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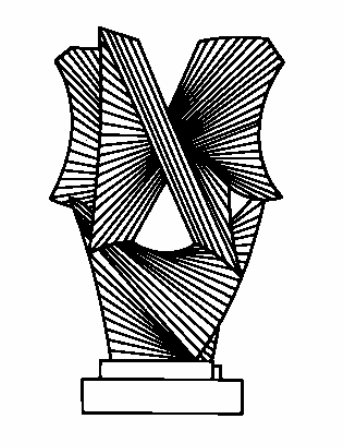

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Abstract: *This paper explores how legal liability in the IPO context can impact an entrepreneur's decision of whether and how to take a firm public. Liability under the Securities Act of 1933 effectively embeds a put option in an IPO security, where the entrepreneur must insure the shareholder against poor firm performance, which inflates the price of the security and exposes 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 NPV projects, asset partitioning, and reduced disclosure—this state of affairs is inefficient compared to a system where the entrepreneur can simply allocate the risk to shareholders. While the Securities Act's risk-allocation regime may provide some benefits in the form of more accurate disclosure, the availability of substitute responses by the entrepreneur makes any such benefit uncertain.*

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* Preliminary and incomplete.

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I.A. Introduction

When an entrepreneur, who has founded a firm and developed its business, decides to take his firm public in an initial public offering (IPO), the entrepreneur gets to choose many things about the firm's initial set-up. For instance, he may decide to embed takeover protection in the firm's charter, retain voting control and issue only non-voting stock, or partition the firm's assets and sell only a part thereof to the public shareholders. This choice is subject to the shareholder's valuation of the resulting structure: a shareholder will be willing to pay more or less for the firm's shares depending on whether she finds the entrepreneur's choice 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. 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.

It is the argument of this paper, however, that the U.S. securities laws do not allow this simple risk-sharing bargain to be struck in the IPO context,[1] with negative consequences for shareholder and entrepreneur alike. The

[1] While "seasoned" issuers—those who are already public companies—are also subject to 1933 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 to IPO firms. See infra nn. 23, 60 and accompanying text.

reason is that the material misstatement or omission liability standard of Section 11 of the Securities Act of 1933 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 where the firm performs poorly. The shareholder relies on information—including the entrepreneur's expectations about future performance—provided by the entrepreneur 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 is purchasing not just the firm's equity but also a put option exercisable in the bad state of the world, the shareholder will pay more for the share-cum-option than she would have 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, which will pull assets out of the firm. Underperformance of IPOs, 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 his 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, investments in insurance or hedging transactions, partitioning of assets, refraining from disclosure of 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 compared to allowing the entrepreneur and shareholder to allocate risk between them as they choose.

B. A Note on This Paper's Contribution to the Literature

The chief aim of this paper 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,[2] they do not consider the entrepreneur's broad range of dynamic responses to the threat of litigation. This paper fills that gap, and finds that these responses are themselves potentially quite harmful.

More broadly, this paper bears upon the merits of the Securities Act itself, and so weighs in on a question the legal literature has widely discussed: whether mandatory disclosure laws are justified.[3] While this paper does not discuss the potential costs and benefits[4] of a private-ordering system

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[2] See, e.g., Alexander (1991) at 571.

[3] The traditional position argues that 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, e.g., Stout (2003); Prentice (2002). 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). See Mahoney (1997), Romano (1998), Choi (2000).

[4] 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 externalities from issuer disclosure. Easterbrook and Fischel, for instance, discuss the public goods aspect of disclosure; were disclosure an opt-in affair, issuing firms would rationally choose to free-ride off the disclosure of others. John Coates (2001) 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. Allen Ferrell (2004) considers that

of disclosure, instead taking the mandatory disclosure regime as given, this paper 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. Describing these costs, including the strategic maneuvers by the entrepreneur to affect the firm's structure or capitalization, forms the bulk of this paper, to be found in Parts III and IV.

This paper 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,[5] argues positively that the underlying existence of fraud or material inaccuracy appears uncorrelated with settlement outcomes.[6] The so-called "strike suit," where a decline in share price, by itself, leads to significant settlement amounts, is ostensibly evidence of brokenness.[7] 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

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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.

[5] See Alexander (1991). While the statistical significance of the findings from Alexander's data is questionable, subsequent empirical work has generally backed up her claims. See n.__ infra.

[6] See Alexander (1991) at 571 ("costs [of litigation] do not depend upon proof of wrongdoing but flow from the simple fact of a sufficiently large decline in share price"). For an example of a response to Alexander's line of inquiry, see Seligman (1994) at 444-5, arguing that price drops alone do not lead to suit and settlement. For more recent empirical work on this question, see Bohn and Choi (1996), Perino (2003), Choi (2004).

In contrast to the two sides of this argument, my argument is that a sufficiently large decline in share price is, in fact, "proof of wrongdoing" (to use Alexander's term), since a finder of fact can infer incorrect disclosure from the price adjustment.

[7] For example, Bohn and Choi have used instrumentalities of material misstatements to test whether securities actions are meritorious. See Bohn and Choi (1996). Not everyone has agreed that the strike-suit phenomenon exists. See, e.g., Seligman (1994). Part of the problem has been that data on settlements are hard to come by, since no opinions are filed and no judgments entered, and the amounts of settlement are difficult to measure. The new 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. See Perino (2003), Choi (2004).

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 the paper.

Along the way, I revisit a puzzle that has caused much ink to be spilt in the finance literature: long term underperformance of initial public offerings.[8] 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.[9] New data makes this issue well worth picking up again: studies conducted over the last decade suggest that the magnitude of underperformance is not so great as once thought,[10] while the incidence of securities litigation is significantly higher,[11] especially in certain conditions and for certain firms, than was previously believed. Part III.D puts forth a simple method for measuring the magnitude of this effect, and finds that the liability data are consistent with observed underperformance.

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[8] "Underperformance" is defined as the long term performance measured from the close of the first day's trading. Measuring from the first day's close is done since the closing price should represent the fair market value of the issuing firm based upon all publicly available information. See Brealey and Myers, at ___. This phenomenon was first documented by Ritter (1991).

