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Busted IPOs and Windows of Misopportunity

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Abstract

Evidence from a large sample of IPOs during 1988-1995 supports the theory that failure rates are inefficiently priced during the going public process. Investment banks establish offer prices at a level that does not compensate investors for the likelihood and the costs of financial distress. Investors are insufficiently pessimistic about the business prospects of some IPOs, and apparently purchase shares assuming all new issues will survive. The results also provide evidence on why long-run performance is especially poor following hot markets, and that delayed recognition of high bust rates may contribute to IPO market cycles.

1. Introduction

There is considerable debate in the financial economics literature regarding the long-run performance of issuers following initial public offerings (IPOs). One significant strand focuses on assessing the impact of alternative return benchmarks on an issuer's relative underperformance (see, e.g., Loughran and Ritter [1995] and [2000], Bossaerts and Hillion [2000], Brav, Gezcy and Gompers [2000], Eckbo, Masulis and Norli [2000] and Eckbo and Norli [2000]). Collectively, these studies indicate that the selection of performance benchmarks impacts the magnitude of measured underperformance following equity issues. While measurement of the true level of issuer underperformance is important, these studies are generally limited in that they do not explain why risk mismeasurement affects the IPO market.

An alternative approach to understanding the puzzle of long-run underperformance is to examine the institutional characteristics of the going public process. The goal of this line of research is to identify fundamental reasons that explain the poor long-run performance following IPOs. Two important, albeit partial, explanations have been offered in the literature. Ritter [1991] and Loughran and Ritter [1995] focus on a demand-side explanation. These studies suggest that investors are periodically overoptimistic about the earnings potential of young growth companies, especially those going public in high-volume years. Long-run underperformance is interpreted as evidence that firms take advantage of transitory windows of opportunity by issuing equity when, on average, they are substantially overvalued. These studies do not explain why investors occasionally become overoptimistic nor do they offer a supply-side explanation. [1]

Teoh, Welch and Wong [1998] identify earnings management by issuers as a potential supply-side source of the long-run underperformance. If investors focus on accounting-based performance measures that are not representative of an issuer's long-run economic earnings power, they may overpay for IPOs. Consistent with this supply-side explanation, IPO issuers experience relatively poor post-issue operating performance (Jain and Kini [1994]) and there is evidence that earnings management may not be fully anticipated by equity analysts (Rajan and Servaes [1997]). Importantly, however, Teoh, Welch and Wong [1998] do not explain why investors fail to recognize

[1] In the equity pricing literature, a "window of opportunity" is defined as a period when issuers can raise capital at favorable terms. There is some disagreement, however, as to whether the window is due to time-varying asymmetric information (see, e.g., Bayless and Chaplinsky [1996] and Choe, Masulis and Nanda [1993]) or investor overoptimism (see, e.g., Loughran and Ritter [1995]).

earnings management and forego the opportunity to demand offer price discounts as compensation. In addition, the time-variation in long-run underperformance is not adequately explained.

Our study extends the existing literature on the institutional characteristics of the going public process by providing an integrated supply- and demand-side explanation for long-run underperformance. On the supply-side, poor long-run underperformance suggests that investment banks establish new issue offer prices that exceed the true economic value of the firm. Thus, an important piece of the long-run underperformance puzzle is likely to be related to inefficiency in the methods used by investment banks to price IPOs.

Discussions with practitioners as well as evidence presented in Kim and Ritter [1999] indicate that multiples valuation methods based on comparable companies are the principal approach relied upon to set IPO offer prices. Multiples valuation methods may, however, introduce a survivorship bias into the pricing of new issues. That is, comparison firms that investment banks use for valuing IPOs have, by definition, survived. As a consequence, relative valuation pricing methods overestimate survival probabilities for some firms, and new issues that rely on these methods are overpriced. This valuation inefficiency is especially likely when investment banks are pricing younger firms in risky industries because comparison firms are difficult to identify and failure rates are periodically quite high. Ritter [1991] identifies firms with these characteristics as an important source of long-run underperformance.[2]

If the likelihood that an IPO will subsequently fail, or bust, is not identifiable *ex ante*, efficient pricing requires that investment banks and issuers offer discounts sufficiently large to compensate investors for losses on issues that subsequently bust. The evidence suggests that the average pricing of IPOs by investment banks does not adequately compensate investors for these losses. Rather, on the demand-side, investors are willing (at least periodically) to purchase securities at prices that do not adequately compensate them for the risk of failure. This valuation anomaly is apparently not unique to the IPO market. For example, Asquith, Mullins and Wolff [1989] present evidence from the original-issue high yield bond market consistent with the interpretation that investors underestimate default rates in new issue pricing. This error leads to an understatement of the actual incidence of financial distress and losses by investors.

[2] Investment banks usually rely on accounting-based performance measures such as sales, operating cash flow and earnings in conjunction with comparable firm multiples to value IPOs. Our explanation of the long-run underperformance of IPOs can be interpreted as focused more on the multiple used in the valuation rather than the management of operating performance measures.

An issue-year cohort analysis of the IPO market indicates that much of the long run overpricing phenomenon can be attributed to the failure of investors to properly account for the potential losses associated with busted IPOs on the issue date. Asquith et al. [1989] identify non-stationarity of default rates through time and rapid growth in new-issue volume as the principal causes of valuation errors in the high-yield bond market. We document similar non-stationarity and growth characteristics in the IPO market during our sample period. Given the short operating history and poor credit quality of many IPO firms, it is perhaps not completely surprising that similar problems arise in the pricing of new equity issues.[3]

Based on an analysis of 1,955 issuers that went public between 1988 and 1995, we attribute our supply- and demand-side explanations of long-run underperformance to a combination of several institutional characteristics of the going public process. First, the screening, or certification, of new issues by underwriters (especially low-quality investment banks) is imperfect. Second, the average quality of underwriter screening services deteriorates during periods of high issue volume. Third, the comparable, or relative, valuation method underwriters most frequently use to establish an IPO's offer price is subject to a survivorship bias. The bias causes underwriters to overestimate average post-issue stock price performance. Fourth, investors periodically underestimate the likelihood of post-issue IPO busts, most likely because they do not properly consider the impact of issue-year cohort analysis on the survival rates of new issues.

Collectively, these characteristics of the IPO market suggest several empirical results documented in this paper that have not been previously reported in the literature. First, busted IPOs are more likely to be underwritten by low-quality investment banks. Some new issues that high-quality investment banks would refuse to underwrite go public anyway with low-quality underwriters, and this occurs primarily during high-volume (hot) markets. Hence, the window of misopportunity.

Second, because underwriter screening methods are imperfect or the future is not entirely predictable, high-quality investment banks also underwrite IPOs that bust. Their larger market share results in the underwriting of a larger *proportion* (based on proceeds amount) of busted IPOs than low-quality investment banks. However, the more efficient screening services provided by high-

[3] Traditional studies of high-yield bond defaults measure the default rate by dividing the amount of defaults in a given year by the par value of all outstanding issues (see, e.g., Altman [1987] and Weinstein [1987]). Altman [1989] and Asquith, Mullins and Wolff [1989] introduce aging concepts, which provide a more accurate measure of failure when default rates are non-stationary and aggregate issue volume is increasing.

quality investment banks results in the underwriting of a smaller *fraction* (based on the number of underwritten new issues) of busted IPOs.

Third, conditional on survival, IPOs are priced correctly on average (i.e., neither outperform nor underperform a comparable group of matched firms). High survival rates among IPO firms imply that the majority of new issues do not experience abnormal excess return performance. Yet, because it is common to price IPOs relative to firms that have survived, failure likelihood is not properly considered in new issue pricing valuations. The fact that most IPO firms do not earn positive excess returns is surprising because surviving firms would be expected to outperform their benchmarks if all IPOs are correctly discounted to reflect the true probability of failure.[4]

Fourth, an aging analysis based on issue-year cohorts illustrates that the frequency of busted IPOs is positively correlated with, but lags, new issue volume. As new issue volume increases, the fraction of IPOs that bust relative to overall *contemporaneous* issue volume appears to be small. However, increases in new issue volume *precede* an increase in the volume of IPOs that subsequently bust. Aggregate issue volume growth levels off prior to a substantial increase in the incidence of busted IPOs. We conjecture that slowdowns in IPO market issue volume may be due to investors' delayed recognition of high IPO bust rates.[5]

Fifth, higher bust rates during high-volume markets are at least partially due to increases in the market share of low-quality investment banks during these periods. Since long-run performance of IPOs is especially poor following high-volume markets, time-varying differences in the quality of the screening and certification services provided by investment banks contribute to underperformance. The integrity of the screening and certification services is so important that IPO success and failure rates may be more dependent on this underwriter role than either capital market or macroeconomic conditions.[6]

The remainder of the paper is organized as follows. In Section 2, we discuss our sample selection procedure and describe our data. Section 3 provides an aging analysis of busted IPOs, and links these results to prior evidence (as well as our own) regarding the long-run performance of IPOs. In Section 4, we investigate the relative importance of underwriter reputation, underwriting

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[4] Kim and Ritter [1999] study comparable firm valuation methods and find that multiples are only modestly predictive in valuing IPOs.

[5] Bossaerts and Hillion [2000] also investigate the impact of delisted new issues on the return performance of IPOs. Their analysis relies on the use of a formal asset pricing model, while our approach relies upon an examination of differences between issue-specific factors and the underwriting methods associated with busted versus other IPOs.

[6] Whether IPOs bust because they go public with a fundamentally flawed business model or because investment banks and issuers simply mis-time the IPO market and the going public decision is an interesting question for future research.

activities, capital market conditions and macroeconomic conditions for the success and failure rates of IPOs. A multivariate analysis identifies factors that are most closely related to the likelihood an IPO subsequently busts. Evidence regarding similarities and differences in the factors that influence bust rates during different IPO market cycles is also presented. Section 5 summarizes our main findings and concludes the paper.

2. Sample Selection and Data Description

2.1 Selection Criteria for the IPO Sample

We initially identified a list of 3,753 common equity offerings classified as IPOs by the Securities Data Corporation New Issues Database (SDC) from January 1988 through December 1995. Our sample is based on data availability for issuers that we obtain from several different sources. The sample selection procedure eliminates IPOs (1) by closed-end funds, real estate investment trusts, financial institutions, unit offerings and limited partnerships; (2) without sufficient stock return information available on the Center for Research in Security Prices (CRSP) Nasdaq or American Stock Exchange (Amex) and New York Stock Exchange (NYSE) daily tapes; and (3) for which we cannot verify whether the SDC information on overallotment option (OAO) exercise is correct. Our final sample consists of 1,955 IPOs.[7]

Table 1 presents the distribution of the sample by issue year. IPO volume characteristics for the full sample are reported in Column (1). The 1,955 IPOs conducted during our sample period raised aggregate proceeds of $94.7 billion. The number and dollar value of IPOs are not evenly distributed over the sample period. Rather, year-to-year growth in new issue volume is rapid. This sample period can be described initially as a cold IPO market that turns hot.

After identifying the IPO sample, we examine the CRSP daily tapes for evidence of a delisting event. Each new issue is sorted into one of three mutually exclusive groups, based upon the CRSP delisting code as of December 31, 1998. IPO volume characteristics are reported for three subcategories in Columns (2)-(4) of Table 1. We classify an issue as a busted IPO if the firm has a delist code between 500 and 585. In our sample, issues in the bust category are delisted for reasons related to poor performance. Busted IPO volume characteristics are reported in Column (2). We classify an issuer as an acquired IPO if the firm has a delist code between 200 and 301. These are

[7] Ellis, Michaely and O'Hara [2000] and Logue, Rogalski, Seward and Foster-Johnson [2000] find that SDC often misreports actual OAO exercise. We verified SDC's information for our sample by obtaining information about OAO exercise from the underwriter, the issuing firm and 10Q and 10K filings. We also identify a substantial number of issues for which SDC misreported the OAO data.

issues that are delisted for reasons related to a change in control or listing. Acquired IPO volume characteristics are reported in Column (3). Finally, we classify an issuer as an active IPO if the firm has a delist code of 100. These are issues that are active and still traded in the market as of December 31, 1998. Active IPO volume characteristics are reported in Column (4).[8]

The relative size of the sample in each subcategory depends on whether listing status is measured by the number or the dollar value of new issues. Based on the number of IPOs, 14.1% (275/1955) of the sample period IPOs busted, 23.6% (461/1955) had been acquired, and 62.4% (1219/1955) continued to trade as active IPOs as of December 31, 1998. Based on the dollar value of issues, 6.0% ($5.719/$94.682) of the sample period IPOs busted, 24.3% ($23.033/$94.682) had been acquired, and 69.6% ($65.931/$94.682) continued to trade as active IPOs as of December 31, 1998. Bust rates are higher when measured by the number rather than the dollar value of IPOs. This indicates that smaller IPOs represent a disproportionate number of busted IPOs, which may explain why previous studies that use equally weighted returns find that small IPOs perform especially poorly.

The table also indicates considerable time-variation in the number and dollar value of the IPOs in each subcategory. According to Table 1, there are more busted IPOs during the latter part of the sample period. For example, 64% (175/275) of the total sample period busted IPOs were issued between 1992 and 1995. Based on issue year alone, this suggests that busted IPOs are more frequent during hot IPO markets. Note, however, that issue volume is also higher during hot markets as well. If bust rates and issue volumes are correlated, an analysis of bust rates based on issue year alone may lead to mistaken inferences about the likelihood that an IPO will succeed or fail.

A different picture emerges if busted IPOs are compared to their issue-year cohorts. Bust rates are higher for older IPOs than for more recent IPOs. Based on the dollar value of issues, cohort-year bust rates range between 9.8% ($0.348/$3.556) and 12.1% ($0.370/$3.050) for the 1988-1990 period, and between 3.4% ($0.743/$21.682) and 4.1% ($0.631/$15.310) for 1994-1995. The likelihood that an IPO subsequently busts is not stationary through time, but rather rises with the public market age of an IPO. Older issues have been outstanding longer, and therefore have had more time to bust.

