Why are firms that raise more financing worth more?

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Abstract

I study the financing decisions of firms going public. I find that, all else equal, firms that raise more financing are worth more, and I consider potential explanations for this finding. I provide evidence that raising more financing leads to greater investor recognition, as proxied by better underwriting services, greater liquidity, and greater investor interest, and thereby increases firm value. The results do not appear to be explained by fixed costs of raising financing or market timing, nor do they appear to be driven by investment opportunities or firm quality, exercise of the underwriter's overallotment option, hot issues markets, or reverse causality.

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1. Introduction

Firms going public can choose both the price and the quantity of the financing that they raise. There is a vast literature on the price of financing that firms choose (see Jenkinson and Ljungqvist (2001) and Ritter and Welch (2002) for a review of the literature on IPO underpricing). However, the quantity of financing that firms choose remains largely unexplored even though the quantity of financing may also matter for firm value and thus have implications for investors and managers alike. Moreover, it is not obvious why firms sell so many shares at so high a cost when they go public. The average firm sells 33.8% of its shares even as underwriting fees and underpricing amount to 17.6% of the value of the shares sold. I therefore explore this subject in this paper.

I first study how financing is related to firm value, and I find that, all else equal, firms that raise more financing are worth more. I then study why this is the case. As one potential explanation, I consider the investor recognition hypothesis, which states that raising more financing leads to greater investor recognition, i.e., greater investor awareness of the firm, and greater investor recognition increases firm value. Using several proxies for investor recognition, I find that raising more financing is associated with greater investor recognition, and that the investor recognition caused by raising more financing is associated with higher firm value. I also consider two other potential explanations for why firms that raise more financing are worth more, namely, fixed costs of raising financing and market timing. I do not find any evidence that supports these two explanations. Moreover, my robustness tests suggest that the results do not appear to be driven by investment opportunities or firm quality, exercise of the underwriter's overallotment option, hot issues markets, or reverse causality. Overall, the evidence most strongly supports the investor recognition explanation of why firms that raise more financing are worth more.

I begin my analysis by studying how financing is related to firm value. I focus on financing from the sale of primary shares (new shares issued by the firm) rather than secondary shares (existing shares sold by pre-IPO investors) because most (85.6%) of the shares sold by the average firm are primary. Firms raise financing for standard reasons, such as financing investments, holding cash, and repaying debt, which may have straightforward valuation implications. Therefore, instead of using actual financing raised, I use "excess financing" defined as actual cash holdings after the IPO minus expected cash holdings, where I estimate expected cash holdings using an empirical model of cash holdings used by Opler, Pinkowitz, Stulz, and Williamson (1999), Dittmar and Mahrt-Smith (2007), and Bates, Kahle, and Stulz (2007). These empirical models primarily capture the transactions and precautionary motives for holding cash, i.e., holding cash to avoid the transaction costs of issuing securities when the firm requires external financing and holding cash to allow the firm to use internal financing for investment opportunities that may arise when external financing is prohibitively costly, respectively. Excess financing also has the advantage of being estimated after the firm has repaid debt using the proceeds of the offering. To measure firm value, I match each IPO firm to a comparable seasoned firm, comparable in terms of industry, size, etc., and I compute relative valuation ratios such as the market-to-book of the IPO firm divided by the market-to-book of the matched firm.

I find that firms that raise more financing at the IPO are worth significantly more even five years after going public. A simple analysis of the choice of price and quantity by pre-IPO shareholders suggests that the magnitude of the impact of financing on firm value that I document is consistent with pre-IPO shareholders optimizing. I then study why firms that raise more financing are worth more. I consider three potential explanations, namely, the investor recognition, fixed costs of raising financing, and market timing explanations. In my empirical tests, I find evidence that strongly supports the investor recognition explanation. I do not find any evidence that supports the latter two explanations.

First, the investor recognition hypothesis states that raising more financing leads to greater investor recognition and thereby increases firm value. Merton (1987) develops a model in which greater investor recognition leads to more efficient risk sharing, which decreases the cost of capital and thereby increases firm value. I argue that raising more financing leads to greater investor recognition in two ways. First, by selling more shares, the firm pays its underwriter more, both directly in fees and indirectly through the dollar value of underpricing that the underwriter can allocate to its preferred investor clients. The underwriter works harder at marketing the firm, and investor recognition increases. Second, by selling more shares, the firm can directly increase the number of its investors, thus investor recognition increases. Moreover, as a result of the increase in the number of its investors, liquidity in the firm's shares improves (for example, see Benston and Hagerman (1974)), which makes the firm a more attractive investment for liquidity-oriented investors, especially institutional investors, thus investor recognition increases further. Therefore, in both these ways, raising more financing leads to greater investor recognition and thereby increases firm value. I am agnostic about whether greater investor recognition decreases expected returns and/or increases expected cash flows. Greater investor recognition can decrease expected returns as in Merton (1987) but it can also increase expected cash flows through greater information production, through more monitoring, and even through greater demand for the firm's product. The literature has argued for both drivers of firm value. The bottom line is that if information is costly, then pre-IPO shareholders may find it optimal to reduce the information costs of IPO investors by giving them a quantity of underpriced shares, which leads to greater investor recognition and thereby increases firm value.

In my empirical tests of the investor recognition hypothesis, I use three groups of proxies for investor recognition, namely, proxies for underwriting services, liquidity, and investor interest (analyst coverage and breadth of ownership). Additionally, I account for underpricing because underpricing the offering more can also lead to greater investor recognition (see Chemmanur (1993), Aggarwal, Krigman, and Womack (2002), and Cliff and Denis (2004)). I find that raising more financing is associated with greater investor recognition, and that the investor recognition caused by raising more financing is associated with higher firm value, even controlling for the investor recognition not caused by raising more financing. My results provide direct support for the investor recognition explanation.

Second, the fixed costs of raising financing hypothesis states that if there are fixed costs associated with raising financing, then firms with relatively higher fixed costs should raise more financing but should do so less frequently. Otherwise, firm value is destroyed either because the firm has to raise more financing subsequently or because the firm does not have the financing to exploit its investment opportunities. I test the fixed costs hypothesis using two interpretations of fixed costs. First, I interpret as fixed costs the direct costs of raising financing (see Lee, Lochhead, Ritter, and Zhao (1996)). I find that these direct costs are an order of magnitude too small to account for the impact of raising more financing on firm value. Second, I interpret as fixed costs the opportunity cost of managers focusing on raising financing rather than on running operations. Using a fixed costs proxy that I construct, I find that firms that have higher fixed costs raise more financing. I then use my fixed costs proxy to test whether firms with higher fixed costs and that raise more financing are worth more. I do not find any evidence that supports the fixed costs of raising financing explanation.

Third, the market timing explanation states that if firms can raise financing at prices above fundamental value, they should raise as much financing as possible and as soon as possible. Firms going public may be overvalued because of excessively low expected returns and/or excessively high expected cash flows. If this overvaluation is corrected within a few years, then, in the years after going public, firms that time the market should have lower realized returns relative to the appropriate benchmark, reflecting upward revisions of expected returns and/or downward revisions of expected cash flows (for example, see Ritter (1991) and Baker and Wurgler (2002)). They may also have lower realized cash flows relative to expected cash flows. To test the market timing explanation, I test whether raising more financing is associated with worse stock performance and lower than expected earnings. I do not find any evidence that supports the market timing explanation.

I perform several additional robustness tests of the results. First, I may be finding that firms that raise more financing are worth more because both financing and firm value are mismeasured and contain investment opportunities and/or firm quality. I consider this possibility by examining secondary share sales for which my three explanations are just as applicable as for primary share sales but which may be unaffected by measurement error. Using secondary share sales, I find the same results as I do using primary share sales, thus my results do not appear to be driven by measurement error. Second, I find the same results regardless of whether the overallotment option is exercised, thus my results are not mechanically driven by the underwriter exercising the overallotment option (and increasing the financing raised by the firm) when the firm is worth more in the aftermarket than at the offering. I also find the same results regardless of whether the firm goes public during a hot issues market versus other periods. Finally, I find the same results regardless of whether the firm receives a positive or negative valuation shock, which alleviates some concerns about reverse causality.

Overall, the evidence most strongly supports the investor recognition explanation of why firms that raise more financing are worth more, namely, that raising more financing leads to greater investor recognition and thereby increases firm value. The rest of this paper is organized as follows. Section 2 describes the data. Section 3 examines the relationship between raising more financing and firm value. Section 4 considers potential explanations for this relationship. Section 5 presents the results of robustness tests. Section 6 concludes.

2. Data

I construct my sample of IPO firms by extracting all IPOs between 1980 and 2004 from Securities Data Company's New Issues database (10,715 firms).[1] I retain only firms that can be matched to CRSP and that have CRSP listing dates sometime within thirty-one days of the SDC IPO date (leaves 9,834 firms). I retain only publicly traded U.S. operating firms, defined as firms with CRSP share codes of 10 or 11 (8,135 firms). I exclude financial and utility firms, defined as firms having CRSP SIC codes of 6000-6999 and 4900-4949, respectively (leaves 7,151 firms).[2] Finally, I retain only firms that have net assets (total assets net of cash) at the fiscal year end

[1] I end my sample in 2004 because of data availability. I use Compustat data to estimate excess cash holdings, which may require Compustat data from 2005 for firms going public in 2004. I also use Compustat data to compute relative valuation ratios, and I wish to have at least one relative valuation ratio for each IPO firm computed after estimating excess cash holdings for that firm, which may require Compustat data from 2006 for firms going public in 2004. Compustat data are available up to and including 2006.

[2] If I also exclude firms with dual class shares, the results of the paper are the same.

before the IPO of at least five million real dollars (leaves 4,572 firms).[3] All accounting data are from Compustat and are available up to and including 2006. All real amounts are in December 2004 dollars.

I construct the sample of firms that I use in my model of normal cash holdings as follows. From Compustat, I obtain all firm-years such that the fiscal year end is between 1980 and 2006 (278,850 firm-years). I retain only firm-years that are matched to CRSP. I split these firm-years into two groups, namely, firm-years for which the fiscal year end is more than five years after the CRSP listing date (leaves 117,176 firm-years corresponding to seasoned firms) and firm-years for which the fiscal year end is on or after the CRSP listing date but on or before five years after the CRSP listing date (leaves 66,721 firm-years corresponding to IPO firms). For IPO firms, I retain only firms that do an IPO between 1980 and 2006 according to SDC and that can be matched to CRSP (leaves 38,516 firm-years). Next, for both groups, I retain only publicly traded U.S. operating firms (leaves 97,450 and 31,374 firm-years corresponding to seasoned firms and IPO firms, respectively) and I exclude financial and utility firms (leaves 76,461 and 27,959 firm-years, respectively). Finally, for seasoned firms, I retain only firm-years for which net assets are at least five million real dollars (leaves 72,435 firm-years and 8,480 firms). For IPO firms, I retain only firms that have net assets at the fiscal year end before the CRSP listing date of at least five million real dollars (leaves 19,029 firm-years and 4,799 firms).

From CRSP, I obtain stock returns, stock prices, shares outstanding, trading volume, share codes, SIC codes, listing dates, delisting dates, and returns on the CRSP equal weighted

[3] This excludes very small firms that may distort the results. Net assets capture the scale of the firm's operations better than total assets because net assets are unaffected by cash holdings. Moreover, net assets before the IPO are unaffected by how much financing the firm raises (the more firms raise, the more they can invest, and the more they can scale up their operations).

and value weighted indices. Trading volume for NASDAQ firms is available beginning in November 1982. I obtain monthly factor returns from Ken French's website. I obtain purged monthly factor returns from Jay Ritter's website. Purged factor returns are only available up to December 2003.