[9] Alexander discusses a "litigation put" that acts as insurance against market losses, though she dismisses the possibility of significant effects upon price. See Alexander (1994) at 1447 (considering the "theoretical plausibility" of an embedded put, but concluding that it would likely be of "negligible value"). Alexander uses the put, instead, to analyze whether securities damages are measured accurately. See Alexander (1991) at 570 ("to the extent that the ... termination of the litigation put affects share price, [the current system of measuring damages] systematically overstates the amount of damages").

Similarly, Hughes and Thakor (1992) point out that litigation avoidance theories of initial underpricing can be theoretically consistent with observed long term underperformance, but then leave the matter at that.

[10] See Ritter and Welch (2002).

[11] See Perino (2003); Bohn and Choi (1996).

The paper proceeds as follows: in Part II, I provide a description of IPO liability under the Securities Act of 1933, and explain how application of the Act's liability provisions embeds a put option in the 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, and examine existing empirical studies to find that the magnitude of the embedded option effect may match up 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 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 1933 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 misstatements or omissions in a registration statement or prospectus.[12] 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.[13] A misstatement or omission is deemed "material" if it is something that a reasonable investor

[12] 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."

[13] 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. See Securities Act Section 11(e). 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, but these do not affect the analysis.

would have considered important to her investment decision—in short, if it is something investors should care about, it is material.[14] 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.[15]

Because little, if any, prior information about IPO firms is available, investors are dependent upon the firm to provide information about itself.[16] The Securities Act maintains strict control over the flow of information from the 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 price will be based entirely upon the IPO disclosure.[17] Since the price of a security

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[14] The concept of "materiality" is defined by Rule 405 of the 1933 Act, which states that "the term 'material' … [refers] to those matters to which there is a substantial likelihood that a reasonable investor would attach importance in determining to purchase the security…." See also Vizcarrondo and Houston, Liability, 1385 PLI/Corp 1067 at 1076 ("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.")

[15] This type of standard has been adopted in other securities litigation contexts as well, such as 10b-5 claims of fraudulent disclosure that rely on the "fraud on the market" doctrine." Price movements in the market price of a security are adequate to prove reliance under Rule 10b-5. See Blackie v. Barrack, 524 F.2d. 891, 907 (9th Cir. 1975).

[16] 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. "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. See SEC Releases 3844 and 5180. Subsequent to filing of the registration statement, written offers may only be made via the prospectus contained in the registrations statement, and oral offers are subject to liability under Section 12(a)(2). 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 is an example of this, and, 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.

[17] Some "leakage" probably does occur, but either the source must be subject to reputational penalties or to liability of some sort, in order for leaked information to be credible to the market. Other communications, such as roadshows, are allowed at certain times, but these communications are also subject to strict liability, under Section 12 of the 1933 Act (subject to a reasonable care defense). So-called "free-writings" (written materials that accompany a final Section 10(a) prospectus and are subject to fraud liability) are only available post-effectiveness, subsequent to pricing. There is the possibility that information may leak to the

is determined by a firm's expected returns, as well as the degree of non-diversifiable risk that accompanies those expected returns,[18] the firm's IPO prospectus must convey this information to the investor. So we might conceive of the prospectus as describing a range of outcomes and their respective probabilities, which translate into a market price.

Suppose an investor is considering a purchase of a security 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 from the firm information that allows the investor 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, 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, are particularly important.[19] Assuming they believe this information is true, the investor and wider market will 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 non-diversifiable. Given the levels 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.

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market via other means that incur a lower level of liability, such as analyst research reports or underwriter reputation. See James Spindler, Conflict or Credibility: Analyst Conflicts of Interest and the Market for Underwriting Business, University of Chicago Olin Law and Economics Working Paper No. 215 (available at http://ssrn.com/abstract=564381), for a model of signaling via analyst research reports.

[18] Investors care only about systemic, non-diversifiable risk, also known as *beta*. Diversifiable risk (also known as idiosyncratic or firm-specific risk) may be "diversified away" by holding many different sorts of assets in a portfolio. See Brealey and Myers, Principles of Corporate Finance, 6th Edition, Chapter 7.

[19] See Kim and Ritter, Valuing IPOs, 53 Journal of Financial Economics 409 (1999).

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.[20] Section 11 of the Securities Act does just this.[21] Any material inaccuracy results in liability; no fault in terms of inadequate care or deceptive intent is required for the issuer to be held liable, only inaccuracy of the prospectus disclosure. This strict accuracy requirement applies statements of hard fact ("our revenues were $100MM in fiscal 2004") and to disclosures regarding risk ("our revenues are dependent upon continued good relationships with several key clients"), though specific projections and plans, such as earnings estimates ("we expect our revenues to be higher in fiscal 2005"), are not required to be ex post accurate.[22] Liability also attaches for

[20] In a perfectly well-functioning market and in the absence of regulation, we might suppose that market forces would give rise to non-statutory methods of credibility enhancement, such as certification by repeat-player auditors and investment banking intermediaries. However, for whatever reason (such as transaction or search 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 Frank H. Easterbrook and Daniel R. Fischel, The Economic Structure of Corporate Law at 283.

[21] Section 11 is buttressed by Section 12, which covers oral statements in the waiting period (such as roadshow communications), and the anti-fraud provisions of Section 17 and Exchange Act Rule 10b-5.

[22] Some of these statements may qualify as "forward looking statements" under Rule 175 of the 1933 Act, and 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." 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., they were unreasonable when made). This protection is limited to rather narrowly defined "forward-looking statements," which comprise principally 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, the firm is still strictly liable for disclosing risks that might lead the firm to fall short of that estimate. See *In Re Donald J. Trump Casino Securities Litigation—Taj Mahal Litigation*, 7 F.3d. 357 (3rd Circuit, 1993), where the court applies the so-called "bespeaks caution" doctrine despite the ostensible applicability of the Rule 175 safe harbor. This 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 of, or confidence in, the projection's coming true. See, e.g., Regulation S-K, Item 10(b); BNA Corporate Practice Series, *Regulatory Aspects of the Initial Public Offering of Securities*, BNACPS No. 60 § VI at n.5 ("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

material omissions, such as failure to disclose risks or flaws in the firm's business. The firm is also liable for disclosure, or omissions thereof, regarding the firm's exposure to market risk; this makes perfect sense since market risk, not firm-specific risk, is what the diversified investor should care about.[23]

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 passes, and the actual payoff is revealed to be $29, as opposed to the expected value of $45. Just on the facts of the situation 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 would expect a result like this (or worse) to occur about 2.5% of the time. It is a highly unlikely result, though not impossible. However, a plaintiff need not show with certainty that the projections were wrong; to the

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projections were based on facts that make the achievement of the projections "highly probable").

