision, and if, in hindsight, this information appears to have been wrong, the shareholder has the legal right to recover her losses from the firm, wiping out the entrepreneur's stake. The entrepreneur ends up bearing idiosyncratic risk that could be more efficiently borne by the shareholder. There are two principal implications of this risk allocation.

First, because the shareholder purchases not just the firm's equity but also a "put option" exercisable in the bad state of the world, the shareholder pays more for the share-*cum*-option than she would have paid for just the share. This means that the firm initially appears to be valued in excess of the net present value of its future cash flows, and, over time, as the value of the option component of the security declines, the firm will tend to appear to underperform relative to non-IPO firms. This relative underperformance is exacerbated when the shareholder exercises her put option in the bad state of the world, pulling assets out of the firm. Underperformance of IPO firms, which has sometimes been held up as evidence of market inefficiency, may in fact be an artifact of regulatory distortion.

Second, and more importantly, because this allocation of risk is undesirable to the entrepreneur, the entrepreneur may undertake a number of strategic responses to attempt to minimize her exposure to the firm's idiosyncratic risk. These actions could involve initial underpricing of the IPO, managerial entrenchment, choosing lower value (but safer) business projects, investing in insurance or hedging transactions, partitioning of assets, refraining from disclosing positive information about the firm in the IPO prospectus, or firm-level diversification ("empire building"). Most of these activities have the potential to destroy value and lead to outcomes that are inefficient com-

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[4] 15 U.S.C. § 77k (2000).

[5] A "put" or "put option" is the right to sell a security at a specified price (the "strike" or "exercise" price). For example, if an investor "exercises" a put option with a strike price of $30 when the price of the security has dropped to $10, the investor's counterparty is forced to pay $30 to the investor. The put here, at the moment of exercise, is worth a net $20. *See infra* Part II.B (describing the put option characteristics of Securities Act liability).

pared to allowing the entrepreneur and shareholder to allocate risk between them as they choose.

I. A NOTE ON THIS ARTICLE'S CONTRIBUTION TO THE LITERATURE

The chief aim of this Article is to describe the effect that securities liability has on the incentives of the entrepreneur and the firm from an ex ante perspective, providing a linkage between the public capital-raising process and the nature and structure of the public firms that result. This is something on which relatively little has been written. While some have argued in very general terms that overly harsh liability or an overly litigious environment may keep issuers from the public markets in favor of, *inter alia*, private or offshore deals,[6] those authors do not consider the entrepreneur's broad range of dynamic responses to the threat of litigation. This Article fills that gap, and concludes that these responses are themselves potentially quite harmful.

More broadly, this Article bears upon the merits of the Securities Act itself and, in doing so, weighs in on a question the legal literature has widely discussed: whether mandatory disclosure laws are justified.[7] While this Article does not discuss the potential costs and benefits[8] of a private-ordering system of disclosure, instead taking the

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[6] *See, e.g.*, Janet Cooper Alexander, *Do the Merits Matter? A Study of Settlements in Securities Class Actions*, 43 STAN. L. REV. 497, 571-72 (1991) (describing behaviors induced by the threat of litigation).

[7] According to the traditional position, securities laws serve to protect investors, who are plagued by bounded rationality at the individual or even market level. For modern incarnations of this view, see, for example, Robert Prentice, *Whither Securities Regulation? Some Behavioral Observations Regarding Proposals for Its Future*, 51 DUKE L.J. 1397, 1413-17, 1454-56 (2002) (describing bounds on rational decision making by investors), and Lynn A. Stout, *The Mechanisms of Market Inefficiency: An Introduction to the New Finance*, 28 J. CORP. L. 635, 636-67 (2003) (questioning the "efficient capital market hypothesis"). In opposition, market-oriented scholars have argued that a system of private ordering, or at least regulatory competition, is preferable to mandatory federal regulation. For instance, Roberta Romano argues that securities regulation should be devolved to the states, Paul Mahoney argues that securities regulation should be devolved to the exchanges, and Stephen Choi argues that securities regulation should be devolved to private parties (though he would require the licensing of investors). Roberta Romano, *Empowering Investors: A Market Approach to Securities Regulation*, 107 YALE L.J. 2359, 2361-62 (1998); Paul G. Mahoney, *The Exchange as Regulator*, 83 VA. L. REV. 1453, 1453-55 (1997); Stephen Choi, *Regulating Investors Not Issuers: A Market-Based Proposal*, 88 CAL. L. REV. 279, 281-83 (2000).

[8] A somewhat less developed, though interesting, line of argument has taken the position that mandatory disclosure schemes may have a place even in rational and efficient markets if there are network effects from uniform regulation or significant ex-

mandatory disclosure regime as given, it does elaborate upon the costs that a one-size-fits-all system of mandatory disclosure and risk shifting can impose upon issuing firms and shareholders. A description of these costs, including the strategic maneuvers by the entrepreneur to affect the firm's structure or capitalization, forms the bulk of this Article, to be found in Parts III and IV.

This Article also considers the issue of how, exactly, current liability rules function. This inquiry bears on a major question the literature has addressed: whether the litigation mechanism for imposing securities liability is "broken." This literature, which developed around Janet Cooper Alexander's seminal 1991 article, argues positively that the underlying existence of fraud or material inaccuracy appears uncorrelated with settlement outcomes.[9] The so-called "strike

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ternalities from issuer disclosure. Judge Easterbrook and Daniel Fischel, for instance, discuss the public goods aspect of disclosure: were disclosure an opt-in affair, issuing firms would rationally choose to free ride on the disclosure of others. FRANK H. EASTERBROOK & DANIEL R. FISCHEL, THE ECONOMIC STRUCTURE OF CORPORATE LAW 286-90 (1991). John Coates takes a somewhat different tack in proposing that mandatory disclosure requirements, in their present form, prevent a future political backlash against public corporations and securities firms. John C. Coates IV, *Private vs. Political Choice of Securities Regulation: A Political Cost/Benefit Analysis*, 41 VA. J. INT'L L. 531, 533-35 (2001). Allen Ferrell suggests that established firms may, in the absence of a mandatory disclosure regime, intentionally disclose less in order to raise the cost of capital for potential market-entrant competitors, who would be able to free ride off this disclosure. Allen Ferrell, *The Case for Mandatory Disclosure in Securities Regulation Around the World* 6-8 (John M. Olin Ctr. for Law, Econ., & Bus., Harvard Law Sch., Discussion Paper No. 492, 2004), *available at* http://www.law.harvard.edu/programs/olin_center/papers/pdf/Ferrell_492.pdf.

[9] *See* Alexander, *supra* note 6, at 571 ("[C]osts [of litigation] do not depend on proof of wrongdoing but flow from the simple fact of a sufficiently large decline in the stock price."). While the statistical significance of the findings from Alexander's data is questionable, subsequent empirical work has largely backed up her claims. In response to Alexander, Joel Seligman argues that price drops alone do not lead to suit and settlement. Joel Seligman, Commentary, *The Merits Do Matter*, 108 HARV. L. REV. 438, 444-45 (1994) (noting that cases in which the only evidence of wrongdoing is a price drop are generally dismissed). For more recent empirical work on this question, generally supporting the hypothesis that securities class actions are often without merit, see James Bohn & Stephen Choi, *Fraud in the New-Issues Market: Empirical Evidence on Securities Class Actions*, 144 U. PA. L. REV. 903, 979-82 (1996); Michael A. Perino, *Did the Private Securities Litigation Reform Act Work?*, 2003 U. ILL. L. REV. 913, 976-77; and Stephen J. Choi, *The Evidence on Securities Class Actions* 69-72 (Univ. of Cal. at Berkeley Sch. of Law Pub. Law & Legal Theory Research Paper Series, 2004), *available at* http://ssrn.com/abstract=528145.

My argument, which is orthogonal to these two opposing arguments, is that a sufficiently large decline in share price is, in fact, "proof of wrongdoing" (to use Alexander's term), because a finder of fact can infer incorrect disclosure from the price adjustment.

suit," where a decline in share price, by itself, leads to significant settlement amounts, is ostensibly evidence of brokenness.[10] I argue, in contrast, that, from a Bayesian point of view, a decline in share price *should* be a major factor in deciding whether inaccurate disclosure occurred, and in some cases could be the *only* factor necessary to support a presumption of inaccuracy. Whatever the merits or demerits of section 11, settlements based on share price declines are consistent with a proper, statistically informed interpretation of section 11. I explore this point in Part II of this Article.

Along the way, I revisit a puzzle that has caused much ink to be spilt in the finance literature: long-term underperformance of IPO firms.[11] I posit that long-term underperformance could, in fact, be an artifact of regulation, rather than evidence of dysfunctionality in the capital markets; put quite simply, the imposition of Securities Act liability shifts risk from shareholders to the entrepreneur, for which the entrepreneur must be compensated in the form of an artificially high price for the shares. There has been some, though not much, preliminary work along these lines, upon which my discussion builds.[12]

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[10] For example, Bohn and Choi have used instrumentalities of material misstatements to test whether securities actions are meritorious. Bohn & Choi, *supra* note 9, at 924-26. But not everyone has agreed that the strike suit phenomenon exists. *See, e.g.*, Seligman, *supra* note 9, at 442-44 (attacking the claim that firms are sued whenever their stock drops). Part of the problem has been that data on settlements are hard to come by, since no opinions are filed, no judgments entered, and the amounts of settlements are difficult to measure. The current wisdom, however, seems to be that some degree of meritless litigation persists even after litigation reforms such as the Private Securities Litigation Reform Act of 1995 (PSLRA), Pub. L. No. 104-67, 109 Stat. 737 (codified in scattered sections of 15 U.S.C.). *See* Choi, *supra* note 9, at 69-71 (describing potential adverse effects of the PSLRA); Perino, *supra* note 9, at 976-77 (finding that the PSLRA did not reduce meritless litigation with respect to some issuers).

[11] "Underperformance" is calculated using the long-term performance as measured from the close of the first day's trading. Measuring from the first day's close is done because the closing price should represent the fair market value of the issuing firm based upon all publicly available information. *See* BREALEY & MYERS, *supra* note 2, at 419 (noting that "underperformance is an exception to the efficient-market theory"). This phenomenon was first documented in Jay R. Ritter, *The Long-Run Performance of Initial Public Offerings*, 46 J. FIN. 3, 23-24 (1991).

[12] Alexander discusses a "litigation put" that acts as insurance against market losses, though she dismisses the possibility of significant effects upon price. *See* Janet Cooper Alexander, *The Value of Bad News in Securities Class Actions*, 41 UCLA L. REV. 1421, 1447 (1994) (considering the "theoretical plausibility" of an embedded litigation put, but concluding that it likely would be of "negligible value"). Alexander uses the put, instead, to analyze whether securities damages are measured accurately. *See id.* at 1452 ("To the extent that the . . . termination of the litigation put affect[s] the share price, [the current system of measuring damages] systematically overstates the amount of damages.").

New data make this issue well worth picking up again: studies conducted over the last decade suggest that the magnitude of underperformance is not as great as once thought,[13] while the incidence of securities litigation is significantly higher than was previously believed, especially under certain conditions and for certain firms.[14] Part III.D puts forth a simple method for estimating the magnitude of this effect, and finds that the liability data are consistent with observed underperformance.

This Article proceeds as follows: In Part II, I provide a description of IPO liability under the Securities Act and explain how application of the Act's liability provisions embeds a put option in a firm's publicly offered securities. In Part III, I discuss observed trends in IPO price performance, develop a simple model of how the embedded put affects stock price over time, use existing empirical studies to calibrate the model, and find that the magnitude of the embedded-option effect is consistent with findings of long-term underperformance among IPO firms. In Part IV, I describe how the entrepreneur may strategically alter the firm's capital structure, investment activity, or other attributes in order to minimize idiosyncratic risk, and I also examine the inefficiencies generated by these strategic maneuvers. Part V briefly concludes.

