

## The Really Long-Run Performance of Initial Public Offerings:

### The Pre-NASDAQ Evidence

Paul A. Gompers\* and Josh Lerner\*\*

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*Financial economists in recent years have closely examined and intensely debated the performance of initial public offerings using data after the formation of NASDAQ. The paper seeks to shed light on this controversy by undertaking a large, out-of-sample study: we examine the performance for five years after listing of nearly 3,700 initial public offerings in the United States from 1935 to 1972. The sample shows substantial underperformance when event time buy-and-hold abnormal returns are used. The underperformance disappears, however, when cumulative abnormal returns are utilized. A calendar time analysis also shows that over the entire sample period—i.e., from 1935 to 1976—IPOs return as much as the market. But periods directly after heavy IPO volumes are associated with low IPO and benchmark returns, suggesting that managers at IPO firms may target peaks in overall market valuation. Finally, the intercepts in CAPM and Fama-French three-factor regressions are insignificantly different from zero, suggesting no abnormal performance.*

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\*Harvard University and NBER. Address: Harvard Business School, Morgan 485, Boston, MA 02163; (617) 495-6297 (ph); (617) 496-8443 (fax); e-mail address: [pgompers@hbs.edu](mailto:pgompers@hbs.edu).

\*\*Harvard University and NBER. Address: Harvard Business School, Morgan 395, Boston, MA 02163; (617) 495-6065 (ph); (617) 496-7357 (fax); e-mail address: [jlerner@hbs.edu](mailto:jlerner@hbs.edu).

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## **I. Introduction**

Ritter (1991) and Loughran and Ritter (1995) document severe underperformance of initial public offerings (IPOs) during the past twenty years. In discussing these results, they suggest that investors may systematically be too optimistic about the prospects of firms that are issuing equity for the first time. Their results have inspired countless articles in the popular press about the danger of investing in IPOs, as well as academic research that has shown that underperformance extends to other countries as well as to seasoned equity offerings.

The results concerning IPO performance, however, are not uncontroversial. Brav and Gompers (1997) shows that firms which issue equity in initial public offerings do not perform worse than benchmarks matched on the basis of size and book-to-market. In addition, they show that value weighting IPO returns dramatically reduces the measured underperformance.

In this paper we undertake a large, out-of-sample investigation of IPO underperformance. In particular, we gather information on the universe of firm-commitment initial public offerings in the United States from 1935 to 1972 and measure their returns for up to five years after listing. In order to compile this information, we hand-collected over one hundred and fifty thousand observations from such publications as the *Bank and Quotation Record*, the *S&P Dividend Guide*, and the various *Moody's* manuals. This is the first large-scale examination of IPO returns prior to the creation of the NASDAQ exchange, and more than doubles the period over which the performance of U.S. IPOs can be observed. As such, it represents a potentially powerful sample to examine the performance of equity issuers.

The results demonstrate that the performance of IPOs from 1935 to 1972 depends upon the method of return measurement used. While the sample shows severe underperformance when performance is measured using event time buy-and-hold abnormal returns, this underperformance disappears when cumulative abnormal returns are utilized. Similarly, the calendar time analysis shows that over the entire sample period, *i.e.*, from 1935-1976, IPOs return as much as the market. Finally, in simple capital Asset Pricing Model (CAPM) and Fama-French three-factor regressions, the intercepts are insignificantly different from zero or even significantly positive. The difference between the event time and calendar time results stems from the clustering of IPOs in periods immediately preceding poor IPO performance: IPOs and similar size and book-to-market stocks have very low returns after periods with heavy IPO issue volume.

The results support two potential explanations. First, managers of private companies may look to similar public companies to gauge when they should issue equity. When similar companies are overvalued, the managers choose to issue equity to the public. Subsequent returns on IPOs and similar size and book-to-market companies are extremely low. Alternatively, the results may suggest that IPOs are earning “fair” risk-adjusted returns because their performance closely mirrors the performance of similar, non-issuing firms and their returns are priced by various asset pricing models.

The rest of the paper is organized as follows. Section II reviews the relevant earlier literature, and the data are described in Section III. The empirical analysis is discussed in Section IV. Section V concludes the paper.

## **II. Literature review**

### *II.A. Behavioral finance and IPOs*

Behavioral economists have demonstrated that individuals often violate Bayes' Rule and rational choice theories when making decisions under uncertainty in experimental settings (Kahneman and Tversky (1982)). In a similar vein, financial economists have also discovered long-run pricing anomalies that have been attributed to investor sentiment. Behavioral theories posit that investors weight recent results too heavily or extrapolate recent trends too much. Eventually, over-optimistic investors are disappointed and subsequent returns decline.

To cite several important illustrations, DeBondt and Thaler (1985, 1987) demonstrate that buying past losers and selling past winners is a profitable trading strategy. Risk, as measured by beta or the standard deviation of stock returns, does not seem to explain the results. Lakonishok, Shleifer, and Vishny (1994) show that many "value" strategies also seem to exhibit abnormally high returns. These authors form portfolios based on earnings-to-price ratios, sales growth, earnings growth, or cash flow-to-price and find that "value" stocks outperform "glamour" stocks without appreciably affecting risk. Similarly, La Porta (1996) shows that a strategy of selling stocks with high forecasted earnings growth and buying companies with low projected earnings growth produces excess returns. These papers imply that investors are too optimistic about stocks that have had good performance in the recent past and too pessimistic about stocks that have performed poorly.

In addition to trading strategies based on accounting or stock market performance,

researchers have examined financing events as sources of potential trading strategies. Theoretical work by Ross (1977) and Myers and Majluf (1984) suggests that the choice of financing strategy can send a signal to the market about firm valuation. Initial studies (e.g., Mikkelson and Partch (1986), Asquith and Mullins (1986)) focused on the market reaction around the time that equity or debt issues were announced. These works implicitly assume that all information implied by the financing choice was fully and immediately incorporated into the company's stock price. The literature on long-run abnormal performance, on the other hand, examines the possibility that the market underreacts to the informational content of the financing event.

In particular, Ritter (1991) and Loughran and Ritter (1995) show that nominal five-year buy-and-hold returns are 50% lower for recent IPOs (which earned 16%) than they are for comparable size-matched firms (which earned 66%). Teoh, Welch, and Wong (1998) show that IPO underperformance is positively related to the size of discretionary accruals in the fiscal year of the IPO. Larger accruals in the IPO year are associated with more negative performance. Teoh et al. believe that the level of discretionary accruals is a proxy for earnings management and that the boosted earnings systematically fool investors.

On the other hand, papers by Brav and Gompers (1997) and Brav, Geczy, and Gompers (2000) show that equity-issuing firms, whether IPO or seasoned equity offering issuers, appear to perform like other long-standing public companies. In particular, Brav and Gompers show even though the sample of IPOs underperform broad market benchmarks, IPOs from 1975 to 1992 have five-year returns that are similar to size and book-to-market matched benchmarks.

Similarly, value weighting IPO returns substantially reduces measured underperformance relative to all benchmarks.

## *II.B. Performance measurement*

Another area of relevant research considers the choice of metric to measure firms' performance. Several recent papers inform our choice of tests of long horizon abnormal performance. Barber and Lyon (1997), Lyon, Barber, and Tsai (1999), and Kothari and Warner (1997) provide thorough evidence about various methods of measuring abnormal performance. These papers do not find that one method is always preferred.