In any event, Congress appeared to recognize that even the Rule 175 safe harbor was inadequate to encourage adequate disclosure, particularly of positive forward looking information. The Private Securities Litigation Reform Act of 1995 (PSLRA) further limits liability for seasoned (but not IPO) issuers by making forward looking statements subject only to a fraud standard of liability. See Securities Act §27A(b)(2)(D), (c). 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 at 475 (citations omitted). However, the efficacy of the PSLRA is questionable, too. For 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 Secs. Litig., 135 F.Supp.2d 480, at *21 (D. Del. Mar. 29, 2001) (finding that management's statement of belief in adequacy of loss reserve was not forward looking, even though loss reserves relate to expectations of future losses), In re Splash Tech. Holdings, Inc. Secs. Litig. 2000 WL 1727377, at *6 (finding statements regarding "planned investments" and market segment health not to be forward looking under the safe harbor).

[23] The Securities Act requires issuing firms to make disclosure concerning industry conditions and trends, as well as sensitivity to market and credit risk. See Items 303 and 305 of Regulation S-K, as well as the general material information requirement of Rule 408. In practice, firms do provide significant disclosure regarding market risks that have little to do with their businesses directly (see, e.g., Form F-1 of HDFC Bank, at __, 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 would appear a reasonable approach.

contrary, she need only show it is more likely than not that the projections were incorrect. And so, here, an actual payoff that is only likely to occur with a probability of 2.5% if eBank's projections were accurate, while not the end of the inquiry, can go some way toward showing that management's prospectus disclosure was probably incorrect.

To take a simpler example of such analysis, suppose that an entrepreneur sells to an investor a security based on five flips of a supposedly fair coin, which, after 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, the investor 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 valid claim that he 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 probability of .5. Then, the actual result (a zero payoff) is one that should occur only one in thirty-two times with a fair coin.

The investor might allege that the coin was an unfair coin, and sue under Section 11. 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 head and one tail, 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, and the entrepreneur would have to pay back $1.79.[24]

[24] 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 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.

However, it is quite likely that prior data of this sort are not available, especially in the much more complex real world where information is not so readily quantified, and also because the entrepreneur's prior knowledge regarding the firm is not directly verifiable. In the eBank scenario, it seems quite unlikely that the court would have such data. In that case, one can 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.[25] 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 their projections than if they were dishonest and incompetent. Other factors could include looking at the projections' accuracy in predicting various discrete contingencies,[26] calling to the stand business and finance experts to opine as to the reasonableness of such projections at the time made, examining what projections 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 managerial projections of other firms.[27] This prior confidence 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 that the poor results obtained were likely to occur if eBank's projections were wrong, then we could find it more likely than not that the projections were, in fact, inaccurate: 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

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[25] 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' Theorem", The Stanford Encyclopedia of Philosophy (Winter 2003 Edition), Edward N. Zalta (ed.).
Hughes and Thakor (1992) develop a similar sort of analysis, where underwriter reputation serves as the ex ante prior confidence in the correctness of the offering price.

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

[27] This is essentially Rule 175's requirement that projections and forward looking statements are not actionable if they have a "reasonable basis." See n. 23, supra.

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 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 1933 Act Liability.

Liability under Section 11 of the 1933 Act bears a striking resemblance to a "put" option.[28] 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 "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; the reason for this is that options are more valuable as uncertainty is greater, and there is, of course, more uncertainty over a longer period of time than over a shorter one.

The right of recovery under Section 11 expires with the running of the statute of limitations in the 1933 Act. The right of action expires one year from the date of discovery of the misstatement or omission, and in no event can an action be brought more than three years after the date of the public

[28] See Alexander (1991, 1994) for a prior discussion of put characteristics of securities liability.

offering.[29] 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.[30]

Damages under Section 11 are the difference between the initial offering price of the security and the price at which the plaintiff brought suit.[31] 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, an eBank shareholder, if the share was trading at $29 at the time of suit, would recover the $13 difference if her suit proves successful. Since the eBank shares are listed and presumably still liquid, she can sell her shares and be back exactly where she started, with her $42 investment. In this case, the $42 initial purchase price would be 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. As described 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 price that is below the public offering price but where the shareholder will not be able to exercise the put.[32] The level of this threshold will depend upon ex ante estimations of prior accuracy, and we might expect that both

[29] See §13 of the 1933 Act. One should note that the statute of limitations for *fraud* has been increased under §804 of the Sarbanes Oxley Act to two years after the discovery of the fraud, and not more than five years after the commission.

[30] This may not always be easy to do, at least for individual subsequent purchases made through a broker. See Hillary Sale, Disappearing Without a Trace: Sections 11 and 12(a)(2) of the 1933 Securities Act, 75 Wash. L. Rev. 429. While the simplified model of this paper 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 others.

[31] 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 other than the misstatement—but this is really getting to an issue of materiality as discussed above.

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

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. So, at the time the equity cum put option is offered for sale, 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 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 options decline in value as they approach their expiration date. This is due to the decline in uncertainty that the option is insuring against: as the expiration date approaches, the insurance policy covers a smaller span of time, which means that it is worth less. After their expiration date, options are worth nothing: they have either been exercised, or they are expired. So, even assuming the underlying value of the equity stays constant (i.e., market expectations regarding the firm do not change or 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) dating from the end of trading on the day of the IPO to the running of the statute of limitations. Even IPO firms that perform up to expectations (and even, to some extent, beyond expectations) should experience price underperformance relative to identical 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, and it will be as though Section 11 liability does 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 (assuming 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 put option declines, in addition to any decline in the value of the equity. 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 section 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, and then, in Part III.B, I show how the addition of an embedded put right destroys value and affects his decisionmaking. I then show, 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 do 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 will make a

lot of money (denoted as G), or, in the bad state of the world, the project performs poorly, and will 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.[33] Since in either case the entrepreneur must bear the cost of the project no matter what the outcome, the two possible 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 $gG + (1-g)B - C$. 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 .5(\$18) + .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 payoffs are uncertain.[34] For example, suppose the entrepreneur's utility function is given as the square root of his wealth.[35] Then the expected utility from the project is $.5\sqrt{18-2} + .5\sqrt{2-2} = 2$. This is less than the utility of 2.83 that the entrepreneur would enjoy from receiving the expected value of the project up front.[36]

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

[33] At this point in the analysis, I am assuming 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.