From Compustat, I obtain cash (item #1 or CHE), current assets (item #4 or ACT), current liabilities (item #5 or LCT), total assets (item #6 or AT), long-term debt due in more than a year (item #9 or DLTT), sales (item #12 or SALE), EBITDA (item #13 or OIBDP), common stock dividends (item #21 or DVC), common shares outstanding at the fiscal year end (item #25 or CSHO), deferred taxes and investment tax credits (item #35 or TXDITC), long-term debt due within a year (item #44 or DD1), R&D expenditures (item #46 or XRD), book value of common equity (item #60 or CEQ), capital expenditures (item #128 or CAPX), acquisition expenditures (item #129 or AQC), and stock prices at the fiscal year end (item #199 or PRCC_F).

From SDC's New Issues database, for each IPO I obtain the IPO date, the original filing range (i.e., the minimum and maximum price from the preliminary prospectus), the offer price (i.e., the price from the final prospectus), the number of primary shares filed, the number of secondary shares filed, the number of primary shares sold in the offering, the number of secondary shares sold in the offering, the number of shares sold from the exercise of the overallotment option, the gross spread, the name(s) of the lead underwriter(s), the number of lead and co-managing underwriters, whether the firm is venture capital backed, and a breakdown of the expenses of the offering. A breakdown of the expenses of the offering is only available from 1991 to 2001. From Jay Ritter's website, I obtain the Carter and Manaster (1990) underwriter rankings for the lead underwriters of my IPO firms, a monthly time series of the total number of IPOs, and a monthly time series of the mean initial returns on IPOs.

From I/B/E/S, for the last day of each month, which I call the "summary date", for each firm, I compute analyst coverage and the consensus estimate as follows. I begin with the earnings estimates detail file and keep only estimates issued during the year ending on the summary date. I then keep only estimates with fiscal year end dates that fall within one year after the summary date. I then keep only estimates with fiscal year end dates equal to the first fiscal year end date after the summary date, i.e., the earliest fiscal year end date within one year after the summary date. Then, for each broker covering the firm, I keep the latest estimate, i.e., the estimate with an estimate date closest to but on or before the summary date. For the remaining estimates, one per firm-broker, I count the number of brokers covering the firm and I average their estimates to obtain analyst coverage and the consensus estimate, respectively. I/B/E/S earnings estimates in the detail file are available from 1983 to 2007, so analyst coverage and the consensus estimate are available from 1984 to 2007.

From Thomson's 13f filings data, I obtain a list of all institutions that own stock in every firm every calendar quarter. I keep only publicly traded U.S. operating firms. Then, for each quarter, I count the total number of institutions that own stock as well as the number of institutions that own stock in each firm. Thomson's 13f filings data are available from 1980 to 2006.

Finally, all winsorized variables are winsorized at the 1st and 99th percentiles unless otherwise stated. Event years +1 through +5 refer to years one through five years after the IPO date.

3. Financing and Firm Value

I first examine how raising more financing is associated with firm value. By financing, I mean financing raised for reasons other than the standard transactions and precautionary motives for holding cash. To estimate this "excess financing", I compute the difference between actual cash holdings after the IPO and expected cash holdings estimated from a model of cash holdings used by Opler, Pinkowitz, Stulz, and Williamson (1999), Dittmar and Mahrt-Smith (2007), and Bates, Kahle, and Stulz (2007). To account for the transactions motive, I control for firm size and cash substitutes, and to account for the precautionary motive, I control for investment, cash flows, cash flow risk, and investment opportunities.

I use here my sample of 91,464 firm-years between 1980 and 2006 for 8,480 seasoned and 4,799 IPO firms selected as described in the previous section. I define cash holdings as ln(CASH/NA) because it does not suffer from the right-skewness of CASH/NA (Opler, Pinkowitz, Stulz, and Williamson (1999), Dittmar and Mahrt-Smith (2007), and Foley, Hartzell, Titman, and Twite (2007) do likewise). Net assets (NA) are total assets net of cash. My explanatory variables are as follows:

- ln(NA): ln(real net assets), a measure of size
- CAPEX/NA, R&D/NA, and ACQN/NA: All measures of investment
- EBITDA/NA: A measure of cash flows
- Industry median SD(EBITDA/NA): A measure of cash flow risk. Within each industry based on two-digit SIC codes, for each year, for each publicly traded U.S. operating firm, I compute EBITDA/NA for the current year and each of the last nine fiscal years. As long as there are at least five of ten observations for a firm-year, I compute the standard deviation of EBITDA/NA, and I use the median standard deviation in that industry that year.
- NWC/NA: A measure of cash substitutes. Net working capital is computed as current assets minus current liabilities minus cash.

- M/B: A proxy for investment opportunities, computed as market value of equity plus total assets minus book value of equity all divided by net assets (following Dittmar and Mahrt-Smith (2007) and Bates, Kahle, and Stulz (2007)). Market value of equity is market capitalization of equity at the fiscal year end. Book value of equity is book value of common equity plus deferred taxes and investment tax credits.
- LTD/NA: Leverage, computed as long-term debt due in more than a year plus long-term debt due within a year
- Pays dividends dummy: A measure of firm maturity

I also include calendar year dummy variables to capture any year to year changes in macroeconomic conditions that may affect cash holdings. Some firms may consistently have low or high cash holdings, so I control for this with firm fixed effects. All variables other than dummy variables are winsorized.

My empirical implementation is complicated by the possibility that cash holdings and investment opportunities may be endogenously determined. Accordingly, I follow Dittmar and Mahrt-Smith (2007) and I run two-stage regressions, instrumenting for market-to-book in the first stage with industry market-to-book and including all other variables from the second stage as well.[4] Within each industry based on two-digit SIC codes, for each year, for each publicly traded U.S. operating firm, I compute the median market-to-book ratio defined as before.

[Insert Table 1 about here]

Table 1 presents the results both without and with firm fixed effects. Bigger firms, firms that spend more on acquisitions, firms with more cash substitutes, and firms with higher leverage

[4] If I instrument with industry median sales growth rather than industry median market-to-book, the results of the paper are the same.

hold less cash. Firms with greater capital expenditures, firms with greater R&D expenditures, firms with greater cash flows, firms with more risky cash flows, firms with better investment opportunities, and firms that pay dividends hold more cash. These results are consistent with the literature.

For my estimate of excess financing, I use the residuals of the second stage regression with firm fixed effects in Table 1, Xln(CASH/NA), measured in year +1. These residuals also include the estimated firm fixed effects, i.e., I do not include consistently low or high cash holdings in a firm's normal cash holdings but rather in its excess cash holdings.[5] Like Bates, Kahle, and Stulz (2007), I find that firms going public have positive excess cash holdings on average but that this effect becomes economically insignificant within a few years after the IPO. However, my focus is not the level of cash holdings but rather how raising more financing is associated with firm value.

To measure firm value, I take the comparable firm multiples approach that is standard in both the academic literature and among practitioners (for example, see Kim and Ritter (1999), Purnanandam and Swaminathan (2004), and Houston, James, and Karceski (2006)). I match each IPO firm to a comparable seasoned firm and compute relative valuation ratios. I find a matched firm for each IPO firm as follows. For each IPO firm, for each of years +1 through +5, I consider as candidate matched firms all Compustat firms that can be matched to CRSP, that have fiscal year end dates within the event year, that have been listed for at least five calendar years at the

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[5] I use alternative estimates in untabulated results. In one alternative, I measure cash holdings scaled by total assets or sales rather than net assets. In another alternative, I control for industry in my model of normal cash holdings using two-digit SIC codes. In yet another alternative, I estimate excess cash holdings on my sample of IPO firms and excluding seasoned firms. In a final alternative, I use the residuals of a simple model of ln(CASH/NA) explained by ln(NA). Regardless of which alternative I use, the results of the paper are the same.

time of their fiscal year end date, that do not delist before the IPO date, that are publicly traded U.S. operating firms, and that have the same two-digit SIC code as the IPO firm. I require that there be at least five candidate firms for each IPO firm to avoid forcing a bad match for lack of alternatives. I select as the matched firm the candidate firm with the closest net assets to the net assets of the IPO firm. By matching every IPO firm, for every event year, I ensure that there is always a matched firm that is most similar to the IPO firm that year.[6] An IPO firm may have as many as five different matched firms.[7]

I then compute relative valuation ratios. Specifically, for each of years +1 through +5, I first compute market-to-book for each IPO firm and its matched firm, where market-to-book is the ratio of market value of equity plus total assets minus book value of equity all divided by total assets. Market value of equity and book value of equity are defined as before. I then take the natural logarithm of the ratio of IPO firm's multiple to its matched firm's multiple, $\ln\left((M/B)_{IPO}/(M/B)_{match}\right)$. Market-to-book of the firm is the most conservative valuation ratio a priori,[8] but I also compute market-to-book of equity as well as the ratio of net market

[6] If I match only at the fiscal year end before the IPO date, the results of the paper are the same.

[7] As an alternative, I select matched firms based on additional dimensions, such as investment and cash flows, and on alternative measures of size, such as total assets or sales. I also match seasoned firms to IPO firms using propensity score matching. Specifically, for each of years +1 through +5, I compute propensity scores for my sample IPO firms and seasoned firms using size, investment, and cash flows. I then match each IPO firm to the seasoned firm in the same year with the same two-digit SIC code and with the closest propensity score. The results of the paper are the same.

[8] For any ratio $M/B>0$, for any $C\geq 0$, $M/B\geq(M+C)/(B+C)$. In fact, as C becomes arbitrarily large, $(M+C)/(B+C)$ approaches one. Now, market-to-book ratios are typically greater than one (this is certainly the case for virtually all of my sample IPO firms), the market value of debt is typically close to the book value of debt, and both cash and debt are non-negative. Consequently, leaving cash and debt in both the numerator and the denominator typically

capitalization of equity to net assets, to total assets, to sales, and to EBITDA. Net market capitalization of equity is market capitalization of equity net of cash. In the case of EBITDA, I only use observations where both the IPO firm and its matched firm have positive EBITDA.

[Insert Figure 1 about here]

Figure 1 is illustrative only but it does show that raising more financing is associated with higher firm value and that this relationship persists for many years after the IPO. Results using the other relative valuation ratios instead of market-to-book are similar and thus not shown. Using simple regressions of relative valuation ratios on excess cash, I find that raising 100% more financing at the IPO is associated with 10.0%, 6.7%, 5.3%, 5.8%, and 6.3% higher valuations in years +1 through +5. Pre-IPO shareholders choose the price and quantity of the financing that they raise. Conditional upon going public, do they choose price and quantity to maximize the net benefit of going public?

To answer this question, I perform a simple analysis of what the valuation premium must be for pre-IPO shareholders to be willing to bear the costs of raising more financing. I assume that the choice of the offer price per share, P_o, and quantity of shares, $N\times\alpha$, where N is the number of shares outstanding after the IPO and α is the fraction of the post-IPO firm sold to IPO investors, affects the market price per share after the IPO, $P_m=P_m(P_o,N\times\alpha)$. The dollar benefit of raising more financing is $N\times(1-\alpha)\times P_m\times(P_m/P_b-1)$ and it is driven by the valuation premium, P_m/P_b, where P_b is the price per share if the firm does not raise more financing. Pre-IPO shareholders receive this benefit only on the shares they retain after the IPO. The dollar cost of raising more

understates market-to-book for firms that have more cash and more debt. Importantly, doing so also weakens the relationship between financing and firm value. In fact, the results that I report are the least economically significant compared to the results using other valuations ratios.

financing is $N \times \alpha \times P_m \times [(P_o/P_m) \times S + 1 - (P_o/P_m)]$, where S is the gross spread paid to the underwriter and $1-(P_o/P_m)$ is the underpricing. Pre-IPO shareholders are optimizing if $P_m/P_b - 1 = [(P_o/P_m) \times S + 1 - (P_o/P_m)] \times [\alpha/(1-\alpha)]$.