Fama (1998) and Mitchell and Stafford (2000) provide an additional assessment regarding the merits of such methodologies. They argue that abnormal performance measures, such as cumulative abnormal returns (CARs) and time-series regressions, are less likely to yield spurious rejections of market efficiency than methodologies that calculate buy-and-hold returns by compounding single period returns at a monthly frequency. First, the buy-and-hold method can magnify underperformance—even if it occurs in only a single period—due to the nature of compounding single-period returns. Second, distributional properties and test statistics for cumulative abnormal returns are better understood.

These problems can be illustrated by considering a firm that had a return of  $-50\%$  in the first year, and  $+10\%$  in the second and third years, while the market benchmark was flat during the first year and also returned  $+10\%$  during the second and third years. A buy-and-hold calculation will suggest that the company underperforms the index by over  $60\%$  (a return of  $-39.5\%$  vs. that of

121%), while the CARs will differ only by 50% (-30% vs. +20%). As Brav, Geczy, and Gompers (2000) point out, the choice of CARs or BHARs largely depend upon the implicit trading strategy that is being assumed. We will, however, report returns using both methodologies throughout the paper.<sup>1</sup>

### **III. Data**

One of the main barriers to research in this area is the identification and characterization of the initial public offerings. This section describes the procedures that we followed to accomplish these tasks.

#### *III.A. Identifying the Sample*

While researchers examining IPOs undertaken in 1973 and thereafter can identify offerings through electronic databases and filings with the U.S. Securities and Exchange Commission (SEC), research into earlier periods is more challenging. The Securities Data Company's *Corporate New Issues* database only extends back to 1970, and the detail of the information collected is scanty in earlier years. SEC filings prior to 1973 were not distributed by Disclosure and are stored in at least two poorly indexed and documented government archives.

Thus, we relied on a variety of secondary sources to identify the IPOs. We will review these in chronological order. For the period between July 1934 (the effective date of the

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<sup>1</sup>Among the concerns with the use of CARs is the methodology's tendency to misrepresent performance when returns are highly volatile. Consider a case where a firm had returns of -50% in the first period and +100% in the second period while the benchmark was flat in both periods. A buy-and-hold calculation would suggest that the excess return was zero, while the CARs would be computed to be +50%.

Securities Act of 1933) and December 1949, we relied on the compilation, *Issuer Summaries* (Dean, Piel, and Steyer (1951)). This two-volume set was prepared by the defense counsel for the 17 investment banks in the antitrust case *United States v. Henry Morgan, et al.*<sup>2</sup> As part of this litigation, in which the government alleged that the banks had conspired to monopolize underwriting activities, the banks compiled a listing of all security issues in the United States in this period. We only included underwritten initial public offerings of common stock that were executed with the services of an investment banker and were fully registered with the SEC, and where there was at least some primary component to the offering.<sup>3</sup>

For the period between 1950 and 1960, we employed a compilation *Corporate Financing* (Dealers' Digest Publishing Company (1961)), which was prepared by the publisher of the magazine *Investment Dealers' Digest*. The information from this volume was compiled from the semi-annual summaries of activity printed in that magazine. The editors explicitly modeled their compilation after the earlier *Issuers Summaries*. One exception was in its coverage. The volume eliminated offerings that were not underwritten, unregistered offerings, those filed not fully registered with the SEC (during this period, the issuers of all offerings of under \$300,000 could be instead simply file a letter of notification with the SEC), and certain classes of secondary offerings that were not freely tradable after the offering. Since we had eliminated similar

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<sup>2</sup>118 F. Supp. 621 (S.D.N.Y. 1953).

<sup>3</sup>The purely secondary initial public offerings during this period were almost entirely what were known as "special offerings," where trading was limited to the members of the exchange on which it was listed. These were not strictly comparable to the other offerings, and were hence deleted.

offerings from the offerings reported in *Issuer Summaries*, these deletions issued minimal biases. We again only included the IPOs of common stock in our sample.

Offerings in the period from 1960 through 1969 were identified from the volume, *A Decade of Corporate and International Finance: 1960-1969* (Hillstrom and King (1970)). This volume was also compiled from the records of *Investment Dealers Digest* in conjunction with the Investment Bankers Association of America (the predecessor to the Securities Industry Association). The volume did not include non-registered offerings, those of under \$300,000 (entitled to abbreviated registration under Regulation A) and non-underwritten offerings. We again only included the IPOs of common stock in our sample.<sup>4</sup>

The final period for which data was compiled was the years 1970 through 1972. In these years, the records of *Investment Dealers Digest* were computerized, and are available through Securities Data Company (SDC), which acquired the magazine's database business in 1992. The criteria for the inclusion of offerings in the SDC compilation appears identical to those employed by *Investment Dealers Digest*, reflecting the common origin of this data source. We again only included the IPOs of common stock in our sample. Unfortunately, the records available through SDC are not complete. Thus, we collected by hand the missing information from the "New Market Names" section of the *Investment Dealers Digest*, which summarized IPOs on a monthly or bi-monthly basis during this period.

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<sup>4</sup>This data set was at one point available in electronic form as well (Ibbotson (1975), Ibbotson and Jaffe (1975)), but this file has now apparently been lost.

Three methodological issues deserve notice. One complication was introduced by the fact that the volumes for the period 1934 through 1959 did not clearly distinguish between IPOs and seasoned equity offerings. In order to determine this, we checked the issues of *Moody's* and the *Bank and Quotation Record* to determine if the firm had been publicly traded before the offering. If so, we eliminated it as a possible IPO.

A second complication was introduced by firms that are recorded as having gone public, but never appeared in the compilation of stock data discussed below. In many cases, it appears that the compilations (particularly during the 1930s and 1940s) included offerings that were subsequently withdrawn for lack of investor interest. If the firm did not appear in the *Bank and Quotation Record* within twelve months of the reported IPO date, we deleted it from the sample.

Finally, assessing the completeness of the sample is exceedingly difficult. In particular, while the SEC produced at least three compilations of IPO activity during this period (U.S. Securities and Exchange Commission (1941), U.S. Congress (1963), U.S. Small Business Administration (1980)), their compilations are quite different in nature. In particular, most of the tabulations are of all unseasoned firms to file with the SEC, whether the offering was underwritten or not. The tabulations include many private placements and other offerings that were not fully registered with the SEC.

Table I summarizes the final sample of IPOs. There are a total of 3661 offerings in the sample. The distribution over time is highly uneven. There is little IPO activity in the Great Depression and World War II. The number of offerings surged in the late 1950s and early

1960s, and again in late 1960s and early 1970s. Even after adjusting for inflation, the IPOs are quite modest in size by today's standards. The average firm was just over \$8.5 million in constant 1999 dollars (adjusting for the Consumer Price Index). The median firm was only \$3.0 million in market capitalization. Much like the recent samples of IPOs, the IPOs from 1935-1972 also had relatively low book-to-market ratios. The mean (median) book-to-market ratio in our sample is 0.443 (0.305) indicating that our firms are primarily growth companies.

### *III.B. Identifying the Stock Returns*

For each IPO, we sought to compute the five-year calendar and anniversary return. In order to do so, we needed to obtain eleven stock prices. These included the stock price immediately after the offering, on the five anniversaries of the offering, and the end of the five Decembers after the offering.