II. EMBEDDING PUT OPTIONS THROUGH DISCLOSURE LIABILITY

A. *Liability for Inaccurate Disclosure*

The standard for liability in a public offering of securities is set by section 11 of the Securities Act, which provides that an issuing firm (along with, subject to a due diligence defense, the underwriter and the issuer's directors and officers) is strictly liable for any material

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Similarly, Patricia Hughes and Anjan Thakor point out that litigation avoidance theories of initial underpricing can be theoretically consistent with observed long-term underperformance, but they then leave the matter at that. Patricia J. Hughes & Anjan V. Thakor, *Litigation Risk, Intermediation, and the Underpricing of Initial Public Offerings*, 5 REV. FIN. STUD. 709, 735-36 (1992).

[13] *See* Jay R. Ritter & Ivo Welch, *A Review of IPO Activity, Pricing, and Allocations*, 57 J. FIN. 1795, 1817-21 (2002) (reviewing the evidence of underperformance).

[14] *See, e.g.*, Bohn & Choi, *supra* note 9, at 979-81 (describing different rates of suit and settlement for different strata of firms); Perino, *supra* note 9, at 932 (finding that "virtually every issuer that went public at the end of the Internet offering boom has been sued").

misstatements or omissions in a registration statement or prospectus.[15] The measure of damages if the plaintiff shows a material misstatement or omission is the initial offering price of the securities less the price at the time of suit.[16] A misstatement or omission is deemed "material" if a reasonable investor would have considered it important to her investment decision—in short, if investors should care about it, it is material.[17] Looking at markets as a whole, then, any information that affects the price of a security is material, since a change in price means that investors are changing their investment decisions.[18]

Because little, if any, prior information is available about an IPO firm, investors are dependent upon such a firm to provide information about itself.[19] The Securities Act maintains strict control over the

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[15] 15 U.S.C. § 77k (2000). In addition to specifically mandated disclosures, Rule 408 of the Securities Act requires issuing firms to disclose in a prospectus "such further material information, if any, as may be necessary to make the required statements, in the light of the circumstances under which they are made, not misleading." 17 C.F.R. § 230.408(a) (2006).

[16] Securities Act of 1933 § 11(e), 15 U.S.C. § 77k(e) (2000). This is, however, subject to an affirmative defense: if the defendant firm can prove that some portion of the decline in price resulted from factors other than the firm's inaccurate disclosure, the firm can escape liability for that portion of the decline. *Id.* There are alternative forms of damage calculations under section 11(e) in the event that the shareholder has sold prior to suit, or enjoys an appreciation in value post-suit, *id.*, but these do not affect the analysis that follows.

[17] The concept of "materiality" is defined by Rule 405 of the Securities Act, which states that "the [t]erm 'material' . . . [refers] to those matters to which there is a substantial likelihood that a reasonable investor would attach importance in determining whether to purchase the security." 17 C.F.R. § 230.405 (2006); *see also* Paul Vizcarrondo, Jr. & Andrew C. Houston, *Liabilities Under Sections 11, 12, 15 and 17 of the Securities Act of 1933 and Sections 10, 18 and 20 of the Securities Exchange Act of 1934*, *in* UNDERSTANDING THE SECURITIES LAWS 1067, 1075-76 (PLI Corporate Law & Practice, Course Handbook Series No. B-1385, 2003) ("The leading case on materiality is *TSC Industries, Inc. v. Northway, Inc.*, 426 U.S. 438 (1976), which defined a material fact as one to which there is a substantial likelihood that a reasonable investor would attach importance in making a decision because the fact would significantly alter the 'total mix' of available information.").

[18] This type of standard has been adopted in other securities litigation contexts as well. For example, courts have recognized the "fraud on the market" doctrine, according to which movements in the market price of a security are adequate to prove reliance in a fraudulent disclosure claim under Rule 10b-5 of the Securities Exchange Act of 1934, 17 C.F.R. § 240.10b-5 (2006). *See, e.g.*, Blackie v. Barrack, 524 F.2d 891, 907 (9th Cir. 1975) (noting that a purchaser "relies generally on the supposition that the market price is validly set").

[19] Section 5 of the Securities Act makes it illegal to sell or offer securities prior to the filing of a registration statement with the SEC. 15 U.S.C. § 77e(a) (2000). "Offer" is defined broadly under section 2 of the Securities Act to include virtually any information released by the issuer or its agents with a view toward encouraging investors to purchase the issuer's securities. *Id.* § 77b(a)(3); *see also* Guidelines for Release of In-

flow of information from an issuing firm, such that the offering prospectus will contain virtually all of the publicly available information about the firm. If the Securities Act successfully prohibits other disclosure of information, then the firm's share price will be based entirely upon the IPO disclosure.[20] Since the price of a security is determined by a firm's expected returns, as well as the degree of nondiversifiable risk that accompanies those expected returns,[21] the firm's IPO prospectus must convey this information to the investors. Thus, we might conceive of the prospectus as describing a range of outcomes and their respective probabilities, which collectively translate into a market price.

Suppose an investor is considering a purchase of securities in an IPO, such as the hypothetical eBank.com, an online bank. In order to arrive at a valuation for the securities, the investor will need to receive

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formation by Issuers Whose Securities Are in Registration, Securities Act Release No. 6180, 17 Fed. Reg. 16,506 (Aug. 21, 1971); Statement of Commission Relating to the Publication of Information Prior to or After the Effective Date of a Registration Statement, Securities Act Release No. 3844, 17 Fed. Reg. 8359 (Oct. 24, 1957). After the registration statement is filed, written offers may only be made via the prospectus contained in the registration statement; both written and oral offers are subject to liability under section 12(a)(2). 15 U.S.C. § 77*l*(a)(2). (SEC rulemaking in 2005 has created a limited additional avenue of disclosure in the "free writing prospectus," which, for an IPO issuer, must be accompanied or preceded by a formal prospectus. *See* SEC Rule 164, 17 C.F.R. § 230.164 (2006); SEC Rule 433, 17 C.F.R. § 230.433 (2006).) Thus, the Securities Act effectively channels all information about an IPO issuer through the Act's disclosure apparatus. In rare cases, significant information or "buzz" may exist about a pre-IPO firm. Google's IPO provides an example of this buzz; indeed, Google appeared to rely largely on its pre-existing reputation to market its shares to investors, being rather reluctant to disclose additional information in the IPO itself.

[20] Although some "leakage" probably does occur, for leaked information to be credible to the market the source must be subject either to reputational penalties or to liability of some sort. Other communications, such as road shows, are allowed at certain times, but these communications are also subject to strict liability under section 12 of the Securities Act (subject to a reasonable care defense). 15 U.S.C. § 77*l* (2000). In the IPO context, so-called "free writings" (written materials that accompany a final section 10(a) prospectus and are subject to fraud liability; note that these are different from the newly created "free writing prospectus," *see supra* note 19) are only available post-effectiveness, subsequent to pricing. SEC Rule 164, 17 C.F.R. § 230.164 (2006). There is the possibility that information may leak to the market via other means that incur a lower level of liability, such as analyst research reports or underwriter reputation. See James C. Spindler, *Conflict or Credibility: Research Analyst Conflicts of Interest and the Market for Underwriting Business*, 35 J. LEGAL STUD. 303, 303-06 (2006), for a model of signaling via analyst research reports.

[21] Investors care only about systemic, nondiversifiable risk, also known as *beta*. Diversifiable risk (also known as idiosyncratic, unique, or firm-specific risk, *see supra* note 2) may be "diversified away" by holding many different sorts of assets in a portfolio. *See* BREALEY & MYERS, *supra* note 2, at 165-69 (describing how diversification reduces risk).

from the firm information that allows her to construct a probabilistic expectation of the company's future cash flows. This information, which the Securities Act requires to be communicated via the prospectus,[22] will be a mixture of all sorts of information, hard and soft, such as loan loss provisions, capital budgeting, expectations regarding future deposits, expectations regarding new lines of business, statements about the company's competitive position, and descriptions of managerial competence and reputation. Forward-looking information, such as earnings forecasts, is particularly important.[23] Assuming they believe this information is accurate, the investor and the wider market will use it to calculate net present value payoffs of the firm (say, for instance, a per-share expected payoff of $45), with some degree of risk (such as an expected standard deviation in the expected per-share payoff of $8), an element of which is nondiversifiable. Given the level of risk and the expected payoff, and taking into account the time value of money, the investor can arrive at a fair market value for the stock (say, $42).

Obviously, since our investor is dependent upon the issuing firm for information about the firm, there needs to be some mechanism—such as a regime of issuer liability—in place to make issuer-originated information credible and reliable.[24] Section 11 of the Securities Act does just this.[25] Any material inaccuracy in the prospectus disclosure results in liability; no fault in terms of inadequate care or deceptive

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[22] *See* 15 U.S.C. § 77g(a) (2000) (setting out requirements for the registration statement); *id.* § 77j(a)(1) (requiring that the information in the registration statement be in the prospectus); *see also* SEC Regulation S-X, 17 C.F.R. pt. 210 (2006) (providing a basic repository of disclosure requirements for various forms and filings under the Securities Act and the Securities Exchange Act of 1934); SEC Regulation S-K, 17 C.F.R. pt. 229 (2006) (same).

[23] *See* Moonchul Kim & Jay R. Ritter, *Valuing IPOs*, 53 J. FIN. ECON. 409, 436 (1999) (finding that "[u]sing earning forecasts improves [IPO] valuation accuracy substantially").

[24] In a perfectly well-functioning market and in the absence of regulation, we might suppose that market forces would give rise to nonstatutory methods of credibility enhancement, such as certification by repeat-player auditors and investment banking intermediaries. However, for whatever reason (such as transaction or searcb costs, public goods aspects of disclosure, or simple public choice or inertia), in reality we have a system of mandatory disclosure and statutory liability. *See* EASTERBROOK & FISCHEL, *supra* note 8, at 283 (suggesting that regulation reduces the costs of certification).

[25] 15 U.S.C. § 77k (2000). Section 11 is buttressed by section 12, *id.* § 77*l*, which covers oral statements in the waiting period (such as road show communications), the antifraud provisions of section 17, *id.* § 77q, and Rule 10b-5 of the Securities Exchange Act of 1934, 17 C.F.R. § 240.10b-5 (2006).

intent is required for the issuer to be held liable. This strict accuracy requirement applies to statements of hard fact (e.g., "our revenues were $100 million in fiscal year 2004") and to disclosures regarding risk (e.g., "our revenues are dependent upon continued good relationships with several key clients"), though specific projections and plans, such as earnings estimates (e.g., "we expect our revenues to be higher in fiscal year 2005"), are not required to be accurate ex post.[26]

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[26] Some of these statements may qualify as "forward-looking statements" under Rule 175 of the Securities Act, 17 C.F.R. § 230.175 (2006), and thus have a slightly more (though how much more is uncertain) protected status. Rule 175 provides that forward-looking statements, such as estimated future revenues, are not subject to liability except when made or reaffirmed "without a reasonable basis" or "other than in good faith." *Id.* § 230.175(a). Forward-looking statements and projections are not actionable simply because they are wrong ex post; they must also have been "wrong" ex ante (i.e., unreasonable when made). This protection is limited principally to specific plans and projected economic targets. So, supposing an issuing firm discloses a profit estimate, even though the firm is not ipso facto liable if it does not meet that estimate, it is still strictly liable for failing to disclose risks that might lead the firm to fall short of that estimate. *See In re* Donald J. Trump Casino Sec. Litig., 7 F.3d. 357, 364 (3d Cir. 1993) (applying the so-called "bespeaks caution" doctrine despite the ostensible applicability of the Rule 175 safe harbor). The protection given to forward-looking statements is qualified further by the strictures of the SEC and courts as to what qualifies as "reasonable" and "good faith" disclosure, since these terms require a high degree of likelihood or confidence that the projection will come true. *See, e.g.*, SEC Regulation S-K, Item 10(b)(1), 17 C.F.R. § 229.10(b)(1) (2006) (requiring management to have a "reasonable basis" for its assessment of future performance); Wieglos v. Commonwealth Edison Co., 892 F.2d 509, 512-16 (7th Cir. 1989); ALAN S. GUTTERMAN & BENTLY J. ANDERSON, REGULATORY ASPECTS OF THE INITIAL PUBLIC OFFERING OF SECURITIES, at A-64 n.5 (Bureau of Nat'l Affairs, Inc., Corporate Practice Series No. 60, 2003) ("Issuers have generally *not* taken advantage of the 'opportunity' [of Rule 175 disclosure] presented by the SEC due to concerns that 'good faith' might imply a belief on the part of the issuer that the projections were based on facts that make the achievement of the projections 'highly probable.'").

