

# Why Do Firms Use Private Equity to Opt Out of Public Markets?

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## Abstract

Why do firms go private? We use existing theories of the going public decision to develop reverse predictions of firms' decisions to go private. We employ a comprehensive sample of going private transactions from 1980-2004 in the U.S. and examine how these firms differ at the initial public offering and over their public life relative to a sample of firms that went and remained public. We find that many of the factors that drive the firms to go private are evident at the initial public offering. Our results provide strong support for the importance of information and liquidity considerations in being a public firm.

Keywords: Going Public, Going Private.

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# 1. Introduction

In the 1980s, an unprecedented number of public corporations and divisions of public companies went private in leveraged buyouts (LBOs), partly fuelled by the development of the junk bond market. LBO activity increased from \$1.4 billion in 1979 to \$77 billion in 1988. The last six years (from the year 2000) have seen the resurgence in going private transactions but fuelled this time by the development of the private equity market. U.S private equity firms are expected to raise \$225 billion in 2006 up from \$159 billion raised in 2005.<sup>1</sup> Given the size and growth of this market, it is important to understand the economic forces that determine going private decisions. The goal of our study is to determine the factors that drive the going private decisions of firms.

To explore the factors that drive a firm to go private, we draw on the previous empirical research on going private transactions [such as DeAngelo, DeAngelo, and Rice (1984a,b), Lehn and Poulsen (1989) and Kaplan (1989a, 1989b, and 1991)] and a large theoretical literature which has developed in the last decade weighing the costs and benefits of being public versus private to explain why firms go public.<sup>2</sup> We use the insights from these theories to develop hypotheses on the going private decisions of firms. In order to do so, it is important that the theories of going public are reversible. Each of these going public theories emphasizes the tradeoff between different economic forces that confer costs and benefits of being public and, therefore, most are reversible. For example, the tradeoff between economic force X (say, liquidity benefits of being a public firm) and economic force Y (say, the costs of losing control in decision making) could be the tension in a model that generates predictions on the going public decision. In this example, when the benefits of liquidity exceed the cost of having lesser control in decision making, firms go public. We argue that since the nature of the theories of going public are tradeoff type theories, the reverse is also true. When the costs of having lesser control exceed the benefits of liquidity, firms will reverse their decision, i.e., firms will exit the public markets and go private. Thus, by systematically reversing the predictions of the going public theories and examining firms' decisions to go private, we can determine which factors drive the choice between being a private or a public firm and test their validity empirically. This is the key idea behind our research design.

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<sup>1</sup>Source: Business Week, November 7,2006.

<sup>2</sup>We summarize these theories in Section 2.

In this paper, we examine the relative importance of each factor in driving a firm to go private over their public life. Specifically, we track firms from the IPO to either their going private decision or, in the case of comparison firms that remain public, to the year 2004 (the end of our sample period). Our initial going private sample consists of 1,451 U.S. firms that go private (called the "private sample", hereafter) between 1980 and 2004 and is the most extensive of going private samples studied to date in the literature. We then find the IPO dates of these firms from a master list of IPOs to track when they went public. We retain those firms in the IPO master list that did not go private for comparison (called the "comparison sample", hereafter). This comparison sample consists of 6,640 IPO firms that remain public. We obtain 24 different firm characteristics from five different databases using data beginning at the firms' initial public offering (as available) through their going private decision or 2004, whichever comes first, to measure the costs and benefits of being public. We then compare characteristics of the private and comparison samples at the time they went public and in the years immediately following the IPO. We further examine the trends in the private sample firms' characteristics during their public life and compare these trends to the comparison sample. In doing so, we not only determine which factors influence the choice between being public and private, but also establish if the differences in these samples was evident at the IPO or if they evolved over time.

One advantage of this study is that we utilize a period when both the sample choosing to be private and the sample choosing to be public are listed in the publicly traded equity markets and track the firms in similar event time. This research design confers two crucial advantages: a) Ex-ante data on the going private firms and the comparison sample are readily available due to the elaborate disclosure requirements of public markets; and, b) Measuring ex-ante, the impact of market forces, such as liquidity and information production, on the public-private decision is easy because the firms are traded on a public exchange. These market forces are central to many theories but cannot be tested using data on private firms that are considering going public because market forces do not visibly impact a firm until after it is public.

Tests comparing the private and comparison samples at the time of the IPO provide striking results. On average, the private sample firms remain in the public market for over thirteen years. Despite this fact, firms that ultimately go private are very different

and discernable relative to firms that remain public, even *at the time of the IPO*. We find that firms that are more likely to ultimately go private have less analyst coverage, less institutional holdings, more concentrated ownership, and more informed trading at the time of the IPO compared to firms that remain public, supporting the importance of information considerations in the choice between being public or private. We also find firms that go private are more illiquid and have less share turnover, supporting the importance of liquidity issues. We find strong support for the importance of free cash flow in determining who goes private, but only in the 1980s. Evidence related to the importance of access to capital is mixed. We also find some evidence that firms that go private engage in fewer acquisitions, suggesting modest support for the role of control considerations.

The results at the IPO not only provide evidence of the choice between being private or public, but also indicate that it is possible to determine the relative costs and benefits of being public early in the firm's public life. Stated another way, it seems that at least in part there is something inherent to the firm at the time of the IPO that determines if it will ultimately go private. Assuming the firm's IPO decision was optimal, these results suggest that firms that ultimately go private may be just above this threshold where benefits exceed the costs at the time of the IPO, but reverse the going public decision once they fall below the threshold. Alternatively, the results may indicate that these are firms that should not have gone public and thus in time reverse this sub-optimal decision. Regardless, the variables examined here and informed by theory are able to successfully capture the relative costs and benefits long before the actual decision is made.

We next explore the importance of changes in firms' characteristics over their public life in predicting the going private decision. First, we compare the private sample firms at the time of the IPO and the time they went private. We find that some of the firms' characteristics evolve in ways that should increase the benefits of being public but others change in ways that make it more likely that the firm will go private. For instance, we find that at the time firms go private they have more analyst coverage and more institutional holdings. These changes suggest that the costs of being public have decreased since the IPO. However, we also find capital expenditures, share turnover, liquidity, and market to book ratio have decreased by the time firms go private. These changes suggest that benefits of being a public firm have decreased as well; thus, the trends in firm characteristics do not provide clear

predictions of why firms go private and illustrate the importance of comparing these changes to those of the comparison sample. Specifically, we use a Cox proportional hazard model, which determines the hazard (probability) a firm will go private given its firm characteristics and their evolution over time, relative to other firms. The results of this analysis reveal that despite changes over time, the costs (benefits) of being public are still greater (lesser) relative to the firms that remain public. Specifically, firms are more likely to go private when they have less information being produced by the public market, are less liquid, and engage in fewer acquisitions relative to the comparison sample. This analysis therefore does not materially change our conclusions but addresses the inconsistencies between the differences at the IPO and the trends over time and confirms the results using a more econometrically rigorous procedure. The stability of the results highlights that it is something intrinsic to the firm at the time of the IPO, rather than factors that change over time, that leads it to subsequently go private.

Finally, we explore the importance of the market wide and macroeconomic forces in the timing of the going private decision using the Cox proportional hazard model after controlling for firm characteristics. We find that all our firm specific characteristics results are robust to controlling for these market forces. Further, we find that the hazard of going private increases significantly in high sentiment (measured as in Baker and Wurgler(2006)) and hot private equity markets and decreases in hot IPO markets. We also find support for the relevance of the supply of debt in the economy, which could potentially substitute as a source of capital by showing that firms are less likely to go private when the slope of the term structure is steep.<sup>3</sup> Further, we find that the likelihood a firm goes private increases with the default risk premium, suggesting that costs of bankruptcy for public firms might be substantial and an influencing factor.

Our results contribute to the long standing literature on the going private decision of firms and their effects. DeAngelo, DeAngelo, and Rice (1984a,b) were among the first to find that public shareholders gain about 22% in going private transactions. Lehn and Poulsen (1989) show that much of the shareholder gain in going private transactions stems from mitigating agency conflicts associated with free cash flow. Kaplan (1989a, 1989b, and 1991) examines the benefits of going private using a sample of leveraged buyouts and highlights the

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<sup>3</sup>We thank Steve Kaplan for this interpretation.

importance of tax and incentive improvements due to the high leverage in these transactions. At the time that these going private studies were written, the theories of why firms go public did not exist. Thus, one contribution of this paper is to bridge these two literatures. We further contribute to the going private literature by updating previous studies using more recent data that reflect differences in going private transactions and examining the entire duration of public life for firms that choose to go private, which has not been previously examined.

A secondary contribution of our study is to also shed light on the going public decisions of firms. Going public is one of the most important events in a private company's development; thus, the initial public offering (IPO) is often seen as a rite of passage in the life-cycle of a young, successful firm. A large theoretical literature alluded to earlier developed in the last decade, weighing the costs and benefits of being public versus private to explain why firms go public. However, empirical analysis investigating the relative importance of these costs and benefits remains scarce because, ideally, we need data on private firms that choose to go public and data on firms that continue to remain private to provide a direct comparison of the choice between being public or private. Data on private firms is not readily available. Our research design circumvents this data challenge by investigating the reversible predictions of the going public theories thus informing us of the important economic forces among the many highlighted by theory. Thus, our paper is also related to a voluminous literature on IPOs which primarily examines underpricing, long run underperformance, and mechanisms for design for IPO sales (see Jenkinson and Ljungqvist (2001) and Ritter (2003) surveys of the IPO literature).<sup>4</sup>

The remainder of the paper is organized as follows. We describe our main hypotheses in Section 2. Section 3 describes the data and sample selection process. In Section 4, we compare firms at the IPO and, in Section 5, we examine how firm characteristics evolve after the IPO, with both sections presenting results regarding the factors that lead a firm to choose to go private. We conclude in Section 6.

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<sup>4</sup>Pagano, Panetta, and Zingales (1998), Boehmer and Ljungqvist (2004), Helwege and Packer (2004), Kim and Weisbach (2005), Rosen, Smart, and Zutter (2005) and Poulsen and Stegemoller (2006) are notable examples of studies on the going public decisions of firms.

## 2. Theoretical predictions and hypotheses

The decision to go public is complex, with many factors to be considered. No single model in the literature captures all facets of this decision. However, in totality, the literature addresses most conceivable influences. These influences can be categorized into the costs and benefits of *being* a public firm. Costs of going public also are important in the decision, but these factors are not redeemable and thus, given the nature of our reverse research design, do not relate to this study. Thus, this paper does not discuss the relative importance of these costs and benefits going public. In this section, we summarize the theories of why firms go public, focusing on the costs and benefits of being a public firm and specifying the testable implications as they relate to the decision to go private.

We categorize the various theories based on the driving force behind the models into four groups: (i) Information Considerations (ii) Access to Capital (iii) Liquidity and (iv) Control and other considerations. In this last section, we also discuss factors of particular importance to firms deciding to go private. In addition to the theory, we also discuss the empirical implications from these categories of models, in turn, below. As we do so, we refer to several empirical proxies used in this study. It is important to note that many of the empirical predictions are not mutually exclusive among the various theories. The source for this data and a detailed description of each variable will be discussed in section 3 and appendix A.

### *2.1. Information Considerations*

#### *2.1.1. Adverse Selection*

Investors are less informed than the issuers about the true value of the companies going public. Investors' concern that they might be purchasing a 'lemon' adversely affects the average quality of the companies seeking a new listing and the price at which their shares can be sold initially and during the public life of the firm. Leland and Pyle (1977) show that entrepreneurs can signal the quality of their projects by investing more of their wealth into these projects but at the cost of imperfect diversification. This adverse selection cost is a more serious obstacle to young, small companies that have low visibility; thus, these firms will tend to go private to avoid the adverse selection costs.

### *2.1.2. Duplicative Monitoring*

Chemmanur and Fulghieri (1999) highlight the costs of duplication of information production by a large number of investors wishing to invest in a public firm.<sup>5</sup> Ultimately, these costs have to be borne by the firm. The costs can be mitigated by the availability of a public price that conveys information to all investors so that only a fraction of the investors will incur the information production cost. Thus, there is a benefit to avoiding these costs by selling shares to a large investor (VC, the venture capitalist) but surrender a greater share of the return to the VC. Their model suggests that once a firm is public, if information production costs of outsiders increase (or that the stock price is not able to aggregate information effectively due to lack of liquidity) more firms would choose to go private since the value of the firm does not accurately reflect available information about the firm.