[34] The entrepreneur is likely to be risk averse with respect to the firm's idiosyncratic risk because of wealth constraints—i.e., 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 and Welch (2002) 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 Chemmanur and Fulghieri (1999); Amit, Glosten, and Miller (1990). Hughes (1986), at 121, makes a similar assumption regarding risk aversion.

[35] The entrepreneur's expected utility would be written as $g\sqrt{G-C} + (1-g)\sqrt{B-C}$.

[36] This is because the entrepreneur gets \$8 in either state of the world, and $.5\sqrt{8} + .5\sqrt{8} = 2.83$.

holding shares of many such projects, than in the hands of the entrepreneur, who cannot.[37] So, in this example, the entrepreneur would sell 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.[38] 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)[39] would be willing to pay up to the point where her expected return from the venture equals her investment. More formally, the shareholder will be willing to contribute the project funding cost C when the expected value of the share of the firm k that she receives 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 = .2), while the entrepreneur would retain the other four-fifths.[40]

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[37] Some scholars have pointed to the desire for risk-diversification as being the primary impetus for the creation of the corporate form. [cite]

[38] Why wouldn't the entrepreneur sell the entire project? One reason is that since the entrepreneur will have to pay the shareholders a market rate of return on their equity investment, it is likely that the entrepreneur would be unable to raise more than C dollars since the entrepreneur 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 NPV; 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 incentive and retain them. I discuss the problem of "cashing out" in Part IV.D.

In fact, the data suggests that the entrepreneur generally will retain a sizeable stake: of IPO firms who are subsequently sued, firm insiders (directors and officers of the firm) own 49.2% of the firm *after* the offering. See Bohn and Choi (1996) at 961.

[39] I am assuming that systemic risk (or *beta*) is already priced in to these examples. Since beta 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 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.

[40] With the shareholder's capital contribution of \$2, the expected value of the firm is now \$10, which is the expected value \$8 of the project plus the \$2 capital contribution. So the share of

The expected absolute payoff to the entrepreneur in this situation is the same as before (the entrepreneur sells the share for its net present value), but the entrepreneur's utility in this situation is higher since the level of risk that the entrepreneur is exposed to is lower. Numerically, the entrepreneur's objective payoff is g(1 – k)G + (1 – g)(1 – k)B = .5*.8*18 + .5*.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 $.5\sqrt{.8\times 18}+.5\sqrt{.8\times 2}=2.53$, as opposed to 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 1933 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. 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?

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the stock that the shareholder owns, should she trade it on the market, would be worth $2, since k*$10 = .2 * $10 = $2.

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.[41] The entrepreneur's payoff in this case is .5(8/9)18 + .5(0) = \$8, and his expected utility is 2, which is identical to in the prior case where the entrepreneur funds 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 point 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.

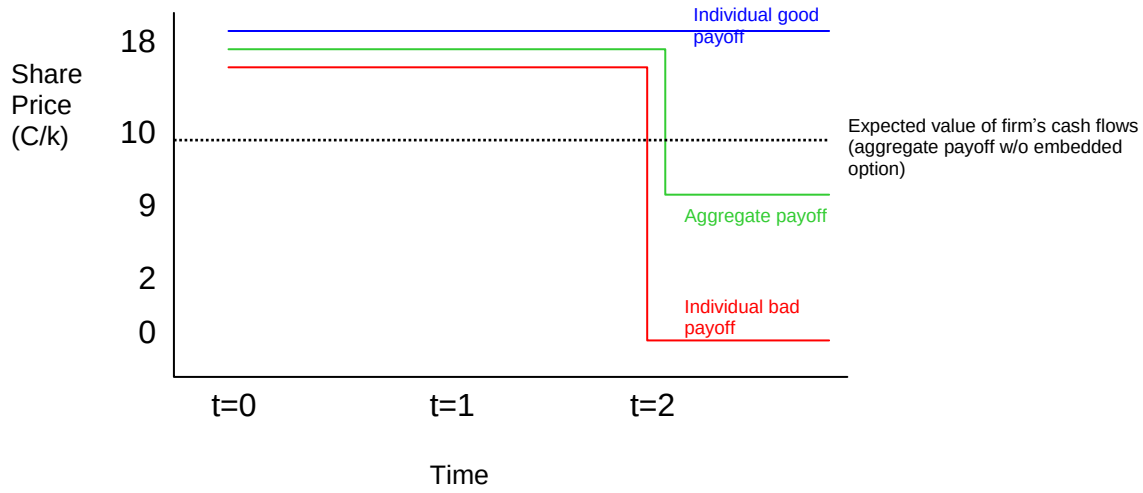
The apparent market valuation of the firm in the second case is higher: the shareholder in the first case receives one-fifth of the firm for her

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

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, since 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 $.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 1, the good or bad state of the world is revealed, and at time 2 the shareholder will exercise her put option if it is in the money. There are two possible outcomes: (a) in the good state, the firm would realize cash flows of $18 and the shares would continue to trade reflecting the now-underlying value of $18, or (b) the bad state of the world is revealed, the shareholder exercises her put, withdrawing the remaining value of $2 from the firm, and the underlying equity interest is now worth zero. In the figure below, outcome (a) is denoted by the blue line, and outcome (b) is denoted by the red line. At time 0, the shares are sold to the shareholder; at time 1, the good or bad state of the world is revealed; and at time 2 the shareholder can exercise her put option. The green line, labeled "aggregate payoff" shows what a market index of identical (but uncorrelated) firms would look like: all firms would start out priced at $18, but at time 2, when shareholders of firms suffering a bad state exercise their put options, half the firms in the index have a value that drops to zero, while half the firms remain priced at $18, for an aggregate price of $9. For contrast, the

black dotted line shows what an index of such identical firms would look like if no embedded put option existed, meaning that firms are priced only based on expected future cash flows.



Two features of this graph are notable. First, with an embedded put option, the firm is initially priced in excess of expected value. This is due to the value of the put option, which is extinguished at time 2. Second, over time, 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. Putting the two effects together, IPO firms would appear to underperform non-IPO firms.