To calibrate the valuation premium at the optimum, I consider different parameter values of P_o/P_m, the ratio of the offer price per share to the market price per share, and α, the fraction of the post-IPO firm sold to IPO investors. I set S=0.07 for simplicity since the gross spread is 7% for the majority of IPO firms. Table 2 presents the valuation premium for different parameter values of P_o/P_m and α that roughly correspond to the bottom, middle, and top quartiles of the empirical distribution of these parameters. The results suggest that the valuation premium should be around 5-15%. This is comparable to the impact of raising more financing on firm value that I have documented, which is consistent with pre-IPO shareholders choosing price and quantity to maximize the net benefit of going public. In the next section, I consider potential explanations for why firms that raise more financing are worth more.

4. Potential Explanations

4.1 The investor recognition explanation

I hypothesize that raising more financing leads to greater investor recognition and thereby increases firm value.[9] This argument assumes that information is costly. If this is the case, then it follows that all investors do not necessarily follow all firms all the time, i.e., investor recognition differs across firms and across time. In turn, all else equal, a firm's stock price in a costly

[9] If the demand curve for shares in the firm slopes downward, shifting the supply curve out by selling more shares would decrease the price per share. Only if the demand curve shifts out to more than compensate for this decrease in price would the equilibrium effect on firm value of selling more shares be positive. If the demand curve is flat, then for the equilibrium effect on firm value of selling more shares to be positive the demand curve would simply have to shift up. Empirically, I only examine the equilibrium effect.

information world is lower than in a costless information world, and the difference is bigger the more costly information is to investors. For IPO investors, the benefits of incurring these information costs include more efficient risk sharing, more informative stock market prices, and greater liquidity. If the benefits are not sufficiently large, a particular IPO investor may not be willing to incur these information costs unless other IPO investors also do likewise (because, for example, there will not be anyone else to share risk with or trade with). For pre-IPO shareholders, the benefits of greater investor recognition are lower expected returns and/or higher expected cash flows. If the net benefit of greater investor recognition is sufficiently large, pre-IPO shareholders may find it optimal to reduce the information costs of IPO investors by giving them a quantity of underpriced shares.[10] In this way, raising more financing leads to greater investor recognition and thereby increases firm value.[11]

To test this investor recognition explanation, I first test whether raising more financing is associated with greater investor recognition, and then I test whether the investor recognition caused by raising more financing is associated with higher firm value.[12] To test whether raising

[10] Pre-IPO shareholders allocate a certain number of shares at the offer price to certain IPO investors instead of requiring them to pay the market price for the shares and paying them cash in proportion to the information costs that they incur. Prospective IPO investors who are not allocated any shares at the offer price are not paid any cash but neither do they incur any information costs. This argument is equivalent to pre-IPO shareholders paying cash to IPO investors for the information costs that the latter incur.

[11] Thus investor recognition, which is driven by information costs required for investment decisions, differs from consumer recognition, which is driven by information costs required for consumption decisions, although the two would appear to be related.

[12] I would expect the results of the latter test to be consistent with the numerous empirical tests of the impact of investor recognition on firm value. Arbel, Carvell, and Strebel (1983) document that firms with greater institutional ownership have lower returns, which is consistent with greater investor recognition decreasing the cost of capital.

more financing is associated with greater investor recognition, I run regressions of investor recognition on excess financing, excess underpricing, and determinants of investor recognition. I account for excess underpricing because underpricing the offering more can also lead to greater investor recognition (see Chemmanur (1993), Aggarwal, Krigman, and Womack (2002), and Cliff and Denis (2004)). I account for excess underpricing rather than underpricing itself because there are numerous reasons for underpricing the offering that are unrelated to investor recognition. For example, greater underpricing may compensate IPO investors for the valuation uncertainty they bear by purchasing shares at the IPO rather than in the aftermarket.[13]

The persistence of the impact of raising more financing on firm value allows me to distinguish between a rational and a behavioral interpretation of the role of investor recognition. If raising more financing leads to greater investor recognition and thereby increases firm value to above fundamental value, and if this overvaluation is corrected within a few years, then the impact of raising more financing on firm value should also dissipate within a few years. However, if the impact is persistent, this is consistent with greater investor recognition playing a rational role in increasing firm value. Thus I examine extent to which the impact is persistent.

Bodnaruk and Östberg (2007) document the same result for all investors' shareholdings using Swedish data. Chung and Jo (1996) find that greater analyst coverage is associated with higher firm value. Kadlec and McConnell (1994) find that graduating from NASDAQ to the NYSE is associated with higher firm value, and Foerster and Karolyi (1999) and Miller (1999) find likewise for cross-listing in the U.S. Amihud, Mendelson, and Uno (1999) find that firms that intervene to relax minimum transaction size constraints experience an increase in firm value. Chaplinsky and Ramchand (2000) find for seasoned equity issuers that firm value is higher when the firm's potential investor base as a result of the offering is broader.

[13] Similarly, Booth and Chua (1996) argue that pre-IPO shareholders may be willing to increase underpricing to reduce the information costs of IPO investors. This increases ownership dispersion and thereby increases liquidity, decreases expected returns, and increases firm value.

I consider three groups of proxies for investor recognition, namely, proxies for underwriting services, liquidity, and investor interest. My proxies for underwriting services are underwriter reputation and the size of the underwriting team. For underwriter reputation, I use a dummy variable for whether the lead underwriter has a Carter and Manaster (1990) rank of at least eight (for firms with multiple lead underwriters, I use the average rank of the lead underwriters). This underwriter rank is a standard proxy for reputation in the IPO literature.[14] For the size of the underwriting team, I use the number of lead and co-managing underwriters. More underwriters can provide better underwriting services because they have more extensive marketing capabilities, a wider distribution network, etc.

I use two proxies for liquidity. The first proxy is the natural logarithm of the mean daily ratio of absolute stock returns to the dollar value of trading volume (in millions of dollars) during the year after the IPO. This proxy is from Amihud (2002) and it measures price impact, that is, the cost in stock returns of trading a million dollars worth of stock. The second proxy is the percent of zero volume trading days during the year after the IPO, and it should be interpreted as a measure of illiquidity. The proportion of my sample firms that trade every day rises from roughly half in year +1 to roughly two-thirds in year +5. I avoid proxies that use the magnitude of trading volume because trading volume is reported differently for NASDAQ, a dealer market, and the NYSE and AMEX, both auction markets, although the difference varies across firms and across time (see Atkins and Dyl (1997)).

[14] In this paper, better underwriting services lead to greater investor recognition. The literature has also examined underwriting services in other contexts such as the formation of underwriting syndicates to reduce moral hazard in team production (Pichler and Wilhelm (2001)), the role of information production in underwriting syndicates (Corwin and Schultz (2005)), and the association of firms and underwriters by mutual choice (Fernando, Gatchev, and Spindt (2005)).

I use two proxies for investor interest. On the assumption that firms with greater investor recognition should have more analyst coverage and broader ownership, I use analyst coverage and breadth of ownership. I compute analyst coverage as explained before, and I measure breadth of ownership as the number of institutions that own stock in a given firm divided by the total number of institutions that own stock in publicly traded U.S. operating firms. I measure both analyst coverage and breadth of ownership one year after the IPO. Analyst coverage is a good rough proxy for investor interest. Compared to analyst coverage, breadth of ownership has the advantage of capturing the fraction of investors that actually own the stock, thus providing a lower bound on investor awareness of the firm, but it ignores investors who are aware of the firm but do not own stock in it.

For my estimate of excess financing, I use the same Xln(CASH/NA) as before. For my estimate of excess underpricing, I need a benchmark for initial returns, so I estimate a model of normal initial returns for my IPO firms based on Bradley and Jordan (2002)'s model. The Appendix provides details on my estimate of excess initial returns, Xln(1+IR).[15]

For the determinants of my investor recognition proxies, I follow the literature. For liquidity, analyst coverage, and breadth of ownership, I follow Chordia, Huh, and Subrahmanyam (2007), Chung and Jo (1996), and Grullon, Kanatas, and Weston (2004), respectively. The main factors used in these papers are size, investment opportunities, profitability, and risk. These factors would also seem to be among the main determinants of underwriting services, though I am not aware of any comprehensive empirical paper that

[15] In principle, as costs of increasing investor recognition, raising more financing and underpricing the offering more may be either substitutes or complements. In practice, they are complements. In untabulated results, I find that a one percent change in initial returns (excess initial returns) is associated with a 0.6% (3.2%) change in cash-to-net assets (excess cash-to-net assets).

addresses this point. To capture these factors, I use ln(NA), CAPEX/NA, R&D/NA, ACQN/NA, EBITDA/NA, industry SD(EBITDA/NA), and industry M/B all from the fiscal year end before the IPO.

I also attempt to account for measurement error in financing and firm value. If both financing and firm value are measured with error, then they may be correlated simply because they both contain some omitted factors, notably, investment opportunities and/or firm quality. As a solution to this potential problem, I attempt to control for these two omitted factors. To proxy for investment opportunities, I use venture capital backing and offer price revisions. To proxy for firm quality, I also use venture capital backing and offer price revisions as well as managerial ownership retention.

The logic behind venture capital backing is that venture capitalists tend to invest in firms in industries with better investment opportunities, so venture capital backing can proxy for better investment opportunities. Similarly, insofar as venture capital backed firms are staffed by highly skilled professional managers (for example, see Hellmann and Puri (2002)), these firms also tend to be higher quality firms. The logic behind offer price revisions is driven by information production by investors about the firm during bookbuilding. Insofar as information produced about the firm's investment opportunities and/or quality is reflected in the offer price revision, offer price revisions can proxy for these omitted factors.[16] The logic behind using managerial ownership retention after the IPO is twofold. Managers can signal firm quality, at the cost of not diversifying their personal wealth, by retaining a larger ownership stake in the firm (see Leland

[16] Primary proceeds revisions are inappropriate because they depend on the scale of the firm's projects. For example, if the scale of the firm's projects is fixed, then if information produced is favorable, price increases but the number of shares decreases such that proceeds remain fixed. Looking at proceeds revisions may fail to reveal whether favorable information is produced.

and Pyle (1977)). Similarly, managers with a larger ownership stake in the firm have a greater incentive to maximize firm value (see Jensen and Meckling (1976)), so higher managerial ownership retention can proxy for the resulting higher firm quality.[17] I measure venture capital backing using a venture capital backing dummy variable, I measure offer price revisions using the ratio of the offer price from the final prospectus to the midpoint of the original filing range from the preliminary prospectus all minus one, which I winsorize, and I measure managerial ownership retention as the fraction of the firm not sold in the IPO.