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[8] We differ from Ritter [1991] and Loughran and Ritter [1995] in our treatment of delisted firms. For IPOs that are delisted prior to the anniversary date, they truncate the aftermarket period, and the anniversary date buy-and-hold returns end with CRSP's last listing. We calculate buy-and-hold returns for early delistings following their methodology,

The analysis suggests that busted IPOs are related to an issue's public market age and issue-year volume. If, as is the case during our sample period, there is rapid year-to-year growth in new issue volume, then measures of busted IPOs based solely on total issue volume bias downward the true rate at which IPOs bust. Failure to consider the lag between issue and bust dates results in the overestimation of cohort-year survival rates during periods of rising issue volume. Under these conditions, investors will be excessively optimistic about the future performance of IPOs because of their failure to accurately assess bust rates.

Table 1 reports issue volume characteristics for acquired IPOs separately for two reasons. First, if acquisitions of IPO firms were concentrated among poorly performing IPOs, our measure of busted IPOs would be biased downward. IPOs that would have busted are acquired instead. Second, acquisitions typically involve the receipt of a control premium by target firm shareholders. Therefore, the return patterns of acquired IPOs may be different from the return patterns of busted and active IPOs. An analysis of delisted IPOs that does not distinguish reasons for delisting may lead to mistaken inferences about these issues. Since the long-run performance of busted and acquired IPOs is likely to be quite different, we suggest that they be treated separately in future empirical studies.

2.2 Calculation of Excess Returns

To evaluate the long-run return performance of IPOs, we follow Ritter [1991] and Loughran and Ritter [1995] by measuring performance as anniversary date buy-and-hold returns for IPOs and a set of size-matched non-issuing firms. We report our results as size-adjusted excess returns so that our results can be compared directly with the findings reported in Ritter [1991] and Loughran and Ritter [1995].[9]

All longer run returns are measured as buy-and-hold returns, and size-adjusted excess returns are measured for each IPO as the difference between the issuer's buy-and-hold returns and the contemporaneous buy-and-hold returns on a portfolio of similarly sized non-IPO firms. Excess returns at each holding-period horizon are calculated as an equally weighted average of each individual stock's excess returns. We measure holding-period returns from the closing market price on the first day of public trading to the market price on the relevant anniversary date. That is, buy-

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but report returns for the delisted firms separately from active firms, and distinguish between "good event" (acquired) and "bad event" (busted) delistings.

[9] Loughran and Ritter [1995] find that book-to-market effects account for only a modest portion of the low returns earned by investors that issue equity.

and-hold returns, R_i, are calculated from the first CRSP-listed post-issue closing price to the relevant anniversary dates for each offering, computed as follows:

$$R_i = \prod_{t=1}^{N} (1 + r_{it}) \quad (1)$$

where r_{it} is the raw return on firm *i* in event month *t*. Long-run return performance is documented for holding-period horizons, N, of 3, 6, 12, 36, and 60 months. We use the CRSP tapes to follow each issuing firm from its offer date until the earlier of its delisting date, or the anniversary holding-period date, or December 31, 1998. If an issuing firm is delisted prior to the anniversary date, its total return is truncated on that date.[10,11]

For each issuing firm, we obtain five years of size decile portfolio membership from CRSP. For each issuer, size decile portfolio returns are obtained according to the year for which issuer returns are being calculated. For example, if the IPO date is December 20, 1995, then the 1995 size decile portfolio membership is used to calculate excess returns until the end of 1995. We then identify the size decile portfolio for the issuer in 1996, and use that reference group to calculate 1996 excess returns. Thus, at the beginning of each year, the size decile portfolio membership used to calculate excess returns for each issue is updated. Therefore, our measure of size-adjusted excess return performance for firm *i*, ER_i, is:

$$ER_i = R_i - \prod_{t=1}^{N} (1 + r_{pt}) \quad (2)$$

where r_{pt} is the raw return on firm *i*'s size decile portfolio in event month *t*.

2.3 The Relative Return Performance of Busted, Acquired and Active IPOs

The impact of annual differences in IPO bust rates on the long-run return performance of IPOs is not obvious. On the one hand, higher bust rates indicate that there is a greater fraction of poor performers among IPOs in a given cohort-year. This would tend to reduce the average return performance for the cohort-year group as a whole. On the other hand, year-to-year differences in issue volume can influence cohort-year return performance measures if the quality of good and bad issuers varies in different market conditions. If issue volume is high, the high number of acquired

[10] Issue-date returns are not included for several reasons, including lags between issue date and listing date, especially among the older IPOs, as well as the difficulty that investors face in purchasing shares at the offer price.

[11] Interestingly, Loughran [1993] reports that IPOs underperform for approximately five years. According to our data, the poor 3 and 5 year performance of IPOs is due to the high bust rates during these periods.

and active IPOs could offset the poor performance of a large number of busted IPOs. Table 2 offers some evidence on this point.

Table 2 indicates that there is considerable difference in the long-run excess return performance of IPOs based upon issue year, and there are several interesting patterns. First, the aftermarket excess return performance of IPOs is positive in the holding periods immediately following issue, regardless of offer year. For example, IPOs outperform their size matched counterparts by 4.6% and 5.6% during the 3-month and 6-month periods, respectively, following their initial trading date.

Second, poor excess return performance begins to appear by the 12-month horizon for several, but not all, issue years. There is a lag between the issue date and the onset of poor excess return performance for all issue-year cohorts.[12]

Finally, aftermarket performance of IPOs is especially poor over both 3 and 5 year holding-period horizons, similar to the results reported in Loughran and Ritter [1995]. During our sample period, 36-month average excess returns are negative for five of the eight cohort groups. Sixty-month average excess returns are negative for most of the cohort groups. Interestingly, although IPOs issued in 1988 and 1989 have the highest cohort year bust rates (29/93 and 20/95 issues, respectively), average long-run excess returns for these cold market cohort years compare quite favorably with average long-run excess returns during hot market cohort years. This indicates that factors in addition to bust rates influence excess return performance of cohort-year IPOs.[13]

Short-run IPO performance studies have demonstrated that return anomalies are at least somewhat sensitive to the impact of institutional characteristics (such as price stabilization) on the issuer's aftermarket price (see, e.g., Aggarwal [2000], Logue et al [2000] and Ruud [1993]). Since these institutional characteristics often times impact only a subset of the issuer universe, proper inferences regarding the magnitude and cause of abnormal performance must explicitly consider these differential subsample effects. Previous studies that attribute long-run underperformance to investor overoptimism do not explicitly consider the possibility that institutional characteristics may have a differential impact on subsets of the issuer universe (see, e.g., Ritter [1991] and Loughran and Ritter [1995]). As we demonstrate in more detail in Section 4, our results suggest that inferences about long-run underperformance may not be due to persistence in investor optimism but rather

[12] A Tukey-Post Hoc test indicates that 3 month, one-year, three-year and five-year returns are significantly different from zero.

[13] The three-year returns are significantly different from the excess returns measured over any of the shorter holding-period horizons at the 0.01 level, based on a paired t-test.

due to the performance variability caused by the time variation in the quality of the screening and certification services of investment banks and the underwriting of busted IPOs.

The impact of bust rates on IPO performance can be illustrated by examining holding-period excess returns over different anniversary dates. Figure 1 plots holding-period excess returns separately for the busted, acquired and active IPOs over several different horizon periods. Immediately following the IPO, there are no significant performance differences between busted, acquired and active IPOs. Average performance differences begin to appear between the 6-month and 12-month holding-period horizon. Consistent with Table 2, the figure suggests almost one year elapses after issue before investors begin to recognize and price the differences between successful and unsuccessful IPO firms.[14,15]

Excess returns for acquired and active IPOs are statistically indistinguishable from zero over longer return horizons. Since these two categories of IPOs constitute the majority of IPOs during our sample period, the figure is consistent with the interpretation that, conditional on survival or a change of control, IPOs are priced efficiently on average.[16,17]

Excess returns for busted IPOs are exceptionally poor over longer return horizons. One explanation is that new issue pricing methods underestimate the failure rate of IPO firms, thereby resulting in excessively high average offer prices. As a result, investors are undercompensated for losses associated with busted IPOs. Busted issues also clearly drive IPO long-run underperformance. Although a relatively small number of new issues are responsible for this long run underperformance, it is not evident why there is such a lag between issue date and investor recognition of operating performance problems.[18]

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[14] Ritter [1991] finds that much of the underperformance occurs in the third post-issue year. Analysis of IPO cohorts reveals that busted IPOs often delist around this time. Ritter also suggests that the concentrations in volumes in certain years are associated with taking advantage of windows of opportunity. Bust rates also increase in high-volume years, primarily because low-quality underwriters gain market share during these periods. It appears that the underlying cause of the poor long-run performance of hot market issues is due to the increased presence of low-quality investment banks during these market conditions.

[15] A Tukey post-hoc test indicates that differences between busted and active IPOs become significant at 3 months, and between busted and acquired IPOs at 12 months.

[16] Mello and Parsons [1998] and Zingales [1995] present theoretical models that predict new-issue pricing compensates issuers for the subsequent sale of a firm to a strategic buyer following an IPO. The finding that excess returns for the acquired IPOs are close to zero is consistent with the hypothesis that issuers extract control premium benefits in the offer price.

[17] Acquired IPO returns are not significantly different from zero for the one-, three- and five-year holding-period horizons, and active IPO returns are not significantly different from zero for the three- and five-year horizons.

[18] For busted IPOs, excess returns are not significantly different from zero at the three- and six-month holding-period horizons, and are significantly negative at one-, three- and five-year holding-period horizons.

The finding that the measured long-run IPO performance depends on the bust rate frequency of new issues implies that attempts to measure the magnitude of long-run underperformance are sample period-specific. The sample frequency of busted IPOs depends on the length of the sample period and issue volume conditions. Consequently, inferences from empirical studies about average return performance are a reflection of underlying issue volume conditions and issuers' public market age during the sample period. This implies that long run performance comparisons between studies that are based on different sample periods are generally inappropriate.

Overall, although only 62% (according to number of issues) to 70% (according to dollar value) of the IPO sample remains actively traded as of December 31, 1998, these issues have delivered returns in line with investments of similar size market capitalization at the time of issue. Thus, an analysis of busted, acquired and active IPOs provides a perspective that differs considerably from the view that long-run investing in a typical IPO is "hazardous to your wealth" (Loughran and Ritter [1995], p. 46). Our results suggest that the long-run underperformance puzzle can be restated as an investigation regarding the reasons why underwriters price, and investors value, IPOs without regard for survival likelihood.

3. Aging Analysis and the Long-Run Performance of IPOs

Why, on average, do underwriters and investors price IPOs as if they will never bust? Few investors would consider bust rates to be important during the period immediately after issue, especially in a hot issue market. In addition, the number and dollar value of IPOs that bust in a given year relative to the overall size of the new issues market is small. Both factors might contribute to the perception that bust rates are a small and unimportant influence in the IPO market.

Suppose, however, that the likelihood an IPO will bust is not stationary through time, but rather varies with an IPO's public market age. If underwriters and investors do not properly consider the impact of aging on IPO bust rates during periods of high growth in new issue volume, a comparison of contemporaneous IPO busts relative to the aggregate new issue market size underestimates the true rate of busted IPOs. A failure rate analysis that accounts for age produces a very different picture of bust rates in the market for new equity issues.

The observation that investors underestimate failure rates in their pricing of security offers is not new. Asquith, Mullins and Wolff [1989] document the consequences of improper consideration of the aging of new issues on returns in the high-yield bond market. They recommend measurement

of default over time based upon a cohort analysis of bonds issued during the same year. We find that this phenomenon may be important in the market for new equity issues as well.

Table 3 provides evidence on the relation between busted IPOs and their year of issue. Panel A presents annual bust rates for each issue year. Bust rates are expressed as the percentage of aggregate cohort-year issue volume that busts *n* years following the offer date. For example, 0.28 percent of IPOs issued in 1988 busted within 1 year of their offer date; an additional 1.93 percent busted within 2 years; and so on. This analysis illustrates the annual relation between issue date and bust date based upon the offer year, providing evidence on the time to bust.

Panel B reports cumulative bust rates for each issue year. Cumulative bust rates are simply the sum of all prior annual bust rates. This evidence provides a measure of the overall fraction of cohort-year issues that bust as of a specific holding period anniversary date.

Two important characteristics are evident. First, bust rates are generally low immediately following issue, regardless of issue year. Since IPOs raise equity capital for the issuer, this low failure rate is not surprising. In contrast to the potentially substantial debt service requirements of high-coupon bonds, new equity capital does not impose a negative cash flow requirement on the issuer.

Second, the importance of an IPO's public market age on the cumulative cohort-year bust rates becomes apparent over time. Yearly bust rates increase with time, so older IPOs have much higher cumulative default percentages than those issued in recent issue years (Panel B). For example, cumulative bust rates for IPOs issued during 1988-1990 range between 9.8% and 12.1%. Cumulative bust rates for IPOs issued during 1994 and 1995 are as low as 3.4% and 4.1%. The evidence is consistent with the interpretation that the poor long-run performance of IPOs is really a manifestation of the incidence of cohort-year bust rates. Although there is a lag between the issue date and the bust date, investors would be expected to anticipate such failures and to require compensation for bearing this risk. Apparently, this is not the case.

Busted IPOs can be a relatively large percentage of their issue-year cohort universe, especially for the oldest IPOs included in our sample. Note, however, that by the time these issues actually bust, the IPO market is much larger; there has been rapid growth in new issue volume. Rapid growth makes the high cohort-year bust rates appear small relative to the aggregate size of the outstanding issues, which is more heavily dominated by the recently issued IPOs with low bust rates. Simply put, aged and unaged yearly bust rates provide substantially different pictures about the failure rates of IPOs.

To illustrate the extent of the difference, Table 4 reports unaged yearly bust rates calculated as the number of busts in a given year divided by cumulative new issues since 1988. Unaged bust rates do not consider failure relative to issues that have been public for a similar amount of time. Rather, this measure reports bust rates as a percentage of total sample period market size. As the table indicates, annual unaged bust rates are lower than the cohort-year aging analysis. For example, as of December 31, 1998, the aged dollar volume bust rate for 1988 issues is 9.8% while the unaged bust rate (based upon total amount issued during the sample period) is 0.11%. Thus, as in the high-yield bond market, our analysis suggests that public market age has an important effect on the number of busted new equity issues.

