NBER WORKING PAPER SERIES

UNDERSTANDING STOCK PRICE BEHAVIOR AROUND THE TIME OF EQUITY ISSUES

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Working Paper No. 3170

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
November 1989

Presented at the NBER Conference on Information, Capital Markets, and Investment, May 1989. We thank Glenn Hubbard, Jeremy Stein, and conference participants for helpful comments. This paper is part of NBER's research program in Financial Markets and Monetary Economics. Any opinions expressed are those of the authors not those of the National Bureau of Economic Research.

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ABSTRACT

It is well-documented that stock prices rise significantly prior to an equity issue, and fall upon announcement of the issue. We expand on earlier studies by using a large sample which includes OTC firms, by examining the cross-sectional properties of the price rise, and by using accounting data to track the pattern of debt ratios and Tobin's q around the time of equity issues. We consider a number of explanations for our results, and conclude that the data is largely consistent with informational models in which managers are asymmetrically informed about the value of the firm. Surprisingly, debt ratios do not increase prior to equity issues, suggesting that strained debt capacity is not the main reason for equity issues. The behavior of Tobin's q is consistent with equity issues being used to finance new investments.

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I. Introduction

The link between the real and financial decisions of firms has been studied for many years, yet it remains poorly understood. Neoclassical investment theories such as Tobin's q posit a direct, simple link between the market's valuation of the firm and investment decisions: firms invest when the increase in market value due to the investment exceeds the cost of the investment. For a variety of reasons, however -- agency conflicts between management and security-holders, conflicts among security-holders, and asymmetric information between management and security-holders -- the relation between real and financial decisions may be quite complex.

In this paper we study seasoned equity issues as one piece of the corporate financing and investment puzzle. We expect equity issues to be particularly revealing about the role of asymmetric information in financing decisions. First, to the extent that there is asymmetric information between management and outside security holders, the asymmetry should be of greatest concern to potential buyers of common stock since stock is the residual claim on the firm. Second, it is well-documented that stocks exhibit large abnormal returns during the period surrounding an equity issue. This suggests that equity issues do in fact reveal valuable information to the market. It is therefore natural to consider whether the price behavior of an equity-issuing firm sheds light on the importance of asymmetric information in the investment process.

Section II summarizes the observed aggregate price behavior around equity issues, and reviews alternative theories explaining these phenomena.

In Section III we examine the empirical evidence in more detail, with the goal of linking the evidence to the predictions of the various theories. We conclude that informational theories in which managers have superior information about the quality of the firm are capable of providing a parsimonious explanation for much of the observed price and timing behavior, although other factors also appear to be relevant.

Most tax or information-based theories suggest that debt issues are less costly than equity issues. Consequently, one might expect the debt-equity ratio to rise before an equity issue, since firms with sufficient "debt capacity" will tend to finance with debt. In Section IV we track the history of the debt-equity and debt-asset ratios prior to equity issues. Surprisingly, we find that the debt-equity ratio, however measured, falls or remains constant in the two years prior to an equity issue. Section IV also examines the effect of issue size on price behavior, and the relation between the abnormal price rise prior to issue and the price drop at issue. As in previous studies, we find that a larger issue results in a somewhat larger price drop, but the explanatory power is low. We find that the correlation between the rise prior to the issue and the announcement period drop depends on the time period considered, reconciling the contradictory results of earlier studies.

In Section V we discuss some of the welfare implications of the asymmetric information models which are supported by the data. Although equity issues induce a substantial price drop, we argue that these price effects may not provide a reliable guide to the welfare cost of asymmetric information. The social cost may be either larger or smaller than it would appear from examining stock price data alone. Section VI concludes.

II. The Stock Price Behavior Around Equity Issues

Before discussing the theoretical reasons for the unusual behavior of stock prices around the time of equity issues, we present a brief overview of our evidence on stock price behavior. Figure 1 displays the cumulative excess return (the stock's return over and above the return on an equal-weighted index) in the 500 days preceding and 100 days following the issue announcement for primary issues and mixed primary and secondary issues. Figure 2 displays the same information for pure secondary issues (i.e., equity issues which add no capital to the firm.) We divide the sample between NYSE/AMEX firms and Over the Counter (OTC) firms, since previous authors only examine NYSE/AMEX data. Figure 3 shows the return on the market, in excess of the return on short-term treasury bills, in the 500 days preceding and 100 days following the equity issues. The data and measurements are discussed in detail in the next section. Several facts are readily apparent:

1. In the 500 days prior to the issue announcement, there is a cumulative excess return for the NYSE/AMEX firms of 43.8% for primary and combined primary and secondary issues, and 29.3% for pure secondary issues. For OTC firms the corresponding numbers are 68.8% and 44.5%.
2. On the two days on and preceding the equity issue announcement, there is a total abnormal price drop of 3.0% for NYSE/AMEX and 2.9% for OTC primary and combined issues. For pure secondary issues, the drop is 2.8% for NYSE/AMEX firms and 1.7% for OTC firms.
3. The pattern of price behavior is generally similar for pure secondary and for other issues, though primary issue announcements are preceded by

a larger price run-up. OTC and NYSE/AMEX firms also have qualitatively similar price patterns, with a larger rise for OTC firms.

4. Equity issues follow rises in the market as a whole.

These results are consistent with the findings of Asquith and Mullins (1986), and Masulis and Korwar (1986).[1]

Theoretical explanations for these facts can be loosely divided between those based on asymmetric information, and those based on other factors. The following descriptions are organized along these lines.

a. Information-Based Theories of Stock Price Behavior

Most information-based theories presume that managers (or more generally, existing shareholders) know more about the value of the firm than do potential new investors. This asymmetric information creates an adverse selection problem [the "lemons" problem of Akerlof (1970)] which can explain the existence of a price drop when an equity issue is announced. Myers and Majluf (1984) apply this idea to security issues, and create a framework which is used in much of the subsequent literature. They assume that managers know more about the firm's true value than do outside investors, and also that managers act in the interests of existing shareholders. Rational investors correctly value firms on average, but individual firms can be mispriced, conditional on managers' private information. Since managers act in the interests of existing shareholders, there is an incentive to sell new equity when it is overvalued. Thus, selling equity on average conveys negative information about the firm, and the stock price drops at the equity issue announcement.

Lucas and McDonald (1989) demonstrate that a similar story can simultaneously explain the extended price rise preceding the equity issue, the drop at issue, and the clustering of issues following a market rise. The key assumptions behind their model are (a) managers know more about the value of the firm than do outside investors, (b) delaying an equity issue is costly (it lowers the net present value of projects), and (c) the market assesses firm values correctly on average, but individual firms may be temporarily mispriced. As the market receives new information over time, the valuation of undervalued firms tends to increase while the valuation of overvalued firms tends to decrease.

Under these assumptions, consider two firms that for some reason plan to issue equity. Suppose the two firms are identical except that one is overvalued and one is undervalued. The undervalued firm expects the market to revise upward its estimate of the firm's value, hence there is an incentive to postpone the equity issue until the stock price is higher. Overvalued firms, on the other hand, expect that the market will learn their true value if they wait, and they bear the cost of waiting. These firms therefore issue equity as soon as the opportunity arises.

This issue policy for the two types of firms implies that equity issues will be preceded by positive abnormal returns on average. Undervalued firms wait for their price to rise before issuing, so their average price path prior to issue will be upward sloping. Overvalued firms, on the other hand, do not wait. If the arrival of profitable opportunities for issuing equity is uncorrelated with a firm's price history, then their price path prior to issue will on average be flat. Thus the average price path prior to issue for all firms that issue equity will be upward sloping. As in Myers and Majluf

(1984), when firms do issue they tend to be overvalued, so the price drops at issue announcement.

Asquith and Mullins (1986) offer an informal explanation for the connection between the price rise preceding issue and the drop at issue. They find empirically that the price drop at issue is smaller, the greater the excess return preceding the issue. They suggest that if there is a positive correlation between price increases and a reduction in asymmetric information, firms experiencing price increases will have a smaller price drop at issue and therefore are more likely to issue equity. A problem with this explanation is that Masulis and Korwar (1986) find the opposite result in their data: the greater the price rise preceding the issue the greater the price drop. We show in Section IV below that the sign of the relationship between the price run-up and the price drop is not monotonic; it depends upon the length of time over which the price run-up is measured.