[Insert Table 3 about here]

I run probit regressions for the reputable underwriter dummy, negative binomial regressions for the number of underwriters and the number of analysts, and ordinary least squares regressions for price impact, zero volume trading days, and breadth of ownership. Table 3 presents the results for underwriting services, liquidity, and investor interest in the year after the IPO.[18] The regression results indicate that both raising more financing and underpricing the offering more are associated with greater investor recognition. For example, a one-standard deviation increase in excess cash is associated with a 55.3% increase in the probability of having a reputable underwriter, a 49.9% decrease in price impact, and a 4.9% increase in the number of analysts. For excess initial returns, the corresponding figures are 12.5%, 45.9%, and 3.1%,

[17] Morck, Shleifer, and Vishny (1988) find that firm value is not monotonically increasing in managerial ownership. If I replace the fraction of managerial ownership retained with dummy variables for the quartile of managerial ownership retained to capture this lack of monotonicity, the results of the paper are the same.

[18] Although my investor recognition proxies trend over time (for example, see Loughran and Ritter (2004)), the results are the same during various sub-periods.

respectively, impressive though somewhat smaller in magnitude than for excess cash.[19] The results for the determinants of my investor recognition proxies are generally statistically significant and have the correct sign. Bigger firms, firms with better investment opportunities, more profitable firms, more risky firms, and higher quality firms have greater investor recognition.

The results are consistent with the literature on investor recognition. For example, Grullon, Kanatas, and Weston (2004) find that a one-standard deviation increase in advertising expenditures is associated with an 18.3% decrease in relative price impact and an 11.9% increase in the number of institutional shareholders. This is comparable to my finding that a one-standard deviation increase in excess cash is associated with a 49.9% decrease in price impact and a 19.7% increase in the breadth of ownership. Although my estimates are somewhat larger in magnitude than theirs, my sample also comprises much smaller firms than theirs.

[Insert Table 4 about here]

Table 4 presents the results for liquidity and investor interest in years +1 through +5 with the regression specification otherwise the same as in Table 3 (including the explanatory variables being measured at the same point in time as in Table 3). For expositional simplicity, I only tabulate the impacts on each investor recognition proxy of a one-standard deviation change in excess cash and excess initial returns scaled by the mean of the investor recognition proxy where appropriate. Both excess cash and excess initial returns are statistically and economically significant even in year +5. However, the economic impact of excess cash at the IPO tends to be associated with the same impact on liquidity and investor interest in year +1 as in year +5

[19] If I use initial returns rather than excess initial returns, the results of the paper are the same except that the impact of the former is larger in magnitude than the impact of the latter.

whereas the economic impact of excess initial returns gradually halves during the five years after the IPO. In other words, the impact of raising more financing on investor recognition persists for many years whereas the impact of underpricing the offering more dissipates over time. I now test whether the investor recognition caused by raising more financing is associated with higher firm value.

Investor recognition and firm value may be endogenous. In other words, not only may greater investor recognition cause higher firm value, but higher firm value may cause greater investor recognition. In this case, I must control for investor recognition when explaining firm value. I solve this potential endogeneity problem by explaining firm value with investor recognition decomposed by excess financing. The component of investor recognition correlated with excess financing allows me to answer my question of interest while the component of investor recognition uncorrelated with excess financing allows me to control for the effect of investor recognition on firm value. I implement this solution by regressing firm value on the two components of investor recognition. The coefficient estimate on the uncorrelated component is biased so I will not interpret it, but the coefficient estimate on the correlated component should be exogenous to firm value. There is no reason to believe that higher firm value causes firms to increase investor recognition by raising more financing. The same reasoning applies to excess underpricing, so I implement the same solution for excess initial returns.

I use the same relative valuation ratios as before as well as the same investor recognition proxies. I am interested in the impact of my investor recognition proxies individually and collectively. However, the individual proxies are highly correlated (pairwise correlations have an average magnitude of 0.447 and are all statistically significant at the one percent level). Hence I create a composite investor recognition proxy as the first principal component of the individual proxies. The component loadings are 0.347, 0.399, -0.490, -0.300, 0.456, and 0.428, and they all have the correct sign.

I decompose each investor recognition proxy into two components, one correlated with excess cash and the other uncorrelated with excess cash. I regress the investor recognition proxy the year after the IPO on excess cash and I use the fitted values and the residuals as my estimates of the two components, respectively. I then run regressions of relative valuation ratios in years +1 through +5 on the two components of the decomposed investor recognition proxy. To compare the impact of excess cash and excess initial returns on relative valuation ratios, I follow the same procedure for excess initial returns. I also control for investment opportunities and firm quality using the venture capital backing dummy variable, the offer price revision, and the fraction of managerial ownership retained as before.

[Insert Table 5 about here]

[Insert Table 6 about here]

Table 5 and Table 6 present the results for the composite investor recognition proxy and market-to-book as the relative valuation ratio. Results for the individual investor recognition proxies and for the other relative valuation ratios are similar and thus not tabulated. Table 5 reports complete regression results for the composite investor recognition proxy decomposed by excess cash. Table 6 does likewise for excess initial returns.[20]

[20] I use alternative specifications in untabulated results. In one alternative, I include simultaneously the component of investor recognition correlated with excess cash and the component of investor recognition correlated with excess initial returns but I omit the two uncorrelated components. In another alternative, I control for ln(NA), CAPEX/NA, R&D/NA, ACQN/NA, EBITDA/NA, industry SD(EBITDA/NA), and industry M/B. In a final alternative, I control for the year in which the firm goes public. Regardless of which alternative I use, the results are the same.

Panel As of the two tables show that more excess cash is associated with higher valuations in years +1 through +5 whereas higher excess initial returns are associated with higher valuations only until year +3. In terms of economic magnitude as shown in Panel Bs, a one-standard deviation increase in excess cash is associated with roughly 5-10% higher valuations in years +1 through +5. By contrast, a one-standard deviation increase in excess initial returns is associated with roughly 16% higher valuations in year +1, +7% in year +2, and +3% in year +3 (in years +4 and +5, the estimates are not statistically significant).

To simplify the interpretation of the results, I also run a set of regressions like in Table 5 and Table 6 but using both excess cash and excess initial returns simultaneously as the only two explanatory variables and without decomposition. I thus obtain estimates of the elasticity of relative valuation ratios with respect to excess cash and the elasticity of relative valuation ratios with respect to excess initial returns. In years +1 through +5, the elasticities with respect to excess cash are 0.093, 0.064, 0.051, 0.058, and 0.063, respectively. In years +1 through +3, the elasticities with respect to excess initial returns are 1.023, 0.425, and 0.224, respectively, and they are not statistically significant in years +4 and +5. Therefore, raising 100% more financing, for example, is associated with roughly 9% higher valuations in year +1 and roughly 6% higher valuations in years +2 through +5.

To benchmark the magnitude of the impact of raising more financing on firm value, I use the work of Fang and Peress (2007) on media coverage. They find that firms with no media coverage outperform firms with high media coverage by 0.23% per month (0.65% to 1% per month for small firms, firms with low analyst coverage, and firms owned primarily by individuals). Suppose a firm generates a fixed stream of perpetual cash flows and has an expected return of 11% per year. If media coverage increases from no coverage to high coverage and the expected return drops by just one percentage point to 10%, then firm value increases by 10%. This is comparable to my estimates of the impact of raising more financing on firm value, which suggests that the economic magnitude of my estimates is consistent with the literature.

It is possible that all of the shares issued to raise excess financing are bought by a single blockholder and that the positive effect on firm value of the resulting increase in monitoring outweighs the negative effect of resulting decrease in managerial incentives. In the absence of data on blockholders, I cannot disentangle this possibility empirically from investor recognition but it seems improbable given the findings of Field and Sheehan (2004). They find that there are blockholdings in place before the IPO for most firms going public, that these blockholdings remain in place after the IPO, and that the formation of new blockholdings after the IPO is unrelated to underpricing. Instead, it seems more probable that the negative effect on firm value of decreased managerial incentives dominates the positive effect of the single blockholder, especially to the extent that managers sell their shares following the expiration of lockups and venture capitalists sell their shares or distribute them to their investors.

Closely related to the investor recognition explanation is the signaling explanation. A signaling equilibrium is possible where high quality firms raise more financing, low quality firms do not because it is prohibitively costly for them to do so, and investors value more highly firms that raise more financing. (Of course, this signaling equilibrium runs counter to Leland and Pyle (1977)'s argument that managers of high quality firms signal through greater managerial ownership retention.) The predictions of the investor recognition and signaling explanations are similar and the empirical evidence is also generally consistent with both. Both explanations allow that share sales reduce the alignment of managers' and shareholders' interests but that share sales also have offsetting benefits. However, the signaling explanation requires that investors interpret selling more shares, including secondary shares, as a positive signal per se. The consensus in the academic and practitioner literature is inconsistent with this interpretation. In their survey of managers, Brau and Fawcett (2006) report that managers believe that selling a larger fraction of the firm and selling insider shares are viewed as negative signals by the market. Similarly, Killian, Smith, and Smith (2001) repeatedly warn investors about investing in firms going public where managers have too little stock in the firm and/or are cashing out. Therefore, while both the investor recognition and signaling explanations are theoretically possible, the signaling explanation seems less plausible in practice.

In summary, the impact of raising more financing through investor recognition on firm value is economically significant and persists for many years. Moreover, that raising more financing has a persistent impact on firm value is consistent with greater investor recognition playing a rational role in increasing firm value. Overall, there is strong evidence for the investor recognition explanation of why firms that raise more financing are worth more.

4.2 The fixed costs of raising financing explanation

The fixed costs explanation states that if there are fixed costs associated with raising financing, firms with relatively higher fixed costs should raise more financing but should do so less frequently. Otherwise, firm value is destroyed either because the firm has to raise more financing subsequently or because the firm does not have the financing to exploit its investment opportunities. I test the fixed costs hypothesis using two interpretations of fixed costs. First, I interpret as fixed costs the direct costs of raising financing. I follow Lee, Lochhead, Ritter, and Zhao (1996) and I define these fixed costs to be the sum of accounting, legal, printing and engraving, S.E.C. and state registration, transfer and registrar agent, and trustee expenses.[21] I then compute the ratio of these direct costs to market capitalization of equity at the close of the first day of trading. The median firm has direct costs of 0.47% of market capitalization, and the 75th, 90th, and 95th percentiles of direct costs to market capitalization are 0.87%, 1.54%, and 2.09%, respectively. A glance at Figure 1 shows that although these direct costs are not trivial, they are an order of magnitude too small to account for the impact of raising more financing on firm value.

Second, I interpret as fixed costs the opportunity cost of managers focusing on raising financing rather than on running operations. I test whether firm value is higher for those firms that have higher fixed costs of raising financing and that actually raise more financing. As before, I measure firm value using relative valuation ratios.

I construct a fixed costs proxy as follows. Managerial focus on running operations should be more important for smaller firms, for firms with higher investment expenditures, less profitable firms, more risky firms, and firms with better investment opportunities. The variables that I use to capture these fixed costs are ln(NA), the sum of CAPEX/NA, R&D/NA, and ACQN/NA, EBITDA/NA, industry SD(EBITDA/NA), and industry M/B, respectively, all from the fiscal year end before the IPO. I extract the first common factor of these variables and I use its negative as my fixed costs proxy (so that higher values of the fixed costs proxy correspond to higher fixed costs). The factor loadings are -0.353, 0.643, -0.594, 0.661, and 0.708, and they all have the correct sign. The correlation between excess financing and my fixed costs proxy is

[21] The relevant fixed costs are those that must be incurred each time the firm raises financing, i.e., both at the IPO and at an SEO. Accordingly, many fixed costs of the IPO are not relevant because they must be incurred only at the IPO (e.g., stock exchange registration expenses).