If bust rates are not stationary through time, but rise with the IPO's public market age, and if there is rapid growth in new-issue volume, bust rates are severely underestimated by the unaged measure. This distinction between aged and unaged bust rates may explain why investors apparently ignore the impact of low-probability, high-loss events on IPO return performance. Low contemporaneous measures of busted IPOs can dramatically understate failure rates over longer time horizons. In such an environment, new issue pricing decisions may not provide sufficient compensation for the true risk of these offerings until investors recognize the importance of aged bust rates.

These results on aged bust rates have implications for long-run investor returns. For example, an analysis of issue date returns indicates that, on average, IPOs are significantly underpriced. While investors may infer from this that risk-adjusted returns are high for IPOs, low unaged bust rates can be sustained only as long as the high growth in new equity issue volume continues. Once growth slows, the IPO market will no longer be heavily influenced by recently issued IPOs with lower aged bust rates. We recommend that investors measure default experience over time within the cohort of IPOs issued at the same time. They should not simply and naively base their investment decisions on relative valuations in current market conditions.

4. Factors Influencing the Underwriting of Busted IPOs

Although the success and failure rates of IPOs are related to the public market age of new issues, other fundamental factors are also likely to impact the likelihood that an IPO busts. We suggest that there are at least four additional factors that could differentiate the underwriting of busted, acquired and active IPOs. We first present univariate evidence for each set of explanatory variables. Then the four sets of explanatory variables are included in a logit analysis to measure their

incremental contributions to the likelihood that an IPO will subsequently bust. Two sets of multivariate tests are conducted. First, we identify factors that systematically differentiate between new issues that bust and those that do not. We then examine whether the full sample results hold under different types of IPO market conditions—hot, cold and normal. In both sets of tests, we interpret the explanatory variable coefficients as evidence that illustrates the relative importance of underwriter reputation, the underwriter's management of the going public process, capital market conditions and macroeconomic conditions for the marketing of failed and successful IPOs.[19]

4.1 Underwriter Reputation

The first factor we examine relates to the screening and certification roles that investment banks provide when firms go public. Higher-quality investment banks have greater reputation at stake, and therefore would be more adversely affected by failing in these roles. If underwriters differ in their ability or their incentive to conduct due diligence during the going public process, then busted IPOs are more likely to be underwritten by less-prestigious investment banks.[20]

Although we expect that high-quality underwriters provide more credible certification, their screening of new issues may nonetheless be imperfect. Even high-quality investment banks underwrite busted IPOs. We also expect that market conditions and market share may impact the incidence of busted IPOs. For example, an increase in the volume of new issues may increase the costs of conducting adequate due diligence and issuer certification because the average quality of the issuer pool may change, or underwriting capacity constraints at the investment bank may become binding. In addition, changes in underwriter market share may impact the overall quality of the certification of new issues if there are differences in the skills of investment banks.

Carter and Manaster [1990] argue that low-risk firms attempt to reveal their value to the market by selecting underwriters with high prestige. In this case, a prestigious underwriter is adept at identifying lower-risk IPO firms, while non-prestigious underwriters undertake the IPOs of those issuing firms that are unsuitable for their prestigious counterparts. If the distribution of issuer risk levels changes through time, underwriter market share and the incidence of busted IPOs would

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[19] In the multivariate analysis, we treat acquired and active IPOs as a single group. Therefore, the analysis identifies systematic differences in factors associated with IPOs that bust for reasons of poor performance and IPOs that do not bust.

[20] Prior work investigating the role of underwriter reputation in the underwriting of IPOs includes Beatty and Ritter [1986], Booth and Smith [1986], Carter and Manaster [1990], Megginson and Weiss [1991], Carter, Dark and Singh [1998], and Logue, Rogalski, Seward and Foster-Johnson [2000].

change as well. The propensity of investment banks to underwrite risky IPOs may change over time as well.

Table 5 presents underwriter market share and bust percentages by IPO issue year sorted by underwriter reputation. Panel A presents the information based on proceeds amount, and Panel B presents the information based on the number of issues. Lead underwriters for each IPO are identified from the SDC database, and updated Carter-Manaster underwriter reputation measures are obtained from Carter, Dark and Singh [1998]. An underwriter is classified as high-quality if it has a Carter-Manaster reputation measure greater than the overall sample median, and classified as low-quality otherwise.

Several noteworthy characteristics are observable in Table 5. First, higher-quality investment banks have larger underwriting market share than lower-quality investment banks. The magnitude of the difference depends on whether market share is measured by issue proceeds (Panel A) or the number of IPOs (Panel B). This difference is due to the fact that lower-quality investment banks tend to underwrite smaller IPOs. According to the proceeds amount, market share for the high-quality investment banks ranges between 78% (in 1992) and 91% (in 1990), while low-quality investment bank market share ranges between 9% and 22%. High-quality investment banks underwrite the majority of IPOs during our sample period.

Second, high-quality underwriters experience a loss of market share in high-volume periods. For example, according to proceeds amount, low-quality investment bank market share increases from 9% to 12% during 1988-1990 to 17% to 22% during 1992-1994. The change in market share may be because lower-quality issues are more likely to conduct IPOs in hot markets, or because high-quality investment banks are capacity constrained so that issuers must use lower-quality investment banks. Whatever the reason, underwriters who are expected to have less incentive or ability to efficiently screen and certify new issues gain market share when IPO volume increases.

Third, according to proceeds amount, high-quality investment banks underwrite a larger volume of busted IPOs than low quality investment banks (Panel A). The fraction of busted IPOs underwritten by high-quality investment banks ranges between 62% (in 1988) and 81% (in 1993). But, relative to their overall market share, low-quality investment banks underwrite a disproportionately large percentage of busted IPOs. In every sample year, the fraction of busted IPOs (according to proceeds amount) underwritten by low-quality investment banks is greater than their issue year market share. The difference between the absolute and relative underwriting performance of investment banks may be explained by the superior screening and certification skills

of higher quality investment banks and by the attempts of low-quality underwriters to penetrate the market by underwriting more speculative new issues.

Finally, lower-quality investment banks underwrite more busted IPOs (Panel B). The fraction of busted IPOs underwritten by low-quality investment banks ranges between 55% (in 1991) and 83% (in 1994). There is also some evidence of an aging effect here as well. For example, 48% (21/44) of the 1988 IPOs underwritten by the low-quality investment banks busted while only 19% (32/167) of their 1995 issues busted. One interpretation of the evidence could be that low-quality investment banks underwrite fewer busted IPOs during hot markets. On the other hand, however, the 1995 issue-year IPOs have had less time to bust. In order to separate the effects of issue volume and public market age, the multivariate analysis must control for both these effects.

We suggest, however, that the variation in underwriter skills may explain why the long-run performance of hot market IPOs is especially poor. A greater proportion of the IPOs underwritten by low-quality investment banks bust, and these investment banks gain market share in hot markets. Thus, our evidence indicates that the hot market long-run underperformance of IPOs is most likely a manifestation of the changing market share and differential screening skills of underwriters in different market conditions.

4.2 Pre-issue and Aftermarket Underwriting Activities

A second piece of evidence comes from examining the actual pre-issue and aftermarket underwriting activities performed by the investment bank during the going public process. IPO underwriters affect both the supply of and the demand for new shares through their pre-issue price and issue size adjustment decisions and their aftermarket overallotment option (OAO) exercise decisions and price stabilization activities.

Prior to an IPO's offer date, investment banks market a new issue through the offering prospectus and roadshow presentations. Investors convey their investment opinions about the issue to the underwriter through nonbinding indications of demand. Since the investment bank aggregates private information about investors' demand for an issue, pre-issue underwriter decisions could be related to subsequent failure and survival rates of new issues. Previous research shows that pre-issue price adjustments are related to investor returns (Hanley [1993]).

Since an investment bank obtains detailed information about the issuer's business prospects and investors' aggregate demand for an issue, the underwriter's activities during the IPO aftermarket may also be related to the subsequent failure and survival rates of new issues. Intense price

stabilization activities may indicate weak investor demand, while large overallotment option exercise would suggest strong demand. If investors anticipate the poor post-issue performance and failure rates of low-quality IPOs, weaker demand issues would be more likely to bust.[21]

Although the underwriter establishes a preliminary price and offer size in the prospectus, the final offer price and the exact number of shares to be sold are not determined until the day before issuance, and sometimes the actual day of issuance. We examine pre-issue offer price changes by the underwriter as evidence of its marketing skills and expertise. Partial price adjustment (PPA) activities by underwriters are quantified by measuring revisions in expected offer prices during the pre-market period. Changes in offer price are calculated as the difference between the actual offer price and the expected offer price, divided by the expected offer price.

Tables 6 and 7 provide empirical evidence on the relation between preliminary expected offer prices, actual offer prices and busted IPOs. New issues are sorted into three categories, depending on whether the final offer price is below (IPO < offer), within (IPO = offer) or above (IPO > offer) the preliminary prospectus issue price range. Hanley [1993] documents that this classification scheme is significantly related to aftermarket returns. Table 6 presents partial price adjustment information for the full sample and busted issues. Table 7 presents additional evidence on issue characteristics and underwriter market activities that could influence long-run IPO success and failure rates.

Several interesting patterns are evidenced in Table 6. First, the majority of new issues are sold at final offer prices within the expected offer price range established by the underwriter (1056/1955 issues). In fact, this category has the largest fraction of IPOs in every sample year. This indicates a fairly consistent and widespread agreement between underwriters and investors regarding the future prospects and value of a typical IPO prior to issue. This category nevertheless shows the largest fraction of busted IPOs in six of the eight sample years (the exceptions are 1989 and 1990). In most issue years, underwriters and investors do not anticipate busted IPOs in their preliminary pricing and adjusted valuation of new issues.

The information content of issues that have actual offer prices that are substantially higher or lower than the expected offer price is also fairly weak. For the full sample, there are more IPOs with upward price adjustments (IPO > offer) than downward price adjustments (IPO < offer) in

[21] Evidence on IPO underwriter activities prior to the issue date is presented in Hanley [1993] and Logue, Rogalski, Seward and Foster-Johnson [2000]. Studies that focus on the aftermarket activities of the underwriter include Aggarwal [2000], Ellis, Michaely and O'Hara [2000], Hanley, Kumar and Seguin [1993], Hanley, Lee and Seguin [1996], and Logue, Rogalski, Seward and Foster-Johnson [2000].

five of the eight sample years. This is likely attributable to the tendency for offers that do not attract sufficient investor interest to be withdrawn.

If underwriters and investors anticipated high failure rates, we would expect to observe many busted IPOs in the downward price-adjusted category, especially since these firms raise less cash to keep themselves afloat. However, downward price-adjusted issues have higher bust rates than the upward price-adjusted issues in only five of the eight sample years. The evidence is consistent with the interpretation that the partial price adjustment phenomenon does not appear to be a significant systematic determinant of busted IPOs.

Research has shown that partial price adjustment is a good predictor of short-run but not long-run IPO returns. Our evidence sheds additional light on this issue. Since the poor long-run return performance is driven by busted IPOs, and partial price adjustments do not appear to be significantly related to the likelihood that an issue busts, then factors other than the underwriter's pre-issue marketing activities are more likely to explain the future performance of new issues.

Table 7 provides additional information on the relation between partial price adjustments and other issue characteristics. Busted IPOs differ from the sample of acquired and active IPOs in most of these issue characteristics.

Underwriter reputation (*Reputation*) is significantly lower for busted IPOs than for the sample of acquired and active IPOs. The fact that the average reputation measure is particularly low in low-demand categories of busted IPOs (i.e., IPO < offer and IPO = offer) may indicate that low-quality investment banks complete the underwriting of IPOs that subsequently bust despite evidence of weak interest by investors. Instead of withdrawing or postponing the offer, these investment banks adjust offer size and quantity, thereby reducing proceeds for the issuer. One plausible interpretation is that the reduction in issue proceeds reduces the funding available to finance the business plan. If so, this suggests that the decision to underwrite a new issue may be more important than how it is underwritten.

Underwriters also provide two important aftermarket activities on behalf of issuers. First, since underwriters typically oversell an issue, the overallotment option (*OAO*) provides an opportunity for the underwriter to cover its short position at a price equal to the offer price. Therefore, the OAO allows the underwriter to support issue demand without excessive exposure to price risk. We measure OAO exercise as the number of additional shares purchased by the underwriter under the OAO during the aftermarket period, divided by the number of registered

shares sold in the offering. Underwriters can purchase up to 15% of the registered shares if the OAO is exercised. Thus, the variable ranges between 0% and 15%; higher values indicate greater use of the OAO by the underwriter.

Although Table 7 indicates that the sample of acquired and active IPOs and busted IPO OAO exercise averages are similar (8%), a Wilcoxon rank-sum test indicates that OAO exercise in the acquired and active IPO sample is significantly higher than for busted issues. Since OAO exercise is largely a function of aftermarket demand for an issue, weak aftermarket investor demand may be related to long-run survival and failure rates. Given that the immediate aftermarket investor returns for busted IPOs are similar to those of active and acquired IPOs (Table 2 and Figure 1), secondary market investor demand may be a more informative indicator of success and failure than aftermarket investor returns. This is likely due to the ability of underwriters to manipulate prices, and therefore distort returns, in the period immediately following new issues.

The other aftermarket underwriter activity, price stabilization, is a potentially important but unobservable activity conducted by IPO underwriters (*Price Support*). We define price stabilization to involve any activity by the underwriter designed to impede price declines of the new issue. Since underwriters are not required to report their actual price stabilization activities, the extent of price stabilization is usually deduced by observing price and trading patterns during the aftermarket period.

Several proxies for measuring the impact of price stabilization have been proposed in the literature, including the width of bid-ask spreads, estimates of Black-Scholes put option prices and the number of days until the secondary market price of the IPO first drops below the offer price. Our empirical tests use the latter measure.[22]

For each IPO in the sample, we determine the number of days between the offer date and the first date the secondary market price drops below the offer price. Since this distribution is skewed, we create a discrete categorical variable based on a day-count convention.