### *2.1.3. Serendipitous Information Production*

Subrahmanyam and Titman (1999) discuss how the public market provides a tradeoff between costs of duplication of information and the benefits of serendipitous information (defined in their model as the information that stock market investors by chance come across in their day to day activities). Serendipitous information, though noisy, is likely to be diverse across market participants; thus, when aggregated across many investors, it can provide a useful signal. They predict that firms prefer to be public when the benefit of this signal outweighs the cost of duplication. This logic suggests that as the costs of generating serendipitous information increase, firms would choose to go private. They suggest that serendipitous information is less available in high-tech firms, such as those with high research and development expenditures.

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<sup>5</sup>Ritter (1987) estimates that variable costs which are yearly layouts on auditing, certification, dissemination of accounting information, stock exchange fees, etc. are about 7% of the gross proceeds of the IPO. Further, disclosure rules in public markets that force companies to part with private information necessary for their competitive advantage might be an important consideration in the going public decision, as pointed out by Campbell (1979) and Yosha (1995). Maksimovic and Pichler (2001) develop a model of the going public decision driven by product market competition between innovative private firms in an industry. Raising capital in the equity market by going public allows a firm which is an industry leader to raise external capital at a cheaper rate than private financing, thus allowing it to implement its project at its optimal scale. However, going public has the disadvantage of releasing confidential information to competing firms, which can then compete more effectively with the firm going public. This theory and the importance of variable costs implies that the advent of SOX and the associated disclosure requirements, might also prompt firms to go private since confidentiality is a deterrent for obtaining funding in public markets.

#### 2.1.4. Investor Recognition

Merton (1987) provides an extension to CAPM that relaxes the assumption of efficient information for all investors. In this model, expected returns to a firm decrease with the size of investor base, which he characterizes as the 'degree of investor recognition'. Thus, the benefit of being public is diminished for firms with high ownership concentration or lower investor recognition; thus, these firms are more likely to opt to be private.

#### 2.1.5. Summary and Empirical Proxies for Information Considerations

Each of these theories suggests that firms are more likely to reverse the going public decision if information is costly or difficult to obtain. Many of the theories discussed above examine related but subtly different aspects of information considerations. In the theories, these differences are important. Unfortunately it is difficult to proxy for these important but subtle differences. In our empirical analysis, we group this set of theories as those that highlight the importance of information considerations in the decision to go private. The empirical proxies that we use in our analysis are outlined in the table below:

Driving Force	Models	Effect on the going private decision	Empirical Proxy(ies) and predictions
a. Adverse Selection	Leland and Pyle (1977)	As information asymmetry increases, more firms go private	Firms are more likely to go private if they are: - smaller, younger, greater probability of informed trading (PIN).
b. Duplicative Monitoring	Chemmanur and Fulghieri (1999)	If information gathering costs increase, more firms go private	- lower institutional holdings & analyst coverage. - lower Durnev et. al. (2003)
c. Serendipitous Information Production	Titman Subramanyam and Titman (1999)	If serendipitous information gathering costs increase, more firms go private	$\psi$ Measure higher R&D intensity, - high Herfindahl Index of Ownership Concn
d. Investor Recognition	Merton (1987)	Low diffuse ownership or less recognition suggests more firms opt to be private	and not trading on NYSE.

## *2.2. Access to Capital*

### *2.2.1. Cost of Capital*

One important motivation for going public is to minimize the cost of capital for the firm and thus maximize the value of the company. The lower the cost of capital in the public versus the private market, the greater the incentive to be a public firm. This argument has been advanced by Modigliani and Miller (1963) and Scott (1976). This argument suggests that as the cost of capital for firms increase in public markets, firms are more likely to go private.

### *2.2.2. Overcoming Financial Constraints*

The opportunity to tap public markets for equity capital is appealing for high growth firms with large current and future investments that may have limited access to other financing alternatives due to high leverage or other reasons. Thus, firms more concerned about being financially constrained will prefer to be public. Firms that do not have large investments and future growth opportunities may go private.<sup>6</sup> Since asymmetric information is one of the key drivers of financial constraints, firms that do not have sufficient information production in markets and hence are financially constrained would be more likely to go private. Thus, support for the information consideration hypotheses provides indirect support for the importance of financial constraints.

### *2.2.3. Summary and Empirical Proxies for Access to Capital Considerations*

We summarize the empirical implications of the above theories and the empirical proxies that we use in our analysis in the table below:

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<sup>6</sup>Shah and Thakor (1988) also predict that firms with more favorable investment opportunities prefer to be public but in their model this is driven by risk sharing in public companies.

Driving Force	Models	Effect on the going private decision	Empirical Proxy(ies) and predictions
a. Cost of Capital	Modigliani & Miller (1963) Scott (1976)	As cost of capital increases in public markets, firms go private.	Firms are more likely to go private if they are: - non dividend payers.
b. Overcoming financial constraints		Lack of large investments, financial constraints in public markets lead more firms to go private	- low Capex, - financially constrained (KZ index, probability of rating)

### *2.3. Control Considerations*

Zingales (1995) argues that an IPO can serve as the first step toward selling a company at an attractive price through a takeover. In going public, the initial owner sells a portion of his cash flow and control rights. According to Zingales, the markets for these two components are very different. The market for cash flow rights (individual shares) is competitive, but the market for corporate control is not; thus, the incumbent extracts some of the eventual buyer's private benefits in a direct negotiation for transfer of control. This theory suggests a high incidence of control transfers after an IPO. On the flip side, it also suggests if the firm is not very active in the market for corporate control, it will more likely go private. Further the value of the cash flow rights is more sensitive to change in market conditions than the control rights. The value of the control rights relative to the cash flow rights will therefore be greater following declines in the aggregate market. Many of the important aspects of this theory are difficult to capture in our cross-sectional analysis. However, the spirit of the theory, i.e., the importance of value and control issues, are also highlighted in Brau, Francis, and Kohers (2003) and Brau and Fawcett (2006), who suggest that an IPO creates public shares for a firm that may be used as currency in acquiring other companies or in being acquired in a stock deal. This reasoning again suggests that if the firm is not active in the market for corporate control using stock deals, it is likely to go private. In testing these predictions, we also pick up the impact of the price on going private since the relative value of the company will impact its ability to use stock as a currency.

### 2.3.1. Summary and Empirical Proxies for Control Considerations

We summarize the empirical implications of the above theories as they relate to the cross-sectional predictions of why firms go public and the empirical proxies that we use in our analysis in the table below:

Driving Force	Models	Effect on the going private decision	Empirical Proxy(ies) and predictions
Benefit of Corporate control	Zingales(1995)	Facilitate control transfers	Firms are more likely to go private if they are: - engage in fewer mergers - lower market to book
	Mello and Parsons (1998)	increase in public markets,	
	Brau et.al. (2003)	Stock as a currency for future, acquisitions.	
	Boot et.al. (2006)	Managerial autonomy.	

### 2.4. Liquidity

Amihud and Mendelson (1988) was the first paper to emphasize the importance of liquidity considerations for a public firm. Zingales (1995) and Mello and Parsons (2000) also posit the role of an IPO to establish the market price/value for a firm. Share trading on an exchange is cheaper compared to bilateral trades, and this liquidity benefit (which is an increasing function of the trading volume) leads companies to go public. As the liquidity benefit in the market deteriorates, firms go private.

Bolton and Von Thadden (1998) emphasize the tradeoff between liquidity and control in determining corporate ownership structure. Dispersed ownership is beneficial to the extent that it increases secondary market liquidity. Concentration, on the other hand, is valuable because large share holders have a greater incentive to monitor management control. Boot, et.al. (2006) also study a liquidity-control trade off, but identify a managers control benefit as the ability to make investment decisions despite the disagreement of outside shareholders. If managers go public, they give up such control in exchange for stock liquidity. Therefore, managers have an incentive to take firms private when they expect the value of control to exceed the value from stock liquidity. These arguments suggest that lower the level of liquidity benefits, firms would go private.

### 2.4.1. Summary and Empirical Proxies for Liquidity considerations

We summarize the empirical implications of the above theories and the empirical proxies that we use in our analysis in the table below:

Driving Force	Models	Effect on the going private decision	Empirical Proxy(ies) and predictions
Benefit of liquidity	Zingales(1995)	Establish market price of the firm.	Firms are more likely to go private if they have:
	Mello and Parsons (1998)	Liquidity benefit.	- high illiquidity (illiq)
	Bolton and von Thadden (1998)	Managerial autonomy.	- low share turnover.
	Boot et.al. (2006)		

### 2.5. Agency Considerations

Each subsection above discusses implications from theories of going public on the decision to go private. Prior to much of this literature, researchers directly examined the decision to go private. Given the sequential nature of these research streams, the literature on going private does not address the theories of going public. Our goal in this paper is both to test the above mentioned theories in order to understand how firms weigh the costs and benefits of being a public firm and to enhance our understanding of why firms go private. Thus, we also will consider some specific reasons why a firm may go private.

The literature on going private suggests that LBOs lead to efficiency gains because of higher debt payments and alignment of the management incentives by increased equity positions (Jensen (1986)). Thus, the motive for going private may be to reduce free cash flow with a highly levered capital structure since shareholders have a preference for the disbursement of this free cash flow, while managers may prefer to make empire building investments with returns below the cost of capital. We proxy for these considerations empirically, consistent with Lehn and Poulsen (1989), by using free cash flow to assets, firm leverage, cash to assets, return on assets, and tangibility of assets of the firm.

### 3. Data and sample selection

#### 3.1. Sample

To construct our sample of going private firms, we employ three sources. First, we search SEC filings for all 13E3, including 13E3, DEF13E3, and PRE13E3 submissions from 1980 - 2003. A 13E3 is filed if the firm engages in a transaction by which the issuer itself acquires its securities or an affiliate itself acquires its securities or an affiliate engages in a transaction with an issuer; transactions between a third party (i.e. not an affiliate) and an issuer are not within the rule. Using the 13E3 filing to designate going private transactions also has been used by other going private papers such as Engle, Hayes, and Wang (2004). Examining the filing of the DEF13E3 and PRE13E3 is less common but important during the early part of our sample. These are form types that are no longer filed, which may be why they have not been included in other studies. The DEF13E3 and PRE13E3 forms are filed as part of proxy statements but contain 13E3 materials. Second, we use Security Data Corporation (SDC) to identify firms that go private in transactions not involving an affiliate. Specifically we include all going private and LBO transactions from SDC where the acquirer is a financial firm (such as KKR). Third, we supplement our sample with that used in Lehn and Poulsen (1989). The top half of Panel A of Table 1 details the breakdown from these three data sources.<sup>7</sup>

After collecting all going private transactions, we screen all sample firms to verify that they are no longer trading and available on CRSP within 24 months of initial 13E3 submission. In doing so, we exclude any firm from the private sample that was dropped from CRSP because it was moved to trading on an exchange not covered by CRSP. This includes those trading over the counter or on pink-sheets. Thus, our sample does not include those firms that have "gone dark" as described in Leuz, Triantis, and Wang (2005). If a firm meets

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<sup>7</sup>Two things to note about our sample breakdown. First, the bulk of our sample comes from 13E3 filings. This reflects a) the fact that many firms that use a non-affiliate financial firm also will involve an affiliate to facilitate the deal; and b) our exhaustive search of 13E3 filings. Second, one may wonder why we do not use SDC for the full sample. We have not done this because we found that SDC is incomplete in its record of 13E3 filing transactions and going private transactions in general. For instance, of the 1,112 firms with Edgar only filings detailed in Panel A of Table 1, only 279 of these are listed on SDC. Another concern with SDC is it groups LBOs of divisions with other going private and LBO transactions and these are not of interest in our study.

these criteria, we designate the firm as going private. This results in 1,451 going private transactions.<sup>8</sup>

We gather an IPO date for all firms in our sample from three sources to ensure we do not lose sample observations. First, we use SDC, excluding those with offer prices under five dollars, unit offers, ADRs, or REITs. If the date is missing from this source, we use Jay Ritter's database provided on his Web page (<http://bear.cba.ufl.edu/ritter/ipodata.htm>). If the date is not available from either of these sources, we use the first date the firm was listed on CRSP, checking this with the Jovanovic and Rousseau (2001) data for the pre-CRSP period. For robustness, we repeat all analysis excluding firms for which data is obtained only from Jovanovic and Rousseau(2001) or CRSP listing date and all of results survive. In 19 cases, the IPO date we obtain is after the going private date and we delete these firms from our sample. We also exclude 192 cases where Compustat data is not available and 179 firms that have either a one-digit SIC code of 6 (financial institutions) or a two digit SIC code of 49 (utilities). This results in a sample of 1,061 going private transactions. This sample construction process is described in Table 1 Panel A.