In any event, Congress appears to have recognized that even the Rule 175 safe harbor was inadequate to encourage sufficient disclosure, particularly of positive forward-looking information. The PSLRA further limits liability for seasoned (but *not* IPO) issuers by making forward-looking statements subject only to a fraud standard of liability. 15 U.S.C. § 77z-2(b)(2)(D), (c) (2000). The PSLRA was enacted largely "'in order to loosen the "muzzling effect" of potential liability for forward-looking statements, which often kept investors in the dark about what management foresaw for the company.'" Kevin P. Roddy, *Seven Years of Practice and Procedure Under the Private Securities Litigation Reform Act of 1995*, SJ014 ALI-ABA 395, 475 (2003) (quoting Harris v. Ivax Corp., 182 F.2d 799, 806 (11th Cir. 1999) (quoting H.R. REP. NO. 104-369, at 42 (1995) (Conf. Rep.))). However, the efficacy of the PSLRA is questionable. Under both Rule 175 and the PSLRA, there is always uncertainty as to what constitutes a "forward-looking statement" in the first place. *See, e.g.*, *In re* Reliance Sec. Litig., 135 F. Supp. 2d 480, 504 (D. Del. 2001) (finding that management's statement of belief in the adequacy of its loan loss reserves was not forward looking, even though loss reserves relate to expectations of future losses); *In re* Splash Tech. Holdings, Inc. Sec. Litig., No. C 99-00109 SBA, 2000 WL 1727377, at *6 (N.D. Cal. Sep. 29, 2000) (finding statements re-

Liability also attaches for material omissions, such as failure to disclose risks or flaws in the firm's business. The firm is liable, as well, for disclosures or omissions regarding its exposure to market risk; this makes perfect sense since market risk, not firm-specific risk, is what the diversified investor should care about.[27]

How should a court treat a suit by a shareholder who claims that eBank's disclosures pertaining to future performance were inaccurate? Suppose that the investor went ahead and bought the eBank share for $42. A year passed, and the actual payoff was revealed to be $29, as opposed to the expected value of $45. On the facts described so far, it is conceivable that the $29 payoff is consistent with the disclosure in the prospectus that described an expected value of $45: with a standard deviation of $8, we expect a result like this (or worse) to occur about 2.5% of the time. Although this is a highly unlikely result, it is not impossible. A plaintiff need not show with certainty, however, that the projections were wrong; to the contrary, under the standard burden of proof for civil suits—preponderance of the evidence—she need only show it is more likely than not that the projections were incorrect. And so, here, an actual payoff that only occurs with a probability of 2.5%—if eBank's projections are accurate—while not the end of the inquiry, goes some way toward showing that management's prospectus disclosure was probably incorrect.

To take a simpler example, suppose that an entrepreneur sells to an investor a security based on five flips of a supposedly fair coin, which, after the five flips, self-destructs. Each time the coin comes up heads, the investor gets $1 from the entrepreneur, while each time it comes up tails, the investor gets nothing. If the investor believes that the coin is a fair coin, she should be willing to pay up to $2.50 for this security. But suppose that the coin comes up tails five times in a row. With no information available other than this, can the investor make a

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garding "planned investments" and market segment health not to be forward looking under the safe harbor).

[27] The Securities Act requires issuing firms to make disclosures concerning industry conditions and trends, as well as sensitivity to market and credit risk. *See* SEC Regulation S-K, Item 303, 17 C.F.R. § 229.303 (2006) (requiring disclosure about, *inter alia*, expected changes in liquidity and capital resources); SEC Regulation S-K, Item 305, 17 C.F.R. § 229.305 (2006) (requiring disclosure about market risk); SEC Rule 408, 17 C.F.R. § 230.408 (2006) (requiring, generally, disclosure of material information). In practice, firms do provide significant disclosure regarding market risks that have little to do with their businesses directly. *See, e.g.*, HDFC Bank Ltd., Prospectus, at 10-11 (July 20, 2001) (describing risks of war, including nuclear exchange, between India and Pakistan). To the extent that firms themselves are better able to provide this market-sensitivity information than outsiders, this appears to be a reasonable approach.

valid claim that she has been cheated? Here, the analog of the issuer's "projection" is the entrepreneur's assurance that the coin is "fair"—i.e., that it pays off $1 on each flip with a probability of 50%. Then, the actual result (a $0 payoff) is one that should occur only one in thirty-two times with a fair coin.

The investor might sue under section 11, alleging that the coin was unfair. Absent the opportunity to inspect the coin directly, the court would have to look at the degree of prior confidence in the seller's projection that the coin was fair. Suppose, for instance, the entrepreneur had tested the coin only twice before selling it, observing one heads and one tails, and based his price of $2.50 on that. Adding to this sample the five observed tails post-sale, and assuming no other information is available, the court could infer a likely outcome of about 14% heads, for an ex ante value of $0.71; the entrepreneur thus would have to pay back $1.79.[28]

It is quite likely, however, that prior data of this sort will not be available, especially in the much more complex real world where information is not so readily quantified and an entrepreneur's prior knowledge regarding his firm is not directly verifiable. In the eBank scenario, it seems quite unlikely that the court would have such data. In that case, one could estimate an ex ante probability regarding the projections' accuracy, allowing us to perform Bayesian analysis to determine the likelihood of accuracy given the outcome that occurred.[29] In calculating a prior confidence of accuracy, if management is known to be very honest and very competent, for example, we would assign a higher ex ante probability of accuracy to its projections than if it is known to be dishonest and incompetent. Other factors could include

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[28] We might wonder if the entrepreneur's estimate of the value could fall under the Rule 175 safe harbor for forward-looking statements. Such a projection may fit the safe harbor's narrow definition; however, it is unlikely that a projection based on two observations would count as "reasonable" or as being made in "good faith." Additionally, the risk that the coin itself might have been unfair is not subject to the disclosure safe harbor, and omission of this risk disclosure would be grounds for section 11 liability. *See supra* note 26.

[29] Bayesian probability states that the probability of *A* occurring given that *B* has occurred is equal to the probability of *A* and *B* occurring together divided by the probability of *B* occurring. *See* James Joyce, *Bayes's Theorem*, STANFORD ENCYCLOPEDIA OF PHILOSOPHY (Edward N. Zalta ed., Winter 2003 ed.), http://plato.stanford.edu/archives/win2003/entries/bayes-theorem (providing a concise explication of the theorem).

Hugbes and Thakor develop a similar sort of analysis, where underwriter reputation serves as the ex ante confidence in the correctness of the offering price. Hughes & Thakor, *supra* note 12, at 734.

the projections' accuracy in predicting various discrete contingencies,[30] testimony from business and finance experts as to the reasonableness of the projections at the time they were made, the projections that similarly situated firms made and how their results varied, the care and research that went into the projections, management's past history and reputation, and the accuracy of the managerial projections of other firms.[31] This prior-confidence calculation is then updated by the actual ex post outcome. So, if we believe that, from an ex ante perspective, eBank's management was relatively unlikely to be accurate and the poor results obtained were likely to occur if eBank's projections were wrong, then we can find it more likely than not that the projections were, in fact, inaccurate. Therefore, eBank should be held liable under section 11. Furthermore, the poorer the actual result, the more likely it is that eBank should have to pay. In this fashion, the court can incorporate much by way of qualitative evidence in figuring out whether the firm ought to be found liable.

Another way of looking at the problem is that, given any level of ex ante belief in the accuracy of the firm's disclosure, there is a range of bad outcomes (the "bad state of the world") where the issuing firm should be found liable under section 11. This is true for every issuer no matter what the ex ante confidence in its projections is (short of absolute certainty): a sufficiently bad outcome still results in a correct ex post determination that the issuer's projection was, more likely than not, wrong. As the firm performs more and more poorly, the likelihood increases that the firm (and the entrepreneur) will be found liable under section 11 and made to pay. In a very real sense, then, eBank and other issuers like it are put into the position of insuring shareholders against bad outcomes.

B. *Option Characteristics of Securities Act Liability*

Liability under section 11 of the Securities Act bears a striking resemblance to a put option.[32] A put option is a derivative security that allows the holder to sell (or "put") an underlying security, such as an equity share, to the counterparty for a set price (also known as the

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[30] If we find that management was wrong about nearly everything, we would be led to question its general accuracy and predictive ability.

[31] This is essentially Rule 175's provision that projections and forward-looking statements are not actionable if they have a "reasonable basis." *See supra* note 26.

[32] See Alexander, *supra* note 6, at 570, and Alexander, *supra* note 12, at 1440-50, for discussions of the put characteristics of securities liability.

"strike" price). Options usually have a built-in date of expiration, and their value tends to decline over time (known as "time decay") as the date of expiration approaches, because options are more valuable when uncertainty is greater. There is, of course, more uncertainty over a longer period of time than over a shorter period.

The right of recovery under section 11 expires with the running of the statute of limitations in the Securities Act, which is one year from the date of discovery of the misstatement or omission and not more than three years after the date of the public offering.[33] Subsequent purchasers of the securities sold in the offering may bring suit, so long as they can trace their securities back to the public offering.[34]

The amount of damages under section 11 is the difference between the initial offering price of the security and the price when the plaintiff brought suit.[35] A successful plaintiff therefore has the functional equivalent of the right to "put" the shares back to the issuer at the public offering price. For example, if eBank shares were trading at $29 at the time of suit, an eBank shareholder would recover the $13 difference if her suit proved successful. Since the eBank shares are listed and presumably still liquid, she could sell her shares and be back exactly where she started, with her $42. In this case, the $42 initial purchase price is the strike price of the put.

Finally, under section 11, shareholders can sue any time the price of the securities declines below the initial offering price.[36] As de-

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[33] Securities Act of 1933 § 13, 15 U.S.C. § 77m (2000). The statute of limitations for fraud was increased by section 804 of the Sarbanes-Oxley Act of 2002 to two years after the discovery of the fraud, and not more than five years after its commission. 28 U.S.C. § 1658 (Supp. III 2005).

[34] This may not always be easy to do, at least for individual subsequent purchases made through a broker. *See* Hillary A. Sale, *Disappearing Without a Trace: Sections 11 and 12(a)(2) of the 1933 Securities Act*, 75 WASH. L. REV. 429, 466 (2000) (discussing the practical difficulties of meeting the tracing requirement). While the simplified model of this Article only contemplates one primary offering (making tracing irrelevant), in real life, the tracing requirement could mean that shares lose value as they trade hands, creating illiquidity, and that shares are worth more in the hands of some investors, such as large institutional investors who have the economy of scale to ensure that tracing requirements are met, than in the hands of others.

[35] 15 U.S.C. § 77k(e) (2000). The defendant can show that the plaintiff's damages (i.e., the difference between the offer price and the price at the time of suit) were caused by something other than the misstatement—but this is really getting to the issue of materiality discussed above, *supra* notes 15-18 and accompanying text.

[36] That is, a drop in the price of the security below the initial offering price permits an allegation that management materially misrepresented the firm's projected value. Under section 11, plaintiffs cannot maintain a suit when the price has not declined.

scribed above, whether the suit is successful depends on whether the firm's performance has been poor enough to make it appear more likely than not that management's disclosures were materially inaccurate. This means that there is a range of prices below the public offering price at which the shareholder will not be able to exercise the put.[37] The level of this threshold will depend upon ex ante estimations of prior accuracy, and so we might expect that both investors and issuers anticipate, with at least a rough degree of precision, that a certain low level of firm and security price performance would allow a successful section 11 suit. At the time the equity-*cum*-put option is offered for sale, then, the purchaser and seller alike are aware that the embedded put option will be exercisable in the bad state of the world, and so both the purchaser and seller can arrive at a valuation for the option. The total price paid for an IPO share will be the fair market value of the equity security, plus the fair market value of the embedded put option; the trading price of the firm's securities thus will imply a valuation that is in excess of the total value of the firm.