There are other information-based models of financing behavior. For example Leland and Pyle (1977) and Ross (1977) suggest that a reduction in management's stake in the firm conveys negative information, since management should be willing to bear more of the risk of a more profitable firm. This is distinguished from the adverse selection explanation in that the owner-manager bears personal costs from selecting a suboptimal debt ratio. A test of this explanation presumably requires information about the manager's incentives. Miller and Rock (1985) also present a model in which signalling leads to suboptimal investment. All these theories share with Myers and Majluf (1984) the feature that equity issues convey bad news about the firm.

We now turn to several competing and complementary explanations for the price behavior around equity issues.

b. Other Explanations for the Price Rise Prior to Issue

The price rise prior to the announcement of an equity issue has received less attention in the literature than the subsequent price drop, but there are other several possible explanations.

i. **The Market Learns About a Positive NPV Project.** One appealing alternative to the asymmetric information story for the price rise rests on the observation that if the market can observe the arrival of valuable investment projects, firms receiving these projects will experience a price rise. Certainly one reason to issue equity is to finance valuable new projects. Thus, observed prices will tend to rise prior to equity issues if the purpose of the issues is to finance observable new projects. This hypothesis is empirically distinguishable from the asymmetric information hypothesis, as is discussed in Section III below.

ii. **Naive Trading Rule.** Suppose that managers and shareholders believe that the stock price is likely to fall after it has had a sustained positive abnormal return. Then issues will follow price rises, and the trading rule may do no harm, apart from possibly wasting the resources involved in a sale of equity.

c. Other Explanations of the Price Drop

i. **Price Pressure.** The issuance of new shares represents an increase in the supply of shares to the market. Therefore the price will decline if the demand for an individual stock is not perfectly elastic, and the decline should be greater for a larger issue. Note that although the ultimate impact

of price pressure occurs on the issue date, the price declines at the announcement in anticipation of the lower price at issue.

ii. **Issue Costs.** This explanation holds that equity issues are costly to the firm (due to administrative expenses and underwriting fees) and that the price drops because the firm bears this cost.

d. Equity Issues in the Aggregate

So far we have discussed firm-level characteristics of equity issues. There are also two interesting characteristics of equity issues on a more aggregate level. First, as Table 1 shows, there is substantial variation over time in the number of equity issues. In 1980, for example, there were approximately three times as many equity issues as in 1979, and almost twice as many in 1983 as in 1980.[2] Second, Figure 3 shows that equity issues on average follow increases in the market.

There are at least two information-based explanations for variation over time in the quantity of equity issues. First, it is possible that the adverse selection problem is less important at some times than at others. Choe, Masulis, and Nanda (1989) argue that the adverse selection problem varies over the business cycle, and that this can explain "bunching" of equity issues.[3]

Second, it is possible for there to be "bunching" even if the adverse selection problem is constant over time. Lucas and McDonald (1989) show that if managers wait for good news to be revealed before issuing equity, and if good news is correlated across firms, then equity issues will be correlated with market price rises.

Both theories are consistent with the market price pattern illustrated in Figure 3. Figure 3 was constructed by tracking the returns, in excess of the daily equivalent of the one month Treasury bill rate, on an equally weighted market portfolio of NYSE/AMEX/OTC firms around the time of each equity issue in our sample. Figure 3 is a plot of the cross-sectional average of the market excess returns around each issue.

III. Empirical Implications and Tests

a. Data Overview

Our sample is comprised of 1480 seasoned equity issues by industrial firms over the period 1974 to 1983. The sample includes issues which were solely primary issues (underwritten issues by the firm), solely secondary issues (underwritten sales by large stockholders), and combinations of these. Of the 1480 equity issues, 789 are for NYSE/AMEX firms and 691 are for OTC firms. Table 1 provides information on the number of issues by type and by year. The data were obtained from Drexel Burnham Lambert's *Public Offerings of Corporate Securities* (various years). This source includes only issues in excess of three million dollars.

Historical data on daily equity returns and prices were obtained from the Center for Research in Security Prices (CRSP) NYSE/AMEX and NASDAQ data files. Data on accounting based variables and announcement dates of quarterly earnings were obtained from the quarterly Compustat (Industrial and Full Coverage) files. A smaller sample remains after matching and screening for missing observations. Observations are omitted for any of the following reasons: inability to match company name with CRSP or Compustat, missing data, or apparent data errors.[4]

The balance sheet variables are constructed from Compustat data. Debt was measured net of liquid short-term assets.[5] Data definitions are as follows (names of Compustat variables are in italics):

Cash: *Total Current Asset - Total Inventories*

Debt: *Total Long-Term Debt + Total Current Liabilities + Preferred Stock (Liquidating Value)* - Cash;

Equity (Market Value): *End of Quarter Closing Price* $\times$ *Common Shares Outstanding*;

Assets (Market Value): Equity (Market Value) + Debt;

Assets (Book Value): *Total Assets* - Cash

Equity (Book Value): *Total Assets* - Debt - Cash;

We wish to study the abnormal price behavior of firms engaging in issues of seasoned equity. We define abnormal returns on asset i on day t, A_{it}, as the difference between the rate of return on asset i on day t, R_{it}, and the return on a control portfolio on that day, R_{ct}, $A_{it} = R_{it} - R_{ct}$. The control portfolio is defined as the equal-weighted portfolio of all NYSE/AMEX/OTC stocks. Abnormal returns computed in this manner are commonly referred to as "market adjusted returns" [see Brown and Warner (1985)]. We use this measure of abnormal returns to investigate the price behavior around announcement of the equity issue and announcement of accounting measures of earnings.

The cumulative abnormal returns around the announcement and issue dates are defined by:

$$CAR_t = \sum_{\tau=\tau_0}^{t} \bar{A}_\tau \qquad t = \tau_0, \tau_0+1, \ldots, T$$

where $\bar{A}_\tau$ is the cross-sectional average one-day abnormal return over the firms.

Table 2 documents the statistical significance of both the price rise and price drop in this sample. Note that the abnormal returns over the 100 days after the issue date are insignificantly different than 0. The t-statistics provided in Table 2 are calculated for each period using a cross-sectional estimate of the variance of abnormal returns. Simulation results in Collins and Dent (1984) indicate that this method of calculating t-statistics leads to appropriate inferences in experimental designs similar to ours.

Abnormal return calculations over long periods tend to be sensitive to the method used to determine the normal return. To ascertain how robust the results are to different specifications, we also calculated abnormal returns using a variety of alternative methods. These include:

a) Market adjusted returns relative to the value-weighted NYSE/AMEX/OTC portfolio;

b) Market adjusted returns comparing NYSE/AMEX and OTC firms to their respective equal-weighted and value-weighted indices;

c) "CAPM" adjusted returns where abnormal returns are defined as

$$A_{it} = (R_{it} - [R_{Ft} + \beta_{im}(R_{mt} - R_{Ft})])$$

where R_{mt} is the return on a "market" portfolio as defined in the various permutations described above, $\beta_{im} = \text{cov}(R_i, R_m)/\text{var}(R_m)$, and R_{Ft} = return on a riskless asset. For the riskfree rate we use the one-month Treasury bill return from Ibbotson Associates (1985) and assume that the daily return is constant over the month. Assets' sensitivity

to market movements, beta, are measured using the techniques of Scholes and Williams (1977) over periods prior to the announcement of the issue, after the announcement, and combined prior/post announcement periods;

d) Abnormal returns relative to a beta-sorted comparison portfolio as calculated in the CRSP excess returns file (NYSE/AMEX firms only). Assets' betas are estimated over a year and allocated to one of ten portfolios on the basis of the estimates of beta. Over the following year the abnormal return for asset i is its return less the return on the comparison portfolio which is an equal-weighted average of the returns on the component securities.

We find that the basic pattern of abnormal returns around the announcement of equity issues is similar across all methods of calculating abnormal returns, although the magnitudes of abnormal returns cumulated over long periods differ substantially across methods. For instance, the abnormal price rise over the 500 days preceding the announcement for the NYSE/AMEX firms ranged between 20% and 65%. We calculate cross-sectional correlations across methods of measuring cumulative abnormal returns over fifty-day windows over the period from 500 trading days before the announcement to 100 days after. The correlations are generally high (0.85-0.99) with the exception of abnormal returns from the CRSP excess returns file. Thus, inferences drawn from cross-sectional relations (aside from intercepts) should be robust to the method of calculating abnormal returns.

b. Evidence on the Price Rise

We have discussed several plausible reasons for the price rise prior to an equity issue. One is that the market, on average, receives good news about

the value of the firm's current assets since some issues are postponed in anticipation of good news (the information theory). Another is that the market learns of the arrival of a valuable new project that the firm has yet to undertake, and the expected value of the new project is immediately impounded into the firm's price (the good project theory). Our first task empirically is to distinguish between these two explanations.