0.400 (p-value 0.000), which is consistent with firms that have higher fixed costs actually raising more financing.

I run regressions of relative valuation ratios on excess financing, the interaction of excess financing and the fixed costs proxy, and the fixed costs proxy. If firms with higher fixed costs of raising financing actually raise more financing, then the interaction term should be positive. As before, I also control for investment opportunities and firm quality using the venture capital backing dummy variable, the offer price revision, and the fraction of managerial ownership retained.

[Insert Table 7 about here]

Table 7 presents the results for market-to-book as the relative valuation ratio. Results for the other relative valuation ratios are similar and thus not tabulated. More excess cash is associated with roughly 5-10% higher valuations in years +1 through +5. However, the interaction term is not statistically significant in any of years +1 through +5, which does not support the opportunity cost interpretation of fixed costs. Overall, I do not find any evidence that supports the fixed costs explanation of why firms that raise more financing are worth more.

4.3 The market timing explanation

The market timing explanation states that if firms can raise financing at prices above fundamental value, they should raise as much financing as possible and as soon as possible. Firms going public may be overvalued because of excessively low expected returns and/or excessively high expected cash flows. If this overvaluation is corrected within a few years, then, in the years after going public, firms that time the market should have lower realized returns relative to the appropriate benchmark, reflecting upward revisions of expected returns and/or downward revisions of expected cash flows. They may also have lower realized cash flows relative to expected cash flows. To test the market timing explanation, I test whether raising more financing is associated with worse stock performance and lower than expected earnings.

Specifically, I first run calendar-month Fama-French three-factor regressions for a portfolio that is long firms with low excess cash and short firms with high excess cash. The portfolio contains all sample firms that have gone public in the last five years. Low (high) excess cash is defined as below (above) median excess cash for my sample IPO firms. Following Loughran and Ritter (2000), I run regressions with both unpurged factor returns as well as factor returns purged of all firms that have issued equity. Next, I run event-time regressions of buy-and-hold abnormal returns on excess cash. Returns are computed for each firm for up to five years from the IPO date using as the benchmark the CRSP equal weighted index, the CRSP value weighted index, and portfolios matched by size and book-to-market quintiles.

Finally, I run regressions of earnings forecast errors on excess cash. Earnings forecasts errors are defined as realized earnings minus estimated earnings all divided by the stock price. Realized and estimated earnings are in per share terms. For estimated earnings, I compute the consensus estimate as explained before. I measure estimated earnings and the stock price at the end of each of years +1 through +5. I can only compute earnings forecast errors for firms that are covered by at least one analyst. I treat earnings forecast errors greater than 100% in absolute value as missing observations and I winsorized earnings forecast errors at the 2.5^{th} and 97.5^{th} percentiles.

[Insert Table 8 about here]

Table 8 presents the results. From the factor regressions in Panel A, we see that low excess financing firms underperform high excess financing firms by roughly 0.5% per month when returns are equal weighted. The difference between the performance of low and high excess financing firms is not statistically significant when returns are value weighted. In other words, raising more financing is not associated with lower realized returns contrary to what the the market timing explanation predicts. From the buy-and-hold abnormal returns regressions in Panel B, we see that excess cash is only statistically significant using the CRSP value weighted index, and the results in this case suggest that raising more financing is associated with better stock performance. From Panel C, we see that excess cash is associated with higher earnings forecast errors. In other words, firms that raise more financing have higher than expected cash flows, not lower than expected cash flows as the market timing explanation predicts. In summary, the evidence does not support the market timing explanation of why firms that raise more financing are worth more.

The results of these tests of the market timing explanation help differentiate between the investor recognition and market timing explanations. Lower expected returns would be consistent with both explanations provided that cash flow expectations were unbiased. Table 3 and Table 4 show that raising more financing is associated with greater liquidity. Moreover, if greater liquidity decreases expected returns, then firms that raise more financing should have lower expected returns. The results in Table 8 showing that realized returns are not lower for firms that raise more financing are not evidence against either explanation because cash flows may be underestimated and thus realized returns should be higher. However, underestimated cash flows would be consistent only with the investor recognition explanation and not with the market timing explanation since the market timing explanation would predict overestimated cash flows (or no effect on cash flows). Table 8 shows that cash flows are underestimated. Therefore, while the realized returns results in Table 8 can be interpreted as inconclusive about whether expected returns are lower for firms that raise more financing, the underestimated cash flows results in Table 8 are clearly consistent with the investor recognition explanation and inconsistent with the market timing explanation.

5. Robustness Tests

I perform several additional robustness tests of the results. First, I may be finding that firms that raise more financing are worth more because, despite my careful empirical strategy, both financing and firm value may still be mismeasured and contain investment opportunities and/or firm quality. I consider this possibility by examining secondary share sales in the IPO. Secondary share sales transfer ownership from pre-IPO shareholders to IPO investors and do not provide financing to the firm. However, for secondary share sales, the three explanations that I consider are equally applicable as for primary share sales but may be unaffect by investment opportunities and firm quality. Additionally, unlike primary shares sales, secondary shares sales may even be associated with worse investment opportunities and lower firm quality. Firms presumably first sell primary shares to finance investment opportunities and only then sell secondary shares to reduce pre-IPO shareholders' stake in the firm. Thus observing secondary share sales may indicate that a firm has sufficient financing for its investment opportunities. Similarly, selling secondary shares necessarily reduces the alignment of managers' and shareholders' interests and thus decreases firm quality by exacerbating agency problems and thereby decreases firm value.

[Insert Table 9 about here]

I redo the results of Table 3 through Table 8 using only firms that sell at least some secondary shares (roughly 45% of my sample firms). I use secondary share sales instead of excess cash, where I measure secondary share sales as the natural logarithm of the ratio of the dollar value of secondary share sales at the offer price net of the gross spread to net assets in year

+1. (I use this scaling to be consistent with my estimate of excess financing from the sale of primary shares.) Using secondary share sales, I find the same results as I do using primary share sales thus the results do not appear to be driven by measurement error. For this robustness test as well as the other robustness tests in this section, Table 9 reports selected results of regressing firm value on financing to give an idea of how the results differ between various model specifications. Since the difference in a one-standard deviation increase in excess cash across different sub-samples is not economically significant, I do not tabulate the impact of a one-standard deviation increase in excess cash on relative valuation ratios.

Second, I consider whether the results are driven by the sale of shares from the exercise of the underwriter's overallotment options. Underwriters receive an overallotment option from the issuer that allows them to purchase up to 15% of the shares sold in the offering. The underwriter typically oversells the offering by 15% and pursues one of two strategies to cover the resulting short position. If the stock price in the aftermarket is greater than or equal to the offer price, then the underwriter exercises the overallotment option and earns the gross spread on the additional 15% of the shares it oversold. If the stock price is less than the offer price, then the underwriter purchases shares in the aftermarket and profits on the difference between the proceeds of the sale to investors and the cost of purchasing shares in the market.

Consequently, the relationship between raising more financing and firm value may be the mechanical result of the underwriter pursuing its optimal short covering strategy. Since the underwriter exercises the overallotment option if and only if the stock price in the aftermarket is greater than or equal to the offer price, then firms that are worth more in the aftermarket also raise more financing (from the exercise of the overallotment option). I classify my sample firms into two sub-samples based on whether the overallotment option is exercised, and I redo the results of Table 3 through Table 8 to examine whether the results differ between the two sub-samples. The overallotment option is exercised for roughly two-thirds of my sample firms. I find that the results are the same within each sub-sample, thus the results do not appear to be driven by the sale of shares from the exercise of the underwriter's overallotment options.

Third, I consider whether the results are simply a manifestation of Alti (2006)'s hot issues markets finding. Hot issues markets are periods during which a relatively high number of firms go public and are periods of high stock prices. One interpretation of hot issues markets is that they are periods of low asymmetric information, which decreases expected returns and thereby increases both firm value and financing raised (for example, see Choe, Masulis, and Nanda (1993) and Bayless and Chaplinsky (1996)). Alti (2006) studies IPOs that occur during hot issues markets versus other periods and finds that firms issue more equity during hot issues markets. Hence the relationship between raising more financing and firm value may be driven by firms going public during hot issues markets versus other periods.

I classify my sample firms into two sub-samples based on whether the firm goes public during a hot issues market. I follow Alti (2006) and I define hot issues markets as periods when the three-month centered moving average of the total number of IPOs from Jay Ritter's website is above its median value between 1980 and 2004. Roughly three-quarters of my sample firms go public during hot issues markets. I redo the results of Table 3 through Table 8 to examine whether the results differ between the two sub-samples. I find that the results are the same within each sub-sample, thus the results do not appear to be driven by hot issues markets.[22]

[22] The difficulty with defining excess financing as financing adjusted for whether the firm goes public during a hot issues market is that market conditions do not explain much of financing raised. A dummy variable for hot issues markets explains roughly 0.5% of each of Alti (2006)'s ratios of proceeds to total assets.

Finally, I consider whether the causality from raising more financing to firm value runs in the opposite direction. Ritter (1984) observes that to raise a given amount of financing, a firm that is more highly valued has to sell a smaller fraction of its shares outstanding to IPO investors. In other words, if a firm receives a positive valuation shock, both the fraction sold in the IPO and the entire firm are worth more (the firm is not worth more because it raises more financing).

While I cannot observe valuation shocks before the firm files to go public, I can observe valuation shocks between the filing date and the offering date. For firms for which this latter valuation shock is negative, the total valuation shock (before and after the filing date) is smaller and raising more financing should have a smaller impact on firm value. I classify my sample firms into three sub-samples based on whether the final offer price is above, within, or below the original filing range. According to this classification, roughly one-quarter of my sample firms have an unambiguously positive valuation shock (roughly 25% in magnitude measured from the midpoint of the original filing range) between the filing date and the offering date and one-quarter have an unambiguously negative valuation shock (also roughly 25% in magnitude). Not surprisingly, this classification also captures primary proceeds revisions. When the final offer price is above the filing range, primary proceeds increase 73.6% of the time, whereas when the final offer price is below the filing range, primary proceeds decrease 97.8% of the time. However, there is a reasonably large sub-sample of 653 firms for which the offer price is above the midpoint of the filing range and primary proceeds are revised downward (there are only 60 firms for which the opposite happens). These firms experience positive valuation shocks and negative financing shocks. I redo the results of Table 3 through Table 8 to examine whether the results differ between the three sub-samples as well as for the sub-sample of firms with positive valuation shocks and negative financing shocks, and I find that the results are the same within each sub-sample. While this does not allow me to rule out reverse causality completely, it certainly allows the possibility that raising more financing leads to higher firm value.

6. Conclusion

I study the financing decisions of firms going public. I find that, all else equal, firms that raise more financing are worth more. I then study why this is the case. As one potential explanation, I consider the investor recognition hypothesis, which states that raising more financing leads to greater investor recognition and thereby increases firm value. Using several proxies for investor recognition, I find that raising more financing is associated with greater investor recognition, and that the investor recognition caused by raising more financing is associated with higher firm value. I also consider two other potential explanations for why firms that raise more financing are worth more, namely, fixed costs of raising financing and market timing. I do not find any evidence that supports these two explanations. Moreover, my robustness tests suggest that the results do not appear to be driven by investment opportunities or firm quality, exercise of the underwriter's overallotment option, hot issues markets, or reverse causality. Overall, the evidence most strongly supports the investor recognition explanation of why firms that raise more financing are worth more.