How will the price of the option vary? First, we know that an option declines in value as it approaches its expiration date. This is due to the decline in uncertainty against which the option is insuring: as the expiration date approaches, the insurance policy covers a smaller span of time, which means that it is worth less. After its expiration date, an option is worth nothing: it has either been exercised or has expired. Even assuming the underlying value of the equity stays constant (i.e., market expectations regarding the firm do not change and the firm performs exactly to expectations), we should see a declining share price over time (relative to what it would have been without the put option). This decline should date from the end of trading on the day of the IPO to the expiration of the statute of limitations. IPO firms that perform up to expectations (and even, to some extent, those that perform beyond expectations) should experience price underperformance relative to non-IPO firms.

Second, the value of the put option will depend upon the financial condition and structure of the firm. For an insolvent firm that cannot possibly make good on the shareholders' put option, the option will be worth nothing; section 11 liability might as well not exist. Shareholders will bear the risk of poor future performance, but, at the same time, they will not have paid for insurance against that risk (as-

[37] Because of this, the option payoff would appear kinked, with a payoff of zero between the offering price and the price at which a court would find liability.

suming ex post insolvency was foreseen ex ante). For a solvent firm, the put option will be worth its full potential value. Similarly, depending on how the firm's sponsor or founder sets up the capital structure, the put option will vary in value. If assets are withdrawn from the firm, for example, the value of the security will decline not only because of the decrease in the value of the equity, but also because of the decrease in the value of the put option. We might expect, then, that depending upon what type of risk sharing is most efficient—or, more particularly, what type of risk sharing maximizes the entrepreneur's or sponsor's self-interest—we would see a range of different capital structures cropping up. These possibilities are discussed in detail in Parts III and IV, below.

III. UNDERPERFORMANCE, EMBEDDED PUTS, AND THE IPO DECISION

This Part analyzes how, exactly, the imposition of the section 11 embedded put right affects the entrepreneur's incentives. In Part III.A, I present a simple model of the entrepreneur's decision to take his firm public through the IPO process; then, in Part III.B, I show how the addition of an embedded put right destroys value and affects his decision making. I demonstrate in Part III.C how uncertainty regarding whether the put right will be exercisable can lead to initial underpricing at the time of the IPO, and still result in long-term underperformance. The model I describe presents a simple method of estimating the value of the put option and the amount of value that it can potentially destroy based on known parameters, which I examine in Part III.D; I also consider whether the observed magnitude and timing of long-term underperformance is consistent with the model.

A. *The Decision of How To Fund a Project*

Suppose we have an entrepreneur who has a project that has a positive expected value (i.e., the project is expected, on average, to make money). The project, in the good state of the world, will perform very well and make a lot of money (denoted as G), or, in the bad state of the world, the project will perform poorly and make little or no money ($B < G$). The project costs C to undertake, which the entrepreneur can fund with his own wealth or by recourse borrowing

from a bank.[38] Since in either case the entrepreneur must bear the cost of the project no matter what the outcome, the two possible net payoffs are $G - C$, which occurs with probability g, and $B - C$, which occurs with probability $1 - g$. The total expected value of the project is then $g(G - C) + (1 - g)(B - C)$. To take a simple numerical example, if the probabilities of both the good and the bad states of the world are 50%, the good-state cash flow from the project is $18, the bad-state cash flow is $2, and the cost of the project is $2, then the expected value of the project is $0.5(\$18 - \$2) + 0.5(\$2 - \$2) = \$8$.

If the entrepreneur is risk averse, his utility from holding on to the project will be less than his utility from receiving the expected value of the project up front, since the project's net payoffs are uncertain.[39] For example, suppose the entrepreneur's utility function is given as the square root of his wealth, or $g\sqrt{G-C}+(1-g)\sqrt{B-C}$. Then the expected utility from the project is $0.5\sqrt{\$18-\$2}+0.5\sqrt{\$2-\$2}=2$. This is less than the utility of 2.83 that the entrepreneur would enjoy from receiving the expected value of the project up front.[40]

Rather than wait to see how the project turns out, the entrepreneur may desire to sell part or all of the project to a shareholder. Why would the entrepreneur wish to do this? The principal reason is that the project is more valuable in the hands of the shareholder, who can diversify her assets by holding shares of many such projects, than in the hands of the entrepreneur, who cannot.[41] So, in this example, the

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[38] At this point in the analysis, I assume that the entrepreneur will be solvent even in the bad state of the world. If insolvency is a risk, then the cost of borrowing is higher.

[39] The entrepreneur is likely to be risk averse with respect to the firm's idiosyncratic risk because of wealth constraints—that is, the amount of his wealth that is tied up in the firm is probably great enough that he is unable to diversify away the firm-specific risk. *See* Ritter & Welch, *supra* note 13, at 1798 ("Pre-IPO 'angel' investors or venture capitalists hold undiversified portfolios, and, therefore, are not willing to pay as high a price as diversified public-market investors."); *see also* Raphael Amit et al., *Entrepreneurial Ability, Venture Investments, and Risk Sharing*, 36 MGMT. SCI. 1232, 1243 (1990) (noting that entrepreneurs "seek to share risk"); Thomas J. Chemmanur & Paolo Fulghieri, *A Theory of the Going-Public Decision*, 12 REV. FIN. STUD. 249, 250 (1999) (linking diversification with ownership of a relatively small equity share in a public firm). Hughes makes a similar assumption regarding risk aversion. Patricia J. Hughes, *Signalling by Direct Disclosure Under Asymmetric Information*, 8 J. ACCT. & ECON. 119, 121 (1986).

[40] This is because the entrepreneur gets $8 in either state of the world, and $0.5\sqrt{\$8}+0.5\sqrt{\$8}=2.83$.

[41] Some scholars have pointed to the desire for risk-diversification as being the primary impetus for the creation of the corporate form. *See* Henry Hansmann et al.,

entrepreneur would sell to the shareholder a share or shares of stock representing some portion of the equity of the firm, in return for the cost of the project, C.[42] How would the shareholder price the equity—that is, the right to receive the cash flows from this project? The shareholder (who is risk neutral with regard to idiosyncratic risk[43]) would be willing to pay up to the point at which her expected return from the venture equals her investment. More formally, the shareholder would be willing to contribute the project funding cost, C, when the expected value of the share of the firm that she receives, k, is great enough that $k[gG + (1 - g)B] - C \geq 0$. In the above numerical example, the shareholder, in return for contributing the cost $C = \$2$ to the firm, would receive one-fifth of the firm ($k = 0.2$), while the entrepreneur would retain the other four-fifths.[44] The expected net payoff to the entrepreneur in this situation is the same as before (the entrepreneur sells the share for its net present value), but his utility in this

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Law and the Rise of the Firm 55-60 (ECGI Working Paper Series in Law, Working Paper No. 57/2006), *available at* http://ssrn.com/abstract=873507.

[42] Why wouldn't the entrepreneur sell the entire project? Because he must pay the shareholders a market rate of return on their equity investments, the entrepreneur likely would be unable to raise more than C dollars, since he would have no useful employment for the excess cash. For example, suppose there are five identical but uncorrelated projects belonging to entrepreneurs *E1* through *E5*, where each project costs $2 to run and has a positive net present value; assuming that we have a shareholder with exactly $10—just enough to fund each of the projects—the shareholder would maximize the value of her capital by funding each of the projects and receiving some positive rent from each of the entrepreneurs.

An additional consideration is that shareholders may desire that the entrepreneur retain a significant stake in the firm as a way to mitigate agency costs, especially if the entrepreneur's skills are required to make the project work correctly. This is more likely to be the case in firms that rely heavily upon the skills and experience of their founders, or firms that rely heavily on human capital and require large stock grants to insiders to incentivize and retain them. I discuss the problem of "cashing out" in Part IV.D, below.

In fact, the data suggest that the entrepreneur generally will retain a sizeable stake: of IPO firms that are subsequently sued, firm insiders (directors and officers of the firm), on average, own 49.2% of the firm *after* the offering. Bohn & Choi, *supra* note 9, at 961.

[43] I assume that systemic risk (or *beta*) is already priced into these examples. Since systemic risk should be borne equally well by either the entrepreneur or the shareholder, the explicit addition of systemic risk would not change the analysis. Note, however, that having the entrepreneur bear the systemic risk may be harmful: some of the hedging strategies discussed in Part IV (such as managerial entrenchment) would be useful for hedging systemic risk as well.

[44] With the shareholder's capital contribution of $2, the expected value of the firm is now $10, which is the $8 expected value of the project plus the $2 capital contribution. So the share of the stock that the shareholder owns, should she trade it on the market, would be worth $2, since ($k$) ($10) = (0.2)($10) = $2.

situation is higher since the level of risk to which he is exposed is lower. Numerically, the entrepreneur's objective net payoff is $g(1 - k)G + (1 - g)(1 - k)B = (0.5)(0.8)(\$18) + (0.5)(0.8)(\$2) = \$8$, which is the same as before. However, with the same risk-averse utility function as above, we can see that the entrepreneur's utility is higher, since $0.5\sqrt{(0.8)(\$18)} + 0.5\sqrt{(0.8)(\$2)} = 2.53$, as opposed to the utility of 2 that the entrepreneur would receive from funding the project himself or taking out recourse borrowing.

From the above analysis, we can see that total welfare is maximized when the risk-averse entrepreneur can sell part of his project to the risk-neutral shareholder. As a bearer of risk, the entrepreneur is quite inefficient, while the shareholder is very efficient. The entrepreneur can offload part or all of the idiosyncratic risk onto the shareholder, who can simply diversify it away with very little cost.

B. *The Addition of an Embedded Put Right*

Now, suppose the law mandates that when the entrepreneur sells the shareholder the stock, the shareholder also gets the right to sell the stock back to the entrepreneur for the purchase price in the bad state of the world (a money-back guarantee or a put right). Such would be the case under section 11 of the Securities Act, where, in the bad state of the world, the shareholder may successfully sue for damages equal to the offering price of the security less the subsequent trading value.[45] Suppose for the moment that the put right is certain to be exercisable in the bad state of the world. What are the payoffs to the entrepreneur and the shareholder in such a case?

In the good state of the world, the shareholder will receive her share of the good-state cash flows (kG), while in the bad state of the world, the shareholder will sue the entrepreneur to recover the amount of her investment. In our numerical example, in the good state of the world the shareholder would receive a net payoff of $(k)(\$18) - \$2$, while in the bad state the shareholder would receive a net payoff of $\$2 - \$2 = \$0$, and so the minimum fraction of the project that the shareholder would demand in return for her investment of \$2 is a one-ninth share of the firm.[46] The entrepreneur's net payoff in this case is $(0.5)(8/9)(\$18) + 0.5(\$2 - \$2) = \$8$, and his expected util-

[45] 15 U.S.C. § 77k (2000).

[46] In the good state, then, the shareholder receives $(1/9)(\$18) - \$2 = \$0$, and in the bad state, $\$2 - \$2 = 0$.

ity is 2, which is identical to the prior case in which the entrepreneur funded the firm himself or through recourse borrowing.

Note that the addition of this mandatory put option makes the risk-averse entrepreneur worse off, but does not benefit the shareholder. The entrepreneur is unable to get rid of his risk: his payoffs and expected utility under the mandatory put regime are the same as if he had not sold the project to the shareholder in the first place. The important point here is that the mandatory put is, from the entrepreneur's and shareholder's points of view, functionally equivalent to a legal rule prohibiting the entrepreneur from selling the project to the shareholder.