One test is to compare the price path prior to seasoned equity issues with the price path prior to large block sales by existing equity holders (secondary offerings). With a secondary offering, no new capital is added to the firm. Hence the purpose of the sale cannot be to finance a new project. Observing a significant price rise before secondary offerings would therefore support the information hypothesis over the good project theory.

Figures 1 and 2 and Table 2 compare the price behavior surrounding primary and secondary issues. The behavior in both cases appears to be similar both qualitatively and quantitatively, supporting the information theory. There is an apparent difference: the rise before primary issues is steeper than the rise before pure secondary issues. Of course, the price rise preceding pure secondary issues could occur for reasons unrelated to the price rise for primary issues. For instance, uninformed large shareholders may wish to diversify after a large price run-up to rebalance their portfolios. Nevertheless, the similarity between the patterns in Figures 1 and 2 is striking.

A related test involves examining stock price behavior around the time of low risk debt issues. Since some projects are presumably debt-financed, the project arrival theory also predicts a price rise preceding debt issues. On the other hand, if the price rise and subsequent drop upon announcement of

the equity issue are due to adverse selection, this price pattern should not occur for firms issuing riskless debt. Mikkelson and Partch (1986) present evidence that is consistent with the information theory and inconsistent with the project arrival theory. For a sample of 135 NYSE/AMEX firms issuing straight debt between 1972 and 1982, they find a statistically significant abnormal *negative* return of -4.11% in the 60 days preceding the announcement of an issue and a change of only -.39% on the announcement date.

Since accounting earnings before the equity issue can only reflect returns from existing assets, observing positive earnings surprises in the months preceding the equity issue would support the information theory over the good project theory. To implement this idea, we sum the excess returns on earnings announcement dates in the eight quarters preceding the announcement of an equity issue, and compare this with the excess return over the 500 days preceding the announcement of an issue. The earnings announcement event is defined as the day preceding and the day of an earnings announcement in the *Wall Street Journal*. For NYSE/AMEX firms, the average daily abnormal return over the earnings announcements is 0.26% while for OTC firms the average daily abnormal return over the earnings announcements is 0.28%. By comparison, the average daily abnormal returns over the entire period from day -500 to day -2 were 0.08% for NYSE/AMEX firms and 0.13 for OTC firms. Thus, earnings announcements do appear to have an impact on excess returns for these firms.[6]

We do find some evidence in support of the good project theory. On average, firms issuing equity experience a rise in Tobin's q prior to the issue and then a fall following the issue (see Figure 4). Here Tobin's q is measured as the ratio of market value of assets to book value of assets. This pattern is consistent with the view that firms issue equity to finance a

growth opportunity, and that once the project is undertaken the ratio of growth opportunities to assets in place falls.

The third potential explanation for the price rise was the "naive trading rule" under which managers issue after observing a rise in share price. If this is the case, we would expect to see few firms with a price decline prior to issue. Figure 5 illustrates the cross-sectional distribution of excess returns over the 500 days preceding an equity issue announcement for primary, secondary, and combined issues. Although rises predominate, 18% of firms experience a price drop relative to the market in the period preceding the issue announcement.[7] Although this distribution is inconsistent with the naive trading rule, it corresponds to the predicted distribution in Lucas and McDonald (1989).

IV. Other Empirical Results

a. Does a Debt Capacity Constraint Induce Equity Issues?

Information based models of capital structure generally imply that firms are better off issuing lower risk securities; debt dominates equity [see for example Myers and Majluf (1984), and Narayanan (1988)]. However, situations may arise in which issuing more debt is no longer feasible or desirable. For example, a firm may have reached a point at which the costs of debt financing outweigh the benefits, and the firm issues equity to increase "debt capacity". We examine the capital structure of firms around the time of equity issues to see whether firms issuing equity appear to be short on debt capacity.

In Figures 6 and 7 we plot the ratio of the book value of debt to market and book value of assets respectively, over the four year period surrounding the announcement of the issue. Debt ratios based on market values decline

dramatically before the issue of equity, while ratios based on book value decline slightly. This seems to be inconsistent with a story in which the firm is issuing equity because its debt levels have become too high, since issues of debt in the period before the equity issue would tend to lead to increases in the book debt to asset ratios. Also, the cash to book asset ratio increases slightly before the equity issue, increases dramatically at issuance, and falls after the issue (see Figure 8). The fact that cash ratios fall while debt ratios rise after the issue is not consistent with a scenario in which the firm uses cash from the equity issue to retire debt. What factors cause these firms to choose equity over debt remains an interesting and open question.

b. Explaining the Magnitude of the Price Drop

Table 3 shows the relation between the announcement day price drop, the size of primary and secondary issues (expressed as the number of new shares issued divided by the pre-issue number of shares outstanding), abnormal price movements prior to the announcement, and a measure of the direct cost of the issue (the underwriters' spread).

There is a negative relation between the announcement period abnormal return and the abnormal price change from day -100 to day -2. This negative relation is statistically significant, at the 5% level, in one case and is occasionally statistically significant at the 10% significance level. There is no relation between the announcement period return and the abnormal return over the period from day -250 to day -101. On the other hand there is a positive (significant at the 10% level but not at the 5% level) relation

between the announcement period returns and the returns from day -500 to -251.

The earlier empirical literature explored the relation between the slope of the price rise preceding issue and the drop at issue. Asquith and Mullins (1986) find a positive relation between the announcement period returns and prior period returns while Masulis and Korwar (1986) find a negative relation. The former study uses a longer prior period (eleven months) while the latter uses a shorter prior period (three months). There appears to be no compelling theoretical reason that the relation should go in either direction. The regressions reported in Table 3 partially reconcile these opposite findings.

The effect of issue size on the price drop is traditionally used as a test of the price pressure hypothesis. As in previous studies, the evidence seems to be mixed.[8] In Table 3, the relation between the announcement period price change and the size of the primary and secondary components of the issue is consistently negative. The relation is occasionally significant (at the 5% level) for primary issues. Also, note that a negative relation between the announcement period price change and the size of the issue, while being consistent with a price pressure story, is not necessarily inconsistent with an information based explanation of the price behavior. Presumably the more overvalued the equity, the larger the incentive to issue more equity. Thus, the size of the issue may partially reveal the managers' private information.

In order to test the hypothesis that anticipated issue costs cause the price drop upon announcement, we include the underwriters' discount and the product of the discount and the size of the primary issue[9] as explanatory variables. While the underwriters' fees are not the only cost of the issue,

they are generally the major component of the cost [see Smith (1977)]. Neither of the issue cost variables have significant explanatory power.

The issue cost variables' lack of explanatory power may be due to the fact that the actual costs are not known at the announcement date. However, if the issue cost hypothesis were true and investors had rational expectations of the costs, then we should find significantly negative coefficients.

It should be noted that in all of the above cases the explanatory power of prior period abnormal returns, size of the issue, and issue costs is very low.

V. Welfare Implications

The preceding empirical results lend support to the hypothesis that asymmetric information has an important role in explaining stock price behavior around the time of seasoned equity issues. In this section we turn to the question of whether the magnitude of the price drop is likely to be informative about the extent of investment inefficiency. We argue that the magnitude of the price drop is not necessarily related to the extent of investment inefficiency.

Asymmetric information has implications for the real investment policies of firms in most of the information-based models we have discussed. Myers and Majluf (1984) show that asymmetric information can lead to underinvestment because some undervalued firms forego valuable projects to avoid issuing equity at an unfavorable price. Miller and Rock (1985) develop a signalling model in which firms choose to pay dividends rather than to invest optimally. On the other hand, Narayanan (1988) shows that it is possible to obtain overinvestment in similar circumstances. For example, firms with no need for

funds may attempt to benefit shareholders by mimicking high quality firms and issuing equity. If equity issues are costly this dissipates resources.