The primary source of this information was the *Bank and Quotation Record*, a specialized publication of the *Commercial and Financial Chronicle*.<sup>5</sup> This monthly periodical reports on the prices of a large array of securities at the close of the previous month. The *Bank and Quotation Record* also indicates stock splits, name changes, and delistings, but its coverage does not appear

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<sup>5</sup>This was the same source used by Jarrell (1981) and Simon (1989) who examined the returns of IPOs and seasoned offerings between 1926 and 1940. In each case, the sample consisted of less than 100 IPOs. This source was also used for at least three studies of returns during the 1960s. Ibbotson (1975) examined returns from 120 IPOs between 1960 and 1969. Logue (1973) examined the returns of 250 IPOs issued between 1965 and 1969. McDonald and Fisher (1972) examined 142 IPOs issued in 1969. This may have also been the source of the data used by Stigler (1964), who examines the wealth relatives of several hundred IPOs (but does not compute traditional risk-adjusted returns).

to be comprehensive.

The use of the *Bank and Quotation Record* posed a variety of issues. First, not all securities appear in the listing immediately after their reported IPO date. We treat the first observation as the price immediately after the IPO, as long as it appears within twelve months of the reported IPO date. (If it does not appear within twelve months, we do not include the IPO in the sample, as discussed above.) In some cases, a stock price does not appear in a given anniversary month or December, but does so in the month immediately before and after the offering. In this case, we will use the average of the two prices. Occasionally, a company will disappear for an extended period (e.g., one year) and then reappear. In the case of absences of longer than three months, we check with the *Wall Street Journal Index* and *Moody's* guides to insure that this is not a new firm using the same name as the acquired or delisted firm.

Due to the poor coverage of stock splits and delistings by the *Bank and Quotation Record*, as well as its failure to record dividends, we supplemented its information with the *Standard & Poors' Dividend Record*. This has a much more comprehensive coverage of name changes, acquisitions, stock splits, and so forth. We record from this volume all cash or stock dividends paid by the firm through its fifth anniversary.

Finally, for some of the firms that went public in our sample in 1968 and thereafter, we are able to obtain some returns data for the final observations from the tapes of the Center for Research in Securities Prices (CRSP).

### *III.C. Supplemental Information*

A variety of additional data was collected about the firms from two data sources. The first of these was the various *Moody's* manuals, including the industrial, over-the-counter and utility editions. We determined from this source the book value of the common stock as well as the number of shares outstanding, using the edition published immediately after the IPO. Because of the difficulty of obtaining information on the market value of preferred stock in the early years, we computed the market and book value of the common stock only. In computing book equity, we included all forms of retained earnings, surplus, paid-in capital associated with common stock, and minority interests. We did not include reserves, contributions in aid, and other “liability-like” balance sheet entries. The market value was computed as the product of the number of shares of common stock outstanding after the IPO (or at the first period after the offering where this information could be ascertained from *Moody's*) and the first price observation of the common stock in the *Bank and Quotation Record* after the IPO.

We also checked firms that disappeared from the *Bank and Quotation Record* using the *Wall Street Journal Index* and *Moody's* guides. In particular, we sought to discern whether the firm was acquired (and if so, the acquisition price), was liquidated, or was delisted (and the final price in that case). While in many cases, we were unable to discern what happened to the firms from these sources, the unidentified disappeared firms were on average quite small. As a result, the impact of the disappeared firms on the results is quite slight. We explore below the impact on the results of treating the disappeared firms in different ways.

We classified the IPOs into quintiles based on their market capitalization and book-to-

market ratio. We utilize the quintiles created by Davis, Fama, and French (2000). To get size breakpoints, firms are grouped on the basis of market capitalization at the beginning of a particular trading month. As in earlier research, the breakpoints are computed only using stocks trading on major exchanges: in this instance, the New York Stock Exchange. Hence, Davis, Fama, and French allocate an equal number of NYSE stocks to one of five size quintiles. The size quintile breakpoints for each month are recorded. Similarly, each June the ratio of book equity to market equity is calculated for each firm on the NYSE. An equal number of firms is allocated to one of five book-to-market quintiles. The annual book-to-market breakpoints are then intersected with the size breakpoints to create twenty five size and book-to-market portfolios.

Panel A of Table II summarizes the distribution of firms. Not surprisingly, more than one-half the IPO sample falls into the (1,1) portfolio: the collection of smallest firms with the lowest book-to-market ratio. Overall, almost 90% of our IPOs are in the smallest size quintile of stocks when breakpoints are based on NYSE stocks. Less than 2% of our firms are in the largest two size quintiles. Similarly, 61% of our firms are in the lowest book-to-market quintile. In addition, Panels B and C present the average size and book-to-market ratios for the IPOs in each of the twenty five size and book-to-market portfolios.

## **IV. Results**

### *IV.A. Event Time Returns*

In this section we present analysis of the returns on initial public offerings in event time: that is, measuring performance relative to the date of the IPO or the first stock price observation.

Figure 1 provides an initial look at the results. We compute the abnormal return on the IPO in each year by subtracting the return (including any dividends) from one of two benchmarks: the CRSP value-weighted index and the return of the portfolio of firms with the same size and book-to-market ratio as the IPO.

The results suggest the firms out-perform the benchmarks in the first, fourth and fifth years, while underperforming in the second and third years. The returns relative to the size and book-to-market matched index are generally superior to those relative to the CRSP value-weighted index. This reflects the fact that most of the IPOs are classified in (1,1) group: the smallest, most growth oriented firms. The firms in this portfolio have historically performed particularly poorly relative to the market as a whole as first reported by Fama and French (1993). As a result, returns relative to the matching portfolio are higher.

In Table III, we compute the three- and five-year buy-and-hold return on the initial public offerings by compounding the annual return on the issuer firm (once again including any dividends). In Panels A and B, the returns are calculated for three and five years or until the firms are acquired or delisted. In Panels C and D, we splice in the return of the firm's matched size and book-to-market benchmark if the firm delists prior to its third or fifth anniversary. Thus, all firms are in Panels C and D for the full period.

The results in Panels A and B show that the returns to IPOs severely underperform the market on a buy-and-hold return basis. IPOs return 17.3% over three years and only 15.6% over five years. The underperformance relative to the CRSP value-weighted index is -12.6% after

three years and -29% after five years. These patterns largely match the results found in the data after 1972.

In the last two columns of Table III, we compute the value-weighted returns over three- and five-year periods. (We use the market capitalization of the firm as weights, computed using the first market price found in the *Bank and Quotation Record*.) Unlike the post-1972 period, performance is even worse for the larger IPOs. Returns drop to 8.7% after three years and -14.4% after five years. Underperformance relative to the CRSP value-weighted index is -20% after three years and -43% after five years.

Brav and Gompers (1997) show that the underperformance of IPOs after 1972 is eliminated when firms are matched to portfolios based on size and book-to-market. In our sample of IPOs, we find a similar reduction in underperformance. Underperformance after three years is a small -1.7% and underperformance after five years is -8%. This indicates that the poor performance of IPO firms is mimicked by poor performance of small, book-to-market firms more generally. The matched size and book-to-market portfolios in our sample are relatively free from IPO firms because Davis, Fama, and French only allocate NYSE firms to the benchmark portfolios. It was very rare for recent IPOs to be NYSE listed during these years.

The results in Panel C and D show that the earlier results are not the result of any selection bias. Splicing in the size and book-to-market benchmark returns leave underperformance relative to the CRSP value-weighted index quite significant. Again, performance of the IPO portfolio is quite similar to that of the size and book-to-market matched

firms. The effect of splicing in missing observations is to somewhat depress the three-year returns, while increasing the five-year returns.

