How high are investment banking fees? The case of standby underwritten convertible calls

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Abstract

Recent evidence suggests that IPO underwriting fees are high relative to the service provided. The present paper examines standby-underwriting contracts for convertible security calls. Such contracts are straightforward put options on existing securities, allowing us to compute a benchmark for the fee using option-pricing methods. We find that standby fees exceed the benchmark, on average, and typically are many times the benchmark. We consider potential explanations, including investment banker risk aversion, adverse selection, incentives for stabilization, and certification. Ultimately, it is hard to rationalize fees so far above perfect market levels. Why some firms pay them is an unresolved puzzle.

1. *Introduction*

Recent research by Chen and Ritter (1999) investigates whether investment-banking fees are competitively priced. They report that the gross underwriting spread for medium-sized initial public offerings in the United States clusters at 7%. The authors construe the clustering as support for the hypothesis that investment banks tacitly avoid undercutting one another in order to avoid driving down profits across the industry. Separately, the Mergers and Monopolies Commission in the United Kingdom announced a probe into potential price fixing of underwriting fees for rights offerings of equity. Thus, current debate raises the possibility that underwriting fees charged by investment banks are abnormally high for the services rendered.

This paper sheds new light on the fee issue by investigating the pricing of another form of underwriting in the United States, standby underwriting of calls of convertible securities.[1] In contrast to IPOs, where there is no obvious standard against which to gauge fee levels, we compute an economically meaningful benchmark for the underwriting fee associated with a convertible call. Specifically, a standby underwriting contract for a convertible security call is a straightforward put option on an existing stock. The call is likely expected to effectively force conversion into common stock, but the firm faces the risk that it will have to redeem the called securities for cash. The purpose of underwriting is to insure against the cash outflow that would occur were the stock price to drop below the conversion-forcing level. The investment banker provides such insurance by committing to pur-

[1] Singh, Cowan and Nayar (1991) provide the first descriptive statistics of call underwriting fees but do not investigate their determinants or compare them to Black-Scholes model prices.

chase, at a specific price, the shares underlying any unconverted securities. That is, the investment banker writes a put option on the underlying shares. Thus, option-pricing theory can be used to compute a benchmark for the standby fee. We compute a Black-Scholes model benchmark price, referred to hereafter as the perfect market benchmark. Marsh (1980) uses a similar approach to the valuation of UK rights offering contracts. (Also see Bae and Levy, 1990 and Klein, Grube and Joy, 1992 for applications of the put pricing model to firm commitment underwriting contracts in seasoned equity offerings.)

The results show that standby fees for convertible security calls not only exceed the perfect market benchmark, on average, but typically amount to many times the benchmark. To check the robustness of the results, among other measures, we also compute the perfect market benchmark using the option-implied volatility from the Black-Scholes model for the stocks that have call options traded on an exchange just before the call announcement date. The conclusion that standby fees considerably exceed the benchmark value of the contracts remains supported.

We consider potential explanations for high standby fees, including investment banker risk aversion, adverse selection, incentives for stabilization, and certification. However, the evidence suggests that it is hard to rationalize fees so far above perfect-market levels. Unlike an IPO or seasoned equity offering, no new cash is being raised. If the call process unfolds as expected, an underwriter need take no action nor incur any expense to fulfill its contractual obligation. If convertible security holders leave gains on the table by failing to exercise in-the-money conversion options, the underwriter and the firm split the gains. Underwriters can hedge their exposure by buying convertible securities and shorting

the underlying common. They also are entitled to reimbursement of out-of-pocket expenses incurred in covering a failed conversion. Historically, it is extremely rare that a call fails to force conversion, which is not surprising considering that the called securities are deep in the money. Given these conditions, underwriting convertible calls appears to be a low-risk activity. Why some firms pay high fees for underwriting is an unresolved puzzle.

2. Procedures for convertible security calls

2.1. Introduction

Holders of convertible bonds and convertible preferred stocks can exchange them for shares of common stock. Option theory predicts that holders do not exercise their American option before it expires as long as the dividends on the converted common stock do not exceed bond interest payments or preferred dividends. Firms typically retain the option to call convertibles at a small premium to face value. Ingersoll (1977) shows that the optimal policy in perfect markets is to call as soon as the conversion value (the market value of the underlying shares) is equal to the call price, effectively forcing conversion. In practice, firms must give convertible holders an average of 30 days notice between announcing a call and completing the redemption. The notice period introduces the possibility that the call will fail to force conversion. In the event of a failed conversion, the firm must redeem the called securities for cash. Since the firm may have to raise external funds to finance the redemption, forego value-creating projects or default on existing liabilities, a failed conversion can be costly. Therefore, most firms call convertible securities only when the conversion

option is sufficiently in the money to make the probability of a conversion failure small.[2] (See Jaffee and Shleifer, 1990 and Singh, Cowan and Nayar, 1991.)

Alternatively, the firm can buy a standby underwriting agreement from an investment bank. The underwriter guarantees the conversion of the entire called issue by contracting to buy, directly from the firm, the common shares underlying any unconverted securities.[3] The investment bank resells any common shares it acquires to the public, transforming a failed conversion into an underwritten cash offering of stock. Thus, the standby agreement insures the firm against the costs of cash redemption. In effect, the calling firm purchases a put option on its own common stock from the investment banker.

2.2. Form of standby contract

A typical example of a standby agreement, presented in Appendix A, is the one between Mark IV Industries and underwriter Bear Stearns for the redemption of a $38 million convertible debt issue in 1995. The contract provides for Bear Stearns to buy from Mark IV the common shares underlying any bonds that holders do not convert, at an aggregate price equal to the call price of the bonds. The conversion price (to purchase one share of common stock using bond principal) is $14.37; the call price (to redeem one bond) is $1,043.75. The standby price of $15 represents the per share amount needed to replace the call price of an unconverted bond. (The conversion ratio is 1000÷14.37 or 69.5894 shares per bond, thus the call price equivalent per share is 1043.75÷69.5894 or $15.) The

[2] A small fraction of convertibles are called while out of the money, but these calls are not underwritten. See Cowan, Nayar and Singh (1993) and Tang, Kadapakkam and Singer (1994).

[3] Equivalently, in some contracts the underwriter buys and converts unconverted securities.

stock closed at $19.25 the day before the call announcement, so the standby contract is a deep out of the money put option.

Sometimes convertible security holders ignore a redemption notice despite the conversion option remaining in the money. This allows the investment bank to purchase convertible securities at the call price and obtain the underlying common shares at a below-market price. On page 34, paragraph 3a notes that the underwriter will resell any purchased shares. Bear Stearns is to split any gains on resale with Mark IV, provided that fewer than 8% of the total underlying shares are sold at a gain. Paragraph 3b allows the underwriter to purchase convertible bonds during the call period provided that they are converted. However, Bear Stearns also is permitted to sell common stock short, enabling the underwriter to hedge any implicit long position resulting from a pending conversion.

Most call underwriting contracts provide for a two-part fee. One part is a standby fee, which the calling firm is obligated to pay regardless of the outcome of the call or whether the underwriter buys any shares of stock. The second part is a take-up fee per share of stock actually purchased (or obtained by converting purchased convertible securities). Usually the underwriter receives the take-up fee only on shares purchased in excess of five percent of the shares resulting from conversion. In effect, the take-up fee is a quantity discount on the purchase of more than a small number of shares.

Take-up fees may be flat or tiered beyond the initial exclusion. Both types are common. Section 4 of the Mark IV standby agreement describes a tiered fee that rises from 50 cents per share to 75 cents per share if the underwriter purchases more than 15% of the underlying shares. Page 35 shows that Mark IV agreed to limit its own stock sales and those

of its officers and directors in the event that Bear Stearns buys more than 15% of the underlying shares. Expenses to be reimbursed by Mark IV also are detailed.

An issuer making an underwritten call must file a registration statement with the SEC for the underlying shares subject to resale. After the call, the issuer may file a post-effective amendment to de-register any shares not sold to the underwriter. Appendix B contains the post-effective amendment filed by Mark IV. It shows that only $15,000 of bonds remained unconverted on the redemption date, and Mark IV elected, with the underwriter's agreement, not to sell the underlying shares to Bear Stearns after all.

The Mark IV Industries underwritten call is similar to others that we examined in detail. The discussion above shows that the underwriter enjoys several means of limiting its risk and avoiding any expenses associated with a routine conversion-forcing call.