Issuers whose market prices decline below the issue price within two days of the offer date are assigned a value of 1. Thus, low values of the categorical variable indicate that underwriters abandoned aftermarket support activities quickly. If issuers experience price declines below the offer price within the next 28 days, we assume that underwriters were participating in extended price stabilization activities. These issues are assigned a value of 2. Finally, higher values of the categorical

variable indicate that price stabilization activities were not necessary. Issuers that did not experience price declines below the offer price within the first 30 days of trading are assigned a value of 3.[23]

According to Table 7, there is evidence of significantly less price stabilization activity for the sample of acquired and active IPOs than for busted IPOs (2.32 versus 2.11). This is consistent with our OAO results, since underwriters would be expected to provide price stabilization support for weak issues through secondary market purchases rather than OAO exercise (Aggarwal [2000]). Thus, the evidence provides further support for the hypothesis that aftermarket underwriter activities provide better information regarding long-run survival and failure rates than partial price adjustments.

Table 7 also reports several other issue- and issuer-specific characteristics that are related to the underwriting process. We include the natural logarithm of the issuer's revenue in the fiscal year immediately prior to the IPO as a control variable (*Log Revenue*). During the pre-market period, investment banks commonly use a comparable companies methodology to establish the expected offer price of an IPO (see, e.g., Kim and Ritter [1999]). Revenue is often the most important operating performance metric in this valuation process, since other common performance benchmarks such as operating income and operating cash flow are frequently negative, especially for younger firms. Larger and more established revenue streams are more likely to produce more accurate estimates of firm value during the pre-market period. In addition, some investment banks recommend that issuers attain a certain level of revenue prior to a public market offering. Low revenues may be an indication of a less-seasoned business model. In this case, lower revenues may indicate a premature entry into the public market. If so, survival rates would be lower for these issuers. Panel B indicates that busted IPOs have significantly lower revenues in our sample.

Final offer price and issue size adjustments relative to the preliminary issue price and offer size estimates in the prospectus are also reported. Underwriters often adjust offer prices (*PPA*) and issue size (*Issue_Size_Pct*). Table 7 indicates that downward price and share size adjustments occur

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[22] Following Hanley, Kumar and Seguin [1993] and Hanley, Lee and Seguin [1996], we use daily closing prices from CRSP to determine whether the market price dropped below the offer price. Therefore, our estimate of *Price Support* depends on whether the closing price on any given day is above, equal to, or below the offer price.

[23] Our analysis assumes that transaction prices below the offer price indicate the cessation of price stabilization activities. The offer price is the maximum allowable stabilizing bid under SEC Rule 10b-7. To the extent that price stabilization occurs at prices below the offer price, our measurement of price stabilization works against identification of systematic factors that influence such activities. Since we cannot determine the actual date that stabilization ceases for each offer, we perform additional tests based on different assumptions about when stabilization ends. We repeat the analysis using Black-Scholes put option prices as a proxy for the value of price stabilization and sorting issues into categories that depend only on whether there was any price stabilization activity. The results are largely unchanged under these alternative measures of price stabilization. These results are available from the authors upon request.

when the actual offer price is lower than the expected offer price for the sample of acquired and active IPOs and busted IPOs. Although there are no significant differences in issue size adjustments between the sample of acquired and active IPOs and busted IPOs, busted IPOs are more likely to have downward price adjustments than the sample of acquired and active IPOs.

We also control for differences in the *ex ante* risk of an issue through a measure of the preliminary offer price range (*Dollar Range*). Research suggests that investor expectations of new issue pricing are related to *ex ante* uncertainty about the value of the issuer (see, e.g., Beatty and Ritter [1986]). The costs of collecting and analyzing information are likely to be higher as uncertainty increases. The offer range is measured as the difference between the highest and the lowest anticipated values of the offer price indicated in the preliminary offer prospectus. Somewhat surprisingly, offer price ranges are lower for busted IPOs, indicating that these issues are expected to entail less risk.

Finally, we include an age measure (*IPO Age*) that controls for the public market age of the issuer. This variable is measured as the difference between the issue date and December 31, 1998. Although the evidence in Panel B indicates that busted IPOs are older than the typical sample IPO, this is due to the rising issue volume and the impact of aging on bust rates.

Overall, the results in Tables 6 and 7 suggest that there are a number of differences in underwriter activities between the acquired and active IPOs and busted issues. Busted issues have significantly less revenue and narrower preliminary price ranges; experience more intensive aftermarket price support activities and are underwritten by lower-quality investment banks. Although not reported in these tables, issues also have lower expected and actual offer prices and obtain fewer proceeds in their offerings.

One important caveat to bear in mind when interpreting the univariate evidence is that IPO underwriter activities are sequential and mutually interdependent. Therefore, the latter stage activities depend on investor reaction to the early stage activities. Multivariate evidence should reveal significant relationships that may not be evident in the univariate comparisons.[24]

4.3 Capital Market and Macroeconomic Conditions

The third piece of evidence is based on an examination of the impact of capital market and macroeconomic conditions on the going public process and the failure rates of new issues. Capital

[24] A sequential analysis of underwriter reputation and underwriting activities on investor returns is provided in Logue, Rogalski, Seward and Foster-Johnson [2000].

market and macroeconomic conditions might be expected to influence the bust rate of IPOs for several reasons.

Bayless and Chaplinsky [1996] suggest that investors are less fearful of buying overvalued equity in high-volume issue markets. They attribute the window of opportunity for equity issues during these periods to reduced levels of asymmetric information between issuers and investors. There are, however, two different interpretations of the window of opportunity story to consider here. First, if private information is a significant determinant of equity issuance decisions, firms may time their issues to correspond with periods of low information asymmetries. In this case, high-volume periods (hot markets) would be interpreted as periods of low information asymmetry, and we would expect more busted IPOs to be underwritten during low-volume periods (cold markets). Conversely, herding theory suggests that investors can become overly optimistic, and be more receptive to investments in poor-quality firms. This interpretation suggests that investors are less discriminating during hot markets; therefore, we should observe more busted IPOs underwritten during these periods.[25]

A different version of the window of opportunity story suggests that macroeconomic conditions rather than capital market conditions influence information asymmetries and investor psychology. Choe, Masulis and Nanda [1991] argue that information costs and security issue volume depend on macroeconomic conditions. Fama and French [1989] identify a systematic relation between macroeconomic conditions and expected rates of return on corporate securities. The information asymmetry interpretation states that busted IPOs are more likely when macroeconomic conditions are poor, while the herding theory interpretation states that busted IPOs are more likely when macroeconomic conditions are favorable.

Going public decisions and IPO bust rates may also be related to conditions in other segments of the capital markets. Research suggests that issuers occasionally postpone IPOs when credit market conditions and opportunities are favorable (James [1992]). To the extent that favorable credit market conditions provide either substitute or additional sources of investment capital, we expect that IPO bust rates would be inversely related to credit market volume conditions.

Many IPO firms also issue follow-on equity offerings soon after their initial equity sale, which suggests that conditions in the seasoned equity market may be important (Jegadeesh, Weinstein and Welch [1993]). If IPO decisions are timed to coincide with favorable periods in the

seasoned equity market, higher issue volume conditions in the seasoned equity market would be associated with lower IPO bust rates.

Finally, theory suggests and our empirical results confirm that many IPOs subsequently undergo changes in corporate control (Mello and Parsons [1998] and Zingales [1995]). Therefore, conditions in the market for mergers and acquisitions may be an important determinant of the long-run survival of IPOs. The theory predicts that higher volume conditions in the merger and acquisition market would be associated with lower IPO bust rates.

Panel A in Table 8 presents issue-specific, capital market and macroeconomic condition information for IPOs during hot, cold and normal IPO market cycles, as defined using the lagged three month moving average of aggregate monthly IPO issue volume. Bayless and Chaplinsky [1996] recommend the use of issue volume to characterize hot and cold periods in their study of seasoned equity issues. Based on their approach, we define market conditions in the following way. For each month during the sample period, we obtain monthly IPO issue volume. We then form moving averages based upon the issue volume for the three months immediately preceding the issue month. Each issue month during the sample period is then ranked according to the level of the lagged three-month moving average. The issue months in the top quartile of the lagged three-month moving averages are characterized as hot. The issue months in the lowest quartile of the lagged three-month moving averages are characterized as cold. The remaining months are considered normal. Figure 2 illustrates the identification of hot, cold and normal markets during our sample period. The figure also includes information on the length of the market cycles, issue volume and bust frequencies during the different market conditions.[26, 27]

Several interesting relationships are observed in Table 8. First, the largest number of busted IPOs occurs during normal market conditions (148), followed by hot (89) and then cold markets (38). The low incidence of busted IPOs during cold market conditions would seem to support the predictions of herding theory. Note, however, that overall issue volume is also highest in normal

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[25] Investigations of the role of capital market conditions and transactions on security issuance decisions include Ritter [1991] and Loughran and Ritter [1995] in the IPO market, and Loughran and Ritter [1995] and Bayless and Chaplinsky [1996] in the seasoned equity market.

[26] The identification of hot, cold and normal markets is designed to provide some perspective on similarities and differences in IPOs conducted in different market conditions. In the multivariate analysis, issue volume is treated as a continuous rather than a discrete categorical variable. We also repeat the analysis according to the dollar value (rather than the number) of IPOs. In some cases, the inferences about busted IPOs are found to be sensitive to the use of the dollar value rather than the number of IPOs. Therefore, we recommend caution in interpreting results from empirical studies that use only the number of IPOs to describe hot and cold IPO market conditions.

(1022 issues), followed by hot (734 issues) and then cold market conditions (199 issues). Therefore, the higher incidence of busted IPOs during better IPO market conditions is at least partly attributable to higher issue volume during these periods.

The table also indicates that busted IPOs are a higher fraction of issue volume during cold markets (19%) than either normal markets (14%) or hot markets (12%). A chi-square test confirms that a greater fraction of issue volume busts during cold markets than either normal or hot markets. We recommend caution in interpreting this evidence too strongly, however. Cold markets tended to occur during the earliest part of our sample period, so it is not clear whether the higher bust rate is due to differences in market conditions or public market age (as the aging analysis suggests).

Panel A also identifies a number of other significant differences between cold market IPO conditions and other market conditions. Cold market IPOs are issued during periods of lower volumes of new debt offerings (*Debt Volume*), seasoned equity issues (*SEO Volume*), and changes in corporate control (*M&A Volume*). Poor capital market conditions contribute to cold IPO markets. In addition, default premiums (*Default Premium*) are significantly higher (than in normal markets only), term premiums (*Term Premium*) are lower and macroeconomic conditions are generally poorer. For example, leading economic indicators (*Leading_Ind*), coincident economic indicators (*Coincident_Ind*), stock market prices (*SP500*) and industrial production (*Industrial_Prod*) are significantly lower during cold market IPOs. Collectively, this evidence suggests that capital market and macroeconomic conditions are significantly different during cold IPO market cycles. Since cold market IPO conditions are also associated with higher relative rates of busted IPOs, it is important to control for capital market and macroeconomic conditions when assessing survival rates of IPOs and their long-run stock price performance.

Panel B in Table 8 provides additional evidence on the relationships between macroeconomic conditions, IPO market cycles and post-issue bust rates. The identification of hot, cold and normal months follows the same moving average methodology and as in Panel A, using industrial production instead. The use of macroeconomic conditions to define hot, cold and normal markets produces a somewhat different picture of IPO issue volume and survival rates. There are more cold market offers (348 versus 199) and a similar number of hot market issues (654 versus 902) when industrial production is used to define market conditions. This suggests that analyses of

[27] For consistency, all macroeconomic and capital market variables reported in this section are lagged three month moving averages. The measurement of conditions over a three month period prior to the offer date captures the idea that the premarket IPO process extends over several months prior to the actual issuance.

hot, cold and normal security issue market conditions may be sensitive to the fundamental variables used to characterize issue conditions.

The macroeconomic classification scheme produces more busted IPOs in cold markets than the IPO volume classification scheme (59 versus 38). As a percentage of cold market issue volume, however, busted IPOs are a lower fraction of the issuer universe (16.9% versus 19.0%). Note also that busted IPOs as a fraction of overall issue volume are quite similar in normal and hot markets in Panels A and B. Thus, only busted IPOs in cold markets seem sensitive to the use of issue volume or industrial production as a measure of IPO market conditions.

Since the absolute and the relative incidence of busted IPOs in cold market conditions are sensitive to the scheme used to characterize issue conditions, continuous rather than discrete categorical variables are a more powerful method for detecting the influence of capital market and macroeconomic conditions on IPO bust rates. However, our ability to identify their marginal contribution to IPO survival and failure rates is limited because the capital market and macroeconomic variables are multicollinear. In our subsequent multivariate tests, this restricts the independent variable combinations that can be included in the regressions.[28]

Finally, recall that the aging analysis results suggest that it is also important to control for the public market age of new issues when assessing busted IPOs. Otherwise, mistaken inferences may be drawn about the systematic factors that are related to survival and failure. As indicated in Panels A and B, cold market IPOs are also the oldest IPOs. Thus, there is limited cross-sectional variation between public market age and the capital market and macroeconomic conditions during our sample period. The multivariate tests in the next section provide some useful insights regarding the relative importance of each.

4.4 Multivariate Analysis

Based on the univariate evidence, we would predict that several factors, including a new issue's public market age, underwriter reputation, premarket and aftermarket underwriter activities, capital market conditions and macroeconomic conditions, distinguish busted IPOs from all other IPOs. Two related sets of analyses are presented to illustrate the relation between these factors and the success and failure rates of IPOs. The first set of analyses examines the impact of these factors

[28] Based on prior literature, the use of IPO issue volume and industrial production to define market conditions seems most sensible. However, we have repeated the multivariate analysis in this paper using each of the other capital market and macroeconomic variables described in Table 7. A copy of these results is available from the authors upon request.

on IPO bust rates throughout the entire sample period. This assumes that the marginal impact of the explanatory factors is constant in different IPO market conditions. The second set of analyses presents evidence regarding similarities and differences in the factors that influence bust rates during different IPO market cycles. This approach provides evidence on whether the explanatory variables become more or less significant during hot, normal and cold market conditions.