Panel B of Table 1 describes the industries in which the sample firms operate, using the 12 industry classifications from Ken French's Web page ([http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data\\_library.html](http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html)). The most prominent industries are Retail and Manufacturing, though no one industry dominates. However, though not presented here, the prevalence of Manufacturing (Business Equipment) decreases (increases) over the sample period.

Panel C describes the year in which the sample firms went private (column 1) and public (column 2).<sup>9</sup> There is an increase in firms going private during the mid-to-late 1980s and a resurgence after 1998.

We also construct a comparison sample using similar data to that which we used to collect IPO dates for the private sample. Like the private sample, the comparison sample includes IPOs from SDC, Jay Ritter's Website, and the Jovanovic and Rousseau (2001) data. We

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<sup>8</sup>Note that this sample size is comparable to recent studies by Engle, Hayes and Wang (2004), who have 343 firms that went private between 1998 and 2003, and the going private comparison group used in Leuz, Triantis and Wang (2005), which has 406 firms that went private between 1998 and 2003. Of the 1,451 firms in our initial sample, 415 occur between 1998 and 2003. We further detail our sample by year in Table 1 Panel C but this Table contains only firms that pass various screens and are therefore not comparable to the sample descriptions provided in these papers.

<sup>9</sup>Those transactions that occur in 2004 were filed in 2003.

do not utilize CRSP listing dates for this sample; rather we rely solely on IPO source data. Specifically, we include all IPOs listed on SDC with an offer date between 1980 and 2001, except those with offer prices under five dollars, unit offers, ADRs, or REITs and all IPOs not on SDC from the 1970s from Jay Ritter’s Web site and the Jovanovic and Rousseau (2001) data. We exclude all firms in the private sample. Further, since all of our private sample firms went public during or before 2001, we exclude any IPO occurring after 2001. Similar to our private sample we also exclude those with financial institutions (one digit SIC code of 6) or utilities (two digit SIC code of 49). This results in 6,640 comparison IPOs. Unlike the going private sample, our comparison sample begins with IPO dates in 1970 because we use CRSP start dates for the private sample but not the comparison sample. All analysis presented in this paper is qualitatively unchanged whether we exclude all firms that went public before 1970 or we expand our comparison sample with the sample of firms for which Jay Ritter’s database provides CRSP start dates as IPO dates. The third column in Panel C of Table 1 describes the year in which a set of comparison firms went public.

### *3.2. Data and construction of measures*

As we describe in Section 2, we divide our empirical proxies for testing theories of going public into four groups (i) Information Variables, (ii) Access to Capital Variables, (iii) Liquidity variables, and (iv) Control and other considerations variables. We also augment these with macro economic variables. Appendix A details the construction of each of these sets of variables and the data source we use for that purpose.<sup>10</sup>

One of the important considerations in our study is data availability. We undertake a comprehensive review of the going public theories and attempt to capture each aspect of the theory with a corresponding empirical proxy. However, differences in coverage both in scope and time period among the various databases imply that all our variables are not available for the entire sample period of study. To overcome this limitation, we test the different theories independently by using variables pertaining to that theory in order to maximize sample size and statistical power. Additionally, we identify a core set of variables corresponding to the

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<sup>10</sup>In untabulated results, we repeat all analysis winsorizing the data at the 1% level on the upper and lower tails. The results are qualitatively unchanged.

different theories for which data is most available. We also report results testing multiple hypotheses based on this sample and ensure our inferences are broadly consistent with the sub sample tests.

## 4. Comparing firm characteristics at the IPO

### 4.1. Summary statistics

In Table 2, we examine the age of the firm when they go public and the number of years the firms are public before going private. The first column shows the number of years the sample firms were public (i.e., number of years from IPO to going private). On average, the firms in our sample were public for about 13 years. The median number of years the firms are public is 10 years. The second column shows the age of the sample firms at the time of the IPO for those firms for which this data was available. The average (median) sample firms was 21.8 (12) years old at the time of the IPO. We contrast this with other firms that went public. Column three shows that these comparison firms were much younger when they went public, with an average (median) age of 13.7 (7) years. The last two rows indicate that the age of our sample firms is statistically greater than that of the comparison firms.

In Table 3, we compare other firm characteristics between our sample of going private firms and the comparison sample in the year following the IPO. We divide this table by the hypotheses being tested and described in Section 2. The results are striking. The first section provides support for the information consideration hypotheses: the going private firms have significantly less analyst following and higher PIN (more informed trading), more concentrated ownership, less institutional ownership, and fewer funds holding the stock. These results indicate the importance of information asymmetry, information gathering costs, and investor recognition to a firm's choice between being private or public. The sample firms also are larger, more traded on the NYSE, and have lower R&D expenditures.

The second section of Table 3 examines characteristics related to the predictions of the access to capital hypothesis. The statistics show that the private sample firms have lower capital expenditures, indicating that the sample firms have fewer investments and less need for capital. Thus, it may not be surprising that they ultimately abandoned public life and went private. Additionally, a greater percentage of the going private firms pay a dividend or

are in the highest tercile of the probability of having a bond rating relative to the comparison sample, which may indicate that they were less constrained for funding. However, the constraint dummy variable based on the KZ Index is not significant.<sup>11</sup>

The third section of Table 3 shows that the sample firms are significantly more illiquid with less turnover at the time of the IPO, indicating the importance of liquidity to the decision of being public. The last section presents a number of interesting statistics. The sample firms engage in no fewer mergers and acquisitions than the comparable firms. Consistent with Lehn and Poulsen (1989), the going private firms have higher free cash flow than the comparable firms; thus, they may benefit from going private to reduce potential agency problems. This section also presents statistics indicating that the sample firms have significantly lower market to book ratios, higher return on assets, higher leverage, less cash and more tangible assets in contrast to the comparison sample of firms.

## *4.2. Methods*

To investigate the difference in the going private and comparable firms at the time of the IPO, we estimate logistic regression models of the going private decisions of firms. The dependent variable is a dummy variable that equals one if the firm ultimately goes private and zero otherwise. All data is examined on an annual basis, at the first year following the IPO. Given that the average firm remains in the public markets for 13 years, these tests will help us assess the importance of intrinsic characteristics of the firms (measured at the time of the IPO) that can be used to successfully predict the going private decision. In later tests, we change the time point at which firm characteristics are measured (IPO+1 year to IPO+5 years) and repeat the logistic regression analysis to gauge the importance of time varying characteristics and its incremental influence (over and above the intrinsic factors) to predict the going private decision. We discuss the results of this latter analysis in Section 5.

## *4.3. Results*

In Table 4, we present the result of the logit analysis comparing firms at the year following the IPO. Due to data limitations and the restrictions imposed by including multiple variables

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<sup>11</sup>In untabulated results, we replace the KZ Index dummy variable with a constraint dummy based on the Whited and Wu (2006) financial constraint variable. The results are similar to those presented here with the KZ index: the constraint dummy using the Whited and Wu measure is not significant.

in the analysis as explained earlier, we first test each hypothesis separately. Thus, Panels A - D correspond to each of the four sets of theories of going public and other considerations as divided in the sections of earlier tables. Panel E will test the hypotheses by pooling a core set of variables for which data is widely available from each set of theories.

Panel A of Table 4 considers the predictions of the information consideration theories and, overall, the results support these hypotheses. The results show that firms are more likely to go private if they are not listed on the NYSE and have less analyst following, more concentrated ownership, more informed trading, and fewer funds and institutions holding the stock. These results concur with the implications of the summary statistics. Firms are more likely to go private when they will gain less from the information environment in public markets. However, firms also are more likely to go private if they are older and larger. Further, age, Psi, and R&D expenditures have no impact on the probability of going private.

In Panel B of Table 4, we examine the importance of access to capital in predicting if a firm will go private. We show that firms that are less constrained, as indicated by paying a dividend or having a high probability of a bond rating, are more likely to go private. However, the coefficient on the KZ financial constraint dummy is not significant. Further, firms are more likely to go private if they have low capital expenditures, indicating less need for capital, though the coefficient on this variable is significant in only one specification. These results are consistent with the access to capital hypothesis; however, the lack of significance of other related variables leads to only weak support for this theory.

Panel C of Table 4 considers the importance of liquidity and shows that firms are more likely to go private when they are more illiquid or have less turnover. Both of these results are consistent with the prediction that firms will go private when they do not reap the benefits of a liquid, public stock.

Panel D of Table 4 examines the importance of control considerations, valuation and agency problems. Columns 1 and 3 show that firms are more likely to go private if they have more free cash flow, which is consistent with earlier summary statistics and the results of Lehn and Poulsen (1989). Column 2 investigates if the impact of free cash flow has changed over the sample period by interacting free cash flow with two dummy variables equal to one if the year is before 1990 and another if it is after or including 1990. We do this to determine if the previously documented importance of free cash flow remains an important motive in

later years. The results show that the impact of agency costs associated with free cash flow have a significant influence on the decision to go private only in the pre-1990s period. This result suggests that where as firms went private in the 1980s to fix their governance, other motives drive the going private decision in later years. Columns 3 and 4 include merger count and show that firms are more likely to go private if they engage in fewer mergers and acquisitions. This result highlights the importance of being public and using one's own stock as currency to be active in the market for corporate control. The results also show that firms are more likely to go private if they have low market to book ratios, low cash, or more tangible assets at the time of the IPO.

Panel E uses several variables from each of the previous panels, the choice dictated by the sample size available for the variables. The results confirm that firms are more likely to go private if the information environment in the public markets is more costly. This is reflected by the sign and significance of the coefficients on NYSE, analyst coverage, Herfindahl index (HHI), and institutional ownership. The coefficient on R&D expense is not significant and coefficient on size is positive but only significant in two specifications. For sake of brevity, we do not present results using Psi or age. Firms also are more likely to go private if they have low turnover or high illiquidity, indicating the importance of liquidity considerations.

Unlike the results in Panel B, the coefficients on the access to capital variables are not significant. Also, unlike the results in Panel D, firms are not more likely to go private when they engage in fewer mergers and acquisitions. The coefficient on free cashflow is not significant, but column 5 of Panel E shows that the coefficient on free cashflow remains significant in the pre-1990s period.

Table 4 shows the statistical importance of the information consideration and liquidity theories. In Column 1 of Table 5, we present the economic impact of a one-half standard deviation change in each variable using the coefficients from column 7 of Table 4, Panel E on the probability of going private. If the variable is not included in the column 7 specification, we use the available coefficient in Panel E. We bold all coefficients that are statistically significant in Table 4 Panel E (or in the available specification). For comparison, note that, as presented in the last row of Table 5, the predicted probability of going private is 6.49 percent. A one-half standard deviation increase (decrease) in the Herfindahl index (or analyst coverage) increases the probability of going private by almost one percent, approximately

one eighth the predicted probability. Further, a one-half standard deviation decrease in turnover increases the probability of going private by 2.4% percent, approximately one third the predicted probability. Other economically meaningful variables include cash, and being listed on the NYSE. It is important to note that these calculations use the coefficients from Panel E. For several variables, the coefficient in Panel E is smaller and insignificant relative to the results presented in Panels A-D. This may be because we control for other effects, or it may be related to the reduced sample size. Thus, in column 2 of Table 5, we recalculate the economic impact for each variable using the coefficient from the first specification in which it is significant in Panels A-D, for those variables that are statistically significant in at least one specification. These results show that a one-half standard deviation change (in the predicted direction) in analyst coverage, Herfindahl index, or institutional ownership results in an approximately 1.5 percent increase in the probability of going private. Given that the predicted probability for the specifications in Panels A-D range from seven to eleven percent, an increase of two percent is substantial. Other variables also have a greater impact. A one-half standard deviation change (in the predicted direction) in capital expenditures, turnover, or illiq result in an 7.7, 2.2, or 1.9 percent increase in the probability of going private, respectively. A one-half standard deviation change (in the predicted direction) in free cashflow in the pre-1980 period, or merger count results in a 3.11, and 0.80 percent change in the probability of going private, respectively. Thus, almost all of the statistically significant variables have economically meaningful effects.