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

We might expect that the 1933 Act only imposes liability on the part of the issuing firm some percentage of the time, which we can denote as probability θ, where $0 \leq \theta \leq 1$. A θ of 1 means the put always will be enforced, and a θ of zero means the put will never be enforced; a value between 1 and zero means that there is only a likelihood of enforcement. 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 firms' project, which in the numerical example above would be $10.[42] A lower θ makes the entrepreneur better off, though risk-averse shareholders are indifferent.[43]

An exogenously determined θ has no effect on the entrepreneur's pricing decision: as where θ equals zero or one, the entrepreneur will simply charge the highest price that shareholders will pay for the shares.[44] 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, 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 who 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 which lowers the offering price without reducing the proceeds to the issuer; this may take the form of tie-ins or other future business, or else be

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

[43] Assuming that the firm will be solvent to pay the put (i.e., B ≥ C), the shareholder's payoff function is $gkG + (1-g)[\theta C + (1-\theta)kB] - C$. In the bad state of the world, with probability θ, she can exercise the put and receive back her purchase price C, while with probability (1- θ) she will only receive her share of the bad state profits, kB. The entrepreneur's absolute payoff function is given as $g(1-k)G + (1-g)[\theta(\text{B - C}) + (1-\theta)(1-k)B]$. The entrepreneur's utility function (following the example given above) is 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.

[44] 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.

intermediated through the underwriter, who is a repeat player, in the form of lowered underwriting fees or enhanced services.[45] Second, as proposed in Hughes and Thakor (1992), underwriters who develop reputations for consistently underpricing have a higher Bayesian prior of having priced correctly.[46] Other litigation-related models of underpricing have also been put forward;[47] a complete exposition and analysis of these is, however, beyond the scope of this paper.

Returning to our numerical example, suppose θ equals 1 whenever the entrepreneur offers the share at any price representing a firm value above \$9, and is equal to 0.1 whenever the entrepreneur sells at a price less than or equal to \$9.[48] 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 expected of utility of 2 if he were to sell at the maximum price the market

[45] The bribe method of avoiding liability is subject to some leakage, since initial allocatees generally do not hold on to all their allocations, and 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 gotten a disproportionately large share of the awards or settlement from such litigation. The PSLRA, which strengthens the position of institutional investors by making them more likely to be the representative or lead plaintiff, could, under these theories of litigation avoidance, 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 paper.
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.

[46] 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 (1996) find that underwriter reputation, as proxied by lead and co-lead positions, has an inverse correlation with subsequent liability—exactly the opposite relationship suggested by Hughes and Thakor's undewriter-driven model. Also, the same measurement problems that make it difficult to measure long run relative performance (as described in Ritter and Welch (2003)) also make it difficult to discern an underwriter's reputation for fair pricing. See Spindler (2005), making a similar point.

[47] See, e.g., Tinic (1988), Hensler (1995). But c.f. Drake and Vetsuypens (1993) and Alexander (1996), arguing against litigation avoidance theories of underpricing.

[48] 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.

would bear, which is k = 1/9 or $18.[49] 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.[50] (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.[51] The spike is the difference between the offering price, set to avoid liability, and the expected value of the firm's cash flows ($10) plus the value of the embedded option component ($0.35).[52]

Later on, 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 θ = *.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), and if

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[49] 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 high as possible, with the limit being set by what shareholders are willing to pay. Since the shareholder's 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 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 $.5\sqrt{(1-1/9)\$18} + (.5)\sqrt{\$2-\$2} = 2$.

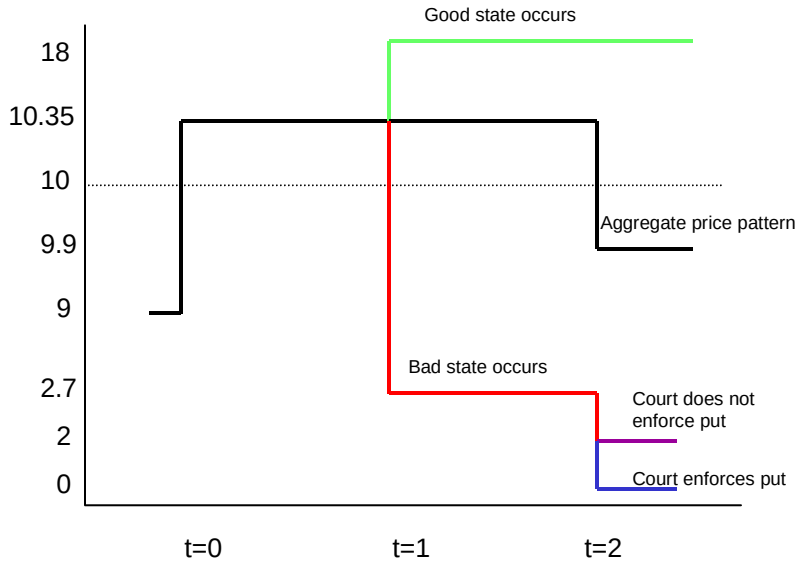
Similarly, we can figure what price the entrepreneur would sell for, given that he is going to sell for not more than $9. Because θ is constant between $0 and $9, increasing the price all the way to $9 increases the entrepreneur's upside without worsening the downside; so we can conclude he will sell at $9, which means that k = 2/9. At a price of $9, shareholders would pay $2 to receive 2/9 of the firm. The entrepreneur's utility here will be $.5\sqrt{(1-2/9)\$18} + (.5)(.1)\sqrt{\$2-\$2} + .5(.9)\sqrt{(1-2/9)2}$, or 2.43.

[50] The shareholder payoff from holding the share of the firm is $(.5)(2/9)(\$18) + (.5)[(.1)(\$2) + (.9)(2/9)(\$2)]$, or $2.3, meaning that the market would bid the price up to $10.35 ($2.3 / (2/9) = $10.35).

[51] Ritter and Welch (2002) at 1802 estimate that IPOs are underpriced about 18.8% on average.

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

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 9.9, which is below the ex ante expected value of the firm. The following graph illustrates these price movements.



Note that the aggregate price pattern line of this graph resembles the observed phenomena of short term underpricing and long term underperformance. What this analysis shows is that initial underpricing is compatible with long-term overpricing, and that both phenomena may occur as a result of Securities Act liability. "Underperformance"—meaning an initial trading price that is in excess of the expected value of the firm's future cash flows—is here a result not of deceptive practices on the part of the issuing firm or underwriter, but rather a consequence of a built-in statutory liability that 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, the result of systemic underpricing is to make it

more expensive for firms to raise equity, and particularly among those firms that have a higher degree of risk.