Indeed, the investor recognition explanation provides a reason why firms sell so many shares at so high a cost when they go public. In the limit, if pre-IPO shareholders focus only on minimizing their costs of going public by selling as few shares as possible, IPO investors may not find it optimal to bear information costs themselves, and no market in the firm's shares develops. Without raising enough financing and thus increasing investor recognition, the firm simply defers going public and the associated benefit of higher firm value to a later time.

Appendix

I follow Bradley and Jordan (2002) in estimating my model of normal initial returns. I define initial returns as $\ln(P_{market}/P_{offer})$, winsorized at the 2.5^{th} and 97.5^{th} percentiles, and denote them as ln(1+IR). My explanatory variables are as follows. I control for the well-known partial adjustment phenomenon documented by Hanley (1993), namely, that the offer price is only partially adjusted to reflect information learned between the filing date and the offering date. I measure offer price revisions using the ratio of the offer price from the final prospectus to the midpoint of the original filing range from the preliminary prospectus all minus one, $P_{offer}/P_{filing}-1$, which I winsorize. I use the mean initial returns of IPOs in the last three months to measure what other firms pay in underpricing costs. I also include ln(NA), CAPEX/NA, R&D/NA, ACQN/NA, EBITDA/NA, industry SD(EBITDA/NA), industry M/B, LTD/NA, and the pays dividends dummy variable all from the fiscal year end before the IPO. These variables should adequately account for size, investment opportunities, profitability, risk, leverage, and firm maturity.[1]

[Insert Appendix Table 1 about here]

Appendix Table 1 presents the results. Firms with greater price revisions and firms going public when initial returns are typically high have higher initial returns. Bigger firms, more profitable firms, and more levered firms have lower initial returns. Firms with better investment opportunities and more risky firms have higher initial returns. These results are consistent with the literature.

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[1] Unlike Bradley and Jordan (2002), however, I do not include overhang (more accurately, managerial ownership retention) and venture capital backing because I use them as proxies for firm quality. I also do not include underwriter reputation because I use excess underpricing to explain underwriting services for which underwriter reputation is a proxy. The results of the paper are the same if I do include overhang and/or the venture capital backing dummy variable.

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Table 1
Model of Normal Cash Holdings

This table presents the estimates of a model of normal cash holdings. The sample comprises a panel of 91,464 firm-years consisting of 8,480 seasoned firms and 4,799 IPO firms between 1980 and 2006. The regression equation is:

$$\ln\left(\frac{CASH_{i,t}}{NA_{i,t}}\right) = \beta_0 + \beta_1 \ln(NA_{i,t}) + \beta_2 \frac{CAPEX_{i,t}}{NA_{i,t}} + \beta_3 \frac{R\&D_{i,t}}{NA_{i,t}} + \beta_4 \frac{ACQN_{i,t}}{NA_{i,t}} + \beta_5 \frac{EBITDA_{i,t}}{NA_{i,t}} +$$
$$+ \beta_6 \text{Industry SD}(EBITDA/NA)_{i,t} + \beta_7 \frac{NWC_{i,t}}{NA_{i,t}} + \beta_8 \text{Instrumented}\left(\frac{M_{i,t}}{B_{i,t}}\right) + \beta_9 \frac{LTD_{i,t}}{NA_{i,t}} +$$
$$+ \text{Pays dividends dummy} + \text{Year dummies} + \text{Firm dummies} + \varepsilon_{i,t}\,.$$

M/B is market value of equity plus total assets minus book value of equity all divided by net assets. NA = net assets. ACQN = acquisition expenditures. Industry SD(EBITDA/NA) is the industry median standard deviation of EBITDA/NA. NWC = current assets minus current liabilities minus cash. Industry M/B is the industry median M/B. LTD = long-term debt. In the second stage of two-stage regressions, I use instrumented market-to-book from the first stage. All regressions include year dummies. Standard errors are clustered by firm. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Below each coefficient estimate is its corresponding robust t-statistic in parentheses.

	Without firm fixed effects		With firm fixed effects	
	First stage	Second stage	First stage	Second stage
	M/B	ln(CASH/NA)	M/B	ln(CASH/NA)
ln(NA)	-0.171***	-0.133***	-0.755***	-0.363***
	(16.24)	(15.96)	(25.16)	(18.78)
CAPEX/NA	3.940***	0.605***	3.756***	0.469***
	(18.89)	(3.78)	(18.15)	(4.25)
R&D/NA	10.677***	2.564***	6.937***	0.750***
	(42.77)	(9.10)	(18.65)	(4.64)
ACQN/NA	-0.242*	-0.341***	-0.130	-0.219***
	(1.70)	(3.71)	(0.99)	(3.15)
EBITDA/NA	2.238***	0.906***	2.831***	0.606***
	(14.54)	(11.89)	(19.67)	(8.74)
Industry SD(EBITDA/NA)	-6.749***	3.854***	-9.390***	1.672***
	(11.94)	(12.43)	(12.05)	(4.76)
NWC/NA	-1.332***	-0.539***	-0.766***	-0.188***
	(14.83)	(9.15)	(7.41)	(3.78)
Industry M/B	0.792***		0.736***	
	(23.87)		(20.27)	
Instrumented M/B		0.163***		0.138***
		(6.97)		(7.54)
LTD/NA	-0.688***	-1.101***	-0.131	-0.148***
	(7.93)	(19.70)	(1.37)	(3.09)
Pays dividends dummy	0.050	0.007	0.285***	0.122***
	(1.34)	(0.23)	(8.47)	(5.01)
Constant	1.200***	-2.522***	4.215***	-1.384***
	(15.79)	(38.86)	(26.17)	(11.79)
Number of firm-years	90,384	90,384	90,384	90,384
Adjusted R^2	0.427	0.324		
Within firms R^2			0.184	0.127
Between firms R^2			0.393	0.234
Overall R^2			0.295	0.187

Table 2
Calibration of Valuation Premium

This table presents the valuation premium for different parameter values of P_o/P_m and α. The sample comprises 4,572 firms that go public between 1980 and 2004. The valuation premium is $P_m/P_b-1=[(P_o/P_m)\times S+1-(P_o/P_m)]\times[\alpha/(1-\alpha)]$. P_o/P_m is the ratio of the offer price per share to the market price per share and α is the fraction of the post-IPO firm sold to IPO investors.

		α, the fraction of the firm sold to IPO investors		
		20%	30%	40%
P_o/P_m, the ratio of the offer price per share to the market price per share	80%	6.4%	11.0%	17.1%
	90%	4.1%	7.0%	10.9%
	100%	1.8%	3.0%	4.7%

Table 3
Short-Term Impact of Raising More Financing and Underpricing More on Investor Recognition

This table presents regressions of investor recognition at the IPO on excess financing and excess underpricing at the IPO. The sample comprises 4,572 firms that go public between 1980 and 2004. The regression equation is:

$$\text{Investor recognition}_i = \beta_0 + \beta_1 \text{X}\ln\left(\frac{CASH}{NA}\right)_i + \beta_2 \text{X}\ln(1+\text{IR})_i + \beta_3 \ln(NA_i) + \beta_4 \frac{CAPEX_i}{NA_i} + \beta_5 \frac{R\,\&\,D_i}{NA_i} + \beta_6 \frac{ACQN_i}{NA_i} + \beta_7 \frac{EBITDA_i}{NA_i} +$$

$$+ \beta_8 \text{Industry SD}(EBITDA/NA)_i + \beta_9 \text{Industry}\left(\frac{M}{B}\right)_i +$$

$$\beta_{10}\text{Venture capital dummy}_i + \beta_{11}\text{Offer price revision}_i + \beta_{12}\text{Managerial ownership}_i + \varepsilon_i .$$

Probit regressions are run for the reputable underwriter dummy as the dependent variable, negative binomial regressions for the number of underwriters and the number of analysts as dependent variables, and ordinary least squares regressions for price impact, zero volume trading days, and breadth of ownership as dependent variables. The reputable underwriter dummy is a dummy variable for whether the lead underwriter has a Carter and Manaster (1990) rank of at least eight. The number of underwriters is the number of lead and co-managing underwriters. Price impact is the mean daily ratio of absolute stock returns to dollar trading volume (in millions of dollars). Breadth of ownership is the number of institutions that own stock in a given firm divided by the total number of institutions that own stock in publicly traded U.S. operating firms. Price impact and the percent of zero volume trading days are measured during the year after the IPO. The number of analysts and the breadth of ownership are measured one year after the IPO. Xln(CASH/NA) is an estimate of excess financing and is the residuals of the second stage regression with firm fixed effects in Table 1 using data from the fiscal year end after the IPO. Xln(1+IR) is an estimate of excess underpricing using the residuals of the regression in Appendix Table 1. NA = net assets. ACQN = acquisition expenditures. Industry SD(EBITDA/NA) is the industry median standard deviation of EBITDA/NA. NWC = current assets minus current liabilities minus cash. Industry M/B is the industry median M/B. ln(NA), CAPEX/NA, R&D/NA, ACQN/NA, EBITDA/NA, industry SD(EBITDA/NA), and industry M/B are from the fiscal year end before the IPO. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Below each coefficient estimate is its corresponding robust t-statistic in parentheses.

Panel A: Regressions of investor recognition proxies on excess financing and excess underpricing						
	Underwriting services		Liquidity		Investor interest	
	Reputable underwriter dummy	Number of underwriters	ln(price impact)	Percent of zero volume trading days	Number of analysts	Percent breadth of ownership
Xln(CASH/NA)	0.214***	0.065***	-0.311***	-0.647***	0.112***	0.270***
	(12.30)	(12.14)	(18.34)	(9.42)	(12.71)	(10.56)
Xln(1+IR)	0.551***	0.227***	-3.245***	-4.712***	0.795***	1.756***
	(3.53)	(4.77)	(17.98)	(7.64)	(9.53)	(8.81)
ln(NA)	0.689***	0.198***	-0.792***	-1.097***	0.304***	0.913***
	(29.23)	(28.34)	(48.43)	(15.45)	(35.31)	(19.24)
CAPEX/NA	0.681***	0.140**	-1.009***	-1.721**	0.551***	0.879***
	(3.83)	(2.32)	(5.58)	(2.27)	(6.36)	(3.81)
R&D/NA	1.205***	0.212***	-1.435***	-1.868***	0.371***	1.643***
	(9.34)	(6.94)	(11.66)	(6.10)	(7.36)	(11.07)
ACQN/NA	0.003	0.193***	-0.085	-0.498	-0.051	-0.626***
	(0.01)	(3.14)	(0.45)	(0.73)	(0.50)	(2.63)
EBITDA/NA	0.098*	-0.065***	-0.151**	-0.569***	0.033	0.427***
	(1.73)	(3.14)	(2.19)	(3.59)	(1.09)	(5.41)
Industry SD(EBITDA/NA)	1.543	1.005***	-4.442***	-9.836***	2.593***	5.242***
	(1.59)	(3.24)	(4.69)	(2.64)	(5.58)	(3.74)
Industry M/B	0.116***	0.105***	-0.131***	-0.422***	0.041**	-0.129***
	(3.17)	(10.64)	(3.56)	(3.02)	(2.38)	(2.84)
Venture capital backed dummy	0.465***	0.105***	-0.280***	-0.714***	0.286***	0.435***
	(9.06)	(7.35)	(5.65)	(3.51)	(11.64)	(6.86)
Offer price revision	0.650***	0.161***	-3.128***	-2.896***	0.720***	2.300***
	(5.22)	(4.77)	(23.66)	(6.33)	(11.73)	(13.19)
Managerial ownership retained	-0.036	-0.208***	0.225*	0.292	0.008	-0.001
	(0.27)	(4.29)	(1.82)	(0.58)	(0.13)	(0.01)
Constant	-2.936***	-0.209***	2.322***	9.203***	-0.564***	-1.945***
	(19.69)	(4.67)	(18.10)	(15.03)	(8.24)	(7.16)
Observations	4,448	4,448	4,331	4,271	4,214	4,403
Pseudo R^2	0.290	0.082			0.096	
Adjusted R^2			0.516	0.129		0.354