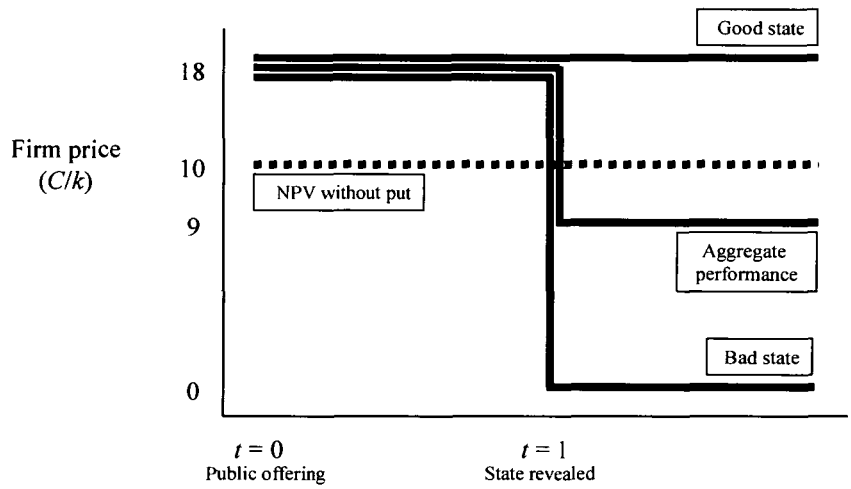
The shareholder is indifferent between the two scenarios. In the first case, without the put right, the shareholder pays $2 for an expected return of $2. In the second case, with the put right, the shareholder again pays $2 and again receives an expected return of $2. The variance (which is entirely idiosyncratic risk) in the first case is higher, but since the shareholder can hold a broad spectrum of assets in her portfolio, this firm-specific risk can be diversified away and is not relevant.

The apparent market valuation of the firm in the second case is higher: the shareholder in the first case receives one-fifth of the firm for her investment of $2, implying a total firm value of $10, while in the second case, the shareholder receives only one-ninth of the firm for the same investment, implying a total firm value of $18. The disparity between the two valuations, however, is not because the firm's intrinsic expected value changes; that stays at $10 in each case. Rather, the put option has a value that is reflected in the price the shareholder pays for her shares. For her investment of $2 in the firm with the put option, the shareholder receives a one-ninth equity share worth $1.11 (since the expected value of the firm's cash flows is $10, of which she owns a ninth), while the embedded put option accounts for the other $0.89 of value.

Since the option is not alienable from the equity interest, the value of the option will continue to affect the price at which the shares trade. At time zero, when the entrepreneur sells the shares to the shareholder, the shares will trade as if the expected value of the firm were $18, even though the expected value of the firm is only $10. At time one, the good or bad state of the world is revealed and the shareholder will exercise her put option if it is in the money. There are two possible outcomes: (a) in the good state of the world, the firm realizes cash flows of $18 and the shares continue to trade reflecting

the now-underlying value of $18, or (b) in the bad state of the world, the shareholder exercises her put, withdrawing the remaining value of $2 from the firm, and the underlying equity interest is now worth zero. In Figure 1 below, outcome (a) is denoted by the top solid line (labeled "good state"), and outcome (b) is denoted by the bottom solid line (labeled "bad state"). At time zero ($t = 0$), the shares are sold to the shareholder; at time one ($t = 1$), the good or bad state of the world is revealed and the shareholder can exercise her put option. The middle solid line (labeled "aggregate performance") shows what a market index of identical (but uncorrelated) firms would look like: all firms would start out priced at $18, but at time one, when shareholders of firms suffering a bad-state outcome exercise their put options, half the firms in the index have a value that drops to $0, while half the firms remain priced at $18, for an aggregate price of $9. For contrast, the dotted line shows what an index of such identical firms would look like if no embedded put option existed, meaning that firms are priced based only on expected future cash flows.

Figure 1: Price of Shares with Embedded Put Right



Two features of this graph are notable. First, with an embedded put option, the firm is initially priced in excess of its expected value. This is due to the value of the put option, which is extinguished at time one. Second, over time, the aggregate price of such firms declines to a point below the ex ante expected value of the firm's cash flows. This is because money is coming out of the firm. The com-

bined effect of these two phenomena is that IPO firms appear to underperform relative to non-IPO firms.

C. *Price Movements with an Endogenous Put: Initial Underpricing, Long-Term Underperformance*

We might expect the Securities Act to impose liability on the issuing firm only some percentage of the time, which we can denote as probability θ, where $0 \leq \theta \leq 1$. A θ of one means the put always will be enforced and a θ of zero means the put will never be enforced. As θ approaches zero, the expected value of the put also declines to zero, and the price a shareholder is willing to pay for the security declines to the expected value of the firm's project, which in the numerical example above would be \$10.[47] A lower θ makes the entrepreneur better off, though risk-averse shareholders are indifferent.[48]

An exogenously determined θ has no effect on the entrepreneur's pricing decision: whether θ equals zero, one, or a number in between, the entrepreneur will simply charge the highest price that shareholders will pay for the shares.[49] The more interesting case, however, is where θ varies with the price. Suppose that θ is a positive function of the initial offering price. That is, as the price at which the entrepreneur sells the securities increases, so does the probability of being found liable, θ, if the bad state of the world occurs. In such a situation, there may be times when the entrepreneur chooses to offer the securities at a lower price than the market would bear—meaning that the market would immediately bid up the price of the shares once trading begins.

Why would the probability of being found liable increase as the offering price increases? There are several possible reasons. First,

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[47] This is after the shareholder's \$2 capital contribution to fund the project.

[48] Assuming that the firm will be solvent to pay the put (i.e., $B \geq C$), the shareholder's net payoff function is $gkG + (1 - g)[\theta C + (1 - \theta)kB] - C$. In the bad state of the world, with probability θ, the shareholder can exercise the put and receive back her purchase price, C, while with probability $1 - \theta$ she will only receive her share of the bad-state profits, kB. The entrepreneur's net payoff function is given as $g(1 - k)G + (1 - g)[\theta(B - C) + (1 - \theta)(1 - k)B]$. The entrepreneur's utility function (following the example given above) is the sum of the probability-weighted square roots of the ultimate-state payoffs, or $g\sqrt{(1-k)G} + (1-g)\theta\sqrt{B-C} + (1-g)(1-\theta)\sqrt{(1-k)B}$. Insolvency makes the put less valuable; at the extreme, with complete insolvency (i.e., B = \$0), the put has zero value.

[49] The reason for this is that lowering the price charged only serves to reduce the entrepreneur's payoff in the good state of the world, without raising the entrepreneur's payoff in the bad state.

significant underpricing may be a payoff to initial allocatees not to sue. Initial allocatees are largely institutional investors, who are repeat players in the IPO game and can be shut out of future offerings by the underwriter if they do not "play along." Alternatively, and even more effectively, we might suppose that the initial allocatees remit a portion of the underpricing back to the issuing firm, thereby lowering the offering price without reducing the proceeds to the issuer; this remittance may take the form of tie-ins or other future business, or may be facilitated by the underwriter, who is a repeat player, in the form of lowered underwriting fees or enhanced services.[50] Second, as proposed by Patricia Hughes and Anjan Thakor, underwriters who develop reputations for consistently underpricing have a higher Bayesian prior (essentially, greater credibility) of having priced correctly.[51] Other litigation-related models of underpricing have also been put forward;[52] a complete exposition and analysis of these is, however, beyond the scope of this Article.

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[50] The bribe method of avoiding liability is subject to some leakage, since initial allocatees generally do not hold on to all of their allocations; subsequent purchasers may also sue, and can utilize the class action mechanism. Institutions, however, do generally end up holding a large amount of the allocations, and have traditionally received a disproportionately large share of the awards or settlements from such litigation. The PSLRA strengthens the position of institutional investors by making them more likely to be the representative or lead plaintiff, through the creation of a rebuttable presumption that the investor with the greatest financial interest will fill this role. *See* 15 U.S.C. § 77z-1(a)(3)(B)(iii)(I)(bb) (2000). Thus, under these theories of litigation avoidance, the PSLRA could in fact *increase* the degree of initial underpricing, since placing underpriced securities with institutions as a bribe not to sue would become more cost effective. This is, however, beyond the scope of this Article. Having the initial allocatees simply hand back the amount of the underpricing to the issuer would, on the other hand, not be subject to such leakage, since this lowers the maximum potential damages without reducing proceeds to the issuer.

[51] *See* Hughes & Thakor, *supra* note 12, at 736 ("[E]ven with underpricing, [initial price] will reflect at least a fraction [of the effects of litigation]."). Some scholarship suggests that underwriter reputation is not particularly useful for ensuring a fair price, and this theory of underpricing also largely neglects the role that the issuing firm's disclosure plays in determining price. Bohn and Choi suggest that underwriter reputation, as proxied by lead and co-lead positions, has a positive correlation with subsequent liability, Bohn & Choi, *supra* note 9, at 969—exactly the opposite of the relationship suggested by Hughes and Thakor's undewriter-driven model, Hughes & Thakor, *supra* note 12, at 737-38 ("[O]ur analysis suggests [underwriter] reputation as an important explanatory variable in understanding the underpricing phenomenon."). The same measurement problems that make it difficult to gauge long-run relative performance (as described in Ritter & Welch, *supra* note 13, at 1817) also make it difficult to discern an underwriter's reputation for fair pricing. *See* Spindler, *supra* note 20, at 309 (making a similar point).

[52] *See, e.g.*, Douglas A. Hensler, *Litigation Costs and the Underpricing of Initial Public Offerings*, 16 MANAGERIAL & DECISION ECON. 111, 115-17 (1995); Seha M. Tinic, *Anat-*

Returning to our numerical example, suppose θ equals 1 whenever the entrepreneur offers the share at any price, P, representing a firm value above $9, and equals 0.1 whenever the entrepreneur sells at a price less than or equal to $9.[53] In this situation, the entrepreneur would choose to sell at $9 ($P = C/k = \$2/(2/9) = \$9$), since this yields an expected utility of 2.43, as opposed to an expected utility of 2 if he were to sell at the maximum price the market would bear, $18.[54] So, the initial price of the offering is $9, but the trading price would immediately rise to $10.35, since at this price the expected return to the shareholder from the share would equal the cost.[55] (One could conceptualize the initial underpricing of $1.35 as being the going rate for a bribe of initial allocatees not to sue.) This would look like a first-day price spike, a common occurrence in IPOs.[56] The spike is the difference between the offering price ($9), set to avoid liability, and the

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omy of Initial Public Offerings of Common Stock, 43 J. FIN. 789, 798-803 (1988). *But cf.* Janet Cooper Alexander, *The Lawsuit Avoidance Theory of Why Initial Public Offerings Are Underpriced*, 41 UCLA L. REV. 17, 72-73 (1993) (arguing against litigation avoidance theories of underpricing); Philip D. Drake & Michael R. Vetsuypens, *IPO Underpricing and Insurance Against Legal Liability*, 22 FIN. MGMT. 64, 70-72 (1993) (same).

[53] This function, though discontinuous, could represent the "going rate" payoff to institutional investors not to sue. The point to be made here is simply that at least some liability functions will result in rational initial underpricing and long-term underperformance.

[54] Why would the entrepreneur, if he is going to sell above $9, sell at $18? The reason is that, because θ does not increase as the entrepreneur raises the offering price of the firm above $9.01, his expected bad-state payoff does not worsen, either. Realizing this, the entrepreneur would then seek to maximize his good-state payoff by raising the firm price as bigh as possible, with the limit being set by what shareholders are willing to pay. Since the shareholder's net payoff function is $gkG + (1 - g)[\theta C + (1 - \theta)kB] - C$, plugging in the numbers, we find that $k = 1/9$. Since the offering price of the firm, P, is equal to C/k, the offering price of the firm here will be $18. The entrepreneur's expected utility pursuing this strategy is $g\sqrt{(1-k)G} + (1-g)\theta\sqrt{B-C} + (1-g)(1-\theta)\sqrt{(1-k)B}$, or $0.5\sqrt{(1-1/9)\$18} + 0.5\sqrt{\$2-\$2} = 2$.

Similarly, we can determine what sale price the entrepreneur would choose, given that he is going to sell for not more than $9. Because θ is constant between $0 and $9, increasing the price all the way to $9 increases the entrepreneur's upside without worsening the downside; we can therefore conclude that he will sell at $9, which means that $k = 2/9$. At a price of $9, a shareholder would pay $2 to receive 2/9 of the firm, and the entrepreneur's expected utility would be $0.5\sqrt{(1-2/9)\$18} + (0.5)(0.1)\sqrt{\$2-\$2} + (0.5)(0.9)\sqrt{(1-2/9)\$2}$, or 2.43.