3. Determinants of underwritten call fees

3.1. Theory

Underwritten calls would seem to allow firms to call at-the-money convertible securities. However, Singh, Cowan and Nayar (1991) report that underwritten calls occur when the conversion option is deep in the money, though not as deep as in uninsured calls. Jaffee and Shleifer (1990) argue that investment bankers cannot effectively hedge an underwritten call. Besides the out-of-pocket costs, they claim that a failed underwritten call would cause the investment bank to suffer a loss of reputation, with particularly brutal consequences for the individual investment banker handling the transaction. Hence, Jaffee and Shleifer predict that risk-averse investment bankers refuse to underwrite convertible security calls that are not deep in the money. They also conjecture that investment bankers

charge a premium over the option value of the underwriting contract, and that the premium diminishes as the conversion option goes deeper in the money.

Singh, Cowan and Nayar (1991) argue that the use of underwriters for convertible security calls entails an adverse selection problem.[4] According to this view, privately informed managers who believe their common stock to be overvalued have an incentive to use costly standby agreements to insure against a failed conversion in the event that the firm's true value should be discovered during the notice period. Nayar, Cowan and Singh (1999) extend the signaling model of Harris and Raviv (1985) to consider call underwriting. In Harris and Raviv, managers with favorable private information abstain from calling convertible securities, signaling the firm's high value.[5] Thus, convertible calls implicitly reveal unfavorable information about firm value. In Nayar, Cowan and Singh, uninsured calls reveal moderately unfavorable information, while underwritten calls imply the most-negative information about firm value. An empirical prediction of the model is that standby underwriting fees are a decreasing function of the extent that the conversion option is in the money.

Risk aversion and adverse selection are not mutually exclusive; individual investment bankers can be averse to the risk of a loss due to adverse selection. However, the risk aver-

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[4] The authors suggest that an agency-cost explanation can also apply. Specifically, risk and effort-averse managers may prefer to let the investment banker deal with the inconvenience and extra effort associated with a convertible security call.

[5] The signal is more costly for a low quality, or overvalued, firm to mimic than for a high quality firm to emit. To see this, note that a convertible bond is equivalent to the common plus a put option to "sell it back" by not converting (Kim 1990). A low-quality firm thus is short a currently undervalued put. This firm would minimize cost by calling, extinguishing the put before private information becomes public and the put's market value rises. Also, delaying a call incurs little out of pocket cost even when the cash flow to convertible security holders exceeds the dividends on the converted common shares (Jaffee and Shleifer, 1990).

sion hypothesis cited above implies that individuals who cannot offset the possibility of a large loss, regardless of the source, drive call-underwriting fees. Adverse selection implies that a large firm would be charged a lower fee because its size is associated with lower information asymmetry. In contrast, the risk aversion hypothesis implies that the possibility of a large loss from a large call, though remote, would dictate a higher abnormal fee.

3.2. Measurement

In the absence of market imperfections such as adverse selection and investment-banker risk aversion, standby fees still would not be zero. The investment bank writes a put option on the common stock, so the theoretical value of the option provides a perfect-market benchmark level for the standby fee. We use the Black-Scholes option-pricing model, adjusted for the reduction in the exercise price by the take-up fee, to estimate the perfect market benchmark, or *expected standby fee*. Complete details of the methods used to estimate the expected fee appear in Appendix D. The unexpected, or *abnormal standby fee*, is the actual minus the expected fees.

A positive average abnormal standby fee would be consistent with both investment-banker risk aversion and adverse selection. To further explore the determinants of abnormal fees, we regress the abnormal fee as a fraction of conversion value on the following explanatory variables.

Conversion option moneyness The underwriter risk aversion and adverse selection hypotheses both predict a negative relationship between the extent that the conversion option is in the money and the standby fee. The extent in the money is the difference between the market value of the underlying common shares on the day before the call date

and the effective call price, as a fraction of the effective call price of the convertible security. We compute the effective call price as the nominal call price plus accrued interest, or the underwriter standby price per share times the conversion ratio, whichever is greater.

Stock price reaction Common stock prices react negatively to underwritten calls of convertible securities, on average. (See Cowan, Nayar and Singh, 1992.) If the negative price reaction stems from a perceived downward revision in the expected value of future firm cash flows, investment bankers, anticipating the revision, will charge higher standby fees to compensate for the increased value of the put option they have issued to the firm. We use the market model-based cumulative abnormal return over the two trading day period starting on the call announcement date to measure the stock-price reaction.

Runup The announcement of a convertible call after a particularly rapid firm-specific rise in the stock price can imply that the event is prompted by the stock becoming overvalued. Abnormal standby fees then would be expected to include a premium related to such adverse selection potential. We compute the stock price run-up as the abnormal buy-and-hold return over 60 trading days, ending 4 days before the call announcement date. The abnormal return reflects market model parameters estimated over one year preceding the 60 day period, using the CRSP value-weighted market index.

Volatility The Jaffee and Shleifer (1990) model predicts that investment bankers require more compensation for the risk of a failed conversion than the Black-Scholes option model provides. The pre-call market-model residual standard deviation of the common stock return provides a measure of firm-specific risk, which Jaffee and Shleifer argue cannot be effectively hedged by underwriters. If investment bankers are constrained from

hedging market risk, for example by their own organizations' policies or by the nature of the underwriting contract, total risk will also be important. The pre-call total standard deviation of stock return measures total risk.

Standby days The standby period is a function of the call notice period required by the bond indenture or preferred stock agreement, over which managers have no control at the time of the call. Risk-averse investment bankers presumably perceive a longer standby period as riskier to their personal and firm reputations, suggesting a positive relation between the abnormal fee and the length of the standby period.

Hot and Cold SEO markets Bayless and Chaplinsky (1996) report that the stock-price reaction to seasoned equity offering announcements is significantly more negative in "cold" markets, defined as periods of low issuance activity, than in "hot", or highly active, market periods. Their evidence is consistent with lower adverse-selection costs in hot markets. The cross-sectional regressions include dummy variables for the hot and cold periods. Bayless and Chaplinsky report period classifications through 1990, and we determine the classifications for 1991-1996 using their method.

Investment bank reputation Chemmanur and Fulghieri (1994) model the role of reputation in equity underwriting and predict that higher reputation underwriters charge larger fees. To control for underwriter reputation, we use the Carter-Manaster (1990) rank as updated and reported by Carter, Dark and Singh (1998).

Size of the call and firm We measure size three ways: the absolute call size, firm size, and the call size relative to the firm's outstanding equity, or dilution. The total standby commitment measures the absolute size of the call. If adverse selection dominates the pric-

ing of standby contracts, there should be a negative relation between the abnormal standby fee and call size due to lower information asymmetry or economies of scale in investigating the firm. If investment-banker risk aversion dominates, there should be a positive relation. Alternatively, the size of the firm potentially can better represent the degree of information asymmetry than the size of the call itself. We measure the size of the firm by the market value of common equity on the day before the call announcement. Finally, firm managers have a greater incentive to force conversion into overpriced shares when the relative increase in common shares upon conversion, or dilution, is large. Thus, the adverse selection hypothesis predicts a positive relation between dilution and the overpricing of the standby fee.

Security type Standby contract pricing is unlikely to differ between convertible debt and convertible preferred stock. However, we include security type as a control for any differences between issuers of debt and preferred that other variables may not capture.

4. Sample development

The initial sample of 221 underwritten calls from 1980-1995 comes from the Securities Data Corporation (SDC) database. For three calls, we could not reconcile the pre-call common stock price reported by SDC with the price reported by the Center for Research in Security Prices (CRSP) database. We exclude the three calls from the analysis. The tables report figures for all calls in the sample of 218 for which we have the relevant data.[6]

SDC (as of the 1997 download used) reports standby fees for only 190 of the 218 calls. Seven of the eight calls made in 1995 have missing standby fees, which we are able to

find in the call registration statements from the Securities and Exchange Commission EDGAR database (http://www.sec.gov/edaux/searches.htm). Thus, the abnormal fee analysis is performed on 197 calls. We apply various screens for anomalous standby fees. Only one call, of a Newmont Mining convertible preferred stock in December 1995, fails the screens. Inspection of the registration statement reveals that the fee for this call differs from the SDC report and we substitute the correct fee.