Panel B: Impact of excess financing and excess underpricing on investor recognition proxies						
	Underwriting services		Liquidity		Investor interest	
	Reputable underwriter dummy	Number of underwriters	ln(price impact)	Percent of zero volume trading days	Number of analysts	Percent breadth of ownership
	$\frac{\hat{\beta}_{X_i} \times \hat{\sigma}_{X_i}}{\hat{\mu}_Y}$	$\frac{\hat{\beta}_{X_i} \times \hat{\sigma}_{X_i}}{\hat{\mu}_Y}$	$\hat{\beta}_{X_i} \times \hat{\sigma}_{X_i}$	$\frac{\hat{\beta}_{X_i} \times \hat{\sigma}_{X_i}}{\hat{\mu}_Y}$	$\frac{\hat{\beta}_{X_i} \times \hat{\sigma}_{X_i}}{\hat{\mu}_Y}$	$\frac{\hat{\beta}_{X_i} \times \hat{\sigma}_{X_i}}{\hat{\mu}_Y}$
Xln(CASH/NA)	55.3%	4.4%	-49.9%	-41.1%	4.9%	19.7%
Xln(1+IR)	12.5%	1.4%	-45.9%	-26.3%	3.1%	11.3%

Table 4
Long-Term Impact of Raising More Financing and Underpricing More on Investor Recognition

This table presents Table 3 regressions with two exceptions. First, the only investor recognition proxies used are price impact, zero volume trading days, the number of analysts, and the breadth of ownership. Second, results for investor recognition are presented for each of the five years after the IPO rather than just the year after the IPO. For expositional simplicity, only impacts are tabulated.

	Change in the investor recognition proxy from a one-standard deviation change in excess financing and excess underpricing									
	Year relative to the IPO date									
	+1		+2		+3		+4		+5	
ln(price impact)										
Xln(CASH/NA)	-49.9%	***	-55.7%	***	-57.5%	***	-60.7%	***	-60.5%	***
Xln(1+IR)	-45.9%	***	-35.6%	***	-23.7%	***	-24.0%	***	-21.3%	***
Percent of zero volume trading days, relative to its mean										
Xln(CASH/NA)	-41.1%	***	-45.2%	***	-44.3%	***	-50.1%	***	-50.0%	***
Xln(1+IR)	-26.3%	***	-25.2%	***	-19.8%	***	-12.9%	***	-13.7%	***
Number of analysts, relative to its mean										
Xln(CASH/NA)	4.9%	***	3.6%	***	3.3%	***	3.4%	***	3.0%	***
Xln(1+IR)	3.1%	***	2.6%	***	2.1%	***	1.5%	***	1.5%	***
Percent breadth of ownership, relative to its mean										
Xln(CASH/NA)	19.7%	***	18.2%	***	18.3%	***	18.4%	***	18.7%	***
Xln(1+IR)	11.3%	***	7.6%	***	6.2%	***	4.6%	***	3.6%	***

Table 5
Investor Recognition Decomposed By Financing and Firm Value

This table presents regressions of firm value on investor recognition decomposed by excess financing. The sample comprises 4,572 firms that go public between 1980 and 2004. The regression equation is:

$$\ln\left(\frac{(M_i/B_i)_{IPO}}{(M_i/B_i)_{match}}\right) = \beta_0 + \beta_1 \text{Fitted investor recognition}_i + \beta_2 \text{Residual investor recognition}_i + \\ + \beta_3 \text{Venture capital dummy}_i + \beta_4 \text{Offer price revision}_i + \beta_5 \text{Managerial ownership}_i + \varepsilon_i .$$

The composite investor recognition proxy is first regressed on Xln(CASH/NA) and both the fitted values and residuals of this first regression are used in place of the composite investor recognition proxy in the second regressions. Seasoned firms are matched to IPO firms by industry and net assets. M/B is market value of equity plus total assets minus book value of equity all divided by total assets. A composite investor recognition proxy is created as the first principal component of the six individual investor recognition proxies. Xln(CASH/NA) is an estimate of excess financing and is the residuals of the second stage regression with firm fixed effects in Table 1 using data from the fiscal year end after the IPO. Regressions are run for each year relative to the IPO date. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Below each coefficient estimate is its corresponding robust t-statistic in parentheses.

Panel A: Regressions of firm value on investor recognition decomposed by excess financing

	$\ln\left((M/B)_{IPO}/(M/B)_{match}\right)$				
	Year relative to the IPO date				
	+1	+2	+3	+4	+5
Component of investor recognition proxy correlated with Xln(CASH/NA)	0.155***	0.124***	0.113***	0.104***	0.136***
	(7.05)	(5.79)	(5.27)	(4.31)	(5.17)
Component of investor recognition proxy uncorrelated with Xln(CASH/NA)	0.080***	0.058***	0.036***	0.019**	0.021**
	(9.42)	(7.30)	(5.10)	(2.35)	(2.24)
Venture capital backed dummy	0.020	0.063**	0.049*	0.106***	0.063*
	(0.79)	(2.42)	(1.83)	(3.53)	(1.94)
Offer price revision	0.574***	0.253***	0.042	0.075	-0.075
	(7.44)	(3.17)	(0.55)	(0.94)	(0.89)
Managerial ownership retained	0.682***	0.244***	0.333***	0.323***	0.301***
	(9.64)	(3.61)	(5.28)	(4.55)	(3.66)
Constant	-0.038	0.034	-0.122***	-0.150***	-0.156***
	(0.79)	(0.76)	(2.93)	(3.22)	(2.82)
Observations	4,041	3,732	3,300	2,827	2,507
Adjusted R^2	0.122	0.051	0.030	0.030	0.024

Panel B: Impact of investor recognition caused by excess financing on firm value

	Year relative to the IPO date				
	+1	+2	+3	+4	+5
Change in relative valuation ratio from a one-s.d. increase in the investor recognition proxy correlated with excess cash	10.1%	7.9%	7.1%	6.5%	8.5%

Table 6
Investor Recognition Decomposed By Underpricing and Firm Value

This table presents regressions of firm value on investor recognition decomposed by excess underpricing. The sample comprises 4,572 firms that go public between 1980 and 2004. The regression equation is:

$$\ln\left(\frac{(M_i/B_i)_{IPO}}{(M_i/B_i)_{match}}\right) = \beta_0 + \beta_1 \text{Fitted investor recognition}_i + \beta_2 \text{Residual investor recognition}_i + $$
$$+ \beta_3 \text{Venture capital dummy}_i + \beta_4 \text{Offer price revision}_i + \beta_5 \text{Managerial ownership}_i + \varepsilon_i .$$

The composite investor recognition proxy is first regressed on Xln(1+IR) and both the fitted values and residuals of this first regression are used in place of the composite investor recognition proxy in the second regressions. Seasoned firms are matched to IPO firms by industry and net assets. M/B is market value of equity plus total assets minus book value of equity all divided by total assets. A composite investor recognition proxy is created as the first principal component of the six individual investor recognition proxies. Xln(1+IR) is an estimate of excess underpricing using the residuals of the regression in Appendix Table 1. Regressions are run for each year relative to the IPO date. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Below each coefficient estimate is its corresponding robust t-statistic in parentheses.

Panel A: Regressions of firm value on investor recognition decomposed by excess underpricing

	$\ln\left((M/B)_{IPO}/(M/B)_{match}\right)$				
	Year relative to the IPO date				
	+1	+2	+3	+4	+5
Component of investor recognition proxy correlated with Xln(1+IR)	0.465***	0.213***	0.105**	0.007	-0.014
	(10.34)	(4.57)	(2.28)	(0.14)	(0.28)
Component of investor recognition proxy uncorrelated with Xln(1+IR)	0.073***	0.058***	0.040***	0.027***	0.031***
	(9.13)	(7.29)	(5.65)	(3.31)	(3.36)
Venture capital backed dummy	0.050**	0.079***	0.066**	0.121***	0.092***
	(2.00)	(3.03)	(2.51)	(4.05)	(2.89)
Offer price revision	0.647***	0.327***	0.103	0.125	-0.016
	(8.70)	(4.12)	(1.36)	(1.58)	(0.20)
Managerial ownership retained	0.639***	0.249***	0.341***	0.352***	0.339***
	(9.20)	(3.68)	(5.36)	(4.89)	(4.08)
Constant	-0.022	0.023	-0.137***	-0.178***	-0.195***
	(0.47)	(0.52)	(3.32)	(3.79)	(3.53)
Observations	3,998	3,696	3,267	2,797	2,481
Adjusted R^2	0.141	0.053	0.028	0.026	0.018

Panel B: Impact of investor recognition caused by excess underpricing on firm value

	Year relative to the IPO date				
	+1	+2	+3	+4	+5
Change in relative valuation ratio from a one-s.d. increase in the investor recognition proxy correlated with excess initial returns	15.7%	6.8%	3.3%	0.2%	-0.4%

Table 7
Test of the Fixed Costs Explanation

This table presents a test of the fixed costs explanation of why firms that raise more financing are worth more. The sample comprises 4,572 firms that go public between 1980 and 2004. The regression equation is:

$$\ln\left(\frac{(M_i/B_i)_{IPO}}{(M_i/B_i)_{match}}\right) = \beta_0 + \beta_1 \mathrm{X}\ln\left(\frac{CASH}{NA}\right)_i + \beta_2 \mathrm{X}\ln\left(\frac{CASH}{NA}\right)_i \times \text{Fixed costs}_i + \beta_3 \text{Fixed costs}_i + $$
$$+ \beta_4 \text{Venture capital dummy}_i + \beta_5 \text{Offer price revision}_i + \beta_6 \text{Managerial ownership}_i + \varepsilon_i .$$

Seasoned firms are matched to IPO firms by industry and net assets. M/B is market value of equity plus total assets minus book value of equity all divided by total assets. Xln(CASH/NA) is an estimate of excess financing and is the residuals of the second stage regression with firm fixed effects in Table 1 using data from the fiscal year end after the IPO. The fixed costs proxy is created as the first common factor of ln(NA), the sum of CAPEX/NA, R&D/NA, and ACQN/NA, EBITDA/NA, industry SD(EBITDA/NA), and industry M/B all from the fiscal year end before the IPO. NA = net assets. ACQN = acquisition expenditures. Industry SD(EBITDA/NA) is the industry median standard deviation of EBITDA/NA. Industry M/B is the industry median M/B. Regressions are run for each year relative to the IPO date. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Below each coefficient estimate is its corresponding robust t-statistic in parentheses.