In Table IV, we calculate abnormal performance using the cumulative abnormal return methodologies. As Fama (1998) and Mitchell and Stafford (2000) argue, CARs may be a better, less biased method to calculate long horizon returns because it eliminates the compounding effect of a single year's poor performance. Abnormal returns are calculated by subtracting benchmark returns from the IPO firm's return. We calculate CARs by summing annual abnormal returns over three or five years. In Panels A and B, returns are calculated for three and five years or until the firm is acquired or delisted. In Panels C and D, however, we splice in the return of the firm's matched size and book-to-market benchmark if the firm delists prior to its fifth anniversary. Again, all firms are included in Panels C and D for the full period.

Once performance is measured using CARs, we get a different picture of long-run performance. All the equal-weighted CARs in Panels A and B are positive, including three- and five-year returns relative to the CRSP value-weighted index. Value weighting reduces the returns somewhat, but all but one of the returns continue to be positive.

Panels C and D show the selection bias-free results in which we splice size and book-to-market benchmark returns in with IPO firm returns. While the CARs in Panels C and D are generally smaller than they are in Panels A and B, they are still largely positive. It appears, therefore, that buy-and-hold abnormal returns and cumulative abnormal returns give different pictures of the performance of IPO firms.

Part of this difference could be the large volatility in the annual IPO returns. The standard deviation in annual returns for our IPOs is more than 150%. The difference between the measured performance of CARs and BHARs diverges more the greater the volatility. From a wealth perspective, the BHARs clearly measure the wealth impact of investing in IPOs and holding them for five years, i.e., it takes the compounding of returns into account.

Table V highlights how the extent to which the event-time returns vary across time. The five-year returns are calculated for all firms going public in a given year. These tables splice in the benchmark returns for firms that are acquired or delisted before the end of the period, as is done in Panels C and D of Tables III and IV. The results show that the cohorts with the greatest number of offerings, from 1968 to 1972, have strongly negative returns. This accounts for the severe underperformance of IPOs when measured in event time. Half of our IPOs occur between 1968 and 1972. Again, the returns relative to the size and book-to-market matched benchmarks are generally higher than those relative to the CRSP value-weighted index. Because of the multiplicative effect discussed in Section II, the results tend to be more volatile when buy-and-hold returns are calculated: the “good” cohorts have more positive returns than those computed using CARs, and the poor ones have more negative ones.

#### *IV. B. Calendar-time Returns*

In order to address potential problems with examining event time returns, we examine calendar time returns for our sample of IPO firms. In order to examine the calendar time performance, we calculate returns for all firms that were already public at the beginning of the

year and do not celebrate the fifth anniversary of their IPO by the end of the year. Returns are again equal and value-weighted.

In Figure 2, we compare the calendar time performance of the IPO portfolio relative to both the CRSP value-weighted index and the matched size and book-to-market benchmarks. These reference portfolios are presented on both an equal- and value-weighted basis. We see from the results that the IPO firms appear to have time series returns that are not strikingly different from the market. The equal-weighted IPOs perform substantially better than the CRSP value-weighted index and matched size and book-to-market benchmarks. The value-weighted IPOs, however, underperform all three benchmarks. Unlike in the NASDAQ era, during these years large IPOs actually performed worse than small offerings.

Table VI computes the returns of the IPO portfolios in each calendar year. For each year, we compute the equal- and value-weighted returns for all IPOs in the sample that have gone public in the past five years, and compare it to various market benchmarks. The average return using three of the four approaches is positive. (Again, value weighting the IPOs reduces the level of returns.) It is important to note the implications of treating each calendar year equally: during the early and mid 1970s, when the most IPOs are in the sample, the returns were quite negative (at least relative to the CRSP value-weighted index).

We also report the return of the (1,1) portfolio<sup>6</sup> net of the CRSP value-weighted index.

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<sup>6</sup>As noted above, the (1,1) portfolio contains those firms that are in the smallest size quintile and the smallest book-to-market quintile based on NYSE breakpoints.

This is very highly correlated with the IPO returns. For instance, the correlation coefficient of excess return of the (1,1) portfolio over the CRSP value-weighted index and the excess return of the value-weighted IPO return series (net of the CRSP value-weighted index) is 0.689 (with a p-value of .000).

The negative correlation between IPO volume and IPO returns is also highlighted in Table VII. The correlation between the size of the portfolio (the volume of IPOs in the past five years, less any delistings) and the annual returns net of the CRSP value-weighted index is about  $-0.1$ , though not statistically significant. The results appear to support Loughran and Ritter (2000) who argue that managers at IPO firms time market-wide mispricing, e.g., managers choose to issue when similar firms are severely overvalued. As such, periods following heavy IPO volumes are likely to be followed by particularly poor IPO performance and by particularly poor returns of the (1,1) portfolio.

#### *IV.C. CAPM and Fama-French Three-factor Regressions*

If IPOs underperform on a risk-adjusted basis, portfolios of IPOs should consistently underperform relative to an explicit asset pricing model. Recent work by Fama and French (1992, 1993, 1995, 1996) indicates that a three-factor model may explain the cross section of stock returns. Their three factors are RMRF, which is the excess return on the value-weighted market portfolio, SMB, the return on a zero investment portfolio formed by subtracting the return on a large firm portfolio from the return on a small firm portfolio, and HML, the return on a zero investment portfolio calculated as the return on a portfolio of high book-to-market stocks minus the return on a portfolio of low book-to-market stocks.

As in Fama and French's work, we use the intercept from time series regressions as an indicator of risk-adjusted performance of the pre-NASDAQ IPOs. The intercepts in these regressions have an interpretation analogous to Jensen's alpha in the CAPM framework. This approach has the added benefit that we can make statistical inferences given the assumption of multivariate normality of the residuals.

This approach has a disadvantage, though: it weights each month equally in minimizing the sum of squares. If underperformance is correlated with the number of IPOs in our portfolios, the Fama-French results will reduce the measured underperformance. We will address this deficiency by also estimating returns weighted by the number of IPOs in the portfolio.

Table VIII presents the three-factor time series regression results. Annual returns of the IPO portfolio returns are regressed on either RMRF for CAPM results or on RMRF, SMB, and HML for the Fama-French three-factor analysis. From this analysis, we see that the intercepts in the simple CAPM are insignificantly different from zero. In the equal-weighted Fama-French three-factor regressions, they are actually positive and significant at the five-percent confidence level. When the IPOs are value weighted, the performance is again poorer: the intercepts are still positive but insignificant. Overall, these results confirm the time series analysis above. IPOs do not appear to underperform on a calendar-time basis.

Panel B presents the Fama-French regressions weighted by the number of firms in the IPO portfolio in each year. Once again, the intercepts in the CAPM regression are not different

from zero, while those in the three-factor regressions are positive and significant in the unweighted case. The primary effect of weighting is to raise the coefficients on the RMRF factor, which suggests the IPOs reflected the overall market's movements in a particularly sharp way in the late 1960s and early 1970s.

This final analysis suggests some more general thoughts about the performance of the pre-NASDAQ population of IPOs. The performance patterns appear to closely reflect those of small growth firms more generally. There seems to be little evidence of a distinct IPO effect in these years.