D. Can This Theory of Embedded Options Explain Observed Patterns of Long-Term Underperformance?[53]

In this section, I present a way to value the expected magnitude of "IPO underperformance" due to liability effects, utilizing 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.[54] This appears to make them a systematically bad deal for those investors who are not lucky enough to get in on the initial allocations of the IPO shares.[55] Indeed, this trend has led some commentators to 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.[56] I would posit, in contrast, that regulatory distortion can explain at least some of this underperformance: the 1933 Act's embedded put option causes securities to be sold in excess of the value of their discounted cash flows, and in the bad

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[53] I would stress that, even if the *magnitude* of the liability put is not particularly large relative to the share price, this does not affect the results in the other portions of the paper. Even if the entrepreneur's stake in the firm is small relative to total firm value, his stake is probably still significant to him and will affect his behavior as described in Part IV.

[54] See Brealey and Myers, Principles of Corporate Finance, at 419 ("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."); Ritter and Welch (2002) at 1816-22. The underpricing trend was first noted by Ritter (1991). Ritter and Welch (2002) provide an excellent overview of theories and research on long term IPO underperformance as well as short term underpricing.

[55] 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 and Welch at 1802 (examining a sample of IPOs from 1980 to 2001). This, of course, is a good deal for investors, but 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 multi-year period of underperformance relative to the non-IPO market (i.e., firms whose IPO was more than five years prior).

[56] See Soderquist and Shayne (1995); Ritter and Welch (2002).

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.[57]

Why would IPO firms fare differently under the Securities Act than non-IPO firms (i.e., firms who 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,[58] whereas all of the IPO issuer's disclosure is subject to strict liability, with IPO disclosure requirements being generally much more extensive than that required of non-IPO firms. With this in mind, we can make a few specific predictions about how IPO firms will appear to perform compared to non-IPO firms.

1. Timing

First off, we can make some predictions from the model about when the bulk of the underperformance ought to occur. While price decay of the option component should continue over time, we would expect price decay to accelerate as expiration nears. The expiration of the option may be at one of two general times: one year from the date of discovery of the misstatement or omission, or three years after the date of the offering, as a final outer limit. 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, we would expect a cluster of suits just before one

[57] Alexander (1991, 1994) and Hughes and Thakor (1992) make a similar point.

[58] 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" and "good faith"—often interpreted to mean "likelihood" (see n.23 supra)—requirement.

year after the date of the offering, since plaintiffs want to make sure that their claims are not barred by the statute. From this, we would expect to see the greatest amount of underperformance just before the one and three year marks.

Data from Ritter (2003)[59] appear to comport with these timing predictions: in a sample of 7,850 IPO firms 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%, whereas for size and book-to-market ratio matched firms, underperformance was 0.5%), with poorer returns concentrated in the second half of the year (for size matched, 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 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). This pattern of greater underperformance in the second half of the first year exists when looking at individual decades of the 70s, 80s and 90s, as well. Even in the 80s, when IPO firms appear not to have experienced significant underperformance,[60] IPO firms still exhibit the pattern of doing relatively worse in the second half of the first year.[61]

There is, similarly, an greater degree of underperformance in the second and third years as compared to the fourth and fifth years. IPO underperformance (against size-matched firms) accelerates from 3.6% in year one to 8.8% in year two and 5.1% in year 3, before tapering off in years four

[59] See Jay Ritter, Long-run returns on IPOs from 1970 to 2002, available at http://bear.cba.ufl.edu/ritter/IPOS5.PDF

[60] Against size-matched firms, IPO firms underperformed by 2.8% in the 80s, while against size and book-to-market matched firms, IPO firms actually outperformed by 0.4%.

[61] Against size matched firms, IPO's outperformed by 1% in the first six months, and underperformed by 2.8% in the second six months. Against size 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.

and five (where underperformance is 2.6% and 0.8%, respectively).[62] This is, again, consistent with the statute of limitations: three years after the date of an offering is the cut-off for any action under Section 11, after which claims cannot be filed. 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.[63]

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,[64] 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%.[65] The top 20% of issuers account for just under half of all IPO suits in Bohn and Choi's sample (with a suit incidence of 9.1%), and, since the top 20% by size of IPO issuers 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.[66]

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[62] For size 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.

[63] The timing of underperformance also appears to accord roughly with the length of time after the IPO that plaintiffs file suit, as reported by Bohn and Choi (1996) at 929 (of 103 IPO suits, 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, 30 were filed in the third year, and nine were filed more than three years after the IPO). This, again, looks like the sort of clustering we would expect to see with options having an uncertain one or three year expiration.

[64] The only previous attempt to estimate the magnitude of this effect is that of Alexander (1994), See Alexander at 1447. Alexander relied on unpublished data and the Drake and Vetsuypens study, infra, that looked at the average rate of suit incidence during only a small time period. More recent data, discussed infra, suggests that rates of suit overall may be higher, and that rates of suit are significantly higher for larger or higher-variance issuers.

[65] James Bohn and Stephen Choi, Fraud in the New Issues Market, 144 U. Pa. L. Rev 905, 936. This is in contrast to the overall incidence of suit of 3.5% for all IPO firms.

[66] From Bohn and Choi's Table 2.5, by adding up the minimum bounds of the various firm-size categories, one can surmise that the top 20% of offerings by size accounted for, at the

While these are fairly rough numbers, they suggest that the median IPO dollar gets sued at least 9.1% of the time, which may well have significant effects on securities price movements.

Assuming a suit occurs, how much money can shareholders expect to get back? Drake and Vetsuypens, in a study of 93 IPOs dating from 1969 to 1990, report that a firm whose shares decline below their offering price, conditional upon being sued, can expect to settle for 31.7% of the post offering decline, on average.[67] After accounting for attorneys' fees (which takes up approximately 21% of settlement amounts), shareholders receive about 25% of post offering declines.[68] Taking that, along with Bohn and Choi's number for 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 a minimally-solvent issuing firm in the bad state of the world,[69] we would find that, in the aggregate, IPO securities would underperform otherwise identical IPO securities by about 2.3%.[70] This is not so far off from the 5.1% underperformance that Ritter and Welch find for IPO firms in a style and size-matched sample.[71]

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

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very least (and probably significantly more), 47% of total offering volume. See Bohn and Choi (1996) at 936.