5. Results

5.1. Descriptive statistics

Table 1 shows that the mean outstanding face value of the called convertible securities is $76 million and the median is $50 million. (All amounts mentioned in this section are constant 1992 dollars. The table also lists current-dollar statistics.) Thus, the calls are significant transactions on average, especially considering that the convertible securities are deep in the money. The conversion value exceeds the effective call price by a mean 67% and median 35%. Standby fees also are non-trivial, with a median of $400,000 and at least one fee greater than $4 million. Standby fees do not appear to cluster on a single percentage, being spread across a range of 0.1% to 3.6% of the redemption value. If a call failed to induce conversion, the calling firm would pay a maximum fee (standby plus take-up) of about $3 million on average, with a range from $277,000 to nearly $25 million. Standby fees constitute 18% of maximum fees on average. Standby periods range from nine to 61 days, but most are close to 30 days. Firms tend to call after an unusual run-up in the stock

[6] The 218 calls were underwritten by a total of 54 investment banks acting as either sole lead manager or co-lead manager. Appendix C lists the investment banks and number of calls underwritten.

price, as shown by a mean 10.2% abnormal buy-and-hold return over the three months before the call week.

5.2. Underwritten call fees versus SEO fees

Standby underwriting effectively transforms a failed conversion into a general cash offering of equity. A natural question is how the call-underwriting fee compares to the fee for an equity offering. The relevant measure for underwritten calls is the maximum fee, which would be paid if all convertible security holders tender for cash instead of converting. Table 2 reports that the mean for the maximum fee is 4.90% of the redemption price and the median is 4.71%. The figures are similar to those that Singh, Cowan and Nayar (1991) report for underwritten convertible debt calls, which they observe resemble total fees for general underwritten seasoned equity offerings (SEOs). However, underwritten calls are not necessarily the same size as the average SEO, and fees can change over time. To estimate equity offering costs, we identify the average gross spreads for offerings of similar inflation-adjusted size to the underwritten call in the same period. The SEO spread data come from Lee, Lochhead, Ritter and Zhao (1996) for 1990–94 (which we apply to 1990–95) and Emery and Finnerty (1991) for 1973–89.

The second row of table 2 reports that the mean gross underwriting spread for size- and period-matched SEOs is 5.47%, with a median of 5.12%. The third row reports the ratio of the maximum call fee to the matched average SEO spread. In a call that completely failed to induce conversion, the maximum fee would amount to a mean 90% and a median 86% of the comparable SEO gross spread, and the range is from 24% to 198%. For 67% of the underwritten call sample, the maximum fee amounts to no more than the comparable SEO cost. Thus, one firm in three, if it were to experience a failed conversion, would have

been better off *ex post* to have issued equity instead of purchasing a standby agreement. This does not imply that the purchase of a standby agreement is necessarily the optimal decision, especially considering that failed conversions are extremely rare in both underwritten and non-underwritten calls.

5.3. Abnormal standby fees

Under both the risk-averse investment banker hypothesis and the adverse selection hypothesis, standby fees are expected to exceed the perfect-market benchmark value of a comparable put option. Table 3 reports that they indeed *are* larger. Regardless of whether historical variance estimates based on closing prices or extreme values or implied variances are used, the average abnormal standby fee is statistically different from zero using the signed rank test. Using historical closing variance estimates allows the calculation of abnormal fees for the largest number of calls, so we focus the discussion on Panel A. The mean abnormal fee amounts to $388,424 and the median is $262,791 (not adjusted for inflation). The abnormal fee is large in relation to the actual fee on average, with a mean and median of 80.8% and 98.4%, respectively, of the actual fee. It also is large in relation to the expected fee, the median being 62 times. (The astronomical mean, 4.376×10^{21}, is outlier-driven.) The abnormal standby fee amounts to a mean and median of 0.8% of the market value guaranteed by the underwriter (the standby price) and 0.6% of the market value of the underlying common stock (the conversion value). Thus, calling firms on average pay about 1% of the guaranteed value in abnormal standby fees. While this does not seem like a large amount, it should be kept in mind that this is the entire cash outlay to the investment banker only if holders convert all the called securities.

The net results in table 3 reflect an assumption that the take-up fee represents a dollar-for-dollar reduction of the exercise price of the standby put option. Although standby agreements call for underwriters to be reimbursed for out-of-pocket expenses, the take-up fee may exist to cover expenses or services not subject to the reimbursement provision. For example, as discussed in section 6.3 below, the fee provides a potential incentive for the underwriter to buy called securities in the secondary market even when the standby put is not exercised. Therefore, one might argue that it is inappropriate to adjust the strike price by the amount of the take-up fee when calculating the expected standby fee. The gross results, which are unadjusted for the take-up fee, show the abnormal standby fee to be a median of 15 times the expected fee, and a median of 0.7% of the standby price. Thus, while ignoring the take-up fee reduces the estimated abnormal standby fees, standby fees still typically amount to several times the expected value of the standby contract as a put option, on average.

Biases in estimating the variance of the underlying stock return could affect the results. Beckers (1983) and Wiggins (1991) report that the Parkinson (1980) estimator that uses intraday high and low prices, or extreme values, provides more efficient estimation than the use of closing prices alone. Table 3, Panel B reports the abnormal fees when the variance is estimated by the Parkinson method. By all measures, the abnormal fees increase or at least do not decrease, on average. For example, the median net abnormal fee increases to 144 times the benchmark level using the extreme value estimator from 62 times using the closing price estimator.

As a further check on the robustness of the results, we measure the option-implied volatility from the Black-Scholes model for the stocks that have call options traded on an exchange just before the call announcement date. The need to have listed options reduces the sample to 62 convertible security calls. Stocks on which listed options are traded tend to be larger than the average firm in our main sample. Therefore, it is not surprising that Panel C of table 3 reports that the dollar abnormal standby fee increases to a mean of $549,767 and median $381,885. The abnormal fee scaled by the actual fee, expected fee or standby price declines. For example, the median net abnormal fee is 12 times the expected fee and the median gross abnormal fee is five times the expected fee. Thus, the conclusion that standby fees considerably exceed the perfect market benchmark value of the contracts remains supported.

Another potential problem with variance estimation is that if measurement error exists, the estimates tend to overstate the variances of high variance stocks and underestimate those of low variance stocks, with asymmetric effects on estimated option prices. (See Black and Scholes, 1972.) To correct for measurement error, we perform a Bayesian adjustment of the estimated variance using the approach discussed by Vasicek (1973) and Marsh (1980). Table 4 displays the results, which are virtually indistinguishable from those in Table 3. Measurement error in the variance calculations appears to have little effect on the estimated abnormal standby fee. Thus, our inference of actual fees far exceeding the perfect market benchmark remains robust with respect to variance estimation methods.

5.4. Determinants of abnormal standby fees

In this section, we investigate whether abnormal standby fees vary across calls in the manner that the adverse selection or investment banker risk aversion hypotheses predict.

To illuminate the effects of our perfect market benchmark adjustment on the results, we conduct parallel regressions using "raw" total standby fees and net abnormal standby fees as dependent variables. Both the total fee per share and abnormal fee per share are normalized by the standby price per share, thereby expressing the fee as a fraction of the value guaranteed by the underwriter.[7] We regress the fees on the explanatory variables discussed in section 3.2. The results appear in table 5.[8]

In regression 1, the total fee is marginally negatively related to the moneyness of the underwriter put option (p=0.066), which is weakly consistent with the Black-Scholes model, and unrelated to the total return standard deviation, which is not consistent with Black-Scholes pricing. In regression 4, the abnormal fee is negatively related to the total standard deviation of the stock return at the 0.01 significance level. This is not surprising, given that the perfect market benchmark is a positive function of the standard deviation while, from regression 1, the total fee is not.

Both the total and abnormal fee are significantly inversely related to both the investment bank reputation and the natural logarithm of call size. The total fee is significantly smaller when the called security is debt. The coefficients of the announcement period stock-price reaction, the prior stock-price runup, the length of the standby period, the hot seasoned equity offering market dummy, and dilution are not statistically different from zero at the 0.05 level. These results are discussed below, but first we present alternative specifications of the regressions.

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[7] The conclusions are identical when the dependent variable is the net abnormal standby fee as a fraction of the conversion value.

[8] Correlation matrices of the explanatory variables appear in Appendix E.