A. *Factors Influencing Bust Rates During the Full Sample Period*

In Table 9, we estimate several different logistic regressions to examine the impact of the explanatory variables on the likelihood that an IPO busts during our sample period. In each model, a positive (negative) independent variable coefficient indicates that the explanatory variable increases (reduces) the likelihood that an IPO will bust.

Regressions (1) and (2) examine the impact of issue specific characteristics only on the likelihood that an IPO subsequently busts. Regression (1) controls for the quality of the IPO underwriter and the premarket underwriting activities. Regression (2) adds the two aftermarket underwriting activities conducted by investment banks. This analysis provides evidence on whether underwriter activities prior to or subsequent to going public are related to the likelihood that an IPO subsequently busts. In both regressions, we also control for the length of time between the IPO's issue date and December 31, 1998. This variable controls for the public market aging effect documented in Section 3.

The results indicate that three issue-specific characteristics distinguish busted IPOs from other IPOs. First, IPOs underwritten by low-quality investment banks are more likely to subsequently bust. The finding that busted IPOs are more likely to be underwritten by low-quality investment banks is consistent with the hypothesis that underwriters provide valuable certification and screening services. The result also suggests that higher-quality investment banks do a better job identifying viable businesses during the going public process. In fact, a one unit increase in Carter-Manaster ranking is associated with between a 21% to 23% decrease in the odds of a busted IPO. Investors should be wary of new issues underwritten by low-quality investment banks.[29, 30]

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[29] Another possible implication is that investors should exercise caution in participation in IPOs underwritten by online investment banks. These new issues may not be subject to the same level of certification and screening that occurs during the traditional book-building process.

[30] Odds ratios were calculated as $[100(e^{b}-1)]$, where ß is the independent variable coefficient from the logistic regression.

The second significant explanatory variable is revenue, which has been used elsewhere to proxy for risk. The significant negative relation between bust likelihood and revenue suggests an alternative, although not inconsistent, interpretation. Higher revenue could indicate a certain degree of product market acceptance. By contrast, low revenue may indicate that an issuer has attempted to conduct an IPO prematurely. That is, some firms may choose to go public too early in the development of their business model. Our results suggest that firms conducting IPOs with an insufficient revenue base may in fact reduce the likelihood of their own long run survival.

Finally, the results provide some support for the existence of a significant relationship between aftermarket underwriter activities and bust likelihood. Stabilization activities (*Price Support*) are not a significant predictor of a busted IPO. Overallotment exercise decisions (OAO) are negative and significant. This suggests that there is significantly less exercise of the OAO in busted IPOs. High levels of OAO exercise generally indicate high demand for an issue and aftermarket stock price levels that are higher than the offer price. Since IPOs with high OAO are typically underpriced, aftermarket demand appears to be a significant determinant of a viable IPO; issues with weak demand are more likely to bust. The results indicate that, at least on the basis of aggregate demand, investor buying and selling activity immediately after issue provides more information about the likelihood an issue will subsequently bust than pre-issue share supply adjustments.

The *IPO Age* variable is also highly significant in Regressions (1) and (2), and is positively related to the likelihood that an IPO subsequently busts. Thus, even after controlling for the quality of the underwriter and its conduct of premarket and aftermarket underwriting activities, the result suggests that the aging analysis is a significant consideration in the bust rates of IPOs. This result confirms that issue year cohort analysis is a significant component of IPO bust rates. By implication, since IPO bust rates are a significant determinant of the long-run underperformance of IPOs, the finding also suggests it is important to control for an IPO's public market age in studies of IPO returns.

Although busted IPOs have an important relation with the reputation of the underwriter and aftermarket underwriter activities, capital market conditions could also impact the success of a new issue. Indeed, we have noted that one version of the window of opportunity story is that firms take advantage of excessive optimism in the capital markets to issue an IPO. Going public is often the first stage in a process of capital acquisition and ownership changes. IPOs are often followed by follow-on seasoned equity offers and merger and acquisition activity. In addition, credit market conditions offer a substitute source of capital when IPO market conditions are poor.

Regression (3) provides evidence on the relationship between busted IPOs and IPO volume conditions. There is a significant negative relationship between the level of activity in the IPO market and subsequent bust rates. Busted IPOs occur when IPO issue volumes are low, a result that provides some support for the asymmetric information version of the window of opportunity story rather than the herding version. We are reluctant to push this interpretation too strongly, however, as the low IPO volume periods occur during the earliest part of our sample period, as Figure 2 illustrates. The oldest IPOs occur primarily during cold markets, thus confounding the aging analysis and market condition interpretations of busted IPOs. We do not include *IPO Age* and *IPO Volume* in the same regression because of their high correlation. Note also that the significant issue specific variables in Regression (2) retain their sign and significance levels in Regression (3), confirming that these variables have reliable explanatory power.

The results also shed light on results from previous studies that find post-issue return performance is especially poor following hot market IPOs. If busted IPOs are more likely to occur during hot (high volume) markets, we would expect to observe a positive and significant coefficient on *IPO Volume* in Regression (3). The significant negative coefficient in our study, in conjunction with the significant underwriter reputation result, suggests that it is not hot market conditions *per se* that increase the incidence of busted IPOs, but rather that low-quality underwriters gain market share during these periods. The important characteristic of a hot IPO market is not the increased volume of new issues, but rather that more new issues are underwritten by investment banks with poorer certification and screening skills. Apparently, the window of misopportunity is thrown open by the combination of market share gains by low-quality underwriters and excessive investor demand for new issues.

Regression (4) tests the robustness of the inferences regarding IPO volume conditions by including industrial production (*Industrial_Prod*) as a measure of macroeconomic performance. Similar to the IPO volume findings, the industrial production results provide evidence in support of a consistent negative relationship between busted IPOs and macroeconomic conditions. During the sample period, poor macroeconomic conditions increased the likelihood that an IPO subsequently busts. Note also that inclusion of the macroeconomic performance measure does not affect the other significant relations found in Regression (3). The fact that the model concordant increases somewhat in this specification relative to Regression (3) leads us to conclude that busted IPOs are more significantly related to macroeconomic rather than capital market measures of business conditions.

Regressions (5)-(7) add default and term premia to the analysis, based on the findings in Fama and French [1989]. Default and term premia are unrelated to IPO bust rates, and their inclusion reduces the significance of IPO volume and industrial production. The issue-specific influences retain their significance levels, however. Thus, it appears that business conditions are only weakly related to IPO bust and survival rates.

Overall, the results in Table 9 suggest that three factors consistently and significantly impact IPO bust rates: poorer-quality underwriters, small revenue bases at the time of issue, and weak secondary market demand immediately following issue. Capital market and macroeconomic conditions appear to have only limited impact on long-run survival.

B. *Factors Influencing Bust Rates During Different IPO Market Cycles*

The influence of issue-specific, capital market and macroeconomic factors on IPO failure and survival rates may differ across market conditions. Table 10 provides univariate evidence that is consistent with this hypothesis. The table presents univariate comparisons of issue-specific, capital market and macroeconomic conditions for busted IPOs versus other IPOs during hot, cold and normal market conditions.[31] Wilcoxon rank sum test statistics compare each characteristic between the busted IPOs and other IPOs within these three distinct market conditions. Thus, the table identifies factors that distinguish success and failure rates within similar market conditions.

In hot markets, only issue-specific characteristics distinguish busted IPOs from other IPOs. Moreover, this inference holds regardless of whether IPO issue volume or industrial production is used to identify market conditions. In a hot IPO market, capital market and macroeconomic conditions have no impact on the success or failure of IPOs. The results suggest that the screening and certification services provided by the underwriter and the conduct of underwriting market activities are especially important during periods when new issue volume is high.

In normal markets, the results indicate that issue-specific, capital market and macroeconomic factors all play a role in determining the success or failure of an IPO. Moreover, these inferences are not sensitive to the use of IPO issue volume or industrial production to define market conditions. Like hot market IPOs, the role of the underwriter and its conduct of underwriting activities are

[31] We also examine the distribution of these statistics by sorting on industrial production. Capital market conditions also become significant when industrial production is used to define market conditions. Thus, the extent to which factors beyond the underwriting process influence success and failure for IPOs in cold markets depends on how an analyst chooses to define market conditions. The results are available from the authors upon request.

important. However, the poor capital market or macroeconomic conditions also appear to be significantly related to busted IPOs in normal markets as well. For IPOs conducted in normal markets, factors beyond the underwriter and the underwriting process influence IPO success and failure.

Finally, based on IPO issue volume, success and failure for cold market IPOs depend on the underwriter, the conduct of the underwriting process and macroeconomic conditions. Our evidence here is dependent on how market conditions are defined, however.

Market participants and underwriters frequently assert that there is a deterioration of quality late in an IPO cycle. Cyclical variation in the quality of IPOs could result in different relations between busted IPOs and other IPOs in different market conditions. In order to examine this hypothesis, we estimate separate logistic regressions to examine differences between busted and other IPOs in three different market conditions: hot, cold and normal. Market conditions are measured using the lagged three-month moving average IPO volume, and the logistic results are presented in Table 11. Panel A reports cold market regressions; Panel B reports hot market regressions; and Panel C reports normal market regressions.[32]

The evidence indicates that bust rates are not influenced by identical factors across different IPO market cycles. We briefly highlight some of the more interesting inferences from these results. The Carter-Manaster measure of underwriter quality is negative and significant in all three market condition regressions. The results are consistent with the hypothesis that lower-quality investment banks are more likely to underwrite IPOs that bust, regardless of whether market conditions are hot, cold or normal. Thus, it appears that investors insufficiently discount the quality of IPOs underwritten by low-quality investment banks in all market conditions.

The importance of the underwriter also appears to vary according to market conditions. A one unit increase in the underwriter's reputation was associated with at least a 21% decrease in busting. In cold markets, however, this relationship is stronger. For every one unit increase in Carter-Manaster reputation, the odds of busting decreased about 34%. In hot and normal markets, the link between underwriter reputation and busting, while statistically significant, reduces to around 23% in hot markets and 20% in normal markets.

Table 11 also offers some evidence on the relationship between market conditions and aging analysis during market cycles. *IPO Age* is a positively related to IPO bust rates, regardless of market

[32] We have also conducted the analysis using industrial production to define market conditions. The results are available from the authors upon request.

conditions. This suggests that it is the IPOs that are issued earliest in the cycle that have the highest likelihood of busting. However, the relationship is significant only during normal market conditions. Thus, within an IPO market cycle, there is an aging effect on bust rates that is separate from the impact of market conditions, but only during some market conditions.

Aftermarket underwriter activities are significant determinants of IPO bust rates in cold markets, but not normal markets. Aftermarket underwriter activities are marginally important in hot markets. To the extent that weak investor demand can be anticipated by investment banks, this suggests that postponing or withdrawing low demand IPOs would be especially important during cold markets.

The revenue base is an important determinant of success and failure only in normal markets. Although conventional wisdom suggests that firms might be tempted to go public prematurely with their business plans in a hot market, our results suggest that it is only in normal markets that this decision significantly influences the likelihood of subsequently failing.

Finally, capital market and macroeconomic conditions are significant only in the normal market regressions. Moreover, the strength of the relation is weak since the variables are not significant in Regressions (6) and (7) of Panel C. Thus, we conclude that while capital market and macroeconomic conditions have no impact on IPO failure rates in hot or cold markets, their influence during normal markets is significant but only marginally so.

5. Summary and Conclusions

Loughran and Ritter [1995] argue that the low returns of issuing firms following IPOs demand an explanation. Indeed, they characterize this phenomenon as a puzzle.

Our evidence suggests that the average long-run underperformance of issuing firms is due to the exceptionally poor performance of busted IPOs. Other explanations have been that investors like to bet on long shots and that investors systematically overestimate the probability of finding a big winner. Loughran and Ritter [1995] characterize this as "…the triumph of hope over experience". Our results actually suggest that investors systematically underestimate the probability of finding a big loser because they do not accurately assess bust rates in the IPO market.

Several IPO market characteristics contribute to the documented relation between busted IPOs and investor returns. First, investment banks perform their screening and certification functions imperfectly. Second, there are important quality variations in the performance of the screening and certification functions of investment banks. Low-quality investment banks perform

these functions especially poorly, regardless of market conditions. Third, low-quality investment banks gain market share in hot IPO markets. This, in conjunction with their relatively poor provision of screening and certification, accounts for the high bust rates and poor return performance of IPO firms following hot markets. Fourth, the use of relative valuation methods appears to be an important reason why failure rates are not properly priced in IPOs. Fifth, investors fail to demand sufficient compensation for failure rates, most likely because they do not properly consider the impact of issue-year cohort analysis on the survival rates of new issues.

In their study of the original issue high-yield bond market, Asquith, Mullins and Wolff [1989] attribute mismeasurement problems to the fact that junk bonds were new to the capital markets, so investors had little historical experience with them. One intriguing implication of our analysis is that these misvaluation episodes may recur periodically in the same market. Suppose that technological or industry events initiate a new hot IPO market (e.g., oil price shock, biotechnology, the Internet). Eventually, IPO bust rates increase so that investors are no longer willing to continue to underwrite new issues. The onset of a 'cold' market until another shock initiates a new cycle. If this is indeed the case, it suggests investigation of the unresolved question of why investors make such errors recurringly.

The period of positive economic growth in our study is too short to tell whether the influence of busted IPOs can explain long-run underperformance in hot and cold markets over different phases of the business cycle. Extension to a longer sample period would be informative. The period we study includes generally falling interest rates, rising stock prices and good economic conditions, which suggests that the effects of busted IPOs may be even more important in other time periods.

Our study may also have some important implications for the IPO market today. Internet-related new issues have been underwritten at a furious pace in the past several years. The hot market for these issues has opened the window for many new public companies in the industry, and our results suggest that a reasonable fraction of these issuers will bust. We would predict that the Internet IPOs most likely to fail are the small issues, issues underwritten by low-quality investment banks and issues with relatively low OAO exercise. Some Internet IPOs underwritten by high-quality banks are likely to bust also, given their large market share and necessarily imperfect screening methods.