Table 5 also details the percentage of the sample that the model correctly predicts. These predictions result from using the unconditional probability of going private as the value for determining whether an observation is predicted to go private or remain public. Overall, specification 7 of Table 4, Panel E predicts 76.2 percent of the going private sample correctly. In order to gauge the significance of this predictive power we ask "What is the probability that we will expect to get success (defined as going private in the model) just by random chance?". We assume that if the logistic regression model had no power to make predictions, the actual group an observation falls into will be independent of the predicted group. Out of the 4,314 observations in the sample (in Specification 7, Table 4, Panel E), 340 observations are going private transactions. Alternatively, the model classifies 2,086 observations as going private transactions. Thus by random chance we expect 3.81% percent accuracy of classifying

the going private transactions (calculated as  $(340/4314) * (2086/4314)$ , i.e., the probability the actual group is a success and the predicted group is a success). Relative to this, the actual accuracy of 76.2% is very impressive, especially given that this analysis is at the time of the IPO and therefore on average 13 years before the going private decision.<sup>12</sup>

## 5. Examining how changes in firm characteristics impact the probability of going private

The previous analysis shows that we are able to predict which firms will go private, on average, 13 years before they make this decision, i.e., at the time of the IPO. This indicates that much of what determines the choice between being private and public is inherent and observable to the firm, at least at the time of the IPO. In this section, we will examine how firm characteristics evolve over the public life of the firm and how these changes impact the probability the firm goes private.

### 5.1. Summary statistics

In Table 6, we examine several firm characteristics in the first year following the IPO and the first year prior to going private for the private sample. In doing so, we hope to add insight as to how the costs and benefits of being public changed over the firms' public life. As before, we divide Table 6 into sections by the theories of why firms go public.

The first section of Table 6 shows that firms are larger, more followed by analysts, have greater institutional holdings and number of funds holding the stock when they go private relative to when they went public. These results indicate that firms are becoming less likely to go private based on the predictions of the information consideration hypotheses. Taken in conjunction with the results discussed in Section 3, this indicates that though firms that go private find the information environment of being public more costly than comparable firms at the time of the IPO - they change such that relative to themselves they will gain more from being public. However, information becomes less asymmetric, as indicated by the

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<sup>12</sup>Of course, the cost of this model is the poor performance in predicting failures. Given the numbers in our model, the probability of predicting failures (not going private) by random chance is 47.57%. Contrast this against the actual model prediction accuracy for failures which is only 54.02%. Thus the model is useful if the cost of not catching a success (going private deal) is very high compared to not catching a failure (not going private), which is a reasonable assumption.

significantly higher psi, when they go private - thus increasing the likelihood that they will go private for information considerations.

The second section of Table 6 presents summary statistics related to the firms' need and access to capital. The results show that at the time firms go public, they have lower capital expenditures and are less constrained, as indicated by the lower percentage of firms with high (low) probability of rating (KZ index) and the higher percentage of firms that pay a dividend. Taken together, these results indicate that these firms have less need for the access to capital being a public firm provides when they decide to go private.

The third section of Table 6 presents two measures of liquidity. The statistics show that firms have lower turnover at the time they go private. These results are consistent with the hypothesis that firms go private when the relative value of having a liquid stock price declines. However, the illiquidity measure does not differ across the two time periods.

The last section of Table 6 presents the statistics related to control, valuation, and agency costs. The results show that the market to book ratio of the firms is significantly and substantially lower at the time they go private. This may indicate declining growth opportunities or it may indicate a decreasing relative valuation. Firms also have less free cash flow at the time they go private. This evidence may seem inconsistent with the agency story supported by Lehn and Poulsen (1989) that firms benefit from going private to reduce potential wasting of free cash flow. However, as seen before, it is the comparison relative to the comparison sample that matters, and these firms have considerably more free cash flow than comparable firms at the IPO, so the decrease may not be material. Additionally, the results show that firms are more levered, with less cash and more tangible assets when they go private.

In Table 6, we compare the year following the IPO and the year preceding going private. In Table 7, we show how these characteristics change by presenting mean firm characteristics for the five years following the IPO and five years preceding going private. Because some firms were not public for more than a few years, we only include sample firms in Table 7 that were public at least seven years.<sup>13</sup> The differences noted in our discussion of Table 6 are apparent here as well. For sake of brevity, we will not discuss each of these but rather

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<sup>13</sup>This analysis is somewhat similar to that in Mikkelson, Partch, and Shah (1997), who examine the operating performance and ownership of IPO firms for 10 years post IPO.

present Table 7 as additional information. We also use this table to develop figures for the trends in five firm characteristics: analyst coverage, turnover, merger count, market to book, and free cash flow. Figures 1 A-E present these items respectively for both the going private and the comparable samples. Thus, these figures allow a joint comparison of the time-series and cross-sectional differences in firms as they consider the choice between being private or public. Figure 1A presents analyst coverage and shows that the going private firms have substantially less coverage at the time of the IPO. Analyst coverage increases but remains below the level of comparable firms; thus, the private sample is more likely to go private based on differences at the IPO and despite changes in the firm characteristics. Figure 1B presents turnover and shows that going private firms have dramatically less turnover at the IPO and, though both groups' turnover declines, the going private firms' turnover remain much lower than that of the comparable firms. This result highlights the importance of turnover in the going private sample. Figure 1C presents merger count and shows that going private firms engage in fewer mergers and acquisitions initially and throughout the public life of the firm, relative to comparable firms, again indicating that the private sample is more likely to go private. Figure 1D presents market to book and indicates that going private firms have a lower market to book ratio at the IPO and the years following the IPO. Figure 1E presents free cash flow and shows that though free cash flow declines for the going private firms, these firms have substantially more cash flow than comparable firms and this free cash flow remains higher throughout their public life.

## *5.2. Methods*

To examine the impact of how changes in firm characteristics impact the probability of going public, we conduct two tests. First, we repeat the logit analysis presented in Table 4 for each of the five years following the IPO. This analysis estimates the overall likelihood that a firm goes private. However, we also would like to use the information about the actual timing of the going private decision. Specifically, we are interested in the length of time it takes to go private and the influence of various variables informed by theory on that duration. We therefore investigate the duration data by estimating a hazard model. While there are parametric models of duration that are simple, by imposing structure as much as they do, the models might distort the estimated hazard rate. Since fewer restrictions

can result in a better representation, we use the Cox proportional hazard model which is commonly employed by researchers (see, for example, Shumway (2001)) to model bankruptcy prediction.

The model to be estimated is

$$h(t, X(t)) = h(t, 0) \exp(\beta' X(t))$$

where  $h(t, X(t))$  is the hazard rate at time  $t$  for a firm with covariates  $X(t)$ . It is important to note that the variables that proxy for the theoretical constructs we test, such as information or liquidity vary with time. Second, some of our observations are right censored. That is, at the end of the sample period there are some firms that continue to remain in the public markets, even though there is a positive probability that they may go private. The hazard model is flexible enough to handle both these complications. The Cox regression estimates the coefficient vector  $\beta$ . The Cox proportional hazard model does not impose any restriction on  $h(t, 0)$  the base line hazard. Cox's partial likelihood estimator provides a way of estimating  $\beta$  without estimating  $h(t, 0)$ . A positive coefficient on variable  $x$  in the hazard model implies that a higher  $x$  is linked to higher hazard rate and thus a lower expected duration. The hazard ratio which is simply  $\exp(\beta)$  tells us how much the hazard (i.e., instantaneous risk) the going private event increases for a unit change in the independent variable.

As described in Section 3.1 and Table 1, Panel C, our comparison sample does not begin until 1970, where as our private sample begins before 1970. In the previous analysis, we used all the data to maximize our private sample size. However, in the estimating the Hazard model, we limit our private sample to those with an IPO date on or after 1970. We do this to make the number of years a firm may be public comparable across the two samples since the hazard model predicts the time to going private.

### *5.3. Results*

In unreported analysis, we tabulate results from rolling forward five years and repeating the logit analysis in Panel E of Table 4. The motivation for doing this is to see if the ability to predict going private increases as we get closer to the going private decision. Obviously,

as we roll forward, we lose those firms that were only public for a few years, since some of these firms would not have data 5 years after the IPO.

Many of the results are quite similar to those at the time of the IPO from Table 4.<sup>14</sup> In all 5 subsequent years, firms are more likely to go private if they have less turnover, lower market to book, or higher free cash flow. These results are consistent with previous findings. Some of the earlier results that were consistent with the hypotheses presented are not as significant in the subsequent years. For instance, analyst following becomes less important three years post-IPO. However, the importance of the dividend dummy strengthens as we get closer to the going private decision.

Possibly more important than the significance of the individual variables in these analyses is the ability of the model to predict if a firm will go private. The percentage of correct predictions modestly increases as we get closer to the going private decision. In Table 4, we were able to correctly predict 76.2 percent of the private sample accurately. Within five years of the IPO, we are able to accurately predict 81 percent of the private sample accurately. Thus, it appears that the many of the factors that determine if a firm will go private - information considerations, liquidity, and free cash flow, are seen at the time of the IPO. Thus, it is more the inherent characteristics of the firm at the IPO than the changes that happen to it when it is public that determine if it will go private.

The previous analysis examines the motives for being public in snapshots of individual years, from the year following the IPO to five years later. This analysis shows that much of what drives a firm to go private is determined at the time of the IPO. However, as we saw in Table 7 and Figure 1 A-E, many firm characteristics change considerably over the public life of the firm. The logit analysis does not incorporate the relevance of the path the firm takes and how its firm characteristics change. To investigate how incorporating this information impacts the determinants of the probability to go private and to understand the factors that determine how long a firm remains public before going private, we use a Hazard Model as discussed in the previous methods subsection. In implementing this model, we replicate the analysis presented in Table 4, in that we examine the hypotheses individually and then all together. However, we exclude the age of the firm at the IPO and the indicator for if the firm is listed on the NYSE, since these variables do not change over time. We present these

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<sup>14</sup>Results available from the authors upon request.

results in Table 8, Panels A through E. The results are quite similar to previous findings and support the importance of information, liquidity, control, free cash flow in impacting the likelihood that the firm goes private.

Panel A of Table 8 presents the results for the information consideration hypotheses and shows that firms are more likely to go private if they have lower analyst following, institutional holdings, and number of funds and have higher Psi and PIN. All these results support the predictions of the information considerations hypothesis. Given the changes in these variables over time, as presented in Table 6 and Figure 1, their continued significance highlights the importance of the differences in the private and comparison samples at the IPO and indicates that any changes occur similarly in both samples. Additionally, the significance of Psi provides stronger support than that in the logit analysis since Psi is insignificant in Table 4. The fact that this variable is significant in the Hazard model but not in the logit analysis suggests that it is the path of change over the public life of the firm that is important.

Panel B of Table 8 examines variables related to a firm's access to capital. Similar to the logit results, firms that pay a dividend or are less likely to have a bond rating are more likely to go private. Further, in two of the three specifications, the coefficient on capital expenditures is marginally significant. Panel C of Table 8 examines the role of liquidity and strongly supports its importance in the decision to go private, given the negative and significant coefficient on turnover. Panel D of Table 8 examines the importance of control and agency costs. As before, firms are more likely to go private if they engage in fewer mergers and acquisitions. Further, firms are more likely to go private when they have a lower market to book, more fixed assets or higher, and free cash flow in the pre-1990s period.