Regressions 2 and 5 substitute the residual standard deviation for the total standard deviation and firm size for the call size. In regression 2, the total fee is inversely related to moneyness and the coefficient is significant at the 0.05 level. The total fee is also positively related to the residual standard deviation, though the coefficient is not statistically significant (p=0.103). In regression 5, the abnormal fee is negatively but insignificantly related to the residual standard deviation. Similar to the results using call size, the total and abnormal fees are significantly inversely related to firm size. The coefficient of the dilution variable changes sign from positive in regressions 1 and 4 to negative in regressions 2 and 5, and in regression 5 it is statistically significant.

The negative relation between the abnormal fee and dilution in regression 5 is inconsistent with the adverse selection hypothesis, which predicts a positive relation. However, there is a strong negative correlation between dilution and market value of equity, the firm size measure in regression 5, but not between dilution and call size, the measure in regression 4. Therefore, we suspect that data characteristics render the significant dilution coefficient in regression 5 unreliable.[9]

In regressions 3 and 6, the regressions are repeated (using total standard deviation and firm size) after dropping the runup, standby days, hot market dummy, and dilution. The only differences in the conclusions occur in regression 3, where the total fee is still inversely related to moneyness, but more marginally (p=0.054), and the coefficient of the

[9] Condition numbers and variance inflation factors (not reported) also support multicollinearity in regression 5. In unreported simple linear regressions, dilution has an insignificant positive coefficient, while the call and firm size and other explanatory variables have coefficients of similar magnitude, and the same sign and significance, as in the multiple regressions.

dummy variable for whether the called security is debt is statistically insignificant. The adjusted R^2 of regressions 3 and 6 are 14.1% and 21.8% respectively.

If fees are influenced by investment banker risk aversion, the abnormal fee should increase with residual risk and possibly with total risk. Instead, there is a negative relation with total risk and no relation with residual risk. There also should be a negative relation between the abnormal fee and moneyness, but there is none. Further, a positive relation between the abnormal fee and call size is expected under the risk aversion hypothesis. In the regressions, a negative relation occurs, consistent with the adverse selection hypothesis.

The negative relation between fees and the investment bank reputation, which is contrary to the prediction of Chemmanur and Fulghieri (1994), reflects the ability of better quality calling firms to hire better quality investment bankers. In other words, while the negative coefficient shows that highly reputable investment banks charge less, this is because the reputable banks accept only the safest clients, who would be charged less by any investment bank. Less reputable banks thus end up with riskier clients who pay higher fees. Unreported regressions of both total and abnormal fees that control for this self-selection bias show that, all else equal, if clients of low reputation banks were to switch to high reputation banks and vice-versa, the fee gap between the two groups would widen.[10] That is, firms that use highly reputable banks would pay even less if they chose less reputable banks, and the firms that actually pay higher fees to less reputable banks would be charged even more if they could and did use highly reputable banks.

[10] The two-stage method introduced by Lee (1978) is used to control for the effects of self-selection.

In summary, the regression results do not lend strong support to either the risk aversion or the adverse selection explanation for abnormal standby fees. In particular, moneyness has no significant impact on abnormal fees, and riskier firms pay lower abnormal fees, keeping other influences constant. Both firm size and call size are inversely related to abnormal fees. The relation between the abnormal fee and size is inconsistent with the risk aversion explanation, which predicts that investment bankers charge higher fees to discourage larger calls or cover disproportionate investigation costs. The adverse selection explanation does predict the observed negative relation. However, there is no evidence of a positive relation between the abnormal fee and dilution as predicted by the adverse selection hypothesis.

6. Other explanations for high standby fees

6.1. Pricing-model misspecification

The large abnormal standby fees also could reflect underestimation by the Black-Scholes model of short-term, deep-out-of-the-money put option prices. If this were the case, there should be a relation between the abnormal standby fee and moneyness, but as discussed above, there is not. Nevertheless, we further investigate this possibility by examining listed put options on the calling firms' stocks on the day before the call announcement. Thirty-seven firms have out-of-the money listed puts. Using only the expiration dates closest to the end of the standby period produces a sample of 80 options. We compute the modified Black-Scholes price using the same methods and volatility data used for the standby contracts. The mean abnormal price of the listed puts is negative, indicating underpricing relative to the perfect-market benchmark. Although the mean is negative, this appears to

result from a few extreme observations, because the median is positive. The median abnormal price is 14% of the actual put price (17% of expected) using closing price variances and 17% of actual (21% of expected) using call-option-implied variances. Stated conservatively, standby contracts show several times as much overpricing, relative to the Black-Scholes model, as listed put options on the same underlying stocks.

The large abnormal fees are not confined to small issues. The sample includes 62 calls larger than $80 million (1992 dollars) and 135 smaller. For both groups, the median net abnormal fee (not reported in a table) using closing volatility is 98% of the actual fee; it is 62 times the expected fee for small calls and 50 times for large ones. Neither difference is statistically significant using either parametric or nonparametric difference tests. The median abnormal fee as a fraction of the conversion value is 0.007 for small and 0.005 for large ones. This difference is statistically significant by both parametric and nonparametric tests, but does not appear economically significant.

6.2. Fixed costs of underwriting

Investment bankers profess to use a due diligence process when underwriting calls (see Jaffee and Shleifer, 1990, p. S117.) If fixed costs of due diligence investigation bring about a minimum standby fee, in dollar terms, that investment banks are willing to charge, then contracts with expected fees below the minimum could drive the average overpricing that we find. If there is a minimum dollar fee, it should show up as a positive intercept in a regression of the fee on determinants of the expected dollar fee. We estimate the following regression, where the fee and call size are expressed in constant 1992 dollars and t-statistics are shown in parentheses:

Dollar standby fee	= –225,324 (–1.13)	+ 0.004(Call size) (16.09)	– 120,823(Moneyness of convertible) (–2.26)	+ 729,856(T-bill yield) (0.69)	+331,041(Variance) (0.97)	+ 11,164(Standby days) (1.72)

The intercept is negative and statistically insignificant. Thus, there is no evidence of a fixed minimum dollar fee. Alternative regression specifications and diagnostics do not alter the conclusion.

6.3. Stabilization and liquidity

The net abnormal fee calculation treats the take-up fee as a reduction of the exercise price of the put option sold by the underwriter, and thus as a reduction of the perfect-market-benchmark standby fee. If the take-up fee compensated the underwriter for additional services, it would not represent a reduction of the true exercise price. This section discusses services permitted, but not mandated, by standby agreements for which the take-up fee could provide implicit compensation.

Standby agreements give underwriters the right to purchase convertible securities in the open market provided that the underwriters convert them. It is not clear in the Mark IV standby agreement whether the underwriters are entitled to a take-up fee on shares obtained in this way. However, we have examined numerous underwritten call standby agreements, prospectuses or call notices, and the majority explicitly provide for a take-up fee in such cases, while none specifically excludes it. Thus, underwriters have an incentive to make open-market purchases of the called convertibles during the call notice period. This activity potentially limits stock price declines during the notice period. For example, if large holders converting and immediately selling the converted shares would create downward pressure on the stock price, underwriters could stabilize the price by buying the convertible securities and spreading the stock sales over time. However, conversations with

practitioners indicate that underwriter purchases of convertible securities are typically hedged immediately through short positions in the underlying common stock. Thus, there appears to be limited potential for stabilization of the stock price.

Another potential benefit of underwriters buying convertible securities to earn the take-up fee is the provision of liquidity to convertible security holders. Howe, Lin and Singh (1998) report evidence that calls of convertible preferred stock trigger a "clientele change" by convertible holders that prefer not to own the underlying common stock. The authors report that the clientele effect is associated with a reduced bid price for the called security. A calling firm that wants to maintain a favorable reputation with convertible security investors, in order to reduce the cost of future issues, would be willing to pay underwriters to add liquidity to the market for the called security.

However, even if the take-up fee represents compensation for additional services, the median gross abnormal standby fee, which ignores the take-up fee, is still 15 times the expected fee. Thus, stabilization and liquidity services fail to completely explain high net abnormal standby fees.

6.4. Certification

Models of certification imply that underwriters must earn fees above perfect-market levels to induce them to certify that the value of the firm is consistent with the market price. (See Beatty and Ritter, 1986; Booth and Smith, 1986 and Chen and Ritter, 1999.) However, there are several reasons to argue that certification does not explain high standby fees for underwritten calls. There is no obvious need for certification when the only alternative to acquiring the stock is for convertible holders to accept a deeply discounted cash

payment. Moreover, underwritten calls are empirically associated with more negative announcement effects than non-underwritten calls. (See Cowan, Nayar and Singh, 1992.)