One way of interpreting the size of the price drop is to look at the "offering dilution". Asquith and Mullins (1986) compute the offering dilution as the ratio of the drop in valuation for the firm as a whole to the amount of equity issued. They show that the average offering dilution is 31% for primary and combined issues. Viewed in this way, one might conclude that firms take strong measures to avoid equity issues, and that the induced investment inefficiency will be large.

The offering dilution may be a gross overestimate of the issuing cost, however. Suppose that managers know the firm is overvalued and issue equity. As a result the stock price drops and there is substantial offering dilution. Presumably the firm's true value would have become known eventually. The equity issue merely serves as a signal of the overvaluation and hastens the release of this information. Despite appearances, there is no social cost associated with the equity issue. The "offering dilution" statistic computed by Asquith and Mullins (1986) is, according to this explanation, irrelevant for measuring the cost of the equity issue.

On the other hand, price changes can underestimate the cost of asymmetric information. Suppose that some firms without valuable projects issue equity in order to pool with higher-valuation firms which do have projects. This has the dual effect of discouraging some high quality firms from issuing equity [as in Myers and Majluf (1984)] and also wastes the resources used in issuing equity. Lucas and McDonald (1989) find that, in theory, the stock price could actually increase upon issue announcement even if some issuing firms dissipate resources. This can occur when the average

project financed increases firm value by more than the announcement signals low asset quality.

Perhaps most importantly, estimating the welfare loss due to asymmetric information requires an understanding of the costs of substituting alternative sources of financing. A convincing estimate would require a more complete characterization of the costs of debt as well as equity.

VI. Conclusions

This paper studies stock price behavior around the time of an equity issue, and also examines the contemporaneous behavior of balance sheet variables. We have argued that information-based theories are consistent with much of the evidence about stock price behavior, in particular the rise preceding the issue, the fall at the announcement of the issue, and the tendency for issues to be clustered after market rises. Furthermore, the evidence weighs against several alternative theories. In the information theories the welfare costs of suboptimal investment cannot be estimated by solely studying asset price reactions to financing announcements. We conclude that a large price drop at issue announcement need not indicate large inefficiencies in the investment process.

There are still significant gaps in our understanding of equity issues. Most fundamentally, we still do not understand how firms choose the method of finance. Our evidence that the debt to value ratio does not rise preceding an equity issue deepens this puzzle.

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Table 1. Number of Issues by Type and by Year

YEAR	PRIMARY	SECONDARY	COMBINED
1974	6	8	9
1975	27	22	20
1976	40	23	31
1977	12	13	22
1978	56	12	27
1979	48	9	23
1980	144	21	73
1981	135	13	62
1982	98	20	55
1983	253	54	144
Total	819	195	466

Table 2

Mean abnormal returns around announcements of equity issues.

Period	Mean abnormal return	t-statistic	Observations
	A. All Issues		
-500 to -251	13.20	11.21	939
-250 to -101	19.59	21.32	1097
-100 to -2	18.84	25.54	1175
-1 to 0	-2.89	-20.70	1197
1 to 100	-0.00	-0.20	1223
	B. Primary and Combined Issues		
-500 to -251	14.35	11.15	813
-250 to -101	19.98	20.23	956
-100 to -2	20.02	25.06	1027
-1 to 0	-2.94	-19.39	1048
1 to 100	-0.01	-0.67	1070
	C. Secondary Issues		
-500 to -251	5.78	2.10	126
-250 to -101	16.91	6.77	141
-100 to -2	10.63	6.07	148
-1 to 0	-2.49	-7.33	149
1 to 100	0.02	1.37	153

Table 3

Regression of announcement day price drop on size of primary and secondary issues, abnormal price movements prior to announcements, and measures of the cost of underwriting.

INTERCEPT	100 × CAR (-100,-2)	100 × CAR (-250,-101)	100 × CAR (-500,-251)	PRIMARY SIZE	SECONDARY SIZE	UNDERWRITER DISCOUNT	DISCOUNT × SIZE	N	R^2
-2.49				-2.30	-1.46			1195	0.00
(-12.30)				(-2.21)	(-0.86)				
-1.39				-2.61	-0.78	-22.53	19.24	1179	0.01
(-1.77)				(-0.58)	(-0.40)	(-1.34)	(0.26)		
-2.64	-1.37							1174	0.01
(-16.91)	(-2.18)								
-2.29	-1.17			-2.33	-1.13			1172	0.01
(-11.16)	(-1.83)			(-2.20)	(-0.64)				
-1.52	-1.14			-2.04	-0.56	-15.60	5.09	1156	0.01
(-1.91)	(-1.79)			(-0.44)	(-0.29)	(-0.95)	(0.07)		
-2.90		-0.08						1096	0.00
(-18.13)		(-0.17)							
-2.48		0.11		-2.76	-1.45			1094	0.01
(-11.84)		(0.21)		(-2.50)	(-0.82)				
-1.36		0.21		-2.01	-0.76	-24.04	5.25	1079	0.01
(-1.64)		(0.41)		(-0.44)	(-0.38)	(-1.39)	(0.07)		
-2.95			0.91					938	0.01
(-19.20)			(1.90)						
-2.66			0.88	-1.52	-2.39			937	0.01
(-12.28)			(1.85)	(-1.31)	(-1.84)				

Table 3 (continued)

INTERCEPT	100 × CAR (-100,-2)	100 × CAR (-250,-101)	100 × CAR (-500,-251)	PRIMARY SIZE	SECONDARY SIZE	UNDERWRITER DISCOUNT	DISCOUNT × SIZE	N	R^2
-1.91			0.91	-0.20	-1.79	-16.60	-7.99	922	0.01
(-2.30)			(1.89)	(-0.04)	(-1.25)	(-0.96)	(-0.09)		
-2.83	-1.23	0.48	0.91					938	0.01
(-15.77)	(-1.75)	(0.78)	(1.89)						
-2.61	-1.08	0.63	0.86	-1.29	-2.43			937	0.01
(-11.88)	(-1.51)	(1.04)	(1.79)	(-1.09)	(-1.87)				
-1.88	-1.08	0.68	0.88	-0.23	-1.86	-16.07	-4.99	922	0.02
(-2.27)	(-1.48)	(1.11)	(1.81)	(-0.05)	(-1.31)	(-0.92)	(-0.06)		

Regression of CAR(-1,0) on abnormal returns prior to announcement; size of the issue [primary size = (#primary shares issued/#shares outstanding prior to issue) and secondary size = (#secondary shares issued/#shares outstanding prior to issue)]; underwriter discount = [(offer price-proceeds to company)/offer price]; and discount × size = Underwriter discount × size of primary issue. Heteroscedastic robust t-statistics in parentheses [see White (1980)].

Endnotes

1. For example, Asquith and Mullins (1986) obtain a two-day announcement return of -2.7% for all firms in their sample, with a cumulative excess return of about 36% for primary and combination issues and 20% for pure secondary issues in the 480 days preceding the issue.

2. Our source for equity issues may not have comprehensive coverage of equity issues, so Table 1 must be viewed as only suggestive. Choe, Masulis, and Nanda (1989), however, also show substantial year-to-year variation in the quantity of equity issues.

3. Korajczyk, Lucas, and McDonald (1988) observe that periodic information releases by the firm will generate time-varying asymmetric information, and that firms will issue equity following such information releases. This does not explain aggregate low frequency variations in the quantity of equity issues, however.

4. We lose 12 issues (10 firms) by not matching firms with the data from CRSP. An additional 202 issues are eliminated because we did not find announcement dates for the issues. The largest source of data loss was missing observations in the Compustat data.

5. Essentially identical results were obtained measuring debt gross of short term assets.

6. The significance of the effect of earnings announcements must be qualified by the observation that a significant proportion of abnormal returns occur

on earnings announcement dates for all firms [Chari, Jagannathan, and Ofer (1988)].

Healy and Palepu (1988) compare earning growth rates before and after equity issues and find no evidence of a significant change.

7. For 22% of NYSE/AMEX firms and 13% of OTC firms, a negative CAR preceded the equity issue announcement.

8. Scholes (1972) studied secondary issues and found the price drop at issue to be permanent and unrelated to the size of the issue. Asquith and Mullins (1986) find that the price drop at announcement appears to be weakly related to the size of the issue, while Masulis and Korwar (1986) find no relation for industrial firms.

9. We only include the product of the discount and size of the primary issue since the firm only bears the underwriting cost of the primary issue.