There are also new methods of underwriting IPOs. Online investment banks suggest that they will provide broader distribution of new issues. Our results indicate that high-quality

investment banks provide valuable screening and certification services. If online investment banks do not provide similar quality services, the IPOs they underwrite may subsequently higher bust rates.

Finally, our suggestion that some firms may go public too early requires further investigation. The literature focuses extensively on the costs and benefits of public versus private ownership, with too little analysis of how these costs and benefits evolve over time. The optimal timing for public market entry and the possibility and consequences of entry that is too early or too late are interesting questions for future research.

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Table 1: Distribution of Sample IPOs by Issue Year

The total number of IPOs and their gross proceeds (in billions of US dollars) for the full sample and sorted by delisting event classification. Each new issue is sorted into one of three mutually exclusive groups, based upon the CRSP delisting code as of December 31, 1998. An issue is classified as a busted IPO if the firm has a delist code between 500 and 585. An issue is classified as an acquired IPO if the firm has a delist code between 200 and 301. An issue is classified as an active IPO if the firm has a delist code of 100. Sample data for the sample of 1,955 IPOs issued between January 1988 and December 1995 are obtained from the Securities Data Corporation New Issues Database (SDC).

Issue Year	All IPOs (1)				Busted IPOs (2)				Acquired IPOs (3)				Active IPOs (4)			
	Number		Proceeds Amount		Number		Proceeds Amount		Number		Proceeds Amount		Number		Proceeds Amount	
	n	%	$	%	n	%	$	%	n	%	$	%	n	%	$	%
1988	93	4.76	3.56	3.76	29	10.55	0.348	6.09	25	5.42	1.074	4.67	39	3.20	2.133	3.23
1989	95	4.86	4.20	4.43	20	7.27	0.440	7.70	25	5.42	1.072	4.65	50	4.10	2.683	4.07
1990	93	4.76	3.05	3.22	20	7.27	0.370	6.46	18	3.90	0.465	2.02	55	4.51	2.215	3.36
1991	234	11.97	10.76	11.37	31	11.27	0.698	12.21	66	14.32	3.817	16.57	137	11.24	6.247	9.47
1992	326	16.68	16.10	17.01	44	16.00	1.075	18.79	84	18.22	4.873	21.16	198	16.24	10.156	15.40
1993	399	20.41	20.03	21.15	48	17.45	1.414	24.72	95	20.61	4.766	20.69	256	21.00	13.845	21.00
1994	322	16.47	15.31	16.17	42	15.27	0.631	11.03	69	14.97	2.636	11.45	211	17.31	12.043	18.27
1995	393	20.10	21.68	22.90	41	14.91	0.743	12.99	79	17.14	4.329	18.80	273	22.40	16.610	25.19
Total	1955	100.00	94.682	100.00	275	100.00	5.719	100.00	461	100.00	23.033	100.00	1219	100.00	65.931	100.00

Table 2: Bust Rates and Excess Return Performance of IPOs by Issue Year

IPOs are as classified as busted, acquired, and active according to the sorting scheme described in Table 1. Investor returns are measured as buy-and-hold returns, and size-adjusted excess returns are measured for each IPO as the difference between the issuer's buy-and-hold-returns and the contemporaneous buy-and-hold returns on a portfolio of similarly sized non-IPO firms. Buy-and-hold returns are calculated from the first CRSP-listed post-issue closing price to several different anniversary dates for each offering in the same cohort-year. For each issue year, excess returns at each holding-period horizon are calculated as an equally weighted average of all cohort-year excess returns and are in percentages (e.g., 3.0 is 3%).

Issue Year	Number of Issues								Average Size-Adjusted Excess Issuer Returns				
	Total		Busted		Acquired		Active		3 Months	6 Months	12 Months	36 Months	60 Months
	n	%	n	%	n	%	n	%					
1988	93	4.8	29	10.6	25	5.4	39	3.2	3.2	3.4	16.4	29.8	31.7
1989	95	4.9	20	7.3	25	5.4	50	4.1	4	9.7	7.2	18.7	9
1990	93	4.8	20	7.3	18	3.9	55	4.5	3.6	2.5	-3.9	-28.7	-43.2
1991	234	12.0	31	11.3	66	14.3	137	11.2	8.3	6.3	-5.6	-12.5	-10.8
1992	326	16.7	44	16.0	84	18.2	198	16.2	0	4.5	-1.7	-11.6	-1.6
1993	399	20.4	48	17.5	95	20.6	256	21.0	8.7	4.5	1.9	0	-14.9
1994	322	16.5	42	15.3	69	15.0	211	17.3	3.5	4.9	11.1	10.3	N/A
1995	393	20.1	41	14.9	79	17.1	273	22.4	3.4	7.9	5.1	-29.6	N/A
Total	1955	100.0	275	100.0	461	100.0	1219	100.0	4.3	5.5	3.8	0.2	-5.0

Table 3: Aging Analysis of Busted IPOs by Issue Year Based Upon the Number of Sample Period New Issues

Panel A presents annual bust rates for each issue year. An IPO busts in the *n*th year if the delisting date occurs within n *x* 365 days of the issue date. Busted IPOs are defined as described in Table 1. Missing entries indicate that the cohort-year sample did not extend to that time period. Panel B reports cumulative bust rates for each issue year. Cumulative bust rates are the sum of the individual year bust rates up to and including n *x* 365 days after issue. Bust rates are expressed in percentages, so that 0.28 is equal to 0.28%.

Panel A: Annual IPO Bust Rates

	Number of Years Until an IPO Busts						
Issue Year	1	2	3	4	5	Beyond 5 years	% of Cohort-Year Issues
1988	0.28	1.93	2.36	1.47	1.63	2.13	9.80
1989	0.13	0.32	0.35	0.47	1.18	8.05	10.50
1990	0.00	0.80	1.40	2.00	0.25	7.68	12.13
1991	0.00	0.33	0.32	1.05	0.79	3.99	6.48
1992	0.00	0.22	1.32	0.98	2.20	1.96	6.68
1993	0.03	0.59	0.71	0.33	4.29	1.11	7.06
1994	0.00	1.55	1.22	0.83	0.52	---	4.12
1995	0.06	1.06	1.06	1.24	---	---	3.42

Panel B: Cumulaive IPO Bust Rates

	Number of Years Until an IPO Busts						
Issue Year	1	2	3	4	5	Beyond 5 years	% of Cohort-Year Issues
1988	0.28	2.21	4.57	6.04	7.67	9.80	9.80
1989	0.13	0.45	0.80	1.27	2.45	10.50	10.50
1990	0.00	0.80	2.20	4.20	4.45	12.13	12.13
1991	0.00	0.33	0.65	1.70	2.49	6.48	6.48
1992	0.00	0.22	1.54	2.52	4.72	6.68	6.68
1993	0.03	0.62	1.33	1.66	5.95	7.06	7.06
1994	0.00	1.55	2.77	3.60	4.12	---	4.12
1995	0.06	1.12	2.18	3.42	---	---	3.42

Table 4: Unaged Yearly IPO Bust Rates Based Upon the Dollar Value and Number of the Aggregate Sample Period New Issues

Unaged IPO bust rates are calculated as the cumulative number of busts divided by the cumulative number of new issues since 1988. Busted IPOs are defined in Table 1. Unaged bust rates are expressed in percentages, so that 1.08 is equal to 1.08%.

Year that IPO busts	Cumulative number of busted IPOs	Cumulative amount of busted IPOs ($ Billions)	Cumulative number of IPOs issued since 1/88	Cumulative amount of IPOs issued since 1/88	Unaged bust rates	
					Number of IPOs	Proceeds amount of IPOs
1988	1	0.00	93	3.56	1.08	0.11
1989	6	0.03	188	7.75	3.19	0.42
1990	16	0.15	281	10.80	5.69	1.38
1991	22	0.20	515	21.56	4.27	0.91
1992	37	0.35	841	37.67	4.40	0.92
1993	48	0.50	1240	57.69	3.87	0.87
1994	66	0.77	1562	73.00	4.23	1.05
1995	101	1.31	1955	94.68	5.17	1.38
1996	139	2.41	---	---	7.11	2.54
1997	194	3.96	---	---	9.92	4.18
1998	275	5.72	---	---	14.07	6.04
Total	275	5.72	1955	94.68	14.07	6.04

Table 5: Distribution by Issue Year of Sample and Busted IPOs According to the Quality of the Lead Underwriter

Underwriter IPO market share in Panel A is based on the issuer's proceeds amount (in billions of US dollars). For each issue year, investment bank market share percentages are calculated as the sum of all issuer proceeds amounts underwritten by similar-quality underwriters divided by the total issue-year proceeds amount. Lead underwriters for each IPO are identified from the SDC database, and updated Carter-Manaster underwriter reputation measures are obtained from Carter, Dark and Singh [1998]. An underwriter is classified as high-quality if it has a Carter-Manaster reputation measure greater than the overall sample median, and classified as low-quality otherwise. Underwriter IPO market share in Panel B is based on the number of IPOs. For each issue year, investment bank market share percentages are calculated as the number of IPOs underwritten by similar-quality underwriters divided by the total Number of IPOs issued during that year. Busted IPOs are defined in Table 1.

Panel A. By Proceeds Amount

		Full Sample			Busted IPOs		
			Underwriter IPO market share as a % of total proceeds amount			Underwriter IPO market share as a % of busted proceeds amount	
Year of Issue	Total number of issues	Proceeds Amount	High-Quality	Low-Quality	Proceeds Amount	High-Quality	Low-Quality
1988	93	3.556	88.2	11.8	0.348	62.38	37.62
1989	95	4.195	90.46	9.54	0.44	75.52	24.48
1990	93	3.05	90.78	9.22	0.37	80.05	19.95
1991	234	10.762	85.31	14.69	0.698	80.5	19.5
1992	326	16.103	77.89	22.11	1.075	71.34	28.66
1993	399	20.025	82.97	17.03	1.414	81.02	18.98
1994	322	15.31	78.87	21.13	0.631	76.41	23.59
1995	393	21.682	87.24	12.76	0.743	70.12	29.88

Panel B: By Number of IPOs

		Full Sample			Busted IPOs		
			Underwriter IPO market share as a % of total number of issues			Underwriter IPO market share as a % of number of busted issues	
Year of Issue	Total number of issues	Number of issues	High-Quality	Low-Quality	Number of issues	High-Quality	Low-Quality
1988	93	93	52.69	47.31	8	27.59	72.41
1989	95	95	61.05	38.95	5	25.00	75.00
1990	93	93	63.44	36.56	7	35.00	65.00
1991	234	234	64.10	35.90	14	45.16	54.84
1992	326	326	53.37	46.63	14	31.82	68.18
1993	399	399	54.14	45.86	14	29.17	70.83
1994	322	322	45.65	54.35	7	16.67	83.33
1995	393	393	57.51	42.49	9	21.95	78.05

Table 6: Distribution by Issue Year of Sample and Busted IPO Pre-issue and Aftermarket Characteristics According to Partial Price Adjustment

Partial Price Adjustment (PPA) categories are determined by a comparison of the offer price range listed in the preliminary offer prospectus and the actual issue date offer price. IPO < Offer contains those firms where the final offer price was less than the offer range; IPO = Offer contains those firms where the final offer price was within the offer range; IPO > Offer contains those firms where the final offer price was higher than the offer range. *IPO Age* is the number of years between issue date and December 31, 1998. *Log Revenue* is the natural logarithm of the issuer's revenue in the fiscal year immediately prior to the IPO. *Reputaion* is the Carter-Manaster underwriter quality ranking, a discrete underwriter reputation variable between 0 and 9, where 9 indicates the most prestigious underwriter and 0 indicates the least prestigious underwriter. PPA is the difference between the actual offer price and the expected offer price, where the expected offer price is calculated as sum of the highest and lowest anticipated values of the offer price as quoted in the preliminary prospectus, divided by two. *Issue_Size_Pct* is the natural log of one plus the percentage change in the number of shares offered, calculated as the actual number of shares offered (excluding the exercise of the overallotment option) minus the number of shares quoted in the preliminary prospectus, divided by the number of shares quoted in the preliminary prospectus. *Dollar Range* is the dollar width of offer range, calculated as the difference between the highest and lowest anticipated values of the offer price as quoted in the preliminary prospectus. OAO is the number of additional shares issued by the underwriter through exercise of the overallotment option divided by the actual number of registered shares offered. *Price Support* is the price stabilization proxy, calculated as a three-level categorical variable based on the number of days between the offer date and the first date that the secondary market price drops below the offer price. Higher values indicate that price stabilization activities were not necessary, and lower values indicate that underwriters abandoned their aftermarket support activities more quickly. [a] Busted IPOs are significantly different from the acquired and active IPOs at the 0.05 level, using Wilcoxon rank-sum test. Busted IPOs are defined in Table 1.