[67] See Drake and Vetsuypens (1993)

[68] See O'Brien (1991)

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

[70] With an average settlement/losses ratio of S, the specification here is that 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 her share of the firm, 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 $k = \frac{C - (1-g)SC}{gG + (1-g)(1-S)B}$.

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 the put may be determined exercisable is $gG + (1-g)(S(B-C) + (1-S)B)$. Relative underperformance, as a percentage, compared to identical non-IPO firms is $\frac{C/k - gG - (1-g)(S(B-C) + (1-S)B)}{C/k}$.

[71] See Ritter and Welch (2002), at 1817.

been smaller—only about 0.9%—but this is still a notable effect. On the other hand, utilizing a higher incidence of suit, such as the 12.2% that the largest decile of offerings face, the degree of underperformance grows larger, to 3.1%. Going still higher, by taking O'Brien and Hodge's finding that 1 in 4 computer and electronics manufacturers is sued, we would expect relative underperformance of 6.3%. As the probability of a bad state of the world gets higher, as proxied by the incidence of suit, so does the degree of underperformance.

Where the firm is more than minimally-solvent ($B > C$) in the bad state, underperformance is positively correlated to the spread between the payoffs in the good and bad states of the world. For instance, if a firm had good and bad payoffs of 6 and 3, with $C = 2$,the degree of underperformance of a firm that has a 9.1% chance of reaching the bad state is 1.9%. Raising the good state payoff to 12 increases underperformance to 2.1%. Generalizing from this, firms with the highest degree of good/bad spread 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 sugpport for this proposition: in going-public cohorts that have a high percentage of technology stocks, underperformance tends to be higher. For instance, in 1980 to 1989, where only 26% of firms going public were tech stocks, style-adjusted underperformance is not observable. In contrast, in 1999–2000, when 72% IPO firms were tech stocks (and highly speculative ones, at that), that cohort exhibited a very high degree of underperformance.[72]

[72] See Ritter and Welch (2002) at 1797, 1800. It should be pointed out, however, that in the period from 1995-8, which the percentage of tech IPO firms rise from 23% in 1990-94 to 37% (admittedly a small increase when compared to 1999-2000), style-adjusted underperformance

Table 1, below, presents varying parameters and the resultant degree of underperformance.

In any event, the point here is to illustrate that the existing data does 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 effect 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 shareholder, and retains a very small amount for himself. Even if the magnitude of his holding is not great enough to seriously impact 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, and this will likely affect his decision-making, both at the pre-IPO stage and thereafter in managing the company. This is the focus of the next Part of this paper.

Table 1

	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 payoff (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 payoff (B)	$2	$2	$2	$2	$3	$3	$3	$3
Ratio of settlement value to market losses (S)	25%	25%	25%	25%	25%	25%	25%	25%
Cost of the project/shareholders' 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%**

was not observable. This may be due to the fact that the data is, as Ritter and Welch point out, quite noisy, especially when adjusting for common risk factors. See id at 1820.

IV. Strategic Reactions to Embedded Put Liability

In the previous Part, I described one method that the entrepreneur can utilize to limit his risk exposure, short term underpricing of the offering. In this part, I will describe several more tactics that the entrepreneur may use, each of which has the potential to destroy value, but which are 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, which Section 11 accomplishes by internalizing the firm's risk upon the entrepreneur even post-sale. (Note that the standard account—that the purpose of Section 11 is to discourage fraud—is probably inaccurate.[73]) 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 can add value, even if costly, since it provides an option to withhold investment if the project turns out to be a dud;[74] 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 postsale.[75] The entrepreneur may be reluctant to engage in such

[73] See, e.g., Sale at 434 for a statement of the traditional view. 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 1933 Act—such as Sections 17 and 24—*do* discourage fraud, of course, and are in tension with Section 11.

[74] See Brealey and Myers (2003) at 268-78 for a discussion of real options.

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

investigations prior to sale, since the entrepreneur 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. Here Section 11's strict liability can play a helpful role, since it shifts risk back onto the entrepreneur post-sale.[76] 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 that the entrepreneur would shun high risk projects—even at the expense of higher net present value—because he will be ultimately unable to transfer the risk to shareholders. The entrepreneur in Part III.B above would trade in the project with payoffs of $18 and $2 for a project with payoffs of $14 and $4. The reason is the entrepreneur's risk aversion: the increase in the bad state payoff from $2 to $4 is worth more to him than the decrease from $18 to $14 (total utility is 2.4 with the new project, as opposed to 2 with the original project), even though the expected value of the new project ($14/2 + $4/2 – $2 = $7) is less than the expected value of the original project ($18/2 + $2/2 – $2 = $8). As the extreme case, the entrepreneur would choose a sure thing of $6.01 over the original project (expected value of $6.01 – $2 = $4.01), with a societal loss in value of $3.99.[77] Obviously, this is not a useful tradeoff, since in this example the variance is purely idiosyncratic risk, which, once again, the shareholder could diversify.

[76] More narrowly tailored alternatives to strict liability are discussed in Part V.

[77] I should point out that, even without the existence of the embedded §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. However, this would be of a lesser degree than when §11 liability is in effect, and we can calculate what the difference in social welfare would be. With no §11 liability, where total utility of the original project is 2.53, the entrepreneur would require a sure thing of at least $6.40, which represents a loss of only $1.60 from the project's expected value of $8. Comparing the break even sure-thing in the non-§11 scenario of $6.40 with the $4.01 break even in the §11 scenario, we can see in our example that the imposition of §11 liability has the potential to destroy an extra $2.39 worth of value.

Thus, the investment in risk reduction may well come at the expense of actual value.[78]

B. Insurance and Hedging

We might suppose that the entrepreneur, recognizing his risk exposure, would 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.

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 fall afoul of the securities laws or SEC regulation, since it would amount to an agreement on the part of the shareholders not to sue the firm. 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.[79]

Alternatively, the firm could purchase insurance against liability. In practice, this done to a limited extent with directors' and officers' (D&O) insurance, although the coverage appears to be partial, at best.[80] More general issuer's liability insurance does not seem to exist. It would not be

[78] From an *ex post* perspective, it is also possible that the entrepreneur would undertake *higher* risk, lower value projects where the firm has performed badly and the entrepreneur expects to be sued, in a situation analogous to the conflict between debt and equity where a firm faces insolvency.