Figure Legends for "Understanding Stock Price Behavior Around the Time of Equity Issues" by R. Korajczyk, D. Lucas and R. McDonald

Figure 1. Cumulative abnormal returns in the period surrounding an equity issue announcement for primary and combined primary/secondary issues.

Figure 2. Cumulative abnormal returns in the period surrounding an equity issue announcement for secondary issues.

Figure 3. Cumulative returns on an equally weighted portfolio of all NYSE/AMEX/OTC firms in the period surrounding an equity issue announcement for primary, secondary and combined issues.

Figure 4. The behavior of Tobin's q.

Figure 5. The cross-sectional distribution of cumulative abnormal returns prior to an equity issue announcement. A histogram bar represents the percentage of firms with a CAR between the previous and current values on the horizontal axis.

Figure 6. The behavior of the ratio of debt to market value of assets.

Figure 7. The behavior of the ratio of debt to book value of assets.

Figure 8. The behavior of the ratio of cash to book value of assets.

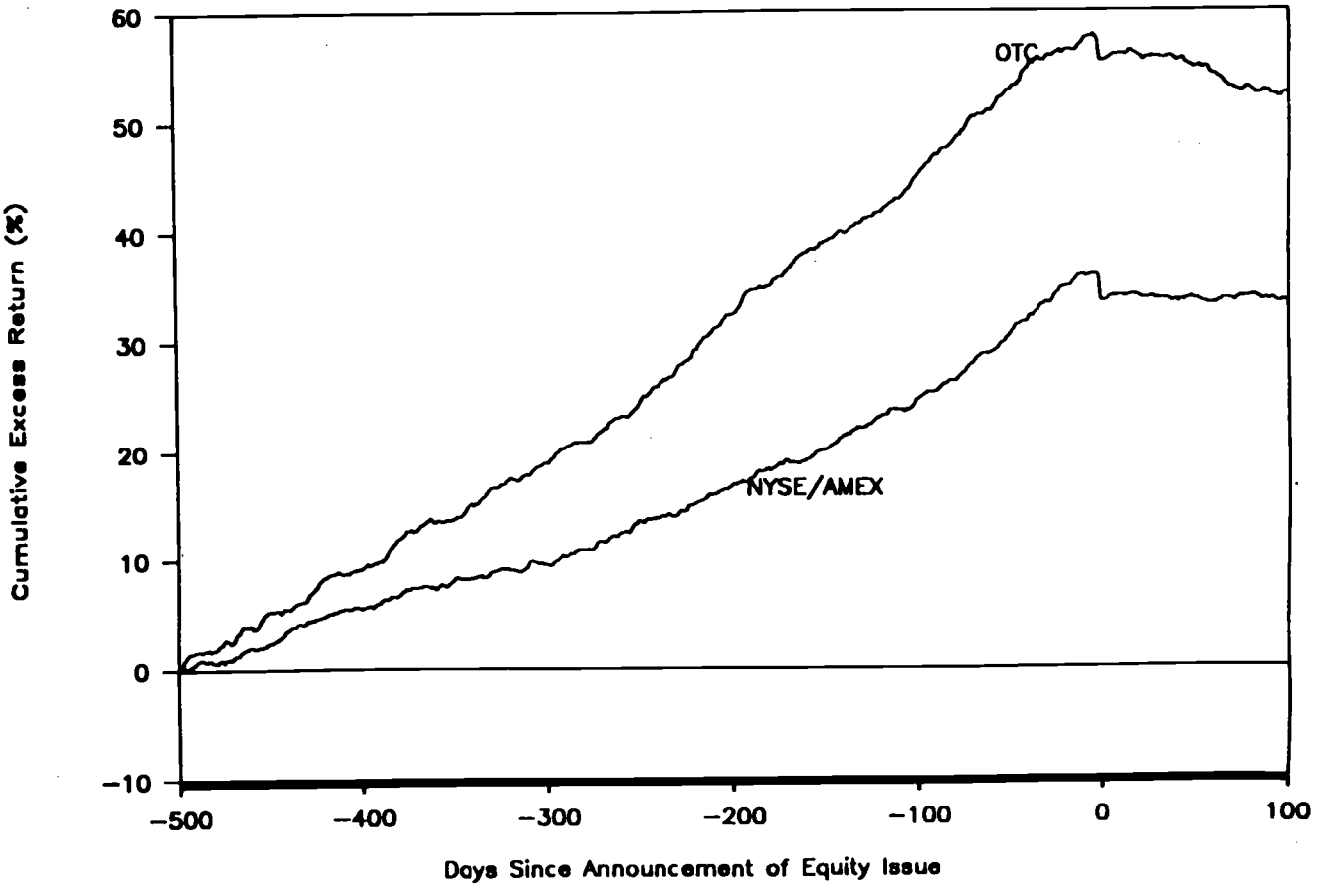
60
50
40
30
20
10
0
−10
Cumulative Excess Return (%)
OTC
NYSE/AMEX
−500
−400
−300
−200
−100
0
100
Days Since Announcement of Equity Issue

Fig. 1

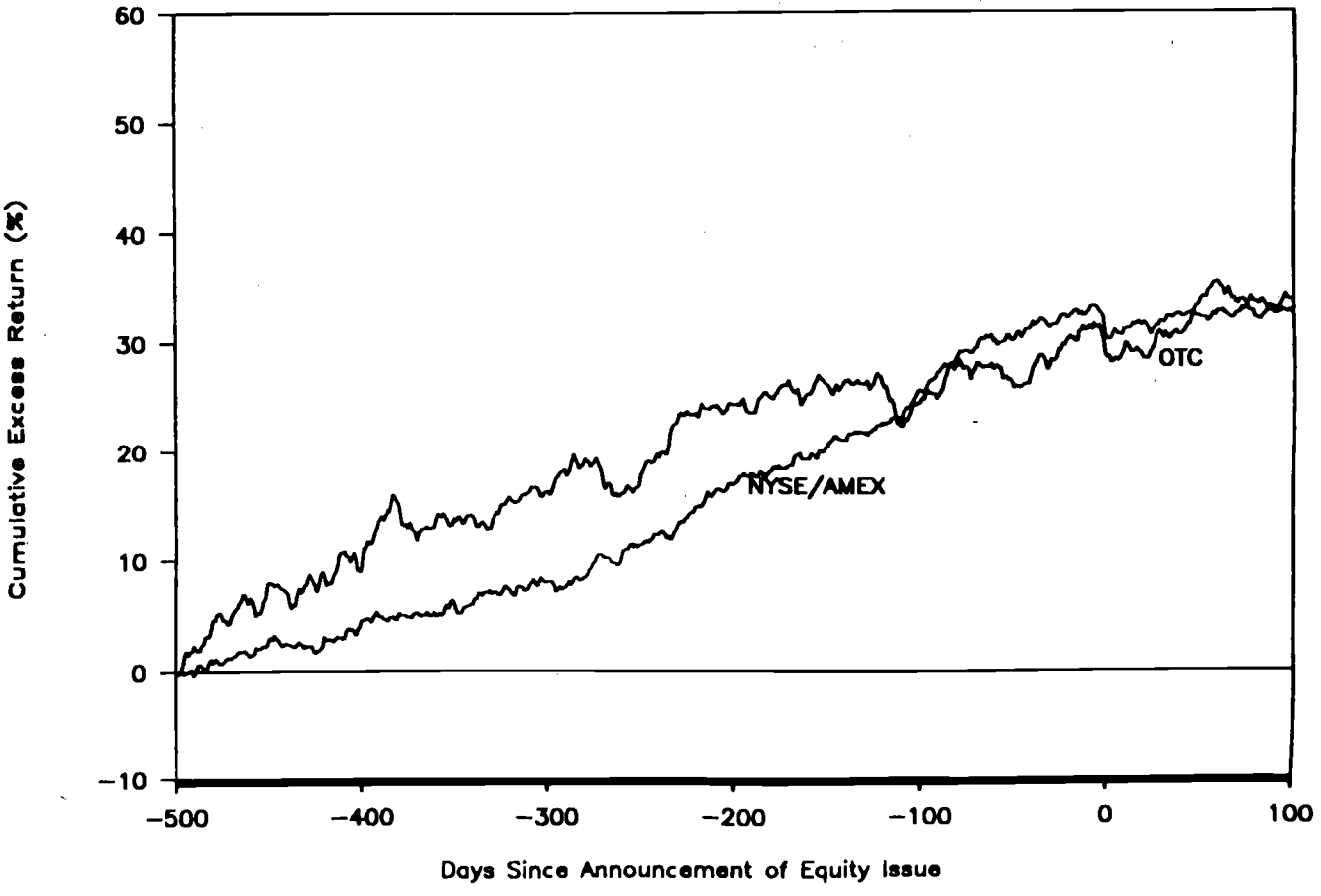
60
50
40
30
20
10
0
−10
Cumulative Excess Return (%)
−500
−400
−300
−200
−100
0
100
Days Since Announcement of Equity Issue
OTC
NYSE/AMEX