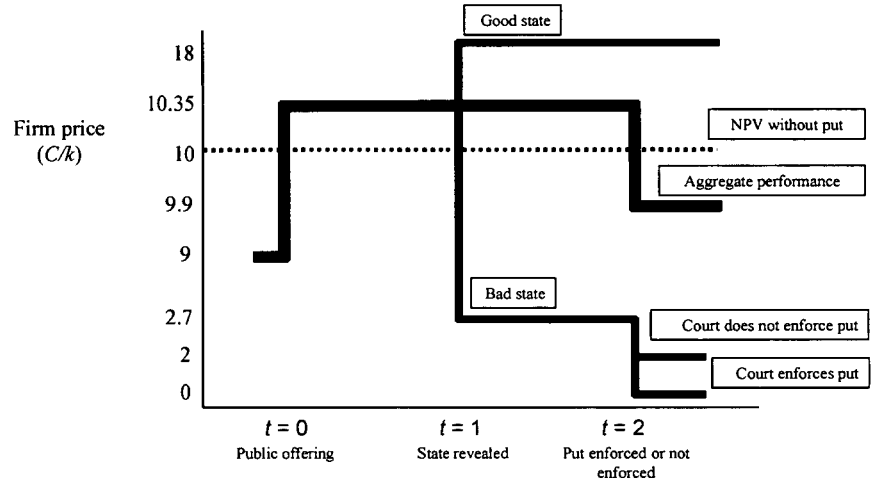
[55] The net payoff to the shareholder from holding the share of the firm is $(0.5)(2/9)(\$18) + (0.5)[(0.1)(\$2) + (0.9)(2/9)(\$2)]$, or $2.30, meaning that the market would bid the price up to $10.35 (because $\$2.30/(2/9) = \$10.35$).

[56] Ritter and Welch estimate that IPOs are underpriced by about 18.8% on average. Ritter & Welch, *supra* note 13, at 1802.

expected value of the firm's cash flows ($10) plus the value of the embedded option component ($0.35).[57]

Later, if the good state of the world occurs, the price of the share would rise to $18. If the bad state of the world occurs, the shareholder can exercise her put option with probability $\theta = 0.1$. If she is able to enforce her put, the price of the underlying equity declines to zero (she takes the remaining money out of the firm and the equity becomes worthless); if she is not, the price of the security declines to $2. In the aggregate, the price of an index of identical firms would come to rest at $9.90, which is below the ex ante expected value of the firm. Figure 2 illustrates these price movements.

Figure 2: Price over Time Where Likelihood of Liability Varies with Price[58]



[57] It is not necessarily always going to be the case that the IPO is underpriced relative to the value of the firm's cash flows. For example, if θ equals 1 whenever pricing is above $11, but equals 0.1 whenever pricing is below $11, the entrepreneur would price the shares at $11, which is above the expected value of the firm's cash flows. There still would be a spike in the price, however, because the value of the option has not been completely priced in. So we still would see the same patterns of apparent short-term underpricing and long-term overpricing.

[58] This Figure assumes $\theta = 0.1$ if $P \leq 9$, and $\theta = 1$ if $P > 9$.

Note that the aggregate performance line of this graph resembles the observed phenomena of short-term underpricing and long-term underperformance. This analysis shows that initial underpricing is compatible with long-term overpricing, and that both phenomena may occur as a result of Securities Act liability. Here, underperformance—meaning an initial trading price that is in excess of the expected value of the firm's future cash flows—is not a result of deceptive practices on the part of the issuing firm or underwriter, but rather is a consequence of a built-in statutory liability that sometimes refunds a shareholder's investment in the bad state of the world.

Is initial underpricing necessarily a bad thing? After all, while issuing firms do not receive as high a price for their shares, initial purchasers of securities gain. However, systemic underpricing makes it more expensive for firms to raise equity, particularly those firms that have a higher degree of risk.

D. *Can This Theory of Embedded Options Explain Observed Patterns of Long-Term Underperformance?*

In this Section, I present a way to value the expected magnitude of IPO underperformance due to liability effects, using existing data on the rate of suit and settlement. IPO underperformance is the phenomenon whereby IPO stocks appear to underperform the market in the long run (say, five years), measured from the close of the first day of trading.[59] This appears to make IPO shares a systematically bad deal for those investors who are not lucky enough to get in on the initial allocations.[60] Indeed, this trend has led some commentators to

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[59] Brealey and Myers observe:

> There is . . . at least one puzzle left. . . . [I]t appears that the long-run performance of companies that issue shares is substandard. Investors who bought these companies' shares *after* the stock issue earned lower returns than they would have if they had bought into similar companies. . . . If so, we have an exception to the efficient-market theory.

BREALEY & MYERS, *supra* note 2, at 419. The underpricing trend was first noted in Ritter, *supra* note 11, at 3. For an excellent overview of theories and research on long-term IPO underperformance, as well as on short-term underpricing, see Ritter & Welch, *supra* note 13, at 1802-08, 1816-22.

[60] The initial allocations are, on average, *underpriced* by about 18.8% compared to the first day's close, meaning that the issuer theoretically could have received a significantly greater amount of proceeds than it did. *See* Ritter & Welch, *supra* note 13, at 1797, 1802 (examining a sample of IPOs from 1980 to 2001). This, of course, is a good deal for investors; however, initial allocations are doled out principally to institutional investors and favored clients. The overall pattern of IPO pricing is an immediate first-day spike, followed by a multiyear period of underperformance relative to the non-IPO

question whether the capital markets really are efficient or whether some form of fraud, bounded rationality, or fundamental shortcoming of the IPO process is at play.[61] I posit, in contrast, that regulatory distortion can explain at least some of this underperformance: the Securities Act's embedded put option causes securities to be sold in excess of the value of their discounted cash flows, and in the bad state of the world, the value of the securities is depressed as the option component's value is extinguished and money comes out of the firm to pay off the put right.[62]

Why would IPO firms fare differently under the Securities Act than non-IPO firms (i.e., firms that are more than five years out from their IPO)? Most obviously, IPO firms have, by definition, just done a public offering, making them subject to Securities Act liability; non-IPO firms may not have. Non-IPO firms, even if they have recently done an offering, will also have shares outstanding that are not subject to section 11 liability. Additionally, non-IPO firms have numerous disclosure options that are subject only to fraud liability, such as annual reports, press releases, and conference calls,[63] whereas the IPO issuer's entire disclosure is subject to strict liability, with IPO disclosure requirements generally being much more extensive. With this in mind, a few specific predictions can be made about how IPO firms will appear to perform compared to non-IPO firms.

1. Timing

First, the model that I have described allows predictions about when the bulk of the underperformance ought to occur. While price decay of the option component should continue over time, price decay should accelerate as expiration nears. The expiration of the option may occur at one of two general times: one year from the date of discovery of the misstatement or omission, or three years after the

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market (i.e., firms whose IPO was more than five years prior). *See supra* notes 48-51 and accompanying text.

[61] For these arguments, see Ritter & Welch, *supra* note 13, at 1822-23; Jonathan A. Shayne & Larry D. Soderquist, *Inefficiency in the Market for Initial Public Offerings*, 48 VAND. L. REV. 965, 965-66 (1995).

[62] For similar points, see Alexander, *supra* note 6, at 571-73; Alexander, *supra* note 12, at 1441-43; and Hughes & Thakor, *supra* note 12, at 714.

[63] Non-IPO issuers also have the benefit of the PSLRA safe harbor for forward-looking statements, which employs a fraud standard, as opposed to Rule 175's "reasonable[ness]" and "good faith"—often interpreted to mean "likelihood"—requirement. *See supra* note 26.

date of the offering, as a final outer limit.[64] The first potential expiration date can be no earlier than one year after the offering, but thereafter the plaintiff runs some risk of being barred; so, when a firm has performed poorly, a cluster of suits should occur just before one year after the date of the offering, because plaintiffs want to make sure that their claims are not barred by the statute. Therefore, the greatest amount of underperformance should be observed just before the one- and three-year marks.

Data from Jay Ritter appear to comport with these timing predictions: in a sample of 7850 IPO and non-IPO firms taken from 1970 to 2002, Ritter finds that IPO firms tend to underperform in the first year post-issuance (for size-matched firms, underperformance was 3.6%; for size-matched and book-to-market-matched firms, underperformance was 0.5%), with poorer returns concentrated in the second half of the year (for size-matched firms, IPO firms actually outperformed in the first six months by 1.7%, but then underperformed in the second six months by 5.3%; for size-matched and book-to-market-matched firms, IPO firms outperformed by 4.3% in the first six months, only to underperform by 4.2% in the second six months).[65] This pattern of underperformance concentration in the second half of the first year exists when looking at individual decades—the 1970s, 1980s, and 1990s—as well.[66] Even in the 1980s, when IPO firms appear not to have experienced significant underperformance,[67] IPO firms still exhibit the pattern of doing relatively worse in the second half of the first year.[68]

There is, similarly, a greater degree of underperformance in the second and third years as compared to the fourth and fifth years. IPO underperformance (against size-matched firms, across all decades studied) accelerates from 3.6% in year one to 8.8% in year two and 5.1% in year three, before tapering off in years four and five (when

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[64] *See supra* note 33 and accompanying text.

[65] Jay R. Ritter, Returns on IPOs During the Five Years After Issuing, for IPOs from 1970-2002, at tbl.1 (Apr. 2, 2003), *available at* http://bear.cba.ufl.edu/ritter/IPOS5.pdf.

[66] *Id.* at tbls.2, 3 & 4.

[67] *Id.* at tbl.3. Against size-matched firms, IPO firms underperformed by 2.8% in the 1980s, while against size-matched and book-to-market-matched firms, IPO firms actually outperformed by 0.4%. *Id.*

[68] *Id.* Against size-matched firms, IPOs outperformed by 1% in the first six months, and underperformed by 2.8% in the second six months. Against size-matched and book-to-market-matched firms, IPO firms outperformed by 4.9% in the first six months, but then underperformed by 0.5% in the second six months. *Id.*

underperformance is 2.6% and 0.8%, respectively).[69] This is, again, consistent with the statute of limitations: as described above, the cut-off for any action under section 11 is three years after the date of an offering. Roughly speaking, at least, the timing of IPO underperformance appears consistent with an embedded put model, where option expirations are concentrated at one and three years after the offering.[70]

2. Magnitude

While some previous work has suggested that the incidence of securities suits may not be great enough to contribute significantly to IPO underperformance,[71] more recent and more detailed evidence on rates of suit and magnitude of settlement suggests just the opposite. For example, according to a study by James Bohn and Stephen Choi, for the top decile of firms by offering size, the incidence of lawsuit is 12.20%.[72] The top 20% of firms by offering size account for just under half of all IPO suits in Bohn and Choi's sample (with a suit incidence of 9.1%),[73] and, because these top 20% account for at least (and almost certainly more than) 47% of IPO volume, dollar-weighted figures for incidence of IPO suit would likely be higher.[74]

Assuming a suit occurs, how much money can shareholders expect to get back? Philip Drake and Michael Vetsuypens, in a study of 93 suits against IPO firms dating from 1969 to 1990, report that "[i]n

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[69] *Id.* at tbl.1. For size-matched and book-to-market-matched firms, IPO underperformance is 0.5% in year one, 4.1% in year two, 3.1% in year three, 3.4% in year four, and 1.1% in year five. *Id.*

[70] The timing of underperformance also appears to accord roughly with the length of time after the IPO that plaintiffs file suit. Bohn and Choi found that, of 103 suits resulting from IPOs, 11 were filed in the first six months after the offering, 28 were filed between six months and one year after the offering, 35 were filed in the second year, 20 were filed in the third year, and 9 were filed more than three years after the IPO. Bohn & Choi, *supra* note 9, at 929. This, again, looks like the clustering we would expect to see with options having an uncertain one- or three-year expiration.

[71] The only previous attempt to estimate the magnitude of this effect is a study by Alexander, *supra* note 12, at 1447-48, which relied on unpublished data and on a Drake and Vetsuypens study, *supra* note 52, at 69, that looked at the average rate of suit incidence during only a small time period.

[72] Bohn & Choi, *supra* note 9, at 936 tbl.2.5. This number is in contrast to the overall incidence of suit of 3.49% for all IPO firms. *Id.*

[73] *See id.* (finding that 60 of 658 IPOs resulted in suits).