6.5. Corporate cash shortfall

If underwriters can price discriminate, the elasticity of the calling firm's demand for a standby contract can affect the price. The calling firm's demand can be relatively inelastic if it is cash constrained. In unreported regressions on a sample of 163 calls for which Compustat data are found, we include liquidity measures for calling firms, specifically the ratios of cash to book assets and market value of equity, the quick ratio, and the ratio of operating income to book assets. No statistically significant relation with the abnormal fee is found. The results for other explanatory variables, using the sample of 163, closely track those in table 5.

6.6. Regulatory capital

Because underwritten calls are conducted on an agency, as opposed to principal, basis during the notice period, underwriters may not be permitted to hedge the implicit put option except to the extent that they purchase called convertible securities. Some investment bankers state that this limitation on their ability to hedge increases the regulatory capital requirements for underwritten calls. However, it seems unlikely that underwritten calls, which are far less common than new security offerings, would burden an investment bank's overall regulatory capital. Also, as discussed above, underwriters are permitted to purchase called convertible securities in the open market and then short the underlying common pending conversion, presumably easing the regulatory capital burden. Moreover, once this open market purchase activity exceeds a relatively low threshold, underwriters earn a take-up fee for each common share underlying the purchased securities. Thus, while

we cannot rule out the possibility that regulatory capital considerations add to underwritten call fees, they do not plausibly explain the magnitude of abnormal standby fees that we observe.

7. Final remarks

Standby fees for underwritten calls typically exceed the Black-Scholes predicted put option value of the standby agreements. On average, standby fees are several times their predicted values. The conclusion is robust to the use of alternative volatility measures, including implied volatility for stocks that have options traded on an exchange just before the call announcement date.

Theories of underwritten calls point to adverse selection by managers who believe their stock to be overvalued, and reluctance on the part of risk-averse investment bankers to underwrite calls, as reasons for standby fees to exceed the put value. In cross-sectional regressions that control for underwriter reputation, there is little empirical support for the theories. Stabilization, liquidity and certification services provided by underwriters are unlikely to explain such large standby fees. It is puzzling that calling firms pay such a steep price for standby underwriting, given that the put option is so rarely exercised.

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Table 1

Descriptive statistics of firm and issue size, underwriter fees, and other characteristics of 197 underwritten calls in 1980–1995.

Issue size is face amount. The standby fee is a fixed fee per contract and the take-up fee is per share of common stock purchased by the underwriter. The maximum fee is the sum of the standby fee and the take-up fees, assuming that all shares issuable on conversion are purchased by the underwriter. 1992 dollar equivalents are computed using the Gross Domestic Product Implicit Price Deflator. Stock price runup and reaction are abnormal returns expressed as decimals, not percent, based upon the market model.

	Mean	Median	First Quartile	Third Quartile	Minimum	Maximum
Firm size in $ MM	767.28	363.77	199.20	849.42	36.35	7,853.30
1992 $ MM	958.27	472.01	250.20	1,097.40	49.92	7,672.90
Face value outstanding $ MM	60.07	40.00	21.00	75.00	1.80	397.90
1992 $ MM	76.17	49.78	28.30	99.28	2.81	620.27
Conversion value $ MM	86.38	58.35	31.55	113.18	4.21	522.21
1992 $ MM	110.42	66.86	40.92	141.91	5.73	814.04
Conversion value minus effective call price, divided by effective call price	0.673	0.353	0.216	1.283	0.001	3.558
Standby fee $1000s	483.82	299.98	177.17	547.70	20.00	4,402.50
1992 $1000s	622.92	399.89	250.96	721.65	31.18	4,341.39
Ratio of standby fee to redemption value	0.009	0.008	0.006	0.011	0.001	0.036
Take-up fee per $ of stock	0.029	0.027	0.018	0.034	0.007	0.061
Maximum fee $1000s	2,900.94	2,256.68	1,141.91	3,622.73	169.21	20,732.63
1992 $1000s	3,723.19	2,685.36	1,478.52	4,757.38	277.35	24,486.40
Ratio of standby fee to maximum fee	0.180	0.176	0.135	0.210	0.021	0.536
Standby period (days)	28.8	30.0	30.0	31.0	9.0	61.0
Stock price runup (day –63 through –4)	0.102	0.077	–0.029	0.206	–0.443	0.826
Stock price reaction (two-day announcement period)	–0.014	–0.014	–0.041	0.007	–0.114	0.100

Table 2

Comparison of maximum underwritten call fee to average gross underwriting spread on a firm-commitment equity offering equal to the standby commitment.

	Mean	Median	First Quartile	Third Quartile	Minimum	Maximum
Maximum fee as a fraction of redemption price	0.0490	0.0471	0.0394	0.0575	0.0165	0.1225
Average gross underwriting spread on equity offering	0.0547	0.0512	0.0474	0.0562	0.0326	0.0868
Ratio of maximum fee to expected equity underwriting spread	0.9007	0.8588	0.7254	1.0588	0.2437	1.9845
Fraction of sample with ratio<=1	0.6696					

Table 3

Abnormal standby fees for underwritten convertible security calls

The total abnormal fee is the difference between the actual and perfect-market expected standby fee; other reported figures are ratios with the total abnormal fee in the numerator. The expected standby fee is computed from a modified Black-Scholes put-option pricing model as described in the text. The striking price of the put option is equal to the underwriter standby price minus the take-up fee ("net") or the underwriter standby price ("gross"). Variance estimates are computed from daily closing prices for six months immediately preceding the call date (Closing), daily extreme values over the same period with (Extreme Value), or listed call option-implied volatility (Implied). All abnormal fee measures in this table are statistically different from zero at the .001 significance level of the signed-rank test.

Striking price	Abnormal fee ratio denominator	N	Mean	Median	First Quartile	Third Quartile
Panel A: Expected fee computed using closing variance estimate						
Net	None (total $ abnormal fee)	191	388,425	262,791	167,817	477,140
Net	Actual fee	191	0.808	0.984	0.874	0.999
Net	Expected fee	191	4.376×10^{21}	61.716	6.931	1182.887
Net	Standby price	191	0.008	0.008	0.005	0.010
Net	Conversion value	191	0.006	0.006	0.004	0.008
Gross	Expected fee	199	1.970×10^{18}	15.154	2.189	247.702
Gross	Standby price	199	0.006	0.007	0.003	0.010
Gross	Conversion value	199	0.005	0.005	0.003	0.007
Panel B: Expected fee computed using extreme-value variance estimate						
Net	None (total $ abnormal fee)	175	435,208	274,600	196,061	533,485
Net	Actual fee	175	0.847	0.993	0.945	0.999
Net	Expected fee	175	3.611×10^{28}	143.789	17.326	11,368.02
Net	Standby price	175	0.008	0.008	0.005	0.011
Gross	Expected fee	181	2.325×10^{24}	33.048	5.842	1173.194
Gross	Standby price	181	0.007	0.007	0.004	0.010
Panel C Expected fee computed using Black-Scholes implied variance from listed call options						
Net	None (total $ abnormal fee	61	549,767	381,885	200,024	711,406
Net	Actual fee	61	0.609	0.925	0.690	0.998
Net	Expected fee	61	1.27×10^{13}	12.32	2.23	630.03
Net	Standby price	61	0.005	0.006	0.002	0.007
Gross	Expected fee	62	8.354×10^{9}	4.940	0.555	204.137
Gross	Standby price	62	0.003	0.005	0.001	0.007

Table 4

Abnormal standby fees for underwritten convertible security calls using Bayesian adjusted variance estimates

The total abnormal fee is the difference between the actual and perfect-market expected standby fee; other reported figures are ratios with the total abnormal fee in the numerator. The expected standby fee is computed from a modified Black-Scholes put-pricing model as described in the text. The striking price is equal to the underwriter standby price minus the take-up fee ("net") or the underwriter standby price ("gross"). Variance estimates are computed with a Bayesian adjustment to reduce the impact of measurement error. All abnormal fee measures are significantly different from zero at the .001 level of the signed-rank test.