Fig. 2

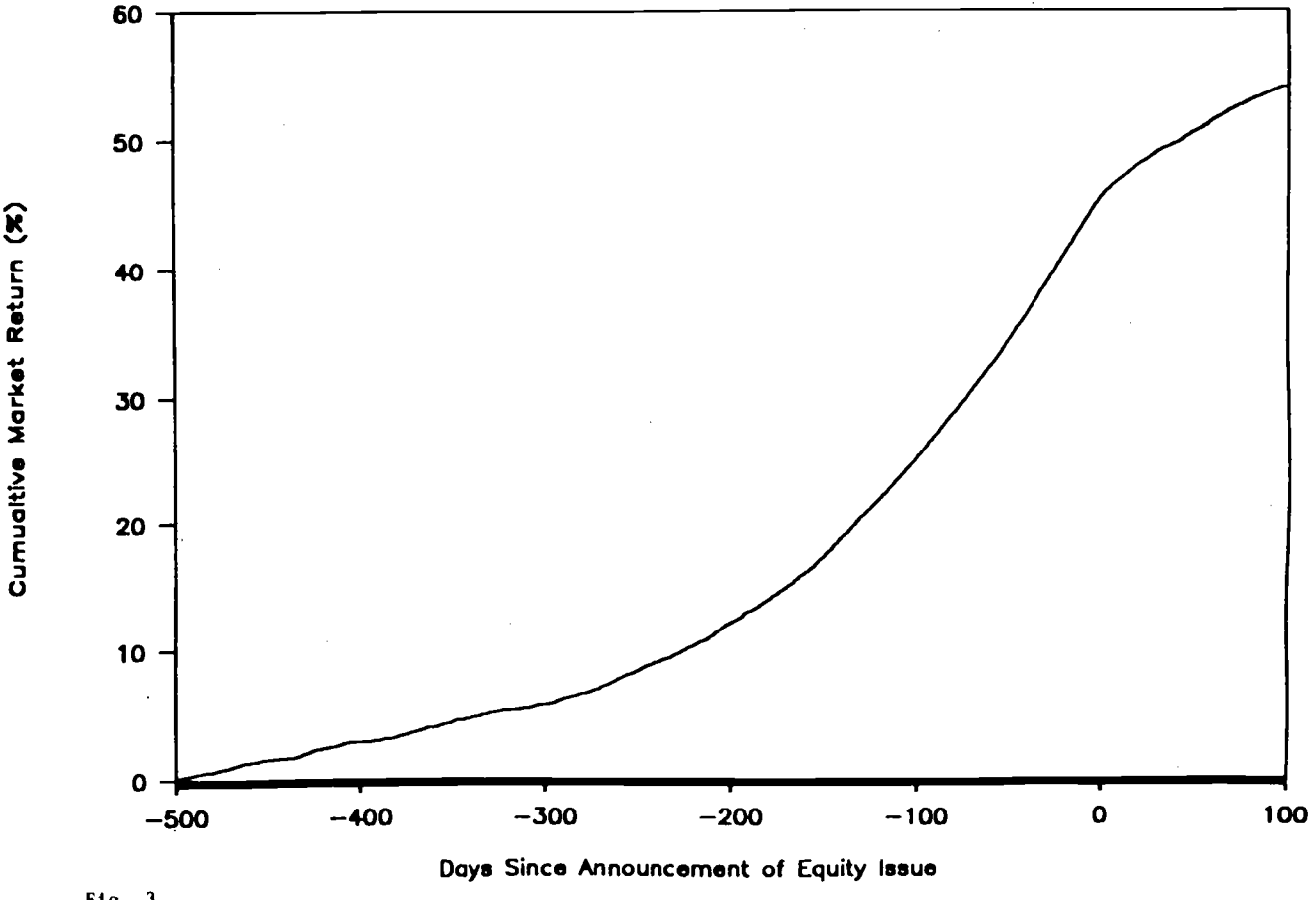
60
50
40
30
20
10
0
Cumulative Market Return (%)
−500
−400
−300
−200
−100
0
100
Days Since Announcement of Equity Issue

Fig. 3

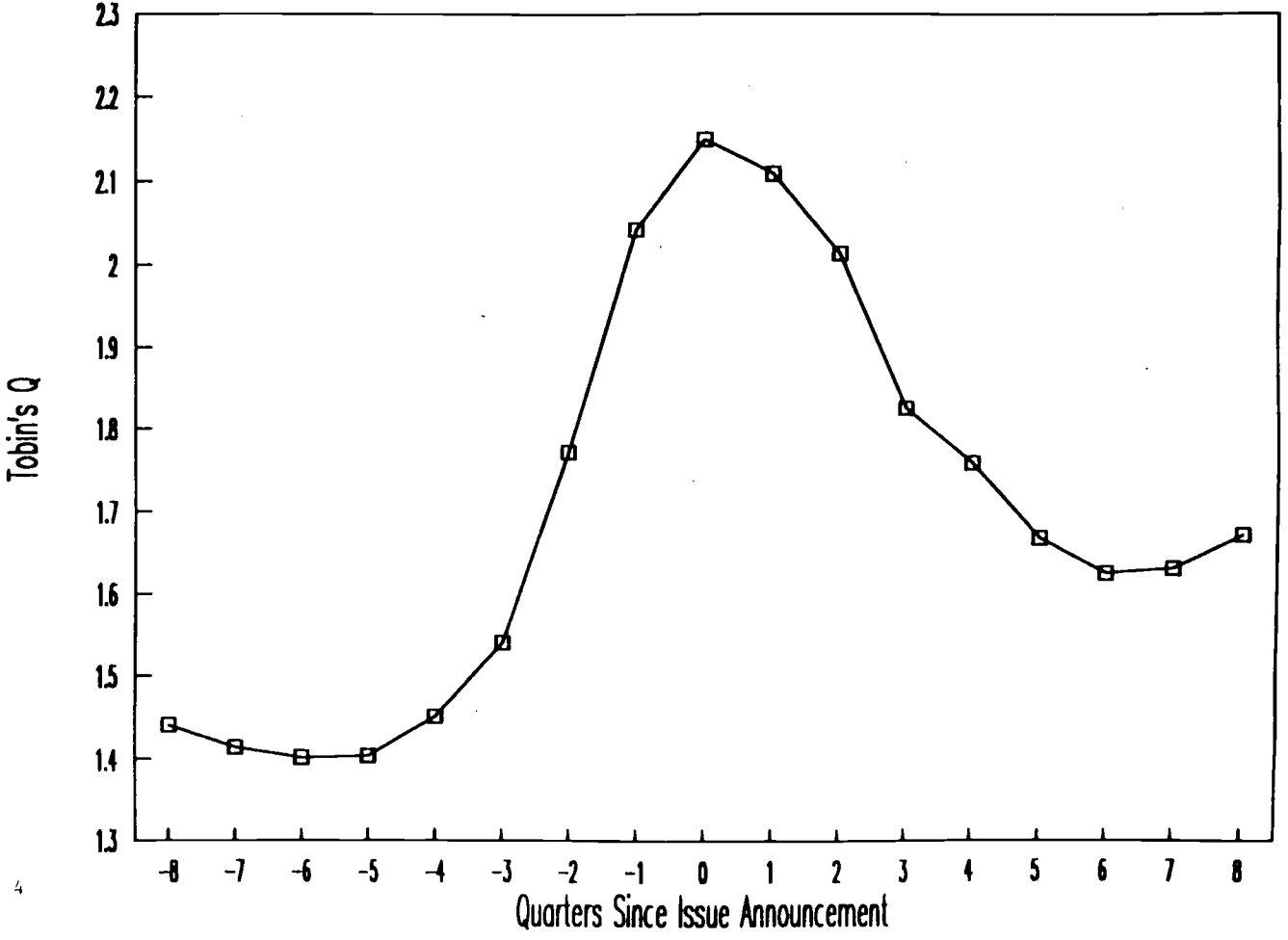
Tobin's Q
2.3
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
-8
-7
-6
-5
-4
-3
-2
-1
0
1
2
3
4
5
6
7
8
Quarters Since Issue Announcement