Panel A: Full Sample

Issue Year	Number of issues	Proceeds amount	Share of IPO market by partial price adjustment as a % of total proceeds amount: IPO < Offer	IPO = Offer	IPO > Offer
1988	93	3.56	19.66	62.47	17.87
1989	95	4.20	17.71	57.61	24.68
1990	93	3.05	18.75	56.05	25.19
1991	234	10.76	15.99	52.23	31.78
1992	326	16.10	31.94	45.97	22.09
1993	399	20.03	17.40	46.16	36.43
1994	322	15.31	26.48	55.66	17.86
1995	393	21.68	16.35	44.55	39.10

Panel B: Busted Issues

Issue Year	Number of issues	Proceeds amount	Share of IPO market by partial price adjustment as a % of busted proceeds amount: IPO < Offer	IPO = Offer	IPO > Offer
1988	29	0.35	26.47	71.74	1.79
1989	20	0.44	63.98	36.02	0.00
1990	20	0.37	12.32	36.53	51.15
1991	31	0.70	16.73	51.73	31.54
1992	44	1.08	34.70	45.31	19.99
1993	48	1.41	11.37	77.66	10.97
1994	42	0.63	45.28	53.96	0.76
1995	41	0.74	17.12	56.31	26.57

Table 7: Distribution of Full Sample and Busted IPO Pre-issue and Aftermarket Characteristics According to Partial Price Adjustment

Partial Price Adjustment (PPA) categories are determined by a comparison of the offer price range listed in the preliminary offer prospectus and the actual issue date offer price. IPO < Offer contains those firms where the final offer price was less than the offer range; IPO = Offer contains those firms where the final offer price was within the offer range; IPO > Offer contains those firms where the final offer price was higher than the offer range. *IPO Age* is the number of years between issue date and December 31, 1998. *Log Revenue* is the natural logarithm of the issuer's revenue in the fiscal year immediately prior to the IPO. *Reputaion* is the Carter-Manaster underwriter quality ranking, a discrete underwriter reputation variable between 0 and 9, where 9 indicates the most prestigious underwriter and 0 indicates the least prestigious underwriter. PPA is the difference between the actual offer price and the expected offer price, where the expected offer price is calculated as sum of the highest and lowest anticipated values of the offer price as quoted in the preliminary prospectus, divided by two. *Issue_Size_Pct* is the natural log of one plus the percentage change in the number of shares offered, calculated as the actual number of shares offered (excluding the exercise of the overallotment option) minus the number of shares quoted in the preliminary prospectus, divided by the number of shares quoted in the preliminary prospectus. *Dollar Range* is the dollar width of offer range, calculated as the difference between the highest and lowest anticipated values of the offer price as quoted in the preliminary prospectus. OAO is the number of additional shares issued by the underwriter through exercise of the overallotment option divided by the actual number of registered shares offered. *Price Support* is the price stabilization proxy, calculated as a three-level categorical variable based on the number of days between the offer date and the first date that the secondary market price drops below the offer price. Higher values indicate that price stabilization activities were not necessary, and lower values indicate that underwriters abandoned their aftermarket support activities more quickly. [a] Busted IPOs are significantly different from the acquired and active IPOs at the 0.05 level, using Wilcoxon rank-sum test. Busted IPOs are defined in Table 1.

	Acquired and Active Issues				Busted Issues			
		Average by Partial Price Adjustment Category				Average by Partial Price Adjustment Category		
Variable	Average	IPO < Offer	IPO = Offer	IPO > Offer	Average	IPO < Offer	IPO = Offer	IPO > Offer
Reputation	8.16	8.21	7.92	8.54	6.80 [a]	6.74	6.54	8.13
OAO	0.08	0.04	0.07	0.12	0.08 [a]	0.02	0.09	0.09
Price_Support	2.32	1.96	2.30	2.65	2.11 [a]	1.83	2.13	2.50
Log_Revenue	3.84	4.13	3.71	3.87	2.48 [a]	2.92	2.26	3.07
Issue_Size_Pct	0.09	-0.03	0.14	0.09	0.05	-0.02	0.07	0.11
PPA	0.00	-0.05	0.00	0.06	-0.01 [a]	-0.07	0.00	0.06
Dollar_Range	1.80	1.88	1.71	1.91	1.28 [a]	1.56	1.14	1.63
IPO_Age	3.32	3.22	3.49	3.09	3.97 [a]	4.23	3.91	3.82
Number of issues		366	869	445		60	187	28

Table 8: Distribution of IPO Issue Characteristics, and Capital Market and Macroeconomic Conditions by IPO Issue Volume and Industrial Production.

Hot, normal and cold market conditions are defined using aggregate monthly IPO issue volume (Panel A) and Industrial Production (Panel B). Each month during the sample period is ranked according to the level of 3 month moving average of IPO issue volume and Industrial Production. The months in the top quartile of issue volume are characterized as hot. The months in the lowest quartile of issue volume are characterized as cold. The remaining months are considered normal. Issue-specific variables are defined in Table 6. *IPO Volume* is the 3 month moving average of the volume of new issues. *SEO Volume* is the 3 month moving average of volume of new seasoned equity issues. *Debt Volume* is the 3 month moving average of volume of new public debt issues. *M&A Volume* is the 3 month moving average of the volume of merger and acquisitions. *Term Premium* is the 3 month moving average of monthly 10-Year U.S. Government bond rate minus the monthly 6-month Treasury bill rate. *Default Premium* is the 3 month moving average of BAA bond yield minus the monthly 10-Year U.S. government bond rate. *Leading_Ind* is the 3 month moving average of leading economic indicators. *Coincident_Ind* is the 3 month moving average of coincident economic indicators. *Industrial_Prod* is the 3 month moving average of industrial production.. *SP500* is the 3 month moving average of the Standard & Poor's index of 500 common stocks. **a,b,c** indicate that differences between means of columns (1) and (2), (1) and (3) and (2) and (3) are significant at the 0.05 level, respectively, using Wilcoxon rank-sum test.

	Panel A: Defined by IPO Volume			*Panel B: Defined by Industrial Production*		
Description	Cold (1)	Normal (2)	Hot (3)	Cold (1)	Normal (2)	Hot (3)
Busted	38 (19.1%)	148 (14.5%)	89 (12.1%)	59 (17.0%)	124 (14.8%)	92 (12.0%)
Acquired	56 (29.2%)	230 (22.5%)	173 (23.6%)	94 (27.0%)	207 (24.6%)	160 (20.9%)
Active	103 (51.7%)	644 (63.0%)	472 (64.3%)	195 (56.0%)	509 (60.6%)	515 (67.1%)
Full sample	199 (10.2%)	1022 (52.3%)	734 (37.5%)	348 (17.8%)	840 (43.0%)	767 (39.2%)
Log Revenue	3.50	3.68	3.69	3.70 [b]	3.72	3.58
Reputation	7.83	8.06	8.01 [c]	8.13 [b]	7.97 [a]	8.02
PPA	0.00 [b]	0.01	0.00 [c]	0.00	0.00	0.00
Issue_Size_Pct	0.01	0.02	0.02 [c]	0.02	0.01	0.03
Dollar Range	1.64	1.74	1.72	1.79	1.73	1.70
OAO	0.08	0.08 [a]	0.07 [c]	0.07	0.08	0.08 [c]
Price Support	2.19 [b]	2.30	2.30	2.14 [b]	2.28 [a]	2.36 [c]
IPO Age	6.30 [b]	3.43 [a]	2.61 [c]	5.49 [b]	4.25 [a]	1.56 [c]
IPO Volume	16.66 [b]	39.78 [a]	64.67 [c]	31.47 [b]	47.19 [a]	53.26 [c]
SEO Volume	15.99 [b]	36.00 [a]	51.22 [c]	30.82 [b]	38.54 [a]	44.95 [c]
Debt Volume	89.40 [b]	220.06 [a]	280.56 [c]	126.13 [b]	186.53 [a]	323.39 [c]
M&A Volume	570.42 [b]	686.88 [a]	690.05 [c]	530.32 [b]	596.12 [a]	830.13 [c]
Term Premium	0.52 [b]	1.72 [a]	2.31 [c]	1.96 [b]	2.12 [a]	1.43 [c]
Default Premium	1.94	1.83 [a]	1.95 [c]	2.05 [b]	1.99 [a]	1.70 [c]
Leading_Ind	99.28 [b]	100.25 [a]	100.56 [c]	99.41 [b]	99.99 [a]	100.95
Coincident_Ind	98.76 [b]	102.97 [a]	103.28 [c]	98.23 [b]	100.54 [a]	106.99 [c]
Industrial_Prod	97.83 [b]	104.47 [a]	104.98 [c]	96.83 [b]	100.72 [a]	110.81 [c]
SP500	324.01 [b]	431.03 [a]	461.44 [c]	352.44 [b]	403.74 [a]	497.91

Table 9: Multivariate Logistic Analyses

For each regression model, the dependent variable equals one if an IPO subsequently busted by December 31, 1998, and is equal to zero otherwise. The independent variables are defined as follows. *Reputation* is the Carter-Manaster underwriter quality ranking, a discrete underwriter reputation variable between 0 and 9, where 9 is the most prestigious underwriter and 0 is the least prestigious underwriter. PPA is the difference between the actual offer price and the expected offer price, where the expected offer price is calculated as sum of the highest and lowest anticipated values of the offer price as quoted in the preliminary prospectus, divided by two. *Issue_Size_Pct* is the natural log of one plus the percentage change in the number of shares offered, calculated as the actual number of shares offered (excluding the exercise of the overallotment option) minus the number of shares quoted in the preliminary prospectus, divided by the number of shares quoted in the preliminary prospectus. *Dollar Range* is the dollar width of offer range, calculated as the difference between the highest and lowest anticipated values of the offer price as quoted in the preliminary prospectus. OAO is the number of additional shares issued by the underwriter through exercise of the overallotment option divided by the actual number of registered shares offered. *Price Support* is the price stabilization proxy, calculated as a three-level categorical variable based on the number of days between the offer date and the first date that the secondary market price drops below the offer price. *IPO Volume* is the 3 month moving average of new issue volume. *Industrial_Prod* is the 3 month moving average of industrial production. *Default Premium* is the 3 month moving average of BAA Bond Yield minus the monthly 10-Year U.S. government bond rate. *Term Premium* is the 3 month moving average of 10-Year U.S. Government Bond Rate minus the monthly 6-Month Treasury Bill Rate. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, [a] $p < 0.10$.

	Regression Model						
Explanatory Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	-0.31	-0.13	1.47 ***	6.63 ***	0.19	5.99 *	6.23 *
IPO Age	0.22 ***	0.21 ***					
Log Revenue	-0.11 *	-0.11 *	-0.10 *	-0.10 *	-0.11 *	-0.11 *	-0.10 *
Reputation	-0.26 ***	-0.24 ***	-0.24 ***	-0.25 ***	-0.24 ***	-0.25 ***	-0.25 ***
PPA	-4.83 *	-2.57	3.19	2.95	-3.05	-3.06	-3.09
Issue_Size_Pct	-0.32	-0.23	-0.28	-0.27	-0.29	-0.25	-0.26
Dollar Range	-0.17	-0.14	-0.17	-0.18	-0.21 [a]	-0.16	-0.16
OAO		-3.65 *	-4.17 **	-3.50 *	-3.88 *	-3.72 *	-3.69 *
Price Support		-0.06	-0.08	-0.09	-0.12	-0.07	-0.07
IPO Volume			-0.02 ***			-0.01 [a]	-0.01
Industrial_Prod				-0.06 ***		-0.05 *	-0.05 *
Default Premium					0.38	-0.10	-0.04
Term Premium							-0.06
Concordant	71.4	72.5	69.9	71.8	69.5	71.7	71.7
Psuedo R-square	0.13	0.13	0.12	0.12	0.11	0.12	0.12

Table 10: Distribution of Issuer Characteristics and Macroeconomic Indicators by Capital Market Conditions.

Hot, normal and cold market conditions are defined using aggregate monthly IPO issue volume. Each month during the sample period is ranked according to the level of 3 month moving average of IPO issue volume and Industrial Production. The months in the top quartile of issue volume are characterized as hot. The months in the lowest quartile of issue volume are characterized as cold. The remaining months are considered normal. Issue-specific variables are defined in Table 6. *IPO Volume* is the 3 month moving average of the volume of new issues. *SEO Volume* is the 3 month moving average of volume of new seasoned equity issues. *Debt Volume* is the 3 month moving average of volume of new public debt issues. *M&A Volume* is the 3 month moving average of the volume of merger and acquisitions. *Term Premium* is the 3 month moving average of monthly 10-Year U.S. Government bond rate minus the monthly 6-month Treasury bill rate. *Default Premium* is the 3 month moving average of BAA bond yield minus the monthly 10-Year U.S. government bond rate. *Leading_Ind* is the 3 month moving average of leading economic indicators. *Coincident_Ind* is the 3 month moving average of coincident economic indicators. *Industrial_Prod* is the 3 month moving average of industrial production. *SP500* is the 3 month moving average of the Standard & Poor's index of 500 common stocks. **a,b,c** indicate that differences between medians of columns (1) and (2), (3) and (4), and (5) and (6) are significant at the 0.05 level, respectively, using Wilcoxon Rank Sum test.

	Cold		Normal		Hot	
Explanatory variable	Busted (1)	Not Busted (2)	Busted (3)	Not Busted (4)	Busted (5)	Not Busted (6)
Log Revenue	2.00 [a]	3.82	2.60 [b]	3.85	2.48 c	3.84
Reputation	5.95 [a]	8.21	6.89 [b]	8.21	7.18	8.08
PPA	-0.02 [a]	0.01	-0.01 [b]	0.01	-0.01	0.00
Issue_Size_Pct	0.04	0.01	0.01	0.02	0.00	0.02
Dollar Range	1.03 [a]	1.78	1.30 [b]	1.82	1.33 c	1.78
OAO	0.12 [a]	0.07	0.07 [b]	0.08	0.08 c	0.07
Price Support	1.97	2.24	2.11 [b]	2.33	2.15	2.32
IPO Age	6.63 [a]	6.22	4.06 [b]	3.32	2.69	2.60
IPO Volume	17.14	16.55	38.23 [b]	40.04	64.88	64.64
SEO Volume	14.24	16.41	32.68 [b]	36.57	51.45	51.19
Debt_Volume	79.18	91.81	195.61 [b]	224.20	277.13	281.04
M&A Volume	570.26	570.46	648.21 [b]	693.42	680.23	691.41
Term Premium	0.43	0.54	1.69	1.73	2.35	2.30
Default Premium	1.90	1.95	1.86	1.83	1.96	1.95
Leading_Ind	99.53 [a]	99.22	100.20	100.25	100.54	100.56
Coincident_Ind	98.57	98.80	102.04 [b]	103.13	103.08	103.31
Industrial_Prod	98.06	97.77	103.16 [b]	104.70	104.63	105.03
SP500	312.67 [a]	326.68	408.30 [b]	434.88	458.71	461.82
Number of IPOs	38	161	148	874	89	645

Table 11: IPO Market Cycle Multivariate Logistic Analyses

For each regression model, the dependent variable equals one if an IPO subsequently busted by December 31, 1998, and is equal to zero otherwise. The independent variables are defined as follows. *Reputation* is the Carter-Manaster underwriter quality ranking, a discrete underwriter reputation variable between 0 and 9, where 9 is the most prestigious underwriter and 0 is the least prestigious underwriter. PPA is the sum of the highest and lowest anticipated values of the offer price as quoted in the preliminary prospectus, divided by two. *Issue_Size_Pct* is the natural log of one plus the percentage change in the number of shares offered, calculated as the actual number of shares offered (excluding the exercise of the overallotment option) minus the number of shares quoted in the preliminary prospectus, divided by the number of shares quoted in the preliminary prospectus. *Dollar Range* is the dollar width of offer range, calculated as the difference between the highest and lowest anticipated values of the offer price as quoted in the preliminary prospectus. OAO is the number of additional shares issued by the underwriter through exercise of the overallotment option divided by the actual number of registered shares offered. *Price Support* is the price stabilization proxy, calculated as a three-level categorical variable based on the number of days between the offer date and the first date that the secondary market price drops below the offer price. *IPO Volume* is the 3 month moving average of new issue volume. *Industrial_Prod* is the 3 month moving average of industrial production. *Default Premium* is the 3 month moving average of BAA Bond Yield minus the monthly 10-Year U.S. government bond rate. *Term Premium* is the 3 month moving average of 10-Year U.S. Government Bond Rate minus the monthly 6-Month Treasury Bill Rate. *** p < 0.001, **p < 0.01, * p < 0.05, [a] p < 0.10.