	$\ln((M/B)_{IPO}/(M/B)_{match})$				
	Year relative to the IPO date				
	+1	+2	+3	+4	+5
Xln(CASH/NA)	0.052***	0.042***	0.047***	0.042***	0.057***
	(4.81)	(4.32)	(4.95)	(3.82)	(4.88)
Xln(CASH/NA) × Fixed costs proxy	-0.002	0.009	-0.017	-0.022	-0.020
	(0.14)	(0.66)	(1.36)	(1.46)	(1.36)
Fixed costs proxy	-0.000	0.024	0.070***	0.008	0.023
	(0.01)	(1.01)	(3.15)	(0.26)	(0.79)
Venture capital backed dummy	0.063**	0.112***	0.088***	0.097***	0.069**
	(2.45)	(4.21)	(3.26)	(3.24)	(2.15)
Offer price revision	0.720***	0.412***	0.141*	0.095	-0.040
	(9.19)	(5.25)	(1.86)	(1.24)	(0.49)
Managerial ownership retained	0.650***	0.258***	0.355***	0.300***	0.299***
	(9.40)	(3.78)	(5.62)	(4.31)	(3.66)
Constant	-0.047	-0.000	-0.178***	-0.156***	-0.189***
	(0.98)	(0.01)	(4.06)	(3.17)	(3.27)
Observations	4,222	3,869	3,432	2,952	2,619
Adjusted R^2	0.097	0.037	0.026	0.029	0.024

Table 8
Tests of the Market Timing Explanation

This table presents tests of the market timing explanation of why firms that raise more financing are worth more. The sample comprises 4,572 firms that go public between 1980 and 2004. Panel A presents calendar-month Fama-French three-factor regressions for a portfolio that is long firms with low excess cash and short firms with high excess cash. The portfolio contains all sample firms that have gone public in the last five years. Xln(CASH/NA) is an estimate of excess financing and is the residuals of the second stage regression with firm fixed effects in Table 1 using data from the fiscal year end after the IPO. Low (high) excess cash is defined as below (above) median excess cash for my sample IPO firms. Unpurged monthly factor returns are available for the 336 months from 1980 to 2007 whereas purged monthly factor returns are only available for the 288 months from 1980 to 2003. Panel B presents regressions of buy-and-hold abnormal returns on excess cash. Panel C presents a regression of earnings forecast errors on excess cash. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Below each coefficient estimate is its corresponding robust t-statistic in parentheses.

Panel A: Three-factor regressions with a portfolio long low excess financing firms and short high excess financing firms

	R_p-R_f			
	Equal weighted portfolios		Value weighted portfolios	
	Unpurged factors	Purged factors	Unpurged factors	Purged factors
R_m-R_f	-0.232***	-0.296***	-0.194***	-0.276***
	(3.38)	(3.78)	(2.61)	(3.21)
SMB	-0.201***	-0.229**	-0.050	-0.058
	(2.84)	(2.20)	(0.48)	(0.40)
HML	0.741***	0.745***	0.839***	0.745***
	(8.62)	(7.31)	(6.68)	(5.16)
Constant	-0.536***	-0.542**	-0.317	-0.079
	(2.86)	(2.39)	(1.32)	(0.28)
Observations	333	285	333	285
Adjusted R^2	0.478	0.418	0.36	0.293

Panel B: Regressions of buy-and-hold abnormal returns for up to five years after the IPO on excess financing

	R_i-R_b		
	R_b = CRSP equal weighted index	R_b = CRSP value weighted index	R_b = Portfolios matched by size and book-to-market quintiles
Xln(CASH/NA)	-0.970	5.603***	-1.752
	(0.45)	(2.61)	(0.83)
Constant	-24.411***	-35.160***	-11.636***
	(5.55)	(8.01)	(2.74)
Observations	4,533	4,533	4,533
Adjusted R^2	0.000	0.001	0.000

Panel C: Regression of earnings forecast errors on excess financing

	100×(Realized earnings-Expected earnings)/Price				
	Year relative to the IPO date				
	+1	+2	+3	+4	+5
Xln(CASH/NA)	0.450***	0.390***	0.300**	0.262**	0.419***
	(5.82)	(3.57)	(2.50)	(2.07)	(3.18)
Constant	-3.258***	-4.264***	-4.400***	-4.353***	-3.733***
	(25.30)	(24.59)	(23.16)	(21.16)	(17.68)
Observations	3,284	3,039	2,607	2,183	1,784
Adjusted R^2	0.011	0.004	0.002	0.001	0.005

Table 9
Robustness Tests

This table presents regressions of firm value on excess financing for various model specifications. The sample comprises 4,572 firms that go public between 1980 and 2004. The regression equation is:

$$\ln\left((M_i/B_i)_{IPO}/(M_i/B_i)_{match}\right)=\beta_0+\beta_1 \mathrm{Xln}(CASH/NA)_i+\varepsilon_i$$

except where otherwise indicated. M/B is market value of equity plus total assets minus book value of equity all divided by total assets. Xln(CASH/NA) is an estimate of excess financing and is the residuals of the second stage regression with firm fixed effects in Table 1 using data from the fiscal year end after the IPO. Secondary share sales are the natural logarithm of the ratio of the dollar value of secondary share sales at the offer price net of the gross spread to net assets in year +1. Hot issues markets are defined as periods when the three-month centered moving average of the total number of IPOs from Jay Ritter's website is above its median value between 1980 and 2004. Only estimates of β_1 are tabulated. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Model specification	Year relative to the IPO date					Observations at the IPO
	+1	+2	+3	+4	+5	
Baseline	0.100***	0.067***	0.053***	0.058***	0.063***	4,533
Using secondary share sales as the explanatory variable	0.164***	0.135***	0.101***	0.098***	0.102***	2,005
Restricted to firms for which the overallotment option is exercised	0.120***	0.077***	0.066***	0.068***	0.061***	2,942
Restricted to firms for which the overallotment option is not exercised	0.039***	0.046***	0.031**	0.038***	0.067***	1,531
Restricted to firms that go public during a hot issues market	0.100***	0.064***	0.053***	0.057***	0.050***	3,478
Restricted to firms that do not go public during a hot issues market	0.098***	0.080***	0.050***	0.061***	0.110***	1,055
Restricted to firms for which the offer price is above the filing range	0.138***	0.034*	0.034*	0.057***	0.043**	1,040
Restricted to firms for which the offer price is within the filing range	0.050***	0.063***	0.046***	0.043***	0.056***	2,331
Restricted to firms for which the offer price is below the filing range	0.069***	0.057***	0.058***	0.071***	0.082***	1,108
Restricted to firms for which the offer price is above the midpoint of the filing range and primary proceeds are revised downward	0.069**	0.061***	0.038*	0.053**	0.077***	653

Appendix Table 1
Model of Normal Initial Returns

This table presents the estimates of a model of normal initial returns. The sample comprises 4,572 firms that go public between 1980 and 2004. ln(1+IR) = ln(P_{market}/P_{offer}). Offer price revision = P_{offer}/P_{filing}-1. NA = net assets. ACQN = acquisition expenditures. Industry SD(EBITDA/NA) is the industry median standard deviation of EBITDA/NA. NWC = current assets minus current liabilities minus cash. Industry M/B is the industry median M/B. LTD = long-term debt due in more than a year plus long-term debt-due within a year. ln(NA), CAPEX/NA, R&D/NA, ACQN/NA, EBITDA/NA, industry SD(EBITDA/NA), industry M/B, LTD/NA, and the pays dividends dummy variable are from the fiscal year end before the IPO. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Below each coefficient estimate is its corresponding robust t-statistic in parentheses.

	ln(1+IR)
Offer price revision	0.513***
	(37.81)
Mean initial returns of IPOs in last three months	0.002***
	(10.30)
ln(NA)	-0.011***
	(7.15)
CAPEX/NA	0.045**
	(2.56)
R&D/NA	0.005
	(0.36)
ACQN/NA	0.021
	(1.09)
EBITDA/NA	-0.032***
	(4.31)
Industry SD(EBITDA/NA)	0.270***
	(3.16)
Industry M/B	0.006
	(1.58)
LTD/NA	-0.017**
	(2.20)
Pays dividends dummy	-0.004
	(0.73)
Constant	0.099***
	(8.67)
Observations	4,454
Adjusted R^2	0.470

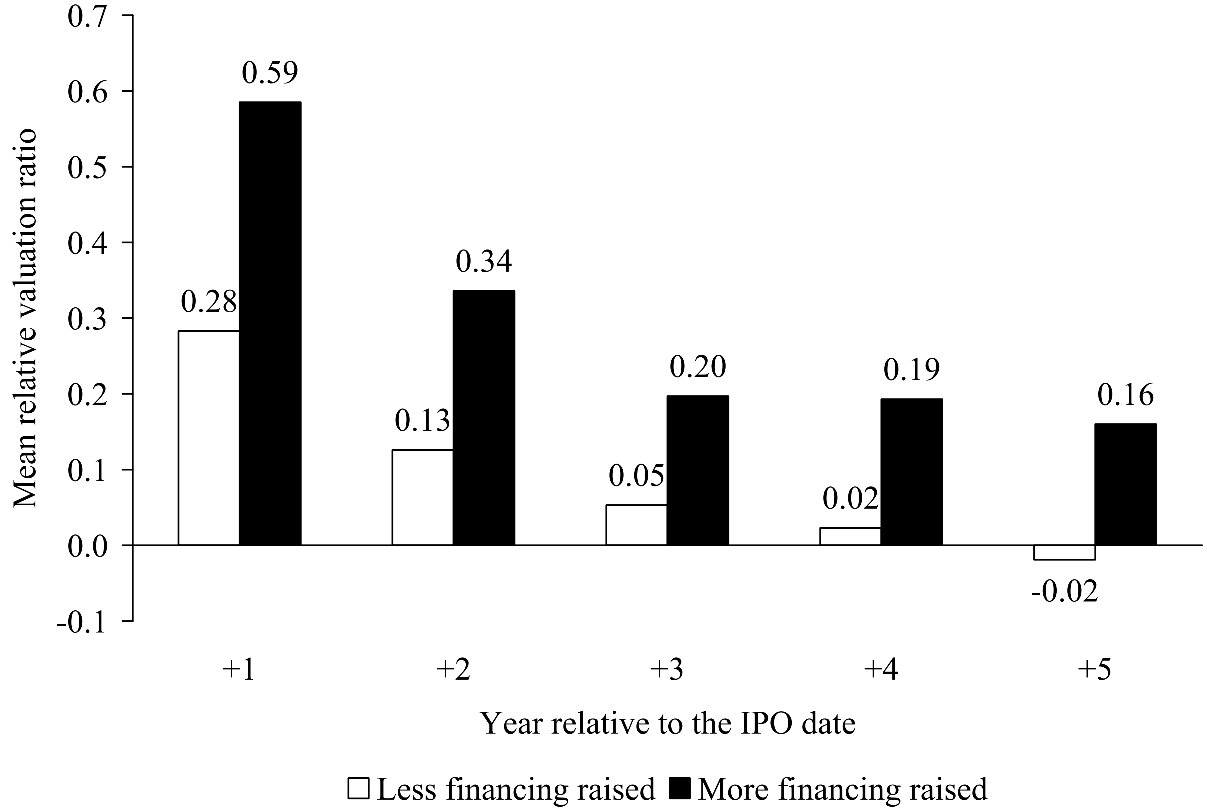

Figure 1. Firm value by financing raised. Firm value is measured by the valuation ratio $\ln\left((M/B)_{IPO}/(M/B)_{match}\right)$. M/B is market value of equity plus total assets minus book value of equity all divided by total assets. Less (more) financing raised is defined as below (above) median excess cash for my sample IPO firms. Xln(CASH/NA) is an estimate of excess financing and is the residuals of the second stage regression with firm fixed effects in Table 1 using data from the fiscal year end after the IPO.