Fig. 4

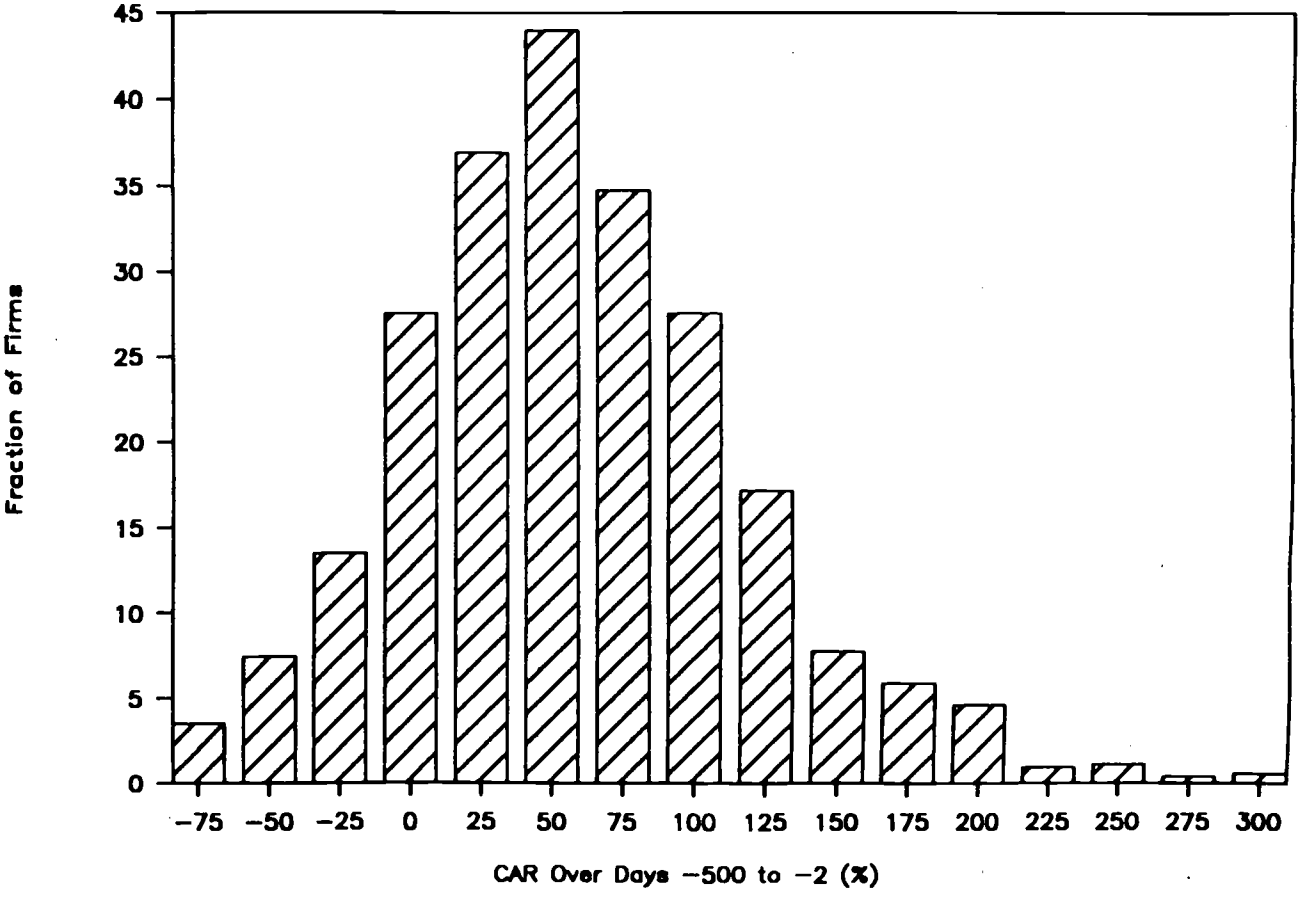
Fraction of Firms
45
40
35
30
25
20
15
10
5
0
−75
−50
−25
0
25
50
75
100
125
150
175
200
225
250
275
300
CAR Over Days −500 to −2 (%)

Fig. 5

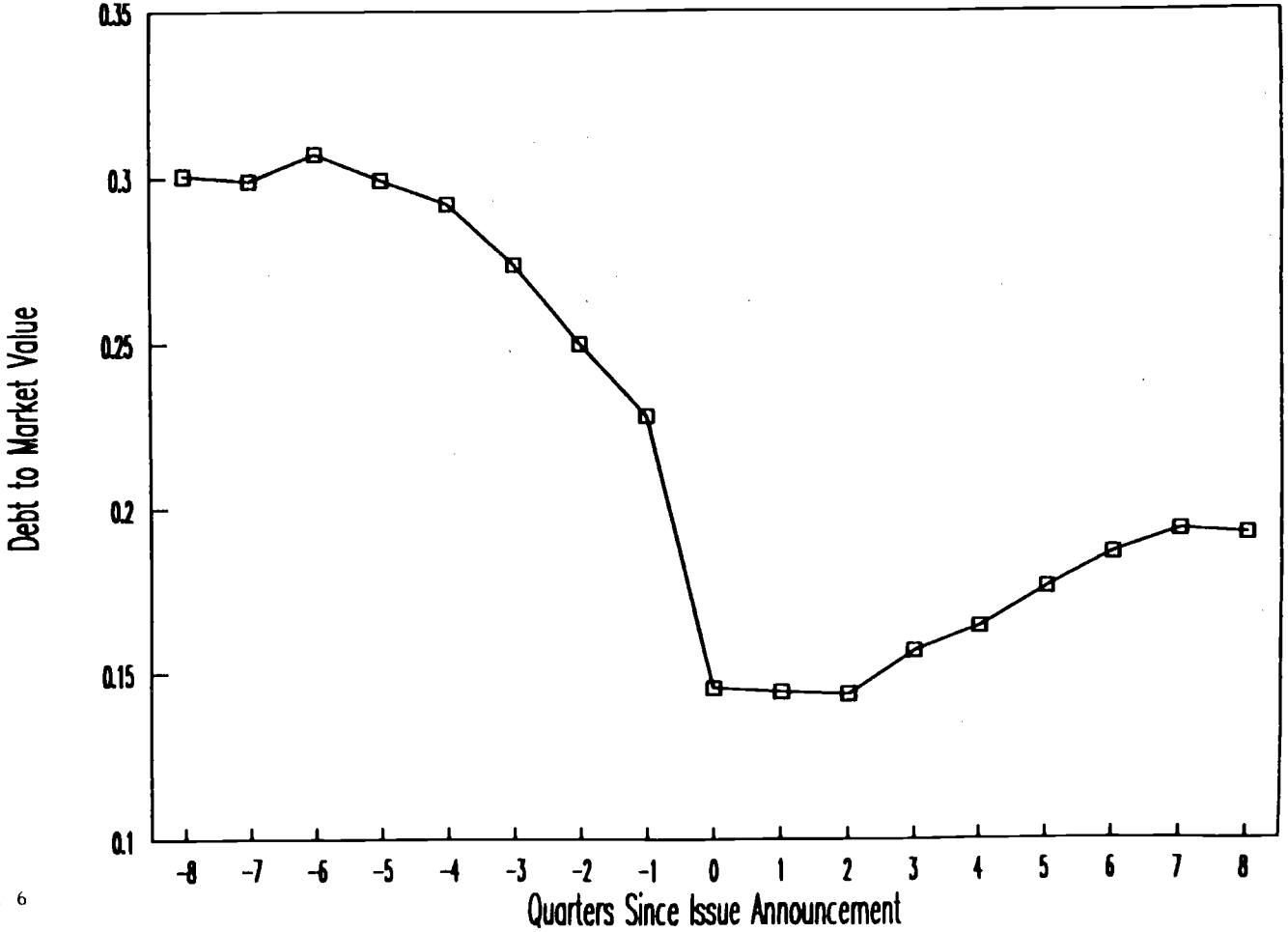
0.35
0.3
0.25
0.2
0.15
0.1
Debt to Market Value
-8
-7
-6
-5
-4
-3
-2
-1
0
1
2
3
4
5
6
7
8
Quarters Since Issue Announcement