## **5. Conclusion**

This paper has sought to examine the performance of IPOs by examining the period before the creation of NASDAQ. By considering a period where returns of IPOs have not been systematically examined, we hope to shed light on whether the poor performance is driven by some fundamental behavioral anomaly or rather is just an idiosyncratic feature of the recent time period that has been the focus of prior academic studies. Pre-NASDAQ IPOs represent a potentially powerful out-of-sample test of IPO underperformance. Papers which examine IPO performance in other countries, as works such as Rouwenhorst (1998) highlight, may be finding similar patterns because of common economic factors or common investor bases across countries at the same time.

In a sample of over 3,600 IPOs between 1935 and 1972, we find severe underperformance when event-time buy-and-hold abnormal returns are used. The

underperformance disappears, however, when we use cumulative abnormal returns. A calendar time analysis shows that over the entire sample period, IPOs return at least as much as the market. Finally, the intercepts in CAPM and Fama-French three-factor regressions are insignificantly different from or even greater than zero.

Two key results stand out from our analysis of pre-NASDAQ IPOs. First, consistent with the results of Brav and Gompers (1997), there appears to be no independent IPO effect. IPO stocks perform like other small, growth companies. Second, the volume of IPOs is heaviest immediately before both issuing and non-issuing small growth companies have particularly poor returns. There appears to be a predictable relationship between the volume of IPOs and future returns on small, growth stocks.

Taken collectively, the evidence suggests two contrasting interpretations. First, the managerial timing hypothesis of Loughran and Ritter (2000) would argue that managers of IPO firms time their equity issues when the market for similar stocks is overvalued. This interpretation may explain the poor returns on IPOs and similar stocks immediately following periods with heavy IPO volumes. Alternatively, managers may be responding rationally to the increasing stock prices and may be raising equity to invest in projects that have value to shareholders. Baker and Wurgler (2000) examine these two potential explanations and conclude that managerial timing is the more likely explanation. While our evidence cannot definitively rule out one of these possibilities, the return on IPOs after heavy issue volume is so low that managerial timing may be a more likely explanation.

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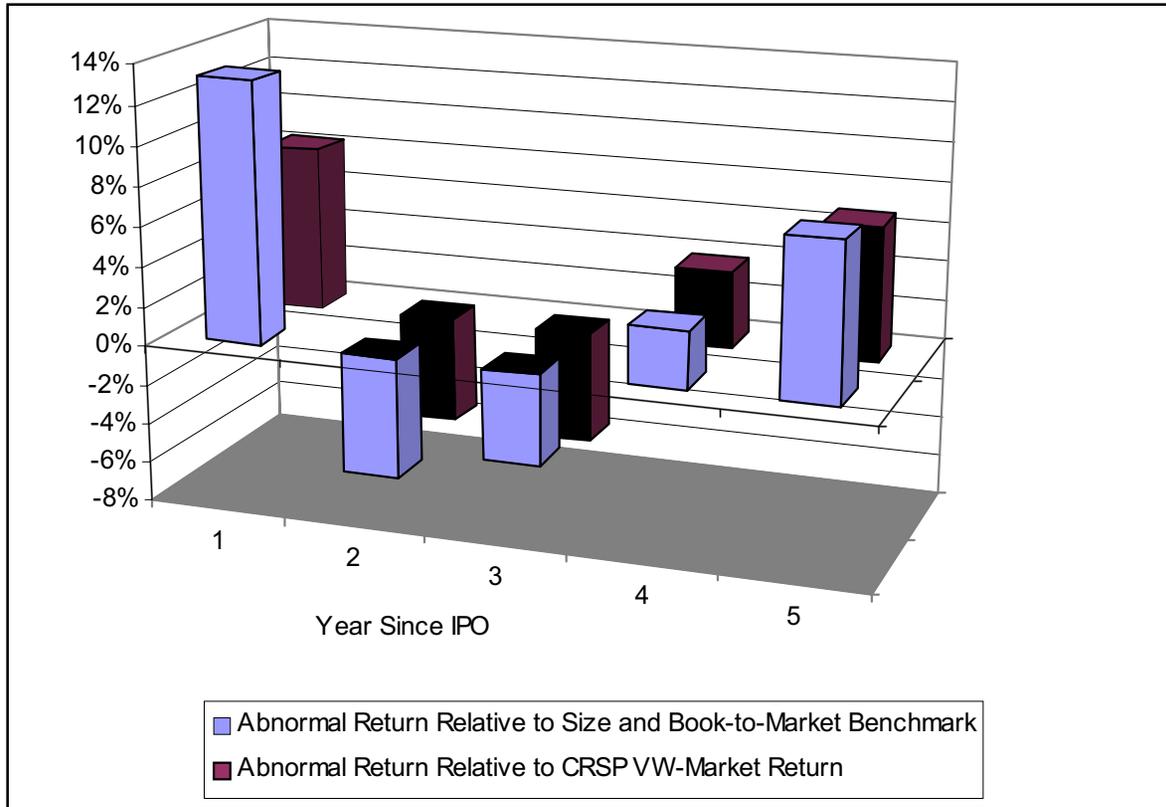
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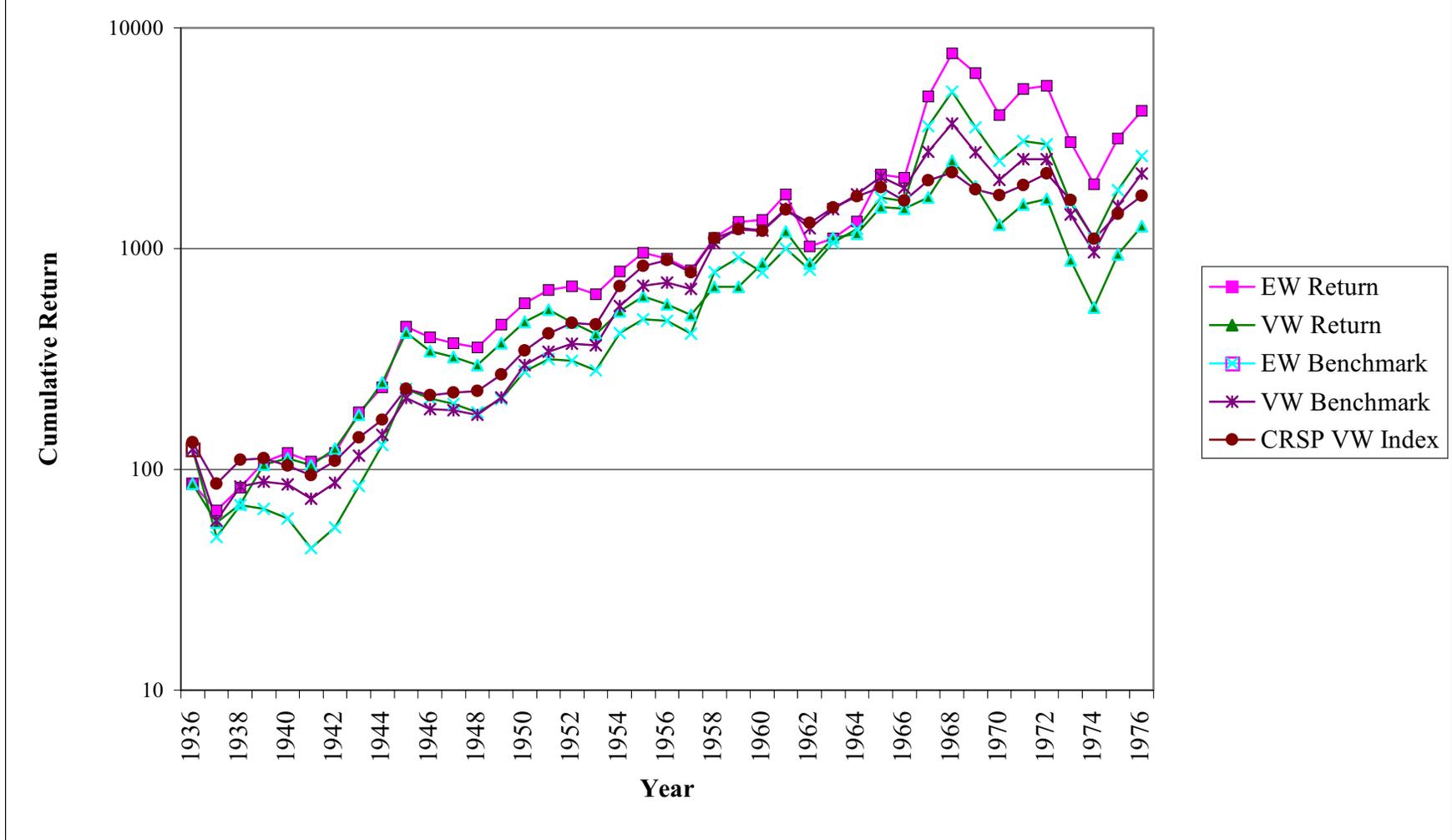
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**Figure 1. Average annual abnormal return.** The sample is 3661 identified IPOs from 1935 to 1972. The average event time annual abnormal return is plotted for years one through five after the IPO. Abnormal returns are calculated by taking the average annual return on the IPOs minus the return on the annual return on the CRSP value-weighted index or the appropriate size and book-to-market matched portfolio.