Panel E of Table 8 examines the relative importance of each hypothesis. The results continue to support the importance of information considerations, liquidity, and corporate control in the choice between being public or private. As in the previous panels, support for the role of free cash flow is limited to the pre-1990s period.

Figures 2 and 3 illustrate the economic significance of several variables in the Hazard Model analysis. Specifically, in Figure 2, we estimate the hazard function using column 7 of Panel E of Table 8. All covariates are held at their sample mean except those indicated. In all figures, we illustrate the difference in each specified variable at the tenth and ninetieth percentile. These figures can be compared to Figure 3, which illustrates the estimated Hazard

function holding all variables at their sample mean. The differences in the hazard functions for firms with high and low analyst coverage, turnover, and market to book are substantial and reflect the economic importance of these variables in determining the choice go private versus remaining public. The differences in the hazard function of the high and low free cash flow and merger count are less dramatic.

#### *5.4. Effect of Market and Macroeconomic Factors*

In Table 9, we explore the importance of the evolution of market wide and macro economic forces in the timing of the going private decision using the Cox proportional hazard set up after controlling for the firm and industry characteristics using specification 7 of Table 8, Panel E. We do this for two reasons. First, waves in going private transactions (as detailed in Panel C of Table 1) suggest that exogenous factors may influence the number of firms going private and thus impact a firm's decision to go private. In this section, we therefore examine the importance of these exogenous factors. Second, as we describe throughout this paper, the difference in firms that go private and remain public are evident at the IPO. One interpretation of this is that the marginal benefit is just above the marginal cost of being public for these firms at the IPO. Over time, forces push the marginal costs over the marginal benefits and thus these firms go private. However, as we saw in Figure 1 and Tables 6 and 7, many of the firm's characteristics do not change in ways that would increase the probability of going private. Thus, it may be that exogenous market and macroeconomic forces also play a role in pushing the firm over the edge. It is important to emphasize that in all these analyses, the sign and significance of the firm characteristics in our earlier tables continue to hold.

We find that the hazard of going private increases significantly in high sentiment (measured as in Baker and Wurgler(2006)) and hot private equity markets and decreases in hot IPO markets. These results suggest that fluctuations in the private equity, IPO, and overall market impact the decision to go private. The results also raise the related question of what drives private equity waves. However, this question is beyond the scope of this paper and we therefore leave it to future research. Column 5 examines the impact a firm's stock return has on the decision to go private. Pastor and Veronesi (2005) predict that firms will rationally go public after a period of high returns. If one reverses this argument, it may suggest that

firms go private after periods of low returns. Though we see firms go private when they have low market to book ratios and we see market to book ratios decline over the firm's public life (consistent with their argument), the coefficient on the market adjusted stock return is not statistically significant. In column 6, we examine the impact of the available debt on the decision to go private. We find that firms are less likely to go private when the yield curve is steep and increasing, suggesting that the supply of debt in the economy might be an important factor in the going private decision. However we do not find that the supply of bank loans significantly impacts the decision to go private. Finally, we find that as default risk premium increases in the economy, the likelihood of a firm going private increases, suggesting that costs of bankruptcy for public firms might be substantial and an influencing factor.

For brevity, we do not present the firm characteristics in Table 9; however, all results are unchanged. Thus, the hazard model analysis confirms the relative importance of the firm characteristics found to significantly impact the probability of going private in the logit analysis. This confirmation not only lends additional support to the role of these factors in the choice between being private versus public but further indicates the importance of the starting point for these firm characteristics at the IPO. In other words, for most firm characteristics, it is their relative level at the time of the IPO and not the change over the firm's public life that determines if a firm will go private.

## **6. Conclusion**

In this paper, we investigate how firms weigh the costs and benefits of being a public firm in the decision to opt out of the public market and go private. In doing so, we draw on previous studies from the 1980s on the decision to go private and on the well developed theoretical literature on why firms go public. We test the relative importance of each of these factors by examining the public-life-cycle of firms from IPO to the going private decision and compare these firms to a set of firms that had IPOs during a similar period but did not go private.

Our findings are two-fold. First, we find support for the importance of many of the costs and benefits of being a public firm. Particularly, we find strong support for the importance of theories that stress information and liquidity considerations. We also find support for

the role of free cash flow, primarily in the pre-1990s period. We find mixed support for the importance of access to capital and control considerations. Second, we find that despite the fact that, on average, our sample firms remain public for over thirteen years, one can predict that they will go private at the time of the IPO. Specifically, most of the factors that significantly determine the duration of public life also significantly predict who will go private using data in the year following the IPO. This result implies that it is not as much the path that the firm takes but factors inherent and observable to the firm at the time of going public that determines if it eventually will go private.

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## Appendix A: Description of Variables Used

This appendix describes the list of variables constructed from various databases and used as proxies for testing the various theories of going public in the paper. It also lists the time period of their availability. COMPUSTAT variables are available from 1950-2004.

Variable name	Description	Source
Sales	Real Net Sales in year 2000 million dollars (Data12)	COMPUSTAT
Assets	Real Assets in year 2000 million dollars (Data6)	COMPUSTAT
Market Value	Market Capitalization of equity in year 2000 million dollars (Data24*Data25)	COMPUSTAT
NYSE	one if the firm is listed on the NYSE and zero otherwise (zlist)	COMPUSTAT
PIN	(note: does not vary over time) Probability of informed trading	Easley et al. (2004) 1983-2001
Age	(percentage, expressed in decimals) Age of firm at the IPO	Loughran and Ritter (2004) Jovanovic and Rousseau (2001) IBES
Analyst Coverage	Number of Analysts following the firm in any fiscal year (set equal to zero if missing)	1974-2004
$\psi$	Relative firm specific stock return variation (percentage, expressed in decimals)	Durnev, et al. (2003) 1974-2004
HHI	Concentration of Institutional holdings - Herfindahl Hirschman index scaled by 100	CDA SPECTRUM 1983-2004
Institutional Holdings	Expressed as percentage of total shares outstanding for each firm	CDA SPECTRUM 1983-2004
Number of Funds	Number of institutions with share holdings for each firm	CDA SPECTRUM 1983-2004
Capex/Sales	Ratio of capital expenditure to sales (Data128/Data12)	COMPUSTAT
R&D/Sales	Ratio of Research and development expenditure to sales (Data46/Data12) (set to zero if missing)	COMPUSTAT

Appendix A: Description of Variables Used (continued)

Variable name	Description	Source
KZ Index Dummy	$-1.001909CFit + 3.139193TLTDit - 39.36780TDIVit - 1.314759CASHit + 0.2826389Qit,$ <p>CF - cash flow to total assets; TLTD - long term debt to total assets.            CASH - liquid assets to total assets; TDIV - total dividends to assets            Q - market to book ratio. As in Lamont, Polk, and Saa Requejo (2001), firms in the highest KZ index tercile (constrained most) are coded 1 for this variable and the rest as zero.</p> <p>Computed as the fitted value of a logit model of probability of rating as in Lemmon and Zender (2004)</p> <p>Firms in the lowest rating tercile (constrained most) are coded 1 for this variable and the rest as zero.</p> <p>Equals one if a firm paid out dividends during the fiscal year and zero otherwise</p>	COMPUSTAT
Prob of rating Dummy	<p>Computed as the fitted value of a logit model of probability of rating as in Lemmon and Zender (2004)</p> <p>Firms in the lowest rating tercile (constrained most) are coded 1 for this variable and the rest as zero.</p> <p>Equals one if a firm paid out dividends during the fiscal year and zero otherwise</p>	COMPUSTAT
Dividend Dummy	<p>Equals one if a firm paid out dividends during the fiscal year and zero otherwise</p>	COMPUSTAT
Illiq	<p>Illiquidity measure computed as in Amihud(2002)            Scaled by 100,000</p>	CRSP 1963-2004.
Turnover	<p>Ratio of daily turnover volume over the past 12 month period divided by number of shares outstanding. Scaled by 1000.</p>	CRSP 1963-2004.
Merger Count	<p>Number of acquisitions in which the company is an acquiror during the year</p>	SDC 1980-2004.
Market to Book	$(Data6-Data60+Data24*Data25)/Data6$	CRSP
Free cash flow/Assets	$(Data13-Data16-Data15-Data21-Data19)/Data6$	COMPUSTAT
Leverage	$Data9/Data6$	COMPUSTAT
Cash to Assets	$Data1/Data6$	COMPUSTAT
Return on Assets	$Data13/Data6$	COMPUSTAT
Net Fixed Assets/Assets	$Data8/Data6$	COMPUSTAT

Appendix A: Description of Variables Used (continued)

Variable name	Description	Source
IPO Volume	Real 2000 dollars value of IPOs in each calendar year	SDC
Number IPO	Number of IPOs in each calendar year	SDC
Sentiment 1	sf1 measure of Baker and Wurgler (2006)	Wurgler's Web site
Sentiment 2	sf2 measure of Baker and Wurgler (2006)	Wurgler's Web site
Annual Adj Ret	Stock's market adjusted return	CRSP
Term	over CRSP Value weighted index in the previous fiscal year	FRED
Default	Yield Spread differential between 10yr 1 yr treasury bonds	FRED
Bank	Yield Spread differential between BBB AAA Corporate bonds	FRED
Private Equity	Real 2000 dollars value of bank loans in each calendar year Real 2000 dollars value of Private Equity deals	Money Tree report of Price Waterhouse Coopers
Private Equity Deals	Number of Private Equity deals	Money Tree report of PriceWaterhouse Coopers

**Table 1, Panel A: Sample Selection**

This table presents data on the derivation of the going private sample for the period 1980-2004 from various data sources and used in the paper.

<b>Sample Source / Screen</b>	<b>Number of Firms</b>
Edgar only	1,112
Lehn & Poulsen (LP) only	92
Edgar / LP Common	164
Financial Buyouts from SDC	83
<b>Total Base Sample</b>	<b>1,451</b>
Less: firms not on Compustat in years between IPO & going private	-192
Less: firms with 6 or 49 SIC code	-179
Less: firms where IPO date is after going private date	-19
<b>Total Sample</b>	<b>1,061</b>

**Table 1, Panel B: Industry Distribution**

This table reports the industry distribution of the going private sample of firms. We use the 12 industry classification of Fama and French (available at Ken French's Web site <http://mba.tuck.dartmouth.edu/pages/faculty/ken.french>) to classify the firms.

<b>S.No.</b>	<b>Description</b>	<b>Number of Firms</b>
1	Consumer Nondurables	151
2	Consumer Durables	44
3	Manufacturing	195
4	Energy	55
5	Chemicals	21
6	Business Equipment	123
7	Telecom	33
8	Utilities	0
9	Shops	200
10	Healthcare	49
11	Money	0
12	Other	190
	<b>Total</b>	<b>1061</b>

**Table 1, Panel C: Time Series Distribution**

This table presents the number of firms in the sample that went private in each year in the first column. The second column reports the time series distribution of the same firms based on their IPO year. The third column reports the time series distribution by IPO year of all other firms that did not go private until the end of our sample period and labeled the comparison sample.

Year	Going private sample	IPO year- going private sample	IPO year - comparison sample
Before 1970		217	
1970		18	69
1971		36	85
1972		200	198
1973		12	26
1974		3	3
1975		18	5
1976		13	31
1977		7	19
1978		13	25
1979		9	54
1980	21	25	76
1981	41	29	216
1982	53	15	79
1983	49	54	399
1984	78	30	187
1985	69	22	189
1986	72	45	327
1987	59	26	260
1988	82	10	110
1989	53	11	136
1990	42	12	119
1991	16	23	259
1992	14	15	374
1993	12	31	483
1994	20	27	420
1995	27	25	438
1996	16	33	631
1997	39	40	399
1998	39	14	240
1999	62	20	376
2000	57	7	338
2001	51	1	69
2002	36		
2003	42		
2004	11		
Total	1061	1061	6640

**Table 2: Age distribution and comparison of firm age at IPO of going private sample and comparable IPO firms**

This table presents the distribution of firm age. The first column presents the age of the firm in public markets (number of years the firm stayed public before becoming private) for the going private sample. Column A presents the distribution of firm age at the time of the IPO for the going private sample. Column B presents the same information for the comparison sample. t-stat (z-stat) reports the results of a test of difference in means (medians) between the (B) and (A) columns is equal to zero. \*\*\*, \*\*, \* indicates significance at 1%, 5% and 10% level respectively. Note that we do not have firm age information for all firms in our sample.