Striking price	Abnormal fee ratio denominator	N	Mean	Median	First Quartile	Third Quartile
Panel A: Expected fee computed using closing variance estimate						
Net	None (total $ abnormal fee)	191	388,423	264,062	168,139	476,741
Net	Actual fee	191	0.808	0.984	0.878	0.999
Net	Expected fee	191	4.130×10^{21}	59.698	7.218	943.529
Net	Standby price	191	0.008	0.008	0.005	0.010
Net	Conversion value	191	0.006	0.006	0.004	0.008
Gross	Expected fee	199	2.260×10^{18}	15.084	2.095	237.570
Gross	Standby price	199	0.006	0.007	0.003	0.010
Panel B: Expected fee computed using extreme-value variance estimate						
Net	None (total $ abnormal fee)	175	435,969	280,700	196,061	533,057
Net	Actual fee	175	0.850	0.993	0.942	1.000
Net	Expected fee	175	6.089×10^{28}	143.802	16.299	6019.523
Net	Standby price	175	0.008	0.008	0.005	0.011
Net	Conversion value	175	0.006	0.006	0.004	0.008
Gross	Expected fee	181	3.652×10^{24}	35.755	4.958	711.558
Gross	Standby price	181	0.007	0.007	0.004	0.010
Panel C Expected fee computed using Black-Scholes implied variance from listed call options						
Net	None (total $ abnormal fee)	61	542,726	389,979	199,517	684,534
Net	Actual fee	61	0.620	0.912	0.644	0.997
Net	Expected fee	61	5.620×10^{11}	10.416	1.809	377.310
Net	Standby price	61	0.005	0.006	0.002	0.007
Net	Conversion value	61	0.004	0.004	0.001	0.005
Gross	Expected fee	62	7.335×10^{8}	4.540	0.549	124.798
Gross	Standby price	62	0.003	0.005	0.001	0.007

Table 5

Regressions of underwritten call standby fee per share or net abnormal standby fee per share, as a fraction of the standby price, on moneyness, stock price reaction, runup, volatility, standby days, hot market dummy, investment bank reputation, size, dilution, and security type. (t-statistics in parentheses.)

	Dependent variable					
	Total standby fee			Net abnormal standby fee		
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.0543	0.0478	0.0470	0.0738	0.0687	0.0625
	(6.46)	(5.35)	(5.94)	(8.15)	(7.07)	(7.35)
Conversion-option moneyness	–0.0026	–0.0030	–0.0027	0.0021	0.0017	0.0017
	(–1.84)	(–2.08)	(–1.93)	(1.45)	(1.14)	(1.21)
Stock price reaction (days 0,+1 abnormal return)	–0.0154	–0.0127	–0.0104	–0.0145	–0.0147	–0.0064
	(–1.59)	(–1.30)	(–1.05)	(–1.44)	(–1.42)	(–0.62)
Runup (60-day buy-and-hold abnormal return)	0.0027	(0.0022)		0.0033	0.0035	
	(1.49)	(1.16)		(1.77)	(1.69)	
Residual standard deviation		0.0091			–0.0073	
		(1.63)			(–1.21)	
Total standard deviation	0.0017		0.0033	–0.0117		–0.0102
	(0.52)		(1.00)	(–3.48)		(–2.97)
Standby days	0.0001	0.0001		0.0000	–0.0000	
	(1.75)	(1.73)		(0.18)	(–0.24)	
Hot SEO market dummy	–0.0013	–0.0012		–0.0007	–0.0005	
	(–1.72)	(–1.66)		(–0.94)	(–0.61)	
Carter-Manaster rank of investment bank	–0.0011	–0.0011	–0.0013	–0.0017	–0.0013	–0.0017
	(–2.42)	(–2.30)	(–2.64)	(–3.05)	(–2.17)	(–3.02)
Log of call size	–0.0020			–0.0028		
	(–4.77)			(–6.46)		
Log of common equity (market. value)		–0.0015	–0.0013		–0.0024	–0.0019
		(–3.65)	(–3.59)		(–5.70)	(–5.29)
Dilution	0.0030	–0.0036		0.0027	–0.0080	
	(1.28)	(–1.28)		(1.11)	(–2.69)	
Debt dummy	–0.0038	–0.0039	–0.0031	0.0007	0.0007	0.0009
	(–2.07)	(–2.08)	(–1.70)	(0.36)	(0.34)	(0.51)
Adjusted R^2	19.8%	17.4%	14.1%	27.2%	21.4%	21.8%
F (*p*-value in parentheses)	5.65	4.95	6.14	7.73	5.91	9.36
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
N	189	189	189	181	181	181

Appendix A: Sample underwritten call standby agreement

MARK IV INDUSTRIES, INC.

STANDBY PURCHASE AGREEMENT

February 1, 1995
New York, New York

BEAR, STEARNS & CO. INC.
245 Park Avenue
New York, New York 10167

Dear Sirs:

Mark IV Industries, Inc., a Delaware corporation (the "Company"), proposes to redeem on February 16, 1995 (the "Redemption Date") all of its outstanding 6¼% Convertible Subordinated Debentures due February 15, 2007 (the "Debentures") at a redemption price (the "Redemption Price") per $1,000 principal amount of Debentures of $1,043.75, plus accrued interest of $.17 from February 15, 1995, and will cause requisite notice of such redemption to be duly given. The Debentures are convertible into shares of the Company's common stock, $.01 par value (the "Common Stock"), at a conversion price of $14.37 per share of Common Stock. The right to convert the Debentures into shares of Common Stock will terminate on the Conversion Expiration Date (as defined below).

To assure the availability of funds to effect the contemplated redemption of the Debentures, the Company desires to make arrangements pursuant to which you would purchase from the Company the shares of Common Stock (hereafter, the "Shares") that would otherwise have been issuable upon conversion of those Debentures that (i) are surrendered for redemption on or prior to the close of business on the Redemption Date or (ii) are not surrendered for conversion on or prior to the close of business on February 15, 1995 (the "Conversion Expiration Date") or surrendered for redemption on or prior to the close of business on the Redemption Date, such purchase to be made for an aggregate price equal to the aggregate Redemption Price of those Debentures. The Company hereby confirms its agreement with you with respect to those arrangements.

1. Sale and Purchase of Shares.

On the basis of the representations, warranties and agreements of the Company contained herein, but subject to the terms and conditions herein set forth, you agree to purchase the Shares, and the Company agrees to issue, sell and deliver the Shares to you, at and for a price (the "Purchase Price") of $15.01 per Share.

2. Payment and Delivery.

No later than 5:30 p.m. New York City time, on the Conversion Expiration Date, the Company shall give to you written or telegraphic notice of the aggregate principal amount of Debentures not theretofore duly surrendered for conversion as described above. No later than 12:00 noon, New York City time, on the Redemption Date, you shall remit to the Company or, at the Company's prior written direction, to Marine Midland Bank ("Marine Midland") as Trustee under the Indenture, dated as of

February 13, 1992, relating to the Debentures (the "Indenture"), for the account of the Company, by certified or official bank check payable in New York Clearing House (next day) funds, a sum equal to the aggregate Redemption Price of the Debentures specified in the Company's notice referred to in the preceding sentence, which sum shall be the aggregate Purchase Price of the Shares to be purchased by you pursuant to this Agreement. …

3. Resale of Shares; Open Market Transactions; Solicitations.

(a) The Company understands that you intend to resell the Shares from time to time at prices prevailing in the open market, as set forth in the Prospectus (as defined in Section 5(a) hereof), and confirms that you and dealers selected by you have been authorized by the Company to distribute the Prospectus in connection with such resales. You agree to remit to the Company an amount equal to 50% of the excess of (i) the aggregate net proceeds realized by you in respect of sales of Shares purchased by you from the Company pursuant to this Agreement over (ii) the Purchase Price of such shares, but only if the number of Shares purchased by you on the Redemption Date pursuant to this Agreement is fewer than 180,820 Shares. Settlement of the profit sharing arrangement set forth in this paragraph shall occur as soon as reasonably practicable after the final disposition by you of all Shares purchased by you pursuant to this Agreement.

(b) The Company acknowledges that it is aware that, until the close of business on the Conversion Expiration Date, you may (but shall have no obligation to) purchase Debentures, in the open market or otherwise, in such amounts and at such prices you may deem advisable. You agree to present for conversion and to convert on or prior to the close of business on the Conversion Expiration Date any Debentures so acquired and any additional Debentures beneficially owned by you. Shares of Common Stock issued to you on conversion of Debentures may be sold by you at any time or from time to time. The Company further acknowledges that it is aware that you may purchase or sell shares of Common Stock for long or short account on the New York Stock Exchange or otherwise, at such times and prices and on such terms as you deem advisable, and that such purchases or sales, if commenced, may be discontinued at any time.