[74] By adding the minimum bounds of the various firm-size categories in Bohn and Choi's Table 2.5, *id.*, one can surmise that the top 20% of offerings by size accounted for, at the very least (and probably significantly more), 47% of total offering volume.

proportional terms, the mean value of the ratio of the settlement fund relative to the aftermarket losses averages 31.7%."[75] After accounting for attorneys' fees, which comprise approximately 21% of settlement amounts,[76] shareholders receive about 25% of post-offering declines.[77] Taking that number, along with Bohn and Choi's finding of incidence of suit for the largest 20% of offerings—9.1%—as a proxy for the likelihood of the bad state of the world occurring, and assuming costs of $2, a good-state revenue of $6, and a minimally solvent issuing firm in the bad state of the world,[78] it appears that, in the aggregate, IPO securities should underperform otherwise identical non-IPO securities by about 2.3%.[79] This is not so far from the 5.1% underperformance that Jay Ritter and Ivo Welch find for IPO firms in a style-matched and size-matched sample.[80]

Of course, had I used a smaller suit incidence rate, such as Bohn and Choi's overall average of 3.5%, the degree of underperformance would have been smaller—only about 0.9%—but this is still a notable effect. On the other hand, using a higher incidence of suit, such as the 12.2% that the largest decile of offerings faces, the degree of underperformance grows larger, to 3.1%. As the probability of a bad state of the world increases, as proxied by the incidence of suit, so does the degree of underperformance.

When the firm is more than minimally solvent ($B > C$) in the bad state, underperformance is positively correlated with the spread between the potential revenues in the good and bad states of the world.

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[75] Drake & Vetsuypens, *supra* note 52, at 71.

[76] *See* Vincent E. O'Brien, *The Class-Action Shakedown Racket*, WALL ST. J., Sept. 10, 1991, at A20 (providing findings from a sample of 330 cases).

[77] Since $(31.7\%)(100\% - 21\%) = 25.04\%$.

[78] That is, $C = B$.

[79] With an average settlement-to-losses ratio of S, the shareholder will invest where $gkG + (1 - g)[SC + (1 - S)kB] - C \geq 0$. In the bad state of the world, the shareholder has probability S of recovering her investment, C, while with probability $1 - S$ she will receive only kB. Solving for k, we find that the shareholder would demand, in return for her investment of C, a share of the firm, k, at least as great as:

$$\frac{C - (1 - g)SC}{gG + (1 - g)(1 - S)B}.$$

The imputed price of the firm at the time of the IPO is equal to C/k, while the expected value of the firm after the good or bad state of the world is revealed and after it may be determined where the put is exercisable is $gG + (1 - g)[S(B - C) + (1 - S)B]$. Relative underperformance, as a percentage, compared to identical non-IPO firms is:

$$\frac{C/k - gG - (1 - g)[S(B - C) + (1 - S)B]}{C/k}.$$

[80] Ritter & Welch, *supra* note 13, at 1817.

For instance, if a firm has potential good- and bad-state revenues of $6 and $3, respectively, with C = $2, and a 9.1% chance of reaching the bad state, the degree of underperformance would be 1.9%. Raising the good-state revenue to $12 increases projected underperformance to 2.1%. Generalizing from this, firms with the highest spread between good- and bad-state payoffs, and the greatest probability of suffering a bad-state payoff, would tend to exhibit the most underperformance. This might be a good characterization of the sort of very speculative, boom-or-bust high-tech companies that dominated the IPO market in the late 1990s, and so we would expect to see the greatest degree of underperformance there. While data in this area are currently lacking, there is some rough empirical support for this proposition: in going-public cohorts that have a high percentage of technology stocks, underperformance tends to be higher. For instance, during the period from 1980 to 1989, in which only 26% of IPOs involved tech stocks, style-adjusted underperformance largely is not observable.[81] In contrast, during the period from 1999 to 2000, in which 72% of IPOs involved tech stocks (and highly speculative ones, at that), the cohort exhibited a very high degree of underperformance.[82] Table 1, below, presents varying parameters and the resultant degrees of underperformance.

In any event, the point here is to illustrate that the existing data do support the possibility that embedded put liability plays a significant role in observed patterns of long-term underperformance. Furthermore, even if the degree of underperformance caused by the embedded option is relatively small, the effects upon the entrepreneur's actions may still be very significant. Suppose that the entrepreneur sells off the majority of the firm to the shareholders, and retains a very small amount for himself. Even if the magnitude of his holding is not great enough to seriously affect the overall price of the publicly traded stock of the firm, the fact remains that his equity position may be wiped out by section 11 liability. Thus, his equity position will likely affect his managerial decision making, both at the pre-IPO stage and thereafter. This is the focus of the next Part of this Article.

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[81] *Id.* at 1797 tbl.I, 1800 tbl.II.

[82] *Id.* It should be pointed out, however, that in the period from 1995 to 1998—during which the percentage of tech IPO firms rose to 37%, from 23% in the period from 1990 to 1994 (admittedly a small increase when compared to 1999 to 2000)—style-adjusted underperformance was for the most part not observable. *Id.* This may be due to the fact that the data are, as Ritter and Welch point out, quite noisy, especially when adjusting for common risk factors. *Id.* at 1820.

Table 1: Underperformance of IPO Firms[83]

	Solvent Firm ($B = C$)				Insolvent Firm ($B < C$)			
Probability of good state (g)	75.0%	87.8%	90.9%	96.5%	75.0%	87.8%	90.9%	96.5%
Good state revenue (G)	$6	$6	$6	$6	$6	$6	$6	$6
Probability of bad state ($1 - g$)	25.0%	12.2%	9.1%	3.5%	25.0%	12.2%	9.1%	3.5%
Bad-state revenue (B)	$2	$2	$2	$2	$2	$2	$2	$2
Ratio of settlement value to market losses (S)	25%	25%	25%	25%	25%	25%	25%	25%
Cost of project/ shareholder investment (C)	$2	$2	$2	$2	$4	$4	$4	$4
Underperformance	**6.25%**	**3.05%**	**2.28%**	**0.88%**	**4.69%**	**2.29%**	**1.71%**	**0.66%**

IV. STRATEGIC REACTIONS TO EMBEDDED PUT LIABILITY

In the previous Part, I described one method that the entrepreneur can use to limit his risk exposure: short-term underpricing of the offering. In this Part, I describe several more tactics that the entrepreneur may use, each of which has the potential to destroy value, but is rational given the constraints of section 11.

A. *Risk Reduction: Information and Investment Choice*

The ostensible purpose of section 11 is to encourage the entrepreneur to invest in reducing the risk of the project being sold to the shareholder; section 11 accomplishes this by forcing the entrepreneur to internalize the firm's risk, even post-sale. (Note that the standard account—that the purpose of section 11 is to discourage fraud—is

[83] *See supra* note 79 for my relative-underperformance equation.

probably inaccurate.[84]) For example, an entrepreneur who believes he has developed a medical device with a high expected net present value, but with a great deal of uncertainty surrounding that expectation, might invest in further test trials of the device prior to starting mass production, which entails a very large investment. Some investigation to reduce uncertainty, even if costly, can add value, since it provides an option to withhold investment if the project turns out to be a dud;[85] requiring some degree of investigation prior to sale to the shareholder may be desirable if it is not feasible, due to agency costs, to undertake the investigation post-sale.[86] The entrepreneur may be reluctant to engage in such investigations prior to sale, since he may prefer to receive the expected value of the firm—behind the veil of ignorance—rather than risk being stuck with a low-value project. Thus, section 11's strict liability can play a helpful role, since it shifts risk back onto the entrepreneur post-sale.[87] However, the entrepreneur has substitutes to investigation (or investment in disclosure accuracy) that can be quite destructive, and these substitutes are the focus of the rest of this Part.

One such substitute is the shunning of high-risk projects by the entrepreneur—even at the expense of higher net present value—because the entrepreneur ultimately will be unable to transfer the risk to shareholders. The entrepreneur in Part III.B, above, would trade the project with projected revenues of $18 and $2 (in the good and bad states of the world, respectively) for a project with potential revenues of $14 and $4. The reason is the entrepreneur's risk aversion: the increase in the bad-state revenue from $2 to $4 is worth more to

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[84] For a statement of the traditional view, see, for example, Sale, *supra* note 34, at 434. To the contrary, section 11 almost certainly *encourages* "fraud"—that is, it encourages the entrepreneur to maximize proceeds received by selling the firm at a price in excess of the net present value of its cash flows. For instance, the firm described in Part III.B above does best under section 11 by selling to the shareholder at the price at the very top of the range of possible outcomes—in that case, for a total firm valuation of $18. Other sections of the Securities Act—such as section 17, 15 U.S.C. § 77q(a) (2000) (prohibiting use of interstate commerce for purposes of fraud or deceit), and section 24, *id.* § 77w (making willful violations a criminal offense)—*do* discourage fraud, of course, and are in tension with section 11.

[85] *See* BREALEY & MYERS, *supra* note 2, at 268-78 (discussing "real options").

[86] That is, an entrepreneur who extracts private benefits from running the firm might decide to invest the shareholders' money in the project even if it turns out to be a dud, since the alternative—giving the money back to the shareholders—does not provide those private benefits.

[87] More narrowly tailored alternatives to strict liability are discussed in Part V, below.

him than the good-state revenue's decrease from $18 to $14 costs him; this is so even though the expected value of the new project—0.5($14 – $2) + 0.5($4 – $2) = $7—is less than the expected value of the original project—0.5($18 – $2) + 0.5($2 – $2) = $8. (Total utility, the square root of his wealth, is 2.4 in the case of the new project, as opposed to 2 if he retains the original project.[88]) In the extreme case, the entrepreneur would choose a project with a certain revenue of $6.01 (the sure-thing revenue of $6.01 minus the cost of the project, $2, leaves the entrepreneur with a sure-thing net payoff of $4.01 and an expected utility of the square root of 4.01, or 2.002, which is greater than the expected utility of 2 in the original project); this choice would cause a societal loss in value of $3.99.[89] Obviously, this is not a useful tradeoff, since in this example the variance is purely idiosyncratic risk, which, once again, the shareholder could diversify. Thus, the investment in risk reduction may well come at the expense of actual value.[90]

B. *Insurance and Hedging*

The entrepreneur, recognizing his risk exposure, might want to hedge his risk by purchasing derivatives or liability insurance. This would reduce his exposure, and reduce the distortion in his behavior that section 11 might otherwise cause. But does an insurance market exist that could insure firm outcomes? Given that the reason many firms go public is to diversify risk and to satisfy capital requirements that the private market cannot, it seems doubtful.

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[88] *See supra* notes 38-40 and accompanying text.

[89] I should point out that, even without the existence of the embedded section 11 option, the entrepreneur would still have some incentive to choose lower variance projects since he may not be able to diversify completely due to his large ownership stake. This incentive, however, would be of a lesser degree than the incentive present when section 11 liability is in effect, and it is possible to calculate what the difference in social welfare would be. With no section 11 liability, to achieve the total utility of the original project, 2.53, *see supra* Part III.A, the entrepreneur would require a certain income of at least $6.40. This value represents a loss of only $1.60 from the original project's expected value of $8. Comparing the income required to break even in the non-section 11 scenario ($6.40) with the break-even income required in the section 11 scenario ($4.01), shows that the imposition of section 11 liability has the potential to destroy $2.39 of value.

[90] From an ex post perspective, it is also possible that the entrepreneur would undertake *higher*-risk, lower-value projects when the firm has performed badly and the entrepreneur expects to be sued. This situation is analogous to that caused by the conflict between holders of debt and equity when a firm faces insolvency.

While there is a ready counterparty for a hedging transaction in the form of the shareholders—the firm could simply purchase back the puts from them—this would likely run afoul of the securities laws, since it would amount to an agreement on the part of the shareholders not to sue the firm.[91] Of course, as discussed in Part III.C, the firm could do the functional equivalent of buying back the puts from initial allocatees by bribing them not to sue with initial underpricing; this is, unfortunately, illegal.[92]

Alternatively, the firm could purchase insurance against liability. In practice, this is done to a limited extent with directors' and officers' (D&O) insurance, although the coverage available appears to be partial, at best.[93] More complete issuers' liability insurance does not seem to exist. It would not be surprising, however, if the insurance market lacks the capability to fully insure IPO firms, since doing so would be the equivalent of selling all the firms' downside risk to the insurer; one of the reasons for going public in the first place is that private buyers lack the capacity to buy all the firms' shares.[94] Finally, the SEC's marked hostility to insurance and indemnification also limits such practices.[95]

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[91] Both the Securities Act and the Securities Exchange Act specifically prohibit disclaimer or waiver of liability under the Acts. Securities Act of 1933 § 14, 15 U.S.C. § 77n (2000); Securities Exchange Act of 1934 § 29, 15 U.S.C. § 78cc (2000).