Age No. of Years	No.of firms		Age at IPO	
	Going Private sample	Going Private sample (A)	Comparison sample (B)	
1	20	40	362	
2	68	28	370	
3	79	25	526	
4	74	39	459	
5	76	19	394	
6	46	24	333	
7	44	32	315	
8	41	17	261	
9	46	22	218	
10	47	23	175	
11-19	324	112	986	
20-29	128	65	359	
30-39	25	52	144	
40-49	12	32	105	
50-59	20	18	83	
60-69	8	22	63	
70-79	2	16	53	
80-89	1	7	50	
90-99		5	36	
100>=		7	34	
Mean	12.9	21.8	13.7	
Median	10	12	7	

t-stat for difference in means (B)-(A): -10.0\*\*\*

z-stat for difference in medians (B)-(A) : -9.8\*\*\*

**Table 3: Comparison of firm characteristics at IPO - Going private sample vs. Comparison IPO sample**

This table presents firm characteristics for the going private sample (column A) and the comparison sample (column B) at the same point in time, i.e, at the time of the IPO. t-stat (z-stat) reports the results of a test of difference in means (medians) between the two columns is greater than zero. \*\*\*, \*\*, \* indicates significance at 1%, 5%, and 10% level respectively.

Measure	Private Firms <i>t= IPO year</i> (A)	Comparison Sample <i>t= IPO year</i> (B)	Difference T stat (Z-Stat) (B)-(A)
<b>Information Variables</b>			
Sales	263.12	246.81	-0.3
	91.03	40.47	-14.2***
Assets	239.57	298.04	0.7
	73.04	51.46	-8.2***
Market Value	326.99	495.21	1.9*
	84.67	99.71	2.4**
NYSE	0.19	0.13	-4.7***
	0.00	0.00	-4.7***
PIN	0.24	0.23	-2.1**
	0.23	0.22	-1.5
Analyst Coverage	0.83	1.10	3.3***
	0.00	0.00	4.3***
$\psi$	0.75	0.75	0.6
	0.81	0.81	0.2
HHI	2.92	2.48	-3.2***
	1.97	1.58	-4.3***
Institutional Holdings	12.32	13.90	1.9*
	4.64	7.26	1.3
Number of Funds	11.83	14.61	2.5**
	5.00	6.00	1.8*
R&D/Sales	0.12	1.30	1.8*
	0.00	0.00	15.4***
<b>Access to Capital</b>			
Capex/Sales	0.21	0.80	1.9*
	0.04	0.06	8.0***
KZ Index Dummy	0.44	0.42	-1.2
	0.00	0.00	-1.2
Probability of rating	0.49	0.66	3.2***
	0.00	1.00	3.2***
Dividend Dummy	0.35	0.15	-14.5***
	0.00	0.00	-14.3***

**Table 3 (continued): Comparison of firm characteristics at IPO - Going private sample vs. Comparison IPO sample**

Measure	Private Firms <i>t= IPO year +1</i> (A)	Comparison Sample <i>t= IPO year + 1</i> (B)	Difference T stat (Z-Stat) (B)-(A)
<b>Liquidity Variables</b>			
Illiq	0.03	0.01	-7.8***
	0.01	0.00	-12.6***
Turnover	0.05	0.08	3.9***
	0.03	0.05	11.8***
<b>Control and Agency</b>			
Merger Count	0.27	0.31	0.9
	0.00	0.00	-0.4
Market to Book	2.11	3.26	7.1***
	1.56	2.21	14.4***
Free cash flow/Assets	0.05	-0.03	-9.1***
	0.07	0.05	-10.0***
Leverage	0.16	0.11	-8.0***
	0.12	0.03	-11.5***
Cash to Assets	0.18	0.35	17.2***
	0.10	0.29	16.0***
Return on Assets	0.14	0.03	-11.2***
	0.15	0.10	-12.8***
Net Fixed Assets/Assets	0.31	0.21	-12.3***
	0.26	0.13	-13.6***

**Table 4 - Panel A: Logistic regression models explaining the decision to go private using information variables at the time of IPO**

This table reports the results of logistic regressions that predict the propensity of a firm to go private based on information variables measured at the time of the IPO year. The dependent variable is one if a firm goes private and zero otherwise. All specifications include Fama-French Industry classification controls. The tables report the coefficients and in parentheses, the standard errors. Variables are defined in appendix A. \*\*\*, \*\*, \* indicates significance at 1%, 5%, and 10% level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Const.	-1.84*** (.15)	-2.22*** (.19)	-2.24*** (.19)	-2.77*** (.31)	-2.38*** (.20)	-2.49*** (.20)	-2.28*** (.70)	-2.20*** (.28)
Log(Sales)	.20*** (.02)	.13*** (.03)	.22*** (.03)	.12*** (.04)	.13*** (.03)	.17*** (.03)	-.04 (.07)	.10*** (.03)
R&D/Sales	-.02 (.03)	-.02 (.02)	-.004 (.02)	-.01 (.02)	-.01 (.02)	-.008 (.02)	-.14 (.29)	-.02 (.02)
NYSE	-.29*** (.11)							
Analyst Coverage		-.13*** (.03)						
Age			.0006 (.002)					
HHI				.10*** (.02)				
Inst. Ownership					-.01*** (.003)			
No. funds						-.01*** (.003)		
PIN							3.39** (1.62)	
$\psi$								-.02 (.23)
Obs.	6834	6386	5581	3917	6218	6218	685	5274
Pseudo R.Sq.	.08	.04	.07	.04	.03	.04	.02	.03

**Table 4 - Panel B: Logistic regression models explaining the decision to go private using access to capital variables at the time of IPO**

This table reports the results of logistic regressions that predict the propensity of a firm to go private based on access to capital variables measured at the time of the IPO year. The dependent variable is one if a firm goes private and zero otherwise. All specifications include Fama-French Industry classification controls. The tables report the coefficients and in parentheses, the standard errors. Variables are defined in appendix A. \*\*\*, \*\*, \* indicates significance at 1%, 5%, and 10% level respectively.

	(1)	(2)	(3)
Const.	-1.30*** (.11)	-1.32*** (.14)	-1.13*** (.33)
Capital Expenditure/Sales	-.09** (.05)	-.07 (.04)	-.11 (.12)
Dividend Dummy	.72*** (.08)		
KZ index		.05 (.09)	
Prob of Rating Dummy			-.49** (.24)
Obs.	7062	5244	1191
Pseudo R.Sq.	.08	.05	.05

**Table 4 - Panel C: Logistic regression models explaining the decision to go private using liquidity variables at the time of IPO**

This table reports the results of logistic regressions that predict the propensity of a firm to go private based on liquidity variables measured at the time of the IPO year. The dependent variable is one if a firm goes private and zero otherwise. All specifications include Fama-French Industry classification controls. The tables report the coefficients and in parentheses, the standard errors. Variables are defined in appendix A. \*\*\*, \*\*, \* indicates significance at 1%, 5%, and 10% level respectively.

	(1)	(2)	(3)
Const.	-1.54*** (.18)	-1.45*** (.13)	-1.91*** (.21)
Turnover	-4.75*** (1.02)		-2.88*** (1.01)
Illiq		4.76*** (1.09)	3.24* (1.76)
Obs.	4992	5850	4366
Pseudo R.Sq.	.04	.06	.03

**Table 4 - Panel D: Logistic regression models explaining the decision to go private using control and other variables at the time of IPO**

This table reports the results of logistic regressions that predict the propensity of a firm to go private based on control and other variables measured at the time of the IPO year. The dependent variable is one if a firm goes private and zero otherwise. All specifications include Fama-French Industry classification controls. The tables report the coefficients and in parentheses, the standard errors. Variables are defined in appendix A. \*\*\*, \*\*, \* indicates significance at 1%, 5%, and 10% level respectively.

	(1)	(2)	(3)	(4)
Const.	-.90*** (.14)	-.98*** (.14)	-1.90*** (.19)	-1.99*** (.20)
Market to Book	-.06** (.02)	-.06** (.02)	-.03 (.02)	-.04 (.02)
Free Cash Flow/Assets	1.13*** (.26)		.75*** (.28)	
Free Cash Flow post-1990s		.23 (.25)		
Free Cash Flow pre-1990s		3.36*** (.47)		
Leverage	-.16 (.23)	-.05 (.23)	.22 (.27)	.17 (.27)
Cash/Assets	-1.36*** (.22)	-1.36*** (.22)	-.85*** (.26)	-.80*** (.26)
Net Fixed Assets/Assets	.58*** (.20)	.50** (.20)	.50** (.25)	.51** (.25)
Merger Count			-.11* (.06)	-.08 (.05)
Return on Assets				.82*** (.26)
Obs.	6512	6512	5918	6381
Pseudo R.Sq.	.09	.09	.04	.04

**Table 4 - Panel E: Logistic regression models explaining the decision to go private using all variables at the time of IPO**

This table reports the results of logistic regressions that predict the propensity of a firm to go private based on all variables for which data is available measured at the time of the IPO year. The dependent variable is one if a firm goes private and zero otherwise. All specifications include Fama-French Industry classification controls. The tables report the coefficients and in parentheses, the standard errors. Variables are defined in appendix A. \* \* \*, \*\*, \* indicates significance at 1%, 5%, and 10% level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Const.	-1.86*** (.28)	-1.93*** (.29)	-1.98*** (.45)	-1.94*** (.29)	-1.93*** (.29)	-2.53*** (.34)	-1.95*** (.30)
Log(Sales)	.11** (.04)	.06 (.04)	.02 (.06)	.05 (.04)	.06 (.04)	.14*** (.05)	.06 (.04)
R&D/Sales	.001 (.007)	.0007 (.008)	.01 (.01)	.0003 (.008)	.0003 (.008)	.004 (.007)	.0004 (.008)
NYSE	-.66*** (.18)						
Analyst Coverage		-.08** (.04)			-.08** (.04)	-.10** (.04)	-.07* (.04)
HHI			.05* (.03)				
Inst. Ownership				-.006* (.003)			
Capital Expenditure/Sales	-.02 (.03)	-.02 (.03)	-.15 (.13)	-.01 (.03)	-.02 (.03)	-.05 (.07)	-.01 (.03)
Dividend Dummy	.08 (.14)	.01 (.15)	.03 (.18)	.02 (.15)	.008 (.15)	.06 (.16)	.03 (.15)
Illiq						4.83** (1.94)	
Turnover	-4.32*** (1.12)	-2.82*** (1.05)	-2.76** (1.25)	-2.56** (1.05)	-2.73*** (1.04)	-1.60 (1.05)	-2.58** (1.04)
Market to Book	-.02 (.03)	-.01 (.02)	-.03 (.03)	-.01 (.02)	-.01 (.02)	-.01 (.02)	-.01 (.02)
Free Cash Flow/Assets	.57* (.34)	.67* (.35)	.81* (.47)	.68* (.35)		.53 (.36)	.62* (.34)
Free Cash Flow post-1990s					.40 (.36)		
Free Cash Flow pre-1990s					1.58** (.68)		
Leverage	-.13 (.32)	-.06 (.33)	-.01 (.40)	-.09 (.33)	-.06 (.33)	-.08 (.35)	-.08 (.33)
Cash/Assets	-.83** (.33)	-.89*** (.34)	-.68 (.42)	-.96*** (.34)	-.91*** (.34)	-.68* (.36)	-.97*** (.34)
Net Fixed Assets/Assets	.74*** (.29)	.73** (.29)	.53 (.38)	.66** (.30)	.72** (.30)	.87*** (.33)	.63** (.30)
Merger Count							-.07 (.06)
Obs.	4420	4350	46	2812	4315	4350	3848
Pseudo R.Sq.	.07	.05	.05	.05	.05	.06	.05

**Table 5 - Economic Significance of forces that explaining the decision to go private using variables at the time of IPO**

This table reports the increase in probability of going private for a 1/2 standard deviation around the mean for each explanatory variable, holding all other variables at their mean. For dummy variables, the change is from 0 to 1. All the results in the first column are based on specification 7 of table 4, panel E. The table also reports prediction accuracy statistics for this specification in the first column. Statistically significant effects at 10% level or higher are in bold. Economic significance of variables that are not included in specification 7 is based on the specification in table 4 panel E in which they appear. For example the HHI effect is computed using specification 3. Since the number of firms for which all variables are available is limited in specification 7 of table 4, Panel E, the second column reports the statistical and economic significance of the same variables using specifications in panel 4A through 4D in which each group of variables (information, access to capital, liquidity and control) are examined separately. Since the second column numbers are based on multiple specifications, we do not report prediction accuracy information.