[79] Among other things, this could be seen as a scheme or artifice to defraud under Section 17 of the Securities Act. Both the Securities Act and the Securities Exchange Act specifically prohibit disclaimer or waiver of liability under the Acts. See Securities Act Section 13; Securities Exchange Act Section 29.

[80] Alexander reports that D&O insurance is partial in settlements (which are, of course, generally for smaller amounts than trial awards), with issuers paying 50 to 80 percent of settlement values themselves. See Alexander (1991), at 572.

that surprising if the insurance market lacks the capability to fully insure IPO firms, since this would be equivalent to selling all the firm's downside to the insurer, and since one of the reasons for going public in the first place is that private buyers lack the capacity to buy all the firm's shares.[81] Finally, the SEC's marked hostility to insurance and indemnification also limits such practices.[82]

C. Managerial Entrenchment

If the entrepreneur faces the risk of having his shareholdings wiped out by the liability put in the event of subsequent declines in share price, and since share price declines increase the likelihood, *ceteris paribus*, that the entrepreneur would 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. Arlen and Talley (2004) describe overt and covert forms of entrenchment and, interestingly, point out that managers generally employ overt entrenchment forms—done with shareholder knowledge and approval, often at or enabled at the IPO stage—rather than covert forms. This implies that shareholders and the entrepreneur see these entrenchment devices as joint-welfare maximizing; one possible explanation for why this would be so is the risk-shifting model developed in this paper; entrenchment may lead to an optimal outcome given that the Securities Act has relegated us to a second-best world.

Interestingly, a study by Daines and Klausner reports a positive correlation between the shareholdings of management and the use of anti-takeover provisions. This is consistent with the hypothesis that as

[81] 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.
[82] See, e.g., Items 510, 512, and 702 of Regulation S-K.

entrepreneurs are less able to cash out of the firm, meaning that they are increasingly exposed to idiosyncratic risk, they would increasingly invest in anti-takeover 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 by-passing the Section 11 put: if the entrepreneur can take money out of the firm such that the firm is unable to pay the put when the shareholder attempts to exercise it, then the put may as well not exist.[83]

There are two principal ways in which the entrepreneur can go about removing his capital. First, the entrepreneur could retain sole ownership of firm assets, and lease those assets 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 payoffs go from being $18/$2 in the good/bad state to $16/$0 once the assets are removed. The Section 11 put is now 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 is lower), but at the end of the day the shareholder is no worse off.

One problem with this approach, however, in that there may be value in the firm's owning the assets. For instance, if the possibility exists that the entrepreneur would be tempted to act opportunistically and withdraw the use of the asset from the firm in the event that a better opportunity comes along, the shareholders may be less willing to invest in the firm. Another example is that the entrepreneur's retention of vital assets allows the entrepreneur to

[83] One limitation on this approach is that Section 11 extends liability to the firm's management, and Section 15 extends liability to control persons. This liability is, however, subject to a due diligence defense, and the entrepreneur would be able to escape direct liability by meeting what is essentially a negligence standard. See Section 11(b) of the Securities Act.

entrench himself in the management of the firm.[84] In short, the entrepreneur's retention of assets imposes an additional agency cost that may reduce overall value.

A second possibility is that the entrepreneur could seek to cash out of the firm entirely. He could do this by selling all of his stock to the shareholder, thus eliminating his exposure to idiosyncratic risk and allowing diversification into other projects. In such a case, the Section 11 put right is valueless, since the shareholder will own the entire firm herself and there would be no residual stakeholder to put the firm back to.[85] Alternatively, the entrepreneur may 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 $18/$2 scenario could have the firm borrow $2 from the bank which the firm pays to the entrepreneur (this could be styled as a buy-back of some of the entrepreneur's equity or as a purchase of assets that the entrepreneur has retained ownership of). This reduces payoffs to $16/$0, erasing the value of the put, which means that the shareholder would 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 has adjusted accordingly.[86] However, more debt increases the likelihood of insolvency and, hence, also the expected costs of financial distress.[87]

A more fundamental problem is that where the entrepreneur is going to stay on 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

[84] See Arlen and Talley (2003) 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 brand name allows her to defeat any prospective takeover offers.

[85] As above, the shareholder can still sue the entrepreneur under Section 11, but this suit is subject to the entrepreneur's due diligence defense.

[86] This does require, of course, that the shareholder realizes that the entrepreneur is going to do this ahead of time.

[87] See Brealey and Myers (2003) at 497-510. The risk of insolvency increases the cost of borrowing because of the costliness of bankruptcies 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.

of the Section 11 put option makes the entrepreneur want to reduce his stakeholding 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. 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. So 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 where 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 liability from nondisclosure can 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. Spindler (2005) presents such a model of this, where the issuer signals information to the market through the underwriter's research analyst, effectively substituting fraud liability for strict liability.[88] Other possibilities may include, though they are not without significant problems or

[88] See Spindler (2005).

costs, a pre-emptive offering,[89] investment in high reputation underwriters,[90] or covertly leaking additional information to the market.[91]

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

Finally, given that the entrepreneur is going to be subject to an increased level of idiosyncratic risk under Section 11 liability, we would expect the entrepreneur (assuming he retains management of the firm) 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 it seems inadvisable compared to allowing diversification at the shareholder level. First, purchases of other firms entail significant transaction costs, which the shareholder could accomplish more cheaply by simply buying the other firms' traded stock. Second, if diseconomies or anti-synergies 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

[89] This entails 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.

[90] As discussed supra at n. __, underwriter reputation is of dubious efficacy in pricing/liability matters.

[91] For example, the issuing firm could tell the initial allocatees such information at the road show. This is technically subject to strict liability under Section 12, though this may be weakened by evidentiary difficulties in proving a case based on roadshow disclosure and by the fact that roadshow attendees are repeat players and thus subject to future sanctions (e.g., exclusion from future allocations) if they sue. The issuer and the investors may be able to approximate the "right" level of disclosure liability in this way. One problem with this approach, however, is that these communications are not observable to investors in the market at large (i.e., those investors not present at the roadshow), who would have no remedy based upon this disclosure, and who would therefore not rely upon it in making an investment decision. See Spindler (2005).

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[92]).

V. Conclusion

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

[92] See Easterbrook (2002)

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