[92] Among other things, this could be considered a scheme or artifice to defraud under section 17 of the Securities Act of 1933, 15 U.S.C. § 77(q)(a)(1) (2000).

[93] Alexander reports that "[i]nsurance, even when it is available, pays only a part of most settlements. In the typical case, the issuer contributes a substantial portion of the settlement—50 percent to 80 percent, or even more." Alexander, *supra* note 6, at 572.

[94] That is, if the entrepreneur can find a private buyer for the firm's downside, there may be little reason to access public markets in the first place.

[95] *See, e.g.*, SEC Regulation S-K, Item 510, 17 C.F.R. § 229.510 (2006) (requiring "a brief description of the indemnification provisions relating to directors, officers and controlling persons of the registrant against liability arising under the Securities Act"); SEC Regulation S-K, Item 512(h)(3), 17 C.F.R. § 229.512 (2006) ("Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons . . . the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy . . . ."); SEC Regulation S-K, Item 702, 17 C.F.R. § 229.702 (2006) (requiring registrants to "[s]tate the general effect of any . . . arrangements under which any controlling persons, director or officer of the registrant is insured or indemnified in any manner against liability which he may incur in his capacity as such").

C. *Managerial Entrenchment*

Since the entrepreneur faces the risk of having his shareholdings wiped out by the put option in the event of subsequent declines in share price, and share price declines increase the likelihood, *ceteris paribus*, that the entrepreneur will lose his job as manager of the firm, the entrepreneur faces the daunting possibility of finding himself not just poor, but also unemployed. One way of mitigating this outcome, then, is to implement entrenchment mechanisms that allow the entrepreneur to keep his job as manager even when the firm performs poorly. A range of options are open to the entrepreneur here. Jennifer Arlen and Eric Talley describe overt and covert forms of entrenchment and, interestingly, point out that managers generally employ overt entrenchment forms—with shareholder knowledge and approval, often at the IPO stage—rather than covert forms.[96] This implies that both shareholders and the entrepreneur see these entrenchment devices as joint-welfare maximizing. Entrenchment may lead to an optimal outcome,[97] given that the Securities Act has relegated us to a second-best world as explained by the risk-shifting model developed in this Article.

Interestingly, a study by Daines and Klausner reports a positive correlation between the shareholdings of management and the use of antitakeover provisions.[98] This is consistent with the hypothesis that, as entrepreneurs are less able to cash out of the firm and therefore are increasingly exposed to idiosyncratic risk, they are more likely to invest in antitakeover technologies to hedge that risk.

D. *Removal of Assets from the Firm*

The entrepreneur can attempt to remove assets from the firm or liquidate his stake in the firm. This has the effect of bypassing the section 11 put: if the entrepreneur can take money out of the firm such

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[96] Jennifer Arlen & Eric Talley, *Unregulable Defenses and the Perils of Shareholder Choice*, 152 U. PA. L. REV. 577, 608-12 (2003).

[97] An example of this entrenchment phenomenon is the Google IPO, in which the founders openly retained control of the company through super-voting shares while selling normal equity stakes to the public. *See* Google Inc., Prospectus (Form S-1/A), at 24-25 (Aug. 18, 2006).

[98] *See* Robert Daines & Michael Klausner, *Do IPO Charters Maximize Firm Value? Antitakeover Protection in IPOs*, 17 J.L. ECON. & ORG. 83, 108 (2001) (finding the positive correlation in the absence of a "control block").

that the firm is unable to pay the put when the shareholder attempts to exercise it, then the put might as well not exist.[99]

There are two principal ways in which the entrepreneur can remove his capital. First, he can retain sole ownership of firm assets and lease them to the firm to undertake the project. In our numerical example, supposing that these assets have a value of $2 in either state of the world, the project's revenue, once the assets are removed, goes from being $18 (in the good state of the world) or $2 (in the bad state) to being $16 (in the good state) or $0 (in the bad state). The section 11 put thus becomes valueless. The shareholder, realizing this, will demand a greater percentage of the firm for her investment of $2 (i.e., the price paid for the shares will be lower), but ultimately the shareholder is no worse off.

One problem with this approach, however, is that there may be value in ownership of assets by the firm. For instance, if the possibility exists that the entrepreneur would be tempted to act opportunistically and withdraw the use of an asset from the firm in the event that a better opportunity comes along, the shareholders may be less willing to invest in the firm. In addition, the entrepreneur's retention of vital assets allows him to entrench himself in the management of the firm.[100] In short, the entrepreneur's retention of assets imposes an additional agency cost that may reduce overall value.

A second way for the entrepreneur to remove capital is by cashing out of the firm entirely. He can do this by selling all of his stock to the shareholder, thus eliminating his exposure to idiosyncratic risk and allowing his diversification into other projects. In such a case, the section 11 put option becomes valueless, since the shareholder now owns the entire firm herself and there is no residual stakeholder to put the firm back to.[101] Alternatively, the entrepreneur can have the firm borrow from a bank, using the shareholder's equity as collateral, in order to cash out the entrepreneur. For example, the entrepreneur in the

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[99] One limitation on this approach is that section 11 extends liability to the firm's management, 15 U.S.C. § 77k(a) (2000), and section 15 extends liability to control persons, *id.* § 77o. This liability is, however, subject to a due diligence defense, and the entrepreneur can escape direct liability by meeting what is essentially a negligence standard. *Id.* §§ 77k(b)-(c), 77o.

[100] See Arlen & Talley, *supra* note 96, at 618-19, for a description of how firm founders can entrench themselves in management by retaining ownership of important assets. For example, Donna Karan's retention of the DKNY trademark allows her to defeat any prospective takeover offers. *Id.* at 619.

[101] As described in note 98 above, the shareholder still can sue the entrepreneur under section 11, but this suit is subject to the entrepreneur's due diligence defense.

scenario in which the revenue is either $18 or $2 can have the firm borrow $2. The firm would pay this amount to the entrepreneur, perhaps styled as a buy-back of some of the entrepreneur's equity or as a purchase of assets over which the entrepreneur had retained ownership. This reduces potential revenues to $16 or $0, erasing the value of the put, meaning that the shareholder will ex ante pay a lower price for the firm's shares. Once again, this does not necessarily make the shareholder worse off, since the price will have adjusted accordingly.[102] However, more debt increases the likelihood of insolvency and, thus, also increases the expected costs of financial distress.[103]

A more fundamental problem is that if the entrepreneur continues to manage the firm, a high ownership stake on his part would help to properly align his interests with those of the shareholder. The imposition of the section 11 put option, however, makes the entrepreneur want to reduce his stake in the firm more than he otherwise would, exacerbating agency costs.

E. *Reduced Information*

It is customary in securities law practice to think of risk-factor disclosure as limiting the seller's liability by providing an insurance policy of sorts; the court-created "bespeaks caution" doctrine allows the issuer to escape liability by describing risks that may subsequently materialize.[104] On the other side of the same coin, disclosure of positive information can be quite risky: positive disclosure increases the probability that the firm will make what, in hindsight at least, appears to be a material misstatement or omission. Thus, firms may wish to disclose less positive information and more negative information.

There is, of course, a cost to this strategy: by reducing positive disclosure and increasing negative disclosure, the issuing firm suffers an asymmetric information problem whereby investors are unable to determine whether the firm is of good or bad quality. It is not clear whether, and in what circumstances, the advantages of reduced liabil-

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[102] Price adjustment does require, of course, that the shareholder realize ahead of time that the entrepreneur will do this.

[103] *See* BREALEY & MYERS, *supra* note 2, at 497-510 (describing the costs of financial distress). The risk of insolvency increases the cost of borrowing because of the costliness of bankruptcy and the unwillingness of creditors, workers, and other third parties to do business with a firm that is likely to become insolvent in the future. *Id.* at 497-503.

[104] For a description of the "bespeaks caution" doctrine, see *In re* Donald J. Trump Casino Securities Litigation, 7 F.3d 357, 364 (3d Cir. 1993).

ity from nondisclosure outweigh the costs of adverse selection and the consequent higher cost of capital.

One unambiguous alternative, however, is that the firm can invest in disclosure "arbitrage," substituting a low liability form of disclosure for a high liability form. In a different article, I present such a model, in which the issuer signals information to the market through the underwriter's research analyst, effectively substituting fraud liability for strict liability.[105] Other substitutes for nondisclosure may include (though they are not without significant problems or costs) preemptive offerings,[106] investment in high reputation underwriters,[107] or covert leakage of additional information to the market.[108]

F. *Firm-Level Diversification and "Empire Building"*

Finally, given that he is subject to an increased level of idiosyncratic risk under section 11 liability, the entrepreneur (assuming he retains management of the firm) has a strong incentive to engage in an increased degree of firm-level diversification, or "empire building." Because the entrepreneur's wealth is tied up in the idiosyncratic fortunes of his firm, the entrepreneur may seek to have the firm diversify by buying other firms or expanding into different lines of business, providing a natural hedge against bad-state outcomes.

This activity is not necessarily destructive of value (after all, combined firms sometimes yield synergies or economies of scale), but seems inadvisable compared to encouraging diversification at the shareholder level. First, purchases of other firms entail significant

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[105] *See* Spindler, *supra* note 20, at 305, 312.

[106] Preemptive offerings entail going public in a small offering so as to become a public reporting company, and then doing a larger offering once the market has acquired more information.

[107] As discussed above, *see supra* note 51 and accompanying text, underwriter reputation is of dubious efficacy in communicating value in the public offering context.

[108] For example, the issuing firm could give initial allocatees such information at a road show. Such action is technically subject to strict liability under section 12, 15 U.S.C. § 77*l* (2000), though the likelihood of liability may be lessened by evidentiary difficulties in proving a case based on road sbow disclosure and by the fact that road show attendees often are repeat players and thus subject to future sanctions (e.g., exclusion from future allocations) if they sue. Although the issuer and the investors may be able to approximate the "right" level of disclosure liability in this way, these communications are not observable to investors in the market at large (i.e., investors not present at the road show). Those investors would have no remedy based upon this disclosure and would therefore not rely upon it in making an investment decision. *See* Spindler, *supra* note 20, at 312-13 (discussing this advantage of analyst reports over prospectus disclosures or road show presentations).

transaction costs; the shareholder can diversify more cheaply by simply buying other firms' traded stock. Second, even if diseconomies or antisynergies exist between the acquiring and acquired firms such that the merger is value destroying, the entrepreneur may proceed regardless, because his gain from diversification outweighs his share of the resultant loss. Third, diversification at the firm level reduces the ability of the individual investor to tailor her portfolio as best suits her: while she may wish to own firm *A* and not firm *B*, she may have no choice in the matter if firm *A* acquires firm *B* (assuming appropriate derivative instruments do not exist[109]).

CONCLUSION

This Article has shown that the Securities Act's standard of strict liability for IPO disclosure has the effect of inefficiently allocating diversifiable risk to entrepreneurs, resulting in distortions of entrepreneurs' behavior. Such distortions include generally value-destroying activities, such as entrenchment, initial underpricing, empire building, end-runs around disclosure rules, lower-value project choices, and asset removal or partitioning. At the same time, the Securities Act may play a significant role in the perceived long-term underperformance of IPO firms by embedding a put option in IPO securities, the value of which declines over time. While such a disclosure-liability regime may lead entrepreneurs to invest more in accurate disclosure, this potential benefit is uncertain, as entrepreneurs have substitute responses at their disposal—the above value-destroying behaviors—that may minimize liability more efficiently.

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[109] *See* Frank H. Easterbrook, *Derivative Securities and Corporate Governance*, 69 U. CHI. L. REV. 733, 738 (2002) (noting that derivatives "overcome many of the obstacles to accurate pricing and hence to the design of optimal terms" for investors).