Variable	Change in Probability (%)	Change in Probability (%)
Log(Sales)	0.71	<b>1.45</b>
NYSE	<b>-1.34</b>	<b>-0.97</b>
Analyst Coverage	<b>-0.82</b>	<b>-1.69</b>
HHI	<b>0.78</b>	<b>1.57</b>
Inst. Ownership	<b>-0.65</b>	<b>-1.16</b>
Capital Expenditure/Sales	-0.64	<b>-7.66</b>
R&D/Sales	0.05	-2.92
Dividend Dummy	0.06	<b>0.03</b>
Turnover	<b>-2.40</b>	<b>-2.20</b>
Illiq	<b>0.72</b>	<b>1.87</b>
Market to Book	-0.34	-0.88
Free Cash Flow/Assets	1.04	<b>1.34</b>
Free Cash Flow/Assets Pre 1990s	<b>1.10</b>	<b>3.11</b>
Leverage	-0.09	0.27
Cash/Assets	<b>-1.72</b>	<b>-1.64</b>
Net Fixed Assets/Assets	<b>0.82</b>	<b>0.71</b>
Merger Count	-0.54	<b>-0.80</b>
Pr (Predict Private   Private)	76.18	
E (Private  X)%	6.49	

**Table 6: Going Private Sample - comparison of firm characteristics at IPO and going private years**

This table presents firm characteristics for the going private sample at two points in time: At the time of the IPO (column A) and at the time of going private (column B). t-stat (z-stat) reports the results of a test of difference in means (medians) between the two columns is equal to zero. \*\*\*, \*\*, \* indicates significance at 1%, 5%, and 10% level respectively.

Measure	Private Firms <i>t= IPO year</i> (A)	Private Firms <i>t= Private year</i> (B)	Difference T stat (Z-Stat) (B)-(A)
<b>Information Variables</b>			
Sales	263.12	606.06	9.9***
	91.03	151.53	15.2***
Assets	239.57	559.56	8.7***
	73.04	115.41	14.9***
Market Value	326.99	416.24	0.5
	84.67	61.24	-0.2
PIN	0.24	0.24	-0.3
	0.23	0.23	-0.8
Analyst Coverage	0.83	2.30	10.3***
	0.00	1.00	10.2***
$\psi$	0.75	0.84	8.4***
	0.81	0.88	8.1***
HHI	2.92	3.43	-0.4
	1.97	2.51	-0.3
Institutional Holdings	12.32	18.36	8.9***
	4.64	11.45	8.9***
Number of Funds	11.83	20.26	7.9***
	5.00	9.00	9.2***
R&D/Sales	0.12	0.10	-0.3
	0.00	0.00	2.0**
<b>Access to Capital</b>			
Capex/Sales	0.21	0.08	-3.4***
	0.04	0.03	-7.5***
KZ Index Dummy	0.44	0.31	-4.4***
	0.00	0.00	-4.3***
Probability of rating	0.49	0.20	-1.9**
	0.00	0.00	-1.9**
Dividend Dummy	0.35	0.37	-3.3***
	0.00	0.00	-2.5***

**Table 6 (continued): Going Private Sample - comparison of firm characteristics at IPO and going private years**

Measure	Private Firms <i>t= IPO year</i> (A)	Private Firms <i>t= Private year</i> (B)	Difference T stat (Z-Stat) (B)-(A)
<b>Liquidity Variables</b>			
Illiq	0.03	0.04	0.9
	0.01	0.01	0.9
Turnover	0.05	0.03	-3.1***
	0.03	0.02	-5.7***
<b>Control and Agency</b>			
Merger Count	0.27	0.23	0.7
	0.00	0.00	0.6
Market to Book	2.11	1.28	-11.5***
	1.56	1.08	-14.5***
Free cash flow/Assets	0.05	0.04	-2.5**
	0.07	0.06	-4.9***
Leverage	0.16	0.20	5.7***
	0.12	0.17	4.7***
Cash to Assets	0.18	0.13	-7.5***
	0.10	0.07	-7.9***
Return on Assets	0.14	0.10	-6.1***
	0.15	0.12	-8.3***
Net Fixed Assets/Assets	0.31	0.33	3.2***
	0.26	0.27	3.4***

**Table 7: Summary Statistics in event time - going private sample**

This table presents the evolution of firm characteristics in event time for the going private sample. We present the cross sectional means of all variables in event time for firms for which data is available for 5 years starting from the IPO year. These are denoted as columns labeled IPO to IPO+4. We also present the information for 5 years leading up to the going private year. These are denoted in columns labeled Private-4 to Private.

	IPO	IPO + 1	IPO + 2	IPO + 3	IPO + 4	Private-4	Private-3	Private-2	Private-1	Private
<b>Information</b>										
Sales	262.72	279.63	287.35	301.02	329.88	699.78	705.65	720.53	734.80	738.50
Assets	189.29	208.29	218.43	232.88	247.99	550.37	559.53	577.07	615.94	621.61
Market Value	185.93	180.15	172.65	189.14	197.84	342.71	391.20	374.71	381.03	444.43
NYSE	0.22	0.21	0.20	0.20	0.20	0.22	0.22	0.22	0.22	0.22
PIN	0.26	0.25	0.25	0.22	0.23	0.24	0.25	0.24	0.24	0.24
Analyst Coverage	0.43	0.86	0.85	0.98	1.09	1.95	2.17	2.33	2.39	2.37
$\psi$	0.74	0.82	0.82	0.81	0.81	0.81	0.81	0.82	0.83	0.84
HHI	3.40	3.60	3.66	3.38	3.58	3.82	3.61	3.63	3.47	3.59
Institutional Holdings	7.23	9.27	10.91	12.80	13.90	14.24	15.06	15.67	16.37	17.07
Number of Funds	6.74	7.95	9.52	11.53	13.79	17.43	19.27	19.31	20.70	21.00
R&D/Sales	0.14	0.14	0.11	0.09	0.11	0.10	0.09	0.09	0.08	0.07
<b>Access to Capital</b>										
Capex/Sales	0.11	0.33	0.17	0.31	0.21	0.22	0.21	0.21	0.19	0.18
KZ Index Dummy	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Probability of rating	0.51	0.49	0.40	0.38	0.36	0.31	0.32	0.31	0.31	0.29
Dividend Dummy	0.38	0.51	0.46	0.41	0.37	0.25	0.22	0.20	0.19	0.16
<b>Liquidity</b>										
Illiq	0.44	0.45	0.45	0.47	0.49	0.54	0.52	0.52	0.52	0.48
Turnover	0.04	0.04	0.04	0.04	0.04	0.03	0.04	0.04	0.06	0.04
<b>Control and Agency</b>										
Merger Count	0.03	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02
Market to Book	1.91	1.56	1.40	1.38	1.28	1.18	1.16	1.13	1.12	1.15
Free cash flow/Assets	0.07	0.07	0.06	0.06	0.07	0.06	0.07	0.06	0.06	0.05
Leverage	0.16	0.18	0.19	0.20	0.20	0.21	0.21	0.21	0.21	0.20
Cash to Assets	0.14	0.12	0.11	0.11	0.11	0.10	0.10	0.10	0.10	0.11
Return on Assets	0.16	0.15	0.14	0.14	0.14	0.13	0.13	0.13	0.12	0.12
Net Fixed Assets/Assets	0.32	0.34	0.34	0.35	0.35	0.35	0.35	0.36	0.36	0.35

**Table 8 - Panel A: Cox Proportional hazard models for time to go private using information variables**

This table reports the results of Cox proportional hazard models with time varying covariates based on information variables. The dependent variable is time to private which measures the time between IPO of the firm and the time they go private. All specifications include Fama-French Industry classification controls. The tables report the coefficients and in parentheses, the standard errors. Variables are defined in appendix A. \*\*\*, \*\*, \* indicates significance at 1%, 5%, and 10% level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Log(Sales)	.10*** (.02)	.09*** (.03)	.03 (.02)	.08*** (.02)	.01 (.05)	.02 (.02)
R&D/Sales	-.005 (.01)	-.004 (.01)	-.01 (.02)	-.007 (.02)	-3.01 (2.21)	-.008 (.01)
Analyst Coverage	-.09*** (.01)					
HHI		.11*** (.01)				
Inst. Ownership			-.008*** (.002)			
No. funds				-.009*** (.001)		
PIN					3.22*** (.98)	
$\psi$						.61** (.26)
Obs.	53456	36959	49889	49889	8757	43367

**Table 8 - Panel B: Cox Proportional hazard models for time to go private using access to capital variables**

This table reports the results of Cox proportional hazard models with time varying covariates based on access to capital variables. The dependent variable is time to private which measures the time between IPO of the firm and the time they go private. All specifications include Fama-French Industry classification controls. The tables report the coefficients and in parentheses, the standard errors. Variables are defined in appendix A. \*\*\*, \*\*, \* indicates significance at 1%, 5%, and 10% level respectively.

	(1)	(2)	(3)
Capital Expenditure/Sales	-.26* (.14)	-.21 (.13)	-.30* (.16)
Dividend Dummy	.17** (.08)		
KZ Index Dummy		-.06 (.08)	
Prob of Rating Dummy			-.33*** (.09)
Obs.	56727	53822	37548

**Table 8 - Panel C: Cox Proportional hazard models for time to go private using liquidity variables**

This table reports the results of Cox proportional hazard models with time varying covariates based on liquidity variables. The dependent variable is time to private which measures the time between IPO of the firm and the time they go private. All specifications include Fama-French Industry classification controls. The tables report the coefficients and in parentheses, the standard errors. Variables are defined in appendix A. \*\*\*, \*\*, \* indicates significance at 1%, 5%, and 10% level respectively.

	(1)	(2)	(3)
Turnover	-9.88*** (1.12)		-14.90*** (1.40)
Illiq		.05 (.04)	.02 (.06)
Obs.	41019	46169	35796

**Table 8 - Panel D: Cox Proportional hazard models for time to go private using control and other variables**

This table reports the results of Cox proportional hazard models with time varying covariates based on control and other variables. The dependent variable is time to private which measures the time between IPO of the firm and the time they go private. All specifications include Fama-French Industry classification controls. The tables report the coefficients and in parentheses, the standard errors. Variables are defined in appendix A. \*\*\*, \*\*, \* indicates significance at 1%, 5%, and 10% level respectively.