(c) You agree that you will not solicit conversions of Debentures by the holders thereof. The Company has not paid or given, and will not pay or give, directly or indirectly, any commission or other remuneration for soliciting conversions of Debentures into Common Stock.

4. Compensation.

As full compensation to you for your commitments hereunder, the Company shall pay to you (i) on the date hereof, the aggregate sum of $200,000 (the "Standby Commitment Fee"), and (ii) on the Closing Date, a further sum (the "Take-up Fee") as follows:

(a) If you purchase up to 113,006 Shares, no Take-up Fee shall be payable.

(b) If you purchase in excess of 113,006 Shares to a maximum of 339,019 Shares, a Take-up Fee of $.50 per Share shall be payable for each Share purchased in excess of 113,006 Shares.

(c) If you purchase in excess of 339,019 Shares, a Take-up Fee of $.75 per Share shall be payable for each Share (including the initial 339,019 Shares) purchased.

All such fees shall be payable in New York Clearing House (next day) funds. You shall have the right, in lieu of receiving payment of the Take-up Fee from the Company, to deduct an amount equal to the aggregate Take-up Fee from the aggregate purchase price of the Shares purchased by you on the Closing Date.

5. Representations and Warranties of the Company.

The Company represents and warrants to you that:

(a) The Company has prepared and promptly following the execution of this Agreement will file with the Securities and Exchange Commission (the "Commission"), pursuant to the

Securities Act of 1933, as amended (the "Act"), and the rules and regulations promulgated by the Commission thereunder (the "Regulations"), a registration statement on Form S-3, including a prospectus, covering the maximum number of shares of Common Stock that could constitute the Shares.…..

6. Covenants of the Company.

The Company covenants and agrees with you that:…

(i) During a period of sixty (60) days from the date of the Prospectus, in the event you purchase in excess of 339,019 Shares, the Company will not, without your prior written consent, issue, sell, offer or agree to sell, or otherwise dispose of directly or indirectly, any Common Stock (or any securities convertible into, exercisable for or exchangeable for Common Stock), other than (i) the Shares to be issued and sold hereunder, (ii) shares of Common Stock issuable upon the exercise of currently outstanding stock options, and (iii) shares of Common Stock issuable under Purolator's 401(k) Plan. The Company will obtain and deliver to you on or prior to the Closing Date an undertaking of each of its officers and directors providing that, if you purchase in excess of 339,019 Shares hereunder such officers and directors shall have the right to sell, collectively, up to an aggregate of the number of shares of Common Stock representing the difference between the aggregate number of shares of Common Stock sold by such directors and officers from December 9, 1994 to the date hereof and 250,000 Shares without your prior written consent during such sixty (60) day period….

(l) The Company will direct Marine Midland, as Trustee and Conversion Agent for the Debentures, to advise the Representative daily of the aggregate principal amount of Debentures (x) surrendered for conversion into Common Stock and (y) surrendered for redemption, in each case through the close of business on the immediately preceding business day.

(m) The Company will (i) give you at least one business day's prior written notice of the contents of any press release or other public announcement it intends to issue on or prior to the Conversion Expiration Date and (ii) consider in good faith any comments you may have concerning the timing and content of such press release or other public announcement.

7. Payment of Expenses.

Whether or not the transactions contemplated in this Agreement are consummated or this Agreement is terminated, the Company hereby agrees to pay all costs and expenses incident to the performance of the obligations of the Company hereunder, including those in connection with (i) preparing, printing, duplicating, filing and distributing the Registration Statement, as originally filed and all amendments thereto (including all exhibits thereto), the Prospectus and any amendments thereof or supplements thereto, and all other documents related to the public offering of the Shares (including those supplied to you in quantities as hereinabove stated), (ii) the issuance and delivery of the Shares to you (including any transfer or other taxes payable thereon), (iii) the qualification of the Shares under state and foreign securities or Blue Sky laws, including the fees and disbursements of your counsel in relation thereto and (iv) listing the Shares on the New York Stock Exchange. In addition, the Company shall reimburse you for your out-of-pocket expenses incurred in connection with this Agreement and the consummation of the transactions contemplated hereby, including the fees and disbursements of your counsel. …

Appendix B: Sample underwritten call "sticker"

As filed with the Securities and Exchange Commission on February 17, 1995

Registration Statement No. 33-57531

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SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

POST-EFFECTIVE AMENDMENT NO. 1
TO
FORM S-3
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

MARK IV INDUSTRIES, INC.
(Exact name of registrant as specified in its charter)

DELAWARE	23-1733979
(State or other jurisdiction of incorporation or organization)	(I.R.S. employer identification number)

==========

WITHDRAWAL OF SHARES FROM REGISTRATION.

The Registrant, by this Post-Effective Amendment No. 1 to its Registration Statement on Form S-3 (Registration No. 33- 57531) (the "Registration Statement"), withdraws from registration under the Securities Act of 1933, as amended, all of the 2,260,125 shares of the Registrant's Common Stock, $.01 par value (the "Common Stock"), which were the subject of the Registration Statement.

REASON FOR WITHDRAWAL

The Registration Statement registered a maximum of 2,260,125 shares of Common Stock issuable by the Registrant to Bear, Stearns & Co. Inc. (the "Purchaser") pursuant to an arrangement whereby the Purchaser agreed to purchase from the Company the shares of Common Stock that otherwise would have been delivered upon conversion of the $37,478,000 aggregate principal amount of the Registrant's 6-1/4% Convertible Subordinated Debentures due February 15, 2007 (the "Debentures") outstanding as of the close of business on January 31, 1995 (other than the $5,000,000 principal amount thereof held by the Mark IV Industries, Inc. and Subsidiaries Employees' Retirement Income Fund).

Subsequent to the announcement by the Registrant of the intended redemption of the Debentures, $37,463,000 aggregate principal amount of Debentures were surrendered for conversion and, at the close of business on February 15, 1995, there remained outstanding $15,000 aggregate principal amount of Debentures (the "Remaining Debentures"). On February 16, 1995, the Registrant and the Purchaser agreed that the Registrant would redeem the Remaining Debentures using its own funds and that no shares of Common Stock would be issued to the Purchaser pursuant to the Registration Statement. Accordingly, the Registrant hereby withdraws from registration the 2,260,125 shares of Common Stock that were originally subject to the Registration Statement but were not issued to the Purchaser pursuant to the standby arrangement.

SIGNATURE

Pursuant to Rule 478(a)(4) of the General Rules and Regulations under the Securities Act of 1933, as amended, this Post-Effective Amendment No. 1 to the Registrant's Registration Statement on Form S-3 (Registration No. 33-57531) has been signed by the Agent for Service designated therein, on February 17, 1995.

MARK IV INDUSTRIES, INC.
BY:/s/ WILLIAM P. MONTAGUE

Appendix C: Investment bankers and number of calls underwritten

Alex Brown & Sons	5	Needham	3
Allen & Co	1	Oppenheimer	1
Anthem	1	Paine Webber (incl. Blyth Eastman)	20
Bear, Sterns	11	Piper, Jaffray	5
Carolina Securities	2	Prudential Bach Securities	2
Chicago Corporation	1	Robinson-Humphrey	4
County NatWest Limited	1	Rotan Mosle	1
Dain Bosworth	4	S. G. Warburg & Co. Ltd.	1
Davis, Skaggs	1	Salomon Brothers	26
Dean Witter Reynolds	6	Scott & Stringfellow	1
Dillon, Read	5	Shearson (all combinations)	15
Donaldson, Lufkin & Jenrette	4	Smith Barney, Harris Upham	11
Drexel Burnham Lambert	29	Stifel, Nicolaus	1
E. F. Hutton	6	UBS Securities	1
Electronics	1	Warburg Paribas Becker, Inc.	2
First Analysis Securities	2	Weber, Hall, Sales & Associates	1
First Boston	18	Wertheim	1
Furman Selz Mager Dietz Birney	2	Wheat, First Securities	2
Gintel	1		
Goldman, Sachs	19		
Hambrecht & Quist	1		
Howard, Weil, Labouisse	1		
Invemed Associates	1		
Janney Montgomery Scott	1		
Jesup & Lamont Securities	1		
Keefe, Bruyette & Woods	3		
Kidder, Peabody	10		
L. F. Rothschild, Unterberg	3		
Ladenburg, Thalmann	1		
Lazard Freres & Co.	3		
Lehman Brothers	14		
McMahan Securities Co., LP	1		
Merrill Lynch Capital Markets	26		
Montgomery Securities	3		
Morgan Stanley	5		
Morgan-Keegan	2		