Fig. 6

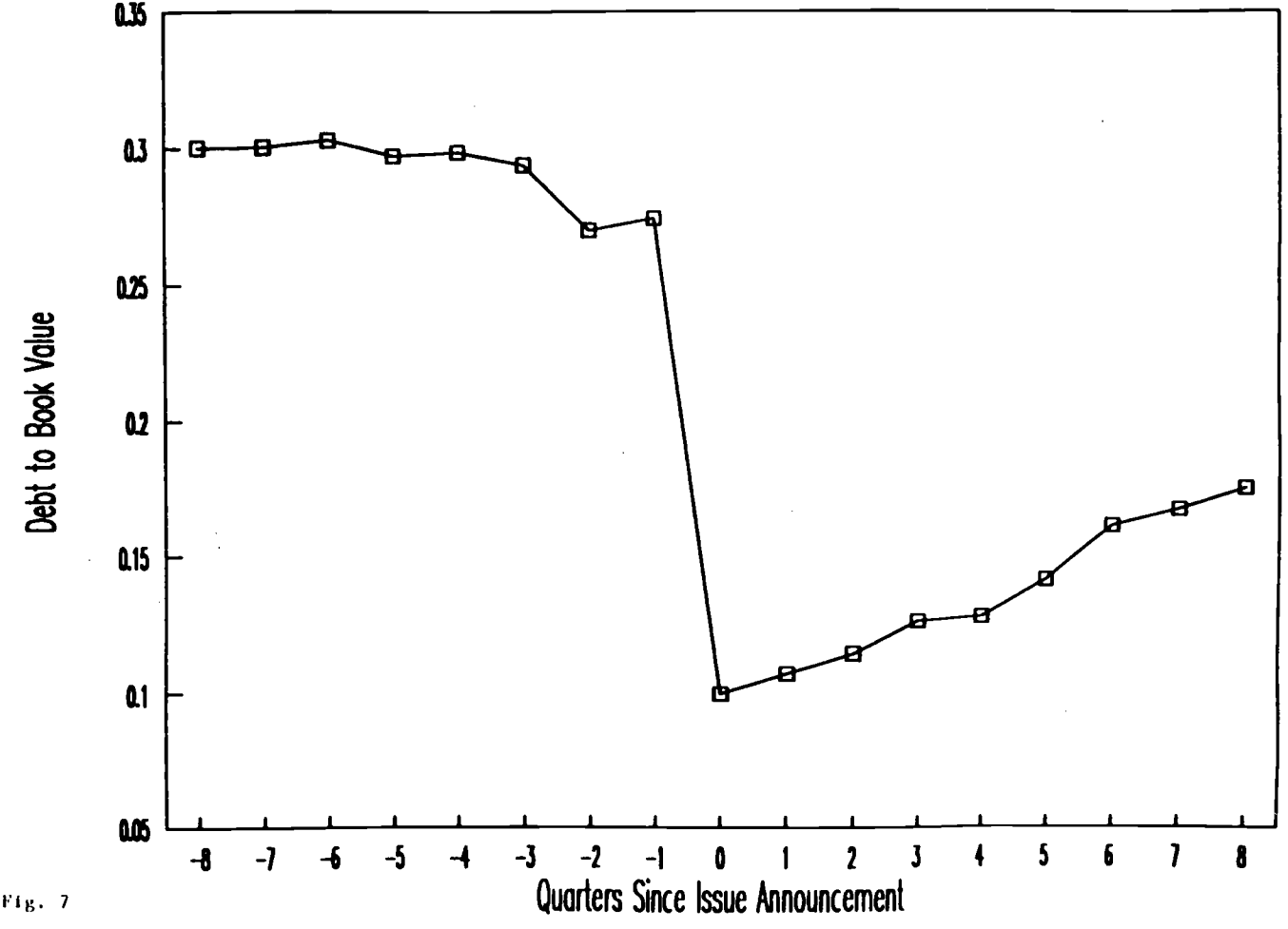
0.35
0.3
0.25
0.2
0.15
0.1
0.05
Debt to Book Value
-8
-7
-6
-5
-4
-3
-2
-1
0
1
2
3
4
5
6
7
8
Quarters Since Issue Announcement

Fig. 7

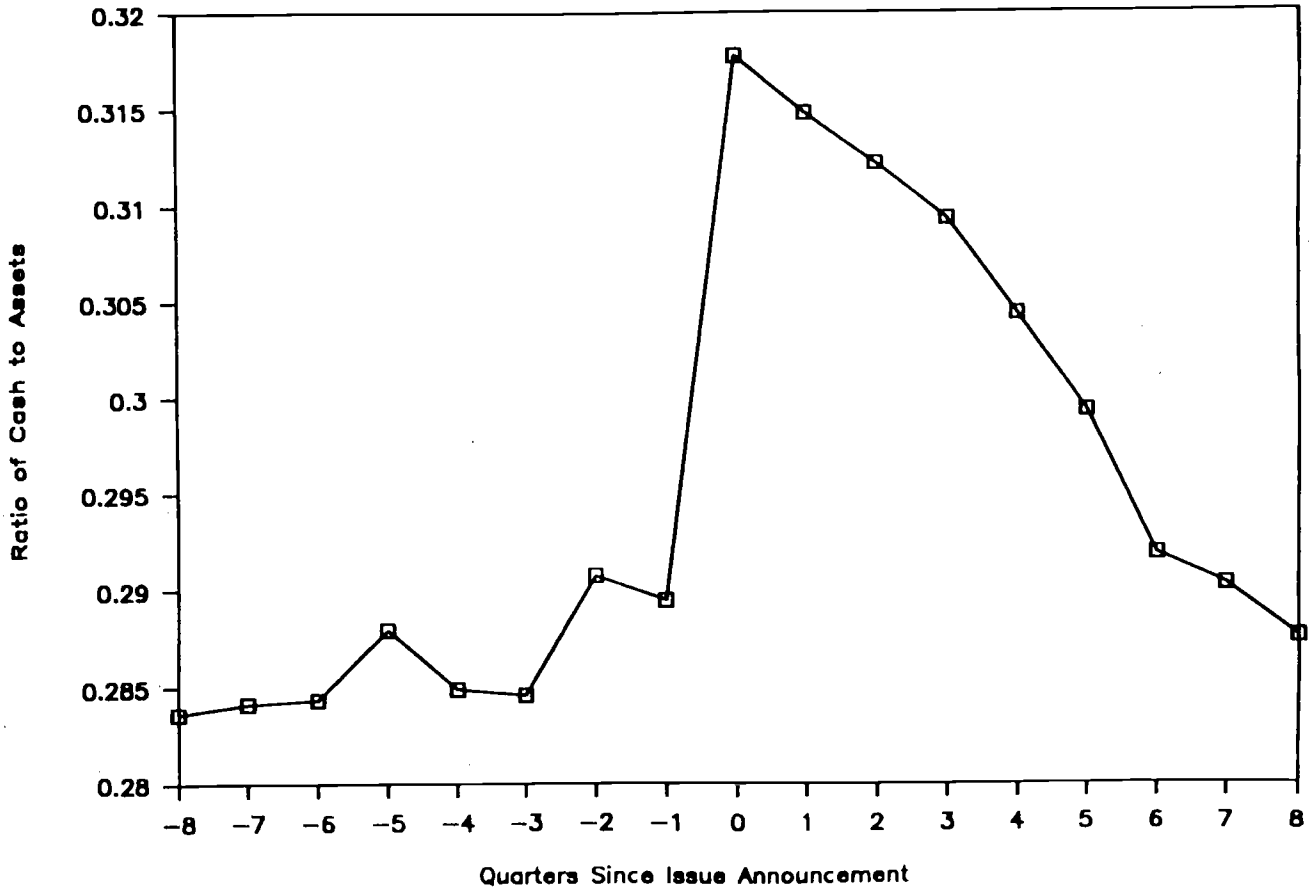
0.32
0.315
0.31
0.305
0.3
0.295
0.29
0.285
0.28
Ratio of Cash to Assets
−8 −7 −6 −5 −4 −3 −2 −1 0 1 2 3 4 5 6 7 8
Quarters Since Issue Announcement

Fig. 8