**Figure 2. Calendar time returns for initial public offerings.** The sample is 3661 identified IPOs from 1935 to 1972. The compounded annual return on all IPOs in the sample that had gone public within the previous five years is compared to the compounded annual return on the CRSP value-weighted index and the average matched size and book-to-market benchmark return.

**Table I****Sample of Initial Public Offerings**

The sample is 3661 identified IPOs from 1935 through 1972. Panel A presents the year of the IPOs in our samples. Panel B presents the average, median, 25<sup>th</sup> percentile, and 75<sup>th</sup> percentile rankings of market capitalization at IPO (in constant 1999 dollars adjusting for the Consumer Price Index) and the ratio of book equity value to market equity value.

## Panel A: Dates of IPOs

Year	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953
Number of IPOs	1	12	2	3	4	8	8	3	1	7	19	51	24	15	5	33	31	29	23
Year	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
Number of IPOs	27	49	45	41	47	122	216	321	236	31	66	66	62	92	378	683	228	204	448
Total	3,661																		

## Panel B: Summary Statistics

	Mean	25th Percentile	Median	75th Percentile
Market Value	\$8,590,000	\$1,420,000	\$3,040,000	\$6,400,000
Book-to-Market	0.443	0.143	0.305	0.552

**Table II**  
**Size and Book-to-Market Portfolio Breakdown for IPO Sample**

The sample is 3,661 identified IPOs from 1935 through 1972. Size breakpoints are formed monthly by dividing all NYSE stocks into five size groups with equal number of firms in each group. Book-to-market breakpoints are formed annually with equal numbers of NYSE firms allocated to each of five book-to-market portfolios. The intersection of these quintile breakpoints results in 25 possible allocations. Panel A presents the fraction of our IPO sample that is allocated to each size and book-to-market portfolio. Panel B gives the average market value of the IPOs (in constant 1999 dollars) in each portfolio. Panel C presents the average book-to-market ratio for our IPOs by portfolio.

Panel A: Distribution of IPOs

Size Quintile	Book-to-Market Quintile					Total
	Lowest	2	3	4	Highest	
Smallest	53.0%	16.1%	8.8%	4.6%	6.6%	89.1%
2	4.5%	1.1%	0.6%	0.4%	0.1%	6.6%
3	1.8%	0.4%	0.4%	0.1%	0.0%	2.8%
4	0.7%	0.1%	0.1%	0.0%	0.0%	1.0%
Biggest	0.5%	0.0%	0.0%	0.0%	0.0%	0.6%
Total	60.5%	17.7%	10.0%	5.1%	6.8%	100.0%

Panel B: Size by Portfolio.

Size Quintile	Book-to-Market Quintile				
	Lowest	2	3	4	Highest
Smallest	\$4,560,000	\$3,370,000	\$3,540,000	\$2,860,000	\$1,740,000
2	\$19,900,000	\$13,800,000	\$13,500,000	\$14,000,000	\$20,100,000
3	\$37,900,000	\$25,000,000	\$24,200,000	\$17,500,000	NA
4	\$81,200,000	\$30,800,000	\$28,800,000	NA	NA
Biggest	\$540,000,000	\$79,500,000	NA	NA	NA

**Table II (continued)**

Panel C: Book-to-Market Ratio by Portfolio.

Size Quintile	Book-to-Market Quintile				
	Lowest	2	3	4	Highest
Smallest	0.180	0.474	0.687	0.978	2.174
2	0.205	0.643	0.807	1.114	1.125
3	0.213	0.513	0.798	0.792	NA
4	0.151	0.793	0.846	NA	NA
Biggest	0.136	0.783	NA	NA	NA

**Table III**  
**Three- and five-year post-initial public offering (IPO) buy-and-hold returns versus various benchmarks.**

The sample is 3661 identified IPOs from 1935 through 1972. Three- and five-year buy-and-hold abnormal returns (both equal-weighted and value-weighted) are compared with alternative benchmarks. In the first row we employ the CRSP value weight index as the benchmark. Value-weighted results are adjusted for inflation. Rows two presents abnormal performance measured relative to attribute-based portfolios. Size and book-to-market portfolios are generated by first forming size quintile breakpoints using NYSE firms only. These quintiles are split further into book-to-market quintiles using NYSE breakpoints only. The universe of NYSE stocks is allocated into the resulting 25 portfolios and equal-weighted monthly returns are calculated. The breakpoints for these portfolios are recalculated annually. Buy and hold returns are generated by compounding annual returns starting in the in the first month that a stock price is found in the *Bank and Quotation Record* following the equity issue. Abnormal return is the simple difference between IPO three or five-year average return and the corresponding benchmark. In Panels A and B, if the IPO delists before the fifth anniversary we compound the return up until the delisting year. In Panels C and D, if the IPO delists before the fifth anniversary, we splice in the return of the matched size and book-to-market benchmark.