Appendix D: Details of expected standby fee calculation

D.1 Put option valuation

The expected standby fee per share of common stock is the Black-Scholes (1973) put option value, adjusted for known dividends:

$$E(SBP) = KB(0,T)N(-d_2) - H(0)N(-d_1)$$

where

$K \equiv$ the underwriter standby price per common share;

$B(0,\bullet) \equiv$ a riskless discount factor, estimated using the 3-month T-bill rate on the day before the call announcement (day –1) as reported in Federal Reserve Statistical Release H.15.;

$N(\bullet) \equiv$ the standard normal cumulative distribution function;

$$d_1 \equiv \left\{ \ln\left[\frac{H(0)}{KB(0,T)} \right] + \sigma^2 \frac{T}{2} \right\} \Big/ \sigma\sqrt{T} \, ;$$

$$d_2 \equiv d_1 - \sigma\sqrt{t} \, ;$$

$T \equiv$ the standby period in years;

$\sigma \equiv$ the instantaneous standard deviation of common stock returns, for which we use six alternative estimates described below.;

$H(0) \equiv S(0) - D(t_1)B(0,t_1)$;

$S(0) \equiv$ the closing common stock price on day –1 from the 1996 CRSP daily stock history file.; and

$D(t_1) \equiv$ a cash distribution to common stockholders, payable $t_1 \le T$ years after the call announcement date.

The total expected standby fee is the product of $E(SBP)$ and the number of common shares to which the standby commitment applies.

D.2 Volatility estimation

We estimate σ^2 using historical closing prices, extreme values (Parkinson, 1980) and option-implied variance. We obtain historical closing prices, dividends, and splits (includ-

ing stock dividends) for 126 trading days (about 6-months) ending on day –3 and estimate σ^2 as 257.6 times the sample variance of daily log price relatives, using split-adjusted, *cum*-dividend prices. The factor 257.6 annualizes the variance; the factor is based upon the assumption that there are 252 trading days in a year, of which 52 follow a weekend and therefore count as 1.107 trading days each with reference to volatility (French and Roll, 1986).

The extreme value estimator requires intraday high and low trade prices, which we obtain from the CRSP file for day –128 through –3. Nasdaq non-National Market stocks (except Small Cap Market stocks in the 1990s) have no intraday trade price data and are excluded from the extreme value analysis. For other stocks, if the closing price on the CRSP file for a given day is a bid-ask average, the reported high and low are not intraday trade prices. We set such prices to missing and conduct the analysis on the remaining days. We apply the screens recommended by Wiggins (1991) to the surviving data. Define $P_{H,t}$ as the greater of the intraday high or the previous closing trade price on day t, and similarly $P_{L,t}$ is the lesser of the intraday low or the previous close. The extreme value estimate is

$$\sigma_{EV}^2 = 257.6 \cdot 0.36067376 \cdot \frac{1}{n-1} \sum_{t=1}^{n} \left[\ln\left(P_{H,t} \Big/ P_{L,t} \right) \right]^2$$

To find the implied variance, we search the *Wall Street Journal* on the call announcement date for a listed option on the common stock. If located, we use the call-option contract with exercise price nearest the closing stock price, and the expiration date closest to the expiration of the standby contract subject to a minimum of 30 days to expiration. The greater number of contracts traded was used as a tie-breaker. The listed call option price

from day –1 is set equal to the Black-Scholes price with the unknown σ solved by iteration. If the stock pays one or more cash dividends between day –1 and the listed option expiration date, we apply the pseudo-American approach suggested by Black (1975).

The variance estimate produced by each of the historical close, extreme value and implied variance methods is further subjected to a Bayesian adjustment using the approach of Vasicek (1973) and Marsh (1980), producing three additional estimates. The Bayesian adjusted variance is

$$\tilde{\sigma}_i^2 = \frac{(\bar{\sigma}^2)^2\left(\hat{\sigma}_i^2 / 2n\right) + (\hat{\sigma}_i^2)^2 V(\hat{\sigma}^2)}{\bar{\sigma}^2\left(\hat{\sigma}_i^2 / 2n\right) + \hat{\sigma}_i^2 V(\hat{\sigma}^2)}$$

where $\hat{\sigma}_i^2$ is the variance estimate for security *i*,

$\bar{\sigma}^2$ is the cross-sectional sample mean of the $\hat{\sigma}_i^2$ s;

$V(\hat{\sigma}^2)$ is the cross-sectional sample variance of the $\hat{\sigma}_i^2$ s; and

n is the number of return observations used to estimate $\hat{\sigma}_i^2$.

D.3 Dilution adjustment

Galai and Schneller (1978) derive an adjustment to a call option valuation for the dilution caused when a warrant instead of an option is being valued. Textbooks sometimes propose that a convertible security be considered as the sum of the equivalent fixed income security and a set of warrants, with the warrant being valued according to the Galai and Schneller approach. We do not apply the Galai and Schneller dilution adjustment in this study for three reasons. First, since the convertible securities already are outstanding before

the standby agreement is announced, the market price and variance of the common stock already reflect the expected dilution due to the exercise of the conversion option. (See Crouhy and Galai, 1991 for further discussion.) Second, previous research reports that the exercise of the standby put is a rare event. Therefore, we doubt that the standby agreement alters the market's estimate of the conversion-option exercise probability. The standby put itself only substitutes, in an unlikely state, for the dilution that the conversion option otherwise would cause. Consequently, the overall expected dilution is essentially unaltered by the standby agreement, and no dilution adjustment to the put pricing model is called for. Finally, a dilution adjustment would reduce the expected standby fee and increase the abnormal standby fee. Thus, the lack of dilution adjustment cannot explain the results.

Appendix E: Correlations coefficients of explanatory variables

Table E-1
Pearson (unshaded lower triangle) and Spearman (shaded upper triangle) correlation coefficients of explanatory variables

	Mon-eyness	Reaction (day –1,0)	Runup	Residual std. dev.	Standby days	Hot market dummy	Carter-Manaster Rank	Dilution	Ln of firm size	Ln of call size	Total std. dev.	Quoted spread	Implied spread	Debt 0/1
Moneyness		-0.05	0.13	0.29	-0.01	0.14	-0.05	0.20	-0.06	0.07	0.28	0.01	0.22	-0.79
Reaction	-0.04		0.01	0.05	0.10	0.04	0.01	0.11	-0.16	0.03	-0.09	0.04	0.09	0.06
Runup	0.07	-0.03		0.30	0.05	0.11	-0.01	-0.01	-0.08	-0.10	0.18	0.07	0.19	-0.01
Resid. std. dev.	0.29	0.11	0.30		0.01	0.13	-0.19	0.14	-0.25	-0.20	0.88	0.21	0.49	-0.16
Standby days	-0.05	0.14	0.09	0.03		0.13	-0.08	0.05	-0.12	-0.12	0.03	0.04	0.02	0.08
Hot market dummy	0.14	0.04	0.10	0.13	0.21		-0.01	0.05	-0.08	-0.04	0.11	-0.01	0.26	-0.14
Carter-Manaster	-0.09	-0.03	-0.01	-0.23	-0.25	-0.07		-0.20	0.35	0.29	-0.23	0.01	-0.06	-0.06
Dilution	0.18	0.06	0.02	0.12	0.08	0.10	-0.06		-0.59	0.05	0.12	0.14	0.01	-0.15
Ln of firm size	-0.05	-0.14	-0.08	-0.26	-0.12	-0.08	0.34	-0.51		0.74	-0.21	-0.13	-0.10	-0.04
Ln of call size	0.13	0.01	-0.01	-0.21	-0.09	-0.05	0.30	0.09	0.75		-0.16	-0.12	-0.19	-0.18
Total std. dev.	0.27	-0.15	0.16	0.84	0.11	0.08	-0.35	0.10	-0.22	-0.17		0.19	0.40	-0.13
Quoted spread	0.15	0.01	0.07	0.34	0.09	0.08	-0.16	0.07	-0.05	0.02	0.31		-0.08	-0.05
Implied spread	0.30	0.02	0.19	0.57	-0.13	0.26	0.01	0.08	-0.15	-0.18	0.46	-0.01		-0.17
Debt 0/1	-0.88	0.08	0.01	-0.17	0.01	-0.14	-0.04	-0.10	-0.04	-0.18	-0.14	-0.09	-0.25	