Panel A: Delisted cold and not delisted cold

	Regression Model						
Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	-0.09	-1.51	-0.43	-21.46	3.32 [a]	1.28	-50.48
IPO Age	0.29	0.42					
Log Revenue	0.09	0.09	0.07	0.08	0.07	0.10	0.05
Reputtation	-0.42 **	-0.42 **	-0.43 **	-0.42 **	-0.41 **	-0.42 ***	-0.43 **
PPA	-20.29 **	-15.79 [a]	-15.93 [a]	-15.38 [a]	-15.71 [a]	-16.89 [a]	-13.29
Issue_Size_Pct	3.72 [a]	3.34	3.23	2.94	2.82	3.06	3.07
Dollar Range	-0.57 *	-0.47	-0.51 [a]	-0.47	-0.46	-0.48	-0.48
OAO		-24.76 **	-22.08 **	-25.11 **	-24.28 **	-24.22 **	-24.28 **
Price Support		0.69 [a]	0.71 *	0.77 *	0.76 *	0.72 *	0.82 *
IPO Volume			0.10				0.09
Industrial_Prod				0.23			0.50
Default Premium					-1.18		0.42
Term Premium						-0.32	0.51
Concordant	82.9	89.9	89.1	90.0	89.4	89.4	89.9
Psuedo R-square	0.20	0.24	0.24	0.24	0.24	0.24	0.21

Panel B: Delisted hot and not delisted hot

	Regression Model						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	-1.00	-1.00	-0.53	5.64	-2.57	-0.71	-7.20
IPO Age	0.31	0.31					
Log Revenue	-0.06	-0.04	-0.03	-0.04	-0.03	-0.04	-0.04
Reputation	-0.28 ***	-0.27 **	-0.26 *	-0.26 **	-0.27 **	-0.26 **	-0.28 **
PPA	-1.90	0.54	0.40	0.40	-0.58	0.54	-0.41
Issue_Size_Pct	-0.92	-0.74	-0.79	-0.76	-0.72	-0.75	-0.75
Dollar Range	-0.01	0.04	0.04	0.04	0.02	0.04	0.03
OAO		-5.49 [a]	-5.38 [a]	-5.33 [a]	-5.46 [a]	-5.26 [a]	-5.49 [a]
Price Support		0.02	-0.01	0.02	0.00	0.00	0.02
IPO Volume			0.01				0.00
Industrial_Prod				-0.06			-0.08
Default Premium					1.25		0.82
Term Premium						0.23	-0.29
Concordant	65.0	67.8	65.3	67.7	67.8	66.5	68.2
Psuedo R-square	0.02	0.02	0.01	0.01	0.02	0.01	0.00

Panel C: Delisted normal and not delisted normal

	Regression Model						
Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	-0.22	0.26	1.95 **	6.06 ***	-0.52	1.06	4.77
IPO Age	0.20 ***	0.19 ***					
Log Revenue	-0.16 *	-0.15 *	-0.15 *	-0.14 *	-0.13 *	-0.14 *	-0.15 *
Reputation	-0.24 ***	-0.22 ***	-0.22 ***	-0.23 ***	-0.21 **	-0.21 **	-0.23 ***
PPA	-5.32 [a]	-3.80	-4.44	-4.33	-4.49	-4.56	-4.13
Issue_Size_Pct	-0.34	-0.31	-0.38	-0.33	-0.37	-0.37	-0.34
Dollar Range	-0.13	-0.15	-0.18	-0.18	-0.22	-0.21	-0.16
OAO		-0.70	-1.01	-0.86	-1.43	-1.38	-0.72
Price Support		-0.23	-0.26	-0.24	-0.24	-0.27	-0.24
IPO Volume			-0.02 [a]				-0.02
Industrial_Prod				-0.05 **			-0.04
Default Premium					0.86 [a]		0.32
Term Premium						0.06	0.00
Concordant	71.7	72.0	68.8	71.0	68.9	67.8	71.3
Psuedo R-square	0.11	0.11	0.10	0.10	0.10	0.09	0.10

Figure 1: Cumulative Excess Returns for Busted, Acquired and Active IPOs

Investor returns are measured as buy-and-hold returns, and size-adjusted excess returns are measured for each IPO as the difference between the issuer's buy-and-hold-returns and the contemporaneous buy-and-hold returns on a portfolio of similarly sized non-IPO firms. Issues identified by CRSP as delisted as of December 31, 1998, are sorted into one of three mutually exclusive groups, based upon the CRSP delisting code. Sample data for the sample of 1,955 IPOs issued between January 1988 and December 1995 are obtained from the Securities Data Corporation New Issues Database (SDC).

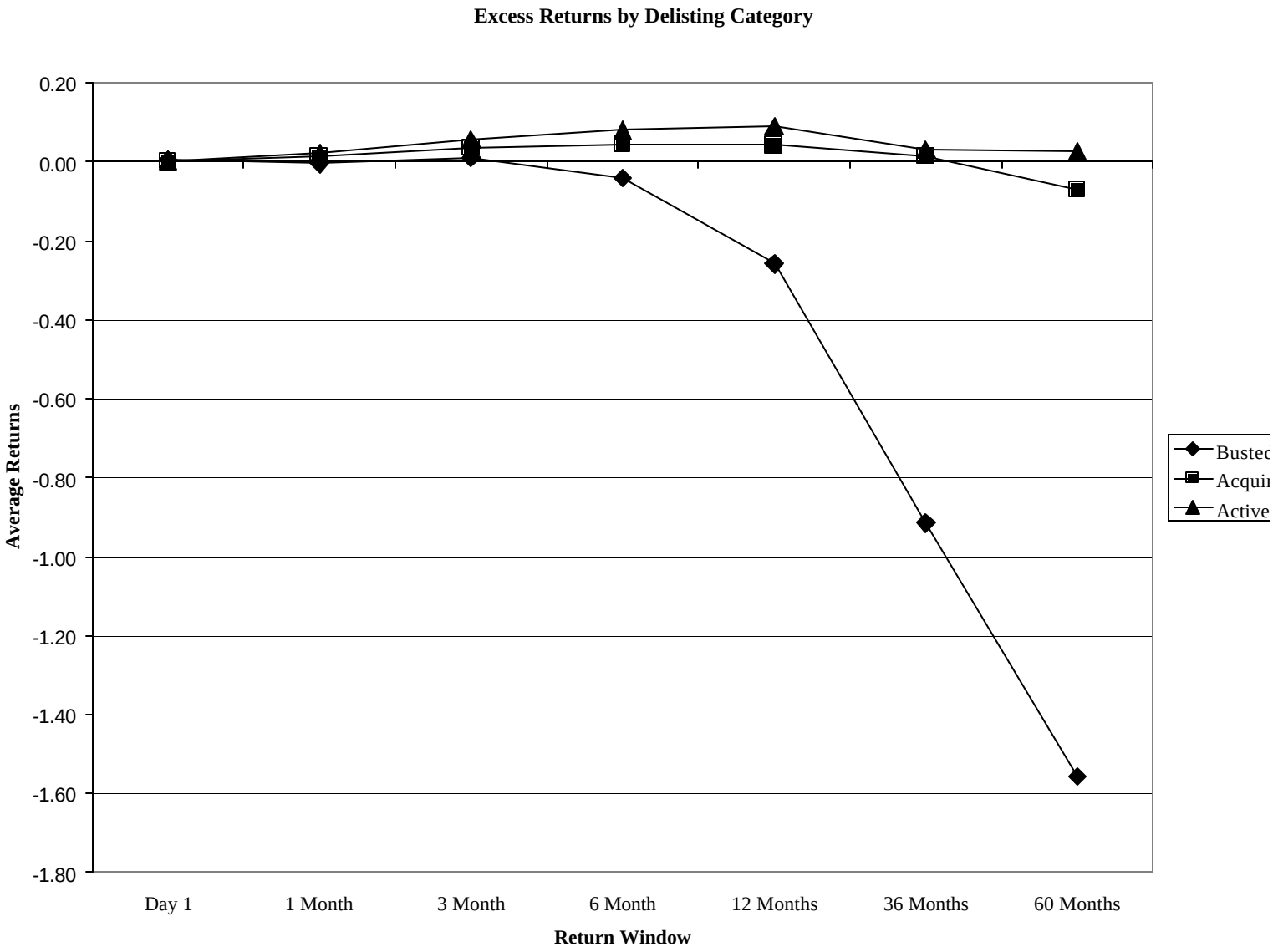
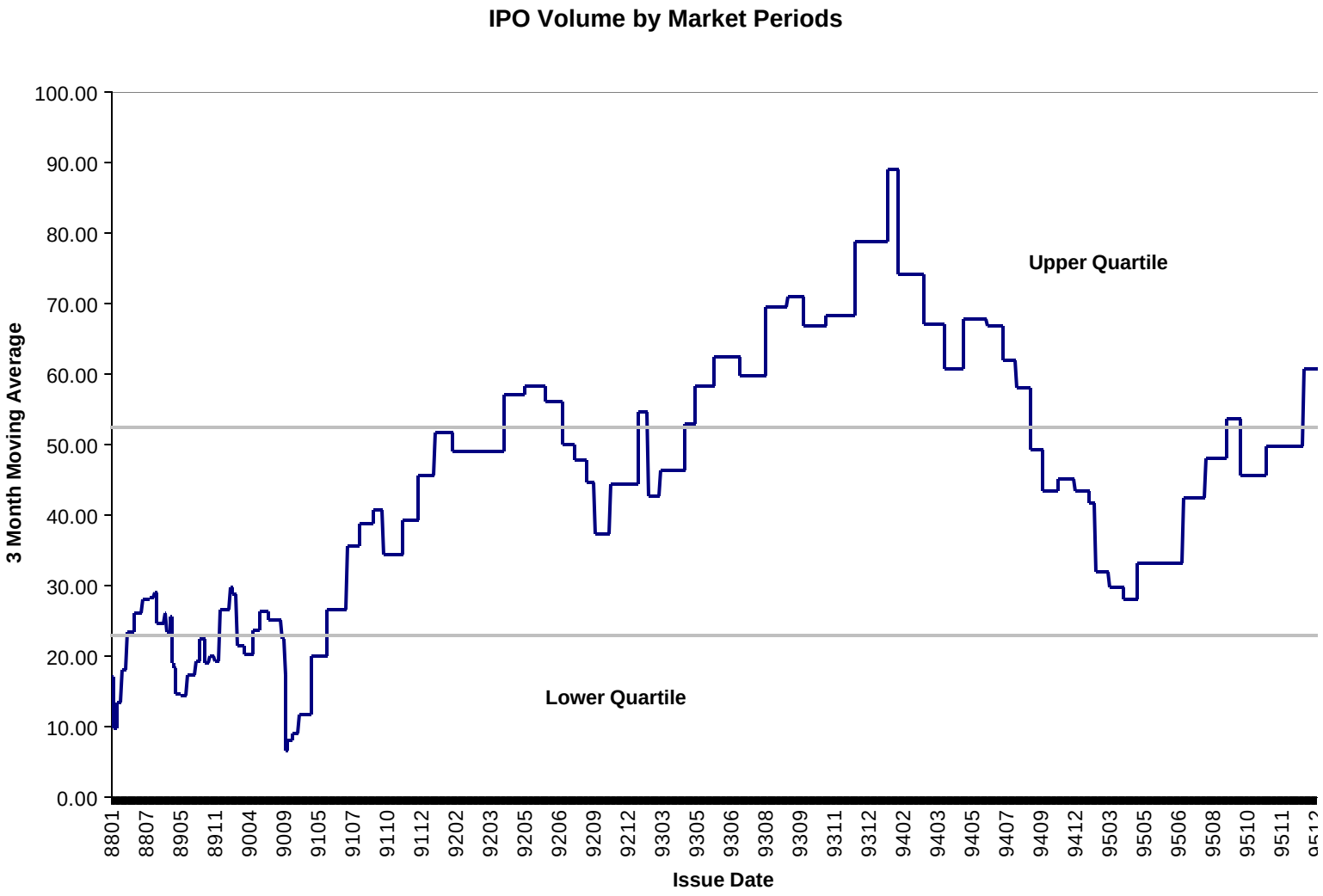


Figure 2. Hot, Cold and Normal IPO Market Conditions

Hot, normal and cold market conditions are defined using aggregate monthly IPO issue volume (Panel A) and Industrial Production (Panel B). Each month during the sample period is ranked according to the level of 3 month moving average of IPO issue volume and Industrial Production. The months in the top quartile of issue volume are characterized as hot. The months in the lowest quartile of issue volume are characterized as cold. The remaining months are considered normal.



IPO Market Cycle Classifications, Durations, and Bust Frequencies

Period	Date	Duration in Months	Number Busted	Number Issued
COLD	1/88-4/88	4	7	23
COLD	2/89-11/89	9	17	76
COLD	3/90-4/90	2	5	27
COLD	9/90-10/90	2	2	6
COLD	12/90-5/91	6	7	67
HOT	4/92-6/92	3	13	93
HOT	1/93	1	0	15
HOT	4/93-8/94	16	69	552
HOT	9/95	1	2	23
HOT	12/95	1	5	51