Panel A				
Buy-and-Hold Abnormal Return				
Three-Year Equal-Weighted			Three-Year Value-Weighted	
Benchmarks	IPO Return	BHAR	IPO Return	BHAR
CRSP VW index	17.3%	-12.6%	8.7%	-20.2%
Size and Book-to-Market (5x5)	17.3%	-1.7%	8.7%	-10.1%

Panel B				
Buy-and-Hold Abnormal Return				
Five-Year Equal-Weighted			Five-Year Value-Weighted	
Benchmarks	IPO Return	BHAR	IPO Return	BHAR
CRSP VW index	15.6%	-29.0%	14.4%	-42.9%
Size and Book-to-Market (5x5)	15.6%	-8.1%	14.4%	-6.3%

**Table III (continued)**

Panel C				
Buy-and-Hold Abnormal Return (with Spliced Data)				
Three-Year Equal-Weighted			Three-Year Value-Weighted	
Benchmarks	IPO Return	BHAR	IPO Return	BHAR
CRSP VW index	11.2%	-16.1%	8.1%	-18.6%
Size and Book-to-Market (5x5)	11.2%	-6.3%	8.1%	-8.4%

Panel D				
Buy-and-Hold Abnormal Return (with Spliced Data)				
Five-Year Equal-Weighted			Five-Year Value-Weighted	
Benchmarks	IPO Return	BHAR	IPO Return	BHAR
CRSP VW index	25.8%	-11.5%	17.1%	-31.9%
Size and Book-to-Market (5x5)	25.8%	8.4%	17.1%	0.5%

**Table IV**  
**Three- and five-year post-initial public offering (IPO) cumulative abnormal returns versus various benchmarks.**

The sample is 3661 identified IPOs from 1935 through 1972. Three- and five-year cumulative abnormal returns (both equal-weighted and value-weighted) are compared with alternative benchmarks. In the first row we employ the CRSP value-weighted index as the benchmark. Value-weighted results are adjusted for inflation. Rows two presents abnormal performance measured relative to attribute-based portfolios. Size and book-to market portfolios are generated by first forming size quintile breakpoints using NYSE firms only. These quintiles are split further into book-to-market quintiles using NYSE breakpoints only. The universe of NYSE stocks is allocated into the resulting 25 portfolios and equal-weighted monthly returns are calculated. The breakpoints for these portfolios are recalculated annually. Annual returns for the IPO firms are generated by calculating annual returns starting in the in the first month that a stock price is found in the *Bank and Quotation Record* following the equity issue. Abnormal return is the simple difference between IPO return in a given year and the designated benchmark. Cumulative abnormal returns are the simple three- or five-year sum of the annual abnormal returns. In Panels A and B, if the IPO delists before the fifth anniversary we compound the return up until the delisting year. In Panels C and D, if the IPO delists before the fifth anniversary we splice in the return of the matched size and book-to-market benchmark.

Panel A		Cumulative Abnormal Return	
	Three-Year Equal-Weighted	Three-Year Value-Weighted	
Benchmarks	CAR	CAR	
CRSP VW index	3.6%	2.9%	
Size and Book-to-Market (5x5)	12.9%	7.7%	

Panel B		Cumulative Abnormal Return	
	Five-Year Equal-Weighted	Five-Year Value-Weighted	
Benchmarks	CAR	CAR	
CRSP VW index	7.6%	-5.8%	
Size and Book-to-Market (5x5)	0.9%	2.5%	

**Table IV (continued)**

Panel C	Cumulative Abnormal Return (with Spliced Data)	
	Three-Year Equal-Weighted	Three-Year Value-Weighted
Benchmarks	CAR	CAR
CRSP VW index	-5.0%	1.3%
Size and Book-to-Market (5x5)	2.7%	8.0%

Panel D	Cumulative Abnormal Return (with Spliced Data)	
	Five-Year Equal-Weighted	Five-Year Value-Weighted
Benchmarks	CAR	CAR
CRSP VW index	8.7%	0.3%
Size and Book-to-Market (5x5)	-0.1%	4.1%

**Table V**  
**Event-Time Returns on IPOs by Cohort Year**

The sample is 3661 identified IPOs from 1935 through 1972. Five-year buy-and-hold and cumulative abnormal returns (both equal-weighted and value-weighted) are compared with alternative benchmarks in each cohort year. We employ both the CRSP value weight index and an attribute-based portfolio as the benchmark. Value-weighted results are adjusted for inflation. Size and book-to market portfolios are generated by first forming size quintile breakpoints using NYSE firms only. These quintiles are split further into book-to-market quintiles using NYSE breakpoints only. The universe of NYSE stocks is allocated into the resulting 25 portfolios and equal-weighted monthly returns are calculated. The breakpoints for these portfolios are recalculated annually. Annual returns for the IPO firms are generated by calculating annual returns starting in the first month that a stock price is found in the Bank and Quotation Record following the equity issue. Abnormal return is the simple difference between IPO return in a given year and the designated benchmark. Cumulative abnormal returns are the simple five-year sum of the annual abnormal returns. Buy-and-hold returns are generated by compounding annual returns. If the IPO delists before the fifth anniversary we splice in the return of the matched size and book-to-market benchmark.

	<i>Five-Year Buy-and-Hold Returns</i>		<i>Five-Year Cumulative Abnormal Returns</i>	
	<i>EW IPOs-EW Size and Book-to-Market Benchmarks</i>	<i>EW IPOs- CRSP VW index</i>	<i>EW IPOs-EW Size and Book-to-Market Benchmarks</i>	<i>EW IPOs- CRSP VW index</i>
1935	59.1%	14.0%	109.13%	16.6%
1936	145.6%	129.2%	96.0%	54.6%
1937	-14.4%	-54.7%	-46.6%	-26.7%
1938	129.4%	114.3%	44.0%	62.0%
1939	12.1%	-65.7%	5.6%	-41.05%
1940	-29.5%	-65.1%	-54.2%	-27.6%
1941	-13.6%	124.8%	-34.1%	64.0%
1942	44.6%	168.5%	40.1%	105.1%
1943	-58.7%	-45.7%	0.4%	12.9%
1944	4.2%	-12.0%	-19.9%	-10.9%
1945	70.4%	-32.2%	53.4%	17.8%
1946	-9.5%	-93.5%	-6.9%	-32.4%
1947	14.7%	-45.5%	7.6%	-30.1%
1948	-6.9%	-80.0%	4.4%	-38.8%
1949	5.6%	-150.3%	-13.6%	-87.1%
1950	21.2%	-124.5%	-18.7%	-79.4%
1951	-29.0%	-87.9%	-29.1%	-55.7%
1952	-13.6%	-74.1%	31.1%	4.2%
1953	80.6%	-4.0%	16.1%	37.1%
1954	-24.2%	-48.8%	-47.3%	-36.1%
1955	-36.6%	-34.9%	-35.9%	-13.5%
1956	-28.4%	-22.8%	-30.5%	-8.3%
1957	-29.2%	-40.6%	-13.1%	-6.1%
1958	95.1%	21.7%	78.5%	61.4%
1959	15.8%	-38.9%	-0.1%	0.6%
1960	42.3%	13.5%	29.6%	38.0%
1961	-41.8%	-53.4%	-63.8%	-21.2%
1962	2.9%	31.0%	-7.8%	37.9%
1963	400.0%	467.0%	141.1%	158.9%
1964	-12.3%	181.6%	39.9%	134.3%
1965	-10.6%	92.6%	32.8%	93.0%
1966	64.4%	62.3%	47.3%	50.3%
1967	20.6%	-23.8%	34.7%	6.7%
1968	-11.6%	-22.7%	7.6%	-1.1%
1969	-35.9%	-71.6%	-19.9%	-62.4%
1970	9.1%	-48.9%	-7.1%	-29.5%
1971	12.2%	-39.2%	-2.7%	-7.3%
1972	0.5%	-3.9%	6.4%	3.8%

**Table VI**  
**Calendar Time Returns on IPOs**

The sample is 3661 identified IPOs from 1935 through 1972. The annual abnormal returns (both equal-weighted and value-weighted) are compared with alternative benchmarks in each year. Each year, the return on all IPOs in the sample that went public within the past five years is calculated. The returns are either equally weighted or weighted by market capitalization at IPO (in constant 1999 dollars). The annual benchmark returns are the annual returns on either the CRSP value-weighted index or the matched size and book-to-market index. The fifth column presents the annual excess return on small, low book-to-market non-issuing firms relative to the CRSP value-weighted index. The final column indicates the number of IPOs in the portfolio in each year.