	(1)	(2)	(3)	(4)
Market to Book	-.49*** (.06)	-.56*** (.06)	-.56*** (.06)	-.52*** (.05)
Free Cash Flow/Assets	.29 (.23)	.49** (.24)		
Free Cash Flow post-1990s			.04 (.21)	
Free Cash Flow pre-1990s			3.00*** (.53)	
Leverage	.11 (.20)	.08 (.20)	.12 (.20)	.03 (.20)
Cash/Assets	.45* (.24)	.34 (.24)	.29 (.24)	.32 (.23)
Net Fixed Assets/Assets	.42** (.18)	.38** (.18)	.33* (.18)	.34* (.18)
Merger Count		-.12** (.05)	-.11** (.05)	-.14*** (.05)
Return on Assets				.96*** (.24)
Obs.	50313	46239	46239	50151

**Table 8 - Panel E: Cox Proportional hazard models for time to go private using all variables**

This table reports the results of Cox proportional hazard models with time varying covariates based on all variables. The dependent variable is time to private which measures the time between IPO of the firm and the time they go private. All specifications include Fama-French Industry classification controls. The tables report the coefficients and in parentheses, the standard errors. Variables are defined in appendix A. \*\*\*, \*\*, \* indicates significance at 1%, 5%, and 10% level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log(Sales)	.03 (.03)	.08** (.03)	.07** (.03)	.08*** (.03)	.08** (.03)	.13*** (.03)	.08*** (.03)
R&D/Sales	.006 (.007)	.006 (.007)	.007 (.007)	.007 (.006)	.005 (.008)	.009 (.006)	.007 (.006)
Analyst Coverage		-.04*** (.01)			-.04*** (.01)	-.04*** (.01)	-.05*** (.01)
HHI			.07*** (.02)				
Inst. Ownership				-.01*** (.002)			
Capital Expenditure/Sales	-.23 (.15)	-.19 (.14)	-.19 (.15)	-.18 (.13)	-.20 (.14)	-.22 (.16)	-.18 (.13)
Dividend Dummy	.14 (.09)	.15 (.09)	.25** (.10)	.24** (.09)	.09 (.09)	.15 (.10)	.27*** (.09)
Illiq						.03 (.06)	
Turnover	-8.03*** (1.26)	-7.19*** (1.28)	-8.02*** (1.36)	-7.99*** (1.31)	-6.66*** (1.26)	-13.23*** (1.63)	-8.54*** (1.35)
Market to Book	-.41*** (.06)	-.38*** (.06)	-.39*** (.06)	-.43*** (.06)	-.37*** (.06)	-.41*** (.06)	-.42*** (.06)
Free Cash Flow/Assets	.38 (.26)	.39 (.26)	.41 (.28)	.64** (.27)		.42 (.28)	.55** (.26)
Free Cash Flow post-1990s					-.08 (.24)		
Free Cash Flow pre-1990s					2.98*** (.61)		
Leverage	.16 (.21)	.12 (.21)	.09 (.22)	.10 (.21)	.14 (.20)	-.05 (.22)	.09 (.21)
Cash/Assets	1.00*** (.26)	1.04*** (.26)	.89*** (.28)	1.05*** (.26)	.98*** (.26)	1.12*** (.27)	1.00*** (.26)
Net Fixed Assets/Assets	.37* (.19)	.42** (.19)	.22 (.21)	.32* (.19)	.37* (.19)	.48** (.21)	.35* (.19)
Merger Count							-.11** (.05)
Obs.	37303	37088	29008	35171	37088	32345	35118

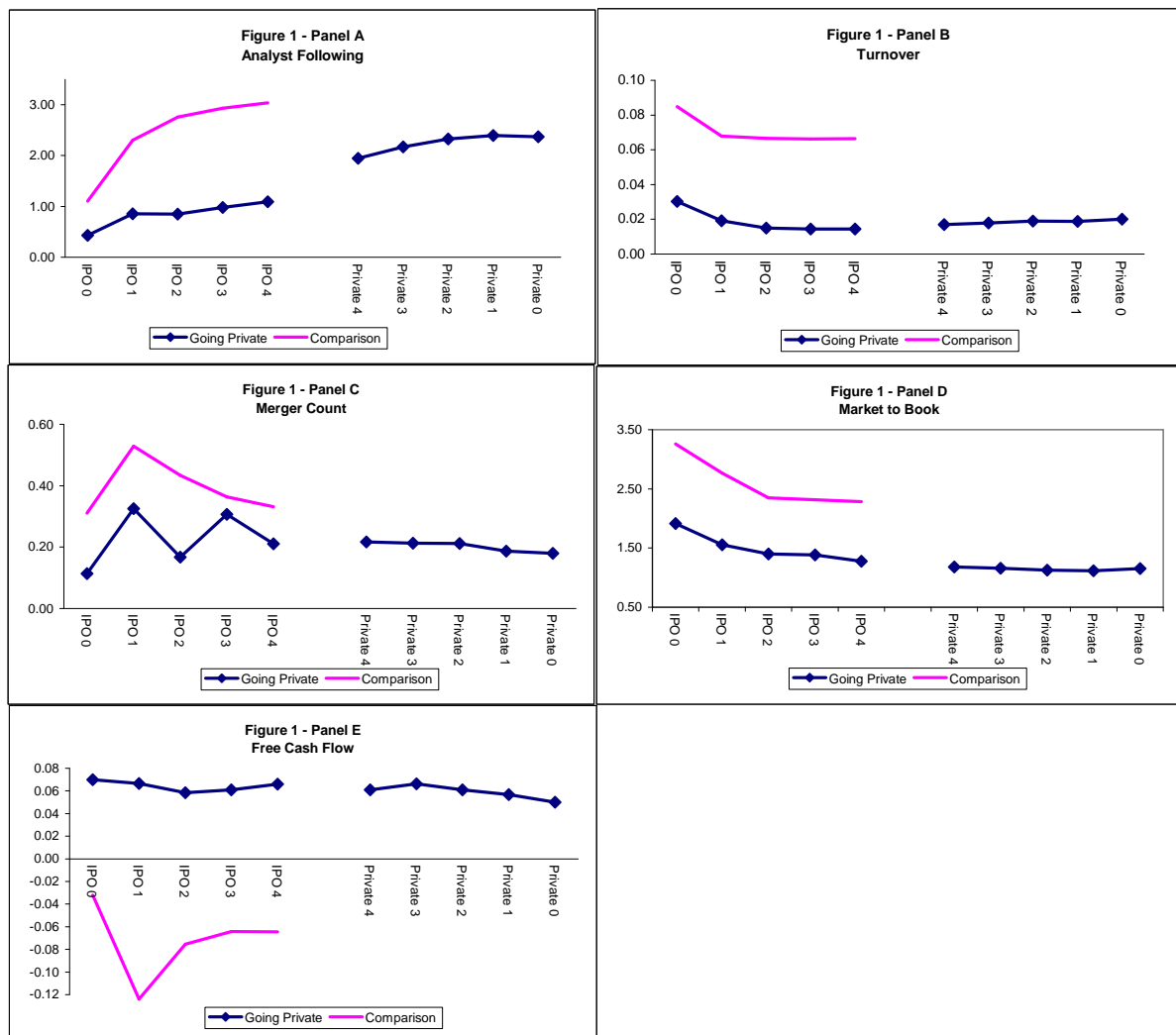
**Table 9: Cox Proportional hazard models for time to go private - Impact of Macro Variables**

This table reports the results of Cox proportional hazard models with time varying covariates based on Macro variables. The dependent variable is time to private which measures the time between IPO of the firm and the time they go private. All specifications include Fama-French Industry classification controls and firm specific variables corresponding to specification 7 of table 8, Panel E. The tables report the coefficients and in parentheses, the standard errors. Variables are defined in appendix A. \*\*\*, \*\*, \* indicates significance at 1%, 5%, and 10% level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
IPO Volume	.0002 (.0003)					
Real \$ Private Equity	.005** (.002)					
Number IPO		-.01*** (.005)				
Private Equity Deals		.21*** (.05)				
Sentiment 1			.29*** (.06)			
Sentiment 2				.31*** (.08)		
Annual Adjusted Return					.08 (.05)	
Term Premium						-.12*** (.04)
Default Risk Premium						.92*** (.10)
Real \$ Bank Loans						.0003 (.0004)
Obs.	20775	20775	35118	35118	31777	35118

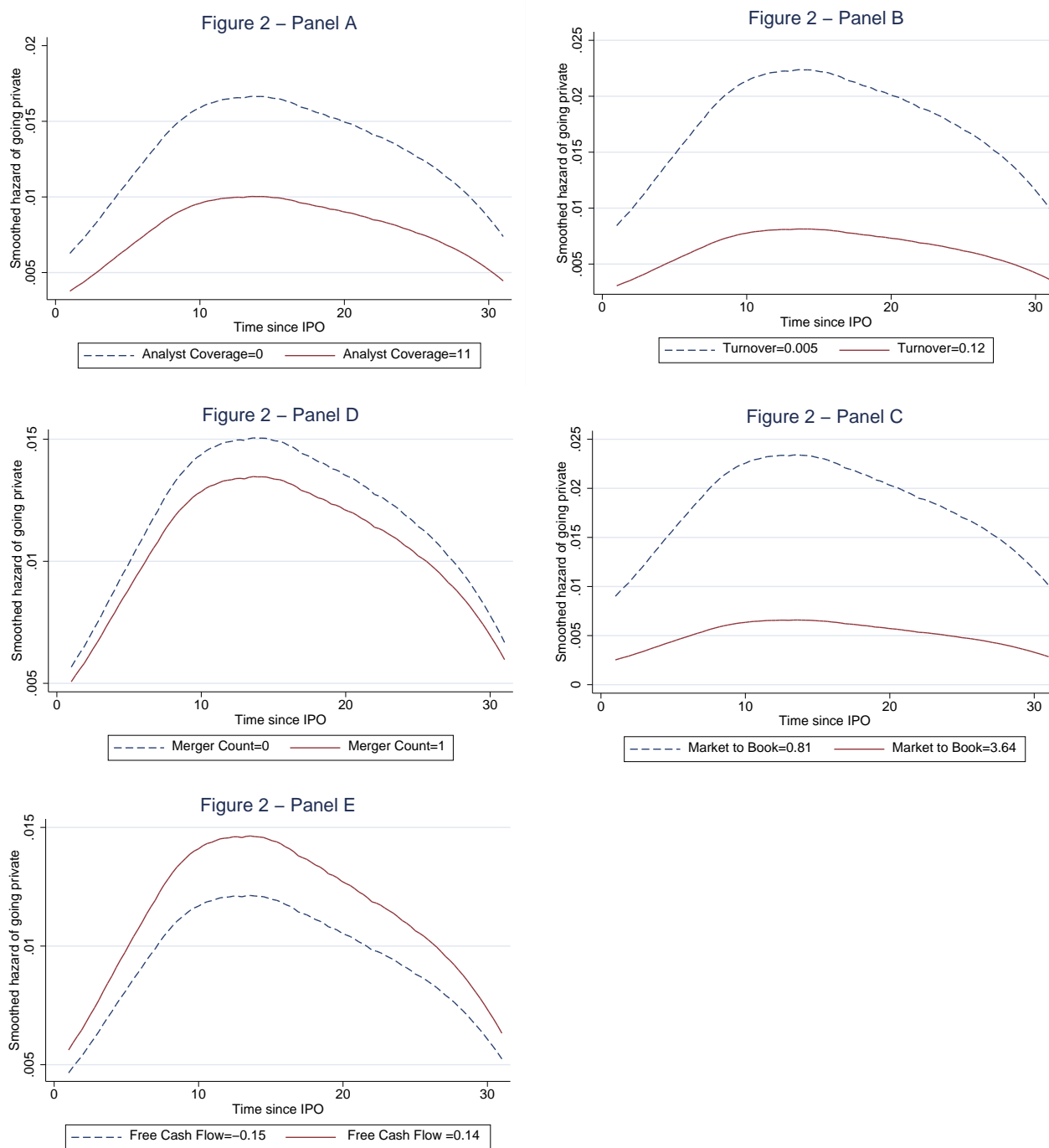
**Figure 1: Trends in key variables in event time**

This figure displays the evolution of firm characteristics in event time for the going private sample and the comparison sample. We present the cross-sectional means of several variables for firms for 5 years from the IPO year (for both samples) and 5 years prior to going private (for the going private sample). The data correspond to that presented in Table 7.



### Figure 2: Economic significance of covariates

This figure displays the effect of five covariates from figure 1 on the hazard of going private based on the hazard function estimated using the Cox model for table 8, Panel E, specification 7. The hazard is evaluated at the 25th and 75th percentile for each specified variable in Panels A, B, D and E and at the 1st and 99th percentile of the specified variable in Panel C. In each Panel the hazard is evaluated at the mean values of the other explanatory variables. The analysis time is in years from the IPO date.



**Figure 3: Estimated Hazard Function**

This figure displays the Cox model hazard function for the table 8, Panel E, specification 7. The hazard is evaluated at the mean values of the explanatory variables. The analysis time is in years from the IPO date.