	EW IPOs- CRSP VW index	VW IPOs - CRSP VW index	EW IPOs-EW Size and Book-to-Market Benchmarks	VW IPOs- VW Size and Book-to-Market Benchmarks	Excess Return on (1,1) Portfolio	Number of IPOs in Portfolio
1936	-46.4%	-46.4%	-37.5%	-37.5%	-6.8%	1
1937	10.7%	1.5%	35.8%	19.0%	-32.2%	13
1938	-1.3%	-6.3%	-12.1%	-20.2%	4.9%	33
1939	28.8%	48.5%	34.2%	45.4%	-17.8%	37
1940	17.2%	14.4%	19.2%	9.4%	-7.1%	40
1941	1.1%	2.7%	18.4%	7.2%	-45.3%	35
1942	-6.7%	3.2%	-15.1%	0.9%	7.8%	23
1943	25.9%	14.4%	-0.8%	9.3%	9.3%	22
1944	8.6%	19.1%	-22.9%	15.6%	50.8%	17
1945	50.8%	30.9%	8.4%	21.1%	50.3%	18
1946	-4.4%	-11.0%	-1.1%	-6.0%	2.5%	29
1947	-8.8%	-9.1%	-0.5%	-5.4%	-8.9%	76
1948	-6.0%	-9.6%	3.7%	-3.4%	-8.1%	96
1949	8.0%	6.5%	12.0%	5.6%	-12.8%	102
1950	-3.2%	-3.0%	-8.2%	-14.7%	-0.6%	87
1951	-4.2%	-5.3%	1.2%	-1.6%	-2.5%	60
1952	-7.8%	-24.6%	6.0%	-20.8%	-27.3%	63
1953	-6.8%	-10.2%	1.3%	-10.4%	-16.7%	78
1954	-21.7%	-22.2%	-20.6%	-23.4%	-14.5%	90
1955	-2.1%	-6.2%	5.6%	-6.1%	-13.8%	93
1956	-11.6%	-14.1%	-3.7%	-11.6%	-13.6%	114
1957	0.2%	1.5%	0.8%	-4.0%	-2.1%	134
1958	-2.3%	-8.3%	-50.4%	-27.2%	70.8%	152
1959	8.3%	-10.0%	2.3%	-17.6%	-1.0%	174
1960	4.1%	29.0%	16.8%	30.2%	-20.0%	233
1961	5.3%	15.0%	1.7%	13.8%	3.4%	384
1962	-29.3%	-15.6%	-22.3%	-9.4%	-7.6%	582
1963	-8.4%	13.0%	-23.5%	7.8%	23.5%	675
1964	7.1%	-7.7%	3.7%	-12.0%	2.9%	578
1965	52.5%	21.9%	24.1%	11.9%	27.2%	463
1966	9.7%	11.1%	0.3%	8.9%	10.8%	288
1967	109.7%	-11.1%	15.8%	-33.3%	115.3%	170
1968	47.9%	38.4%	13.2%	12.7%	31.1%	223
1969	-1.8%	-7.0%	12.8%	2.6%	-15.1%	505
1970	-29.4%	-26.8%	-6.2%	-7.8%	-28.2%	995
1971	19.6%	12.0%	8.5%	-0.8%	12.7%	979
1972	-9.8%	-7.1%	6.4%	5.8%	-17.3%	1027
1973	-20.3%	-23.1%	1.2%	-3.5%	-24.7%	911
1974	-1.9%	-5.6%	-4.3%	-6.4%	0.9%	473
1975	30.9%	44.3%	-4.3%	12.7%	31.5%	361
1976	13.1%	13.3%	-9.2%	-6.1%	21.8%	239
Average Annual Abnormal Return	5.5%	1.2%	0.3%	-1.2%	3.3%	
Median Annual Abnormal Return	-1.3%	-5.3%	1.2%	-3.4%	-2.1%	

**Table VII**  
**Correlation between Calendar Time IPO Returns and Number of IPOs in Calendar Time Portfolio**

The sample is 3661 identified IPOs from 1935 through 1972. The correlation coefficient between the annual abnormal return (both equal-weighted and value-weighted) relative to matched size and book-to-market benchmarks as well as the CRSP Value-weighted index in each year and the number of IPOs in the annual portfolio is calculated. Each year, the return on all IPOs in the sample that went public within the past five years is calculated. The returns are either equally weighted or weighted by market capitalization at IPO (in constant 1999 dollars). The annual benchmark returns are the annual returns on either the CRSP value-weighted index or the matched size and book-to-market index.

	EW IPOs-EW Size and Book-to-Market Benchmarks	VW IPOs -VW Size and Book-to-Market Benchmarks	EW IPOs- CRSP VW index	VW IPOs- CRSP VW index	Number of IPOs in Portfolio
EW IPOs-EW Size and Book-to-Market Benchmarks	1.000				
VW IPOs -VW Size and Book-to-Market Benchmarks	0.571 (0.000)	1.000			
EW IPOs- CRSP VW index	0.501 (0.001)	0.294 (0.089)	1.000		
VW IPOs- CRSP VW index	0.416 (0.007)	0.820 (0.000)	0.590 (0.000)	1.000	
Number of IPOs in Portfolio	-0.015 (0.928)	0.030 (0.852)	-0.143 (0.171)	-0.098 (0.340)	1.000

**Table VIII**  
**CAPM and Fama-French (1993) three factor regression on initial public offering (IPO) portfolios**

The sample is 3661 identified IPOs from 1935 through 1972. Portfolios of IPOs include all issues that were completed within the previous five years. RMRF is the value-weighted market return on all NYSE (RM) minus the risk free rate (RF) which is the one-month Treasury bill rate. SMB (small minus big) is the difference each month between the return on small firms and big firms. HML (high minus low) is the difference each month between the return on a portfolio of high book-to-market stocks and the return on a portfolio of low book-to-market stocks. The first two columns present results for the CAPM regressions. The next two columns present Fama-French three factor regressions (t-statistics are in brackets.) Panel A estimates ordinary least squares regressions while Panel B uses weighted least squares where observations are weighted by the number of IPO firms in the portfolio in a given year.

Panel A: Ordinary Least Squares

	Equal-Weighted	Value-weighted	Equal-Weighted	Value-weighted
Intercepts	0.044 (1.01)	0.008 (0.25)	0.082 (2.90)	0.038 (1.18)
RMRF	1.180 (5.80)	1.068 (6.94)	0.689 (5.07)	0.858 (5.56)
SMB			1.831 (8.43)	0.855 (3.47)
HML			-0.551 (-2.42)	-0.444 (-1.71)
Adjusted R <sup>2</sup>	0.449	0.541	0.824	0.669

Panel B: Weighted Least Squares (Weights Equal to Number of IPOs in Portfolio)

	Equal-Weighted	Value-weighted	Equal-Weighted	Value-weighted
Intercepts	0.017 (0.46)	-0.006 (-0.22)	0.0844 (3.76)	0.036 (1.37)
RMRF	1.515 (7.93)	1.445 (10.67)	0.849 (7.59)	1.127 (8.55)
SMB			1.785 (10.06)	0.793 (3.79)
HML			-0.370 (-1.99)	-0.332 (-1.52)
Adjusted R <sup>2</sup>	0.607	0.738	0.904	0.823