

The strategic use of IPO withdrawals

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Abstract

This paper examines IPO withdrawals as strategic decisions rather than failed offerings. We argue that the IPO process generates costly and credible information about firm value that can be leveraged across alternative exit channels, particularly mergers and acquisitions. Using a comprehensive sample of IPO filings, we show that withdrawal probability is 7 percentage points higher for firms backed by venture capital investors, consistent with these owners treating the IPO as a real option rather than a commitment to public ownership. Withdrawal probability is significantly lower for offerings supported by firm-commitment underwriting (7.5 percentage points) and for offerings with higher free float (9.7 percentage points), suggesting that IPO design choices shape the trade-off between commitment and flexibility. We further show that a larger valuation wedge between IPO-implied prices and firms' continuation values increases the likelihood of becoming an acquisition target following an IPO attempt. A real-option-based valuation framework yields consistent results, underscoring the role of exit flexibility. These effects imply economically meaningful increases in acquisition probability, ranging from 13% to 29% relative to the unconditional likelihood of becoming a target. Together, our findings highlight the informational and option value of the IPO process and the interdependence of public and private exit routes.

JEL classifications: G24, G32, G34.

Keywords: IPO withdrawal; Corporate venture capital; Exit strategy; Real options; Valuation disagreement; Underwriter commitment; Free float.

1. Introduction

Initial public offering (IPO) withdrawals are defined as cases in which a firm initiates the IPO process but subsequently decides not to proceed with the offering. In the existing literature, IPO withdrawals are generally interpreted as failures, and commonly associated with adverse market conditions, insufficient investor demand, negative information revealed during the book-building process, or firm-specific weaknesses that become apparent during due diligence (Helbing, 2019). In this paper, we question this prevailing interpretation and, rather than viewing IPO withdrawals solely as failures (Busaba, 2006), we propose that the option to withdraw an IPO *ex ante* may itself constitute a strategic tool (Busaba 2001, Busaba & Chang, 2010). Specifically, we argue that firms and their owners may rationally enter the IPO process even when the ultimate objective is not necessarily to complete the listing, but rather to generate information, reduce uncertainty, and influence negotiations with alternative buyers.

IPOs are typically pursued by firms that have reached a stage of sufficient scale, growth potential, and organizational maturity to access public equity markets (Lowry & Schwert, 2004) where the IPO serve both as a financing event, raising new capital for the firm (Benninga et al., 2005), and as a liquidity event, allowing founders and early investors to monetize part of their holdings over time (Loughran & Ritter, 1995; Baker & Wurgler, 2002; Ritter & Welch, 2002). However, an IPO is only one of several exit routes available to private firms and their owners. Existing shareholders seeking liquidity may instead sell the firm to a strategic buyer, typically an operating company in the same or a related industry, or to another financial investor (Achleitner & Figge, 2014; Bonini, 2015; Lemley & McCreeary, 2020). Strategic acquisitions often reflect not only the target's standalone value but also potential synergies available to the acquirer, resulting in valuation mechanisms that differ from those in public markets. Importantly, firms considering an IPO frequently face simultaneous interest from both strategic and financial buyers, making the IPO decision one among several feasible exit alternatives (Zingales, 1995; Boeh & Dunbar, 2021). Rather than representing a single, irreversible choice, the IPO can therefore be viewed as part of a broader exit strategy in which owners compare opportunities across public and private markets (Sherman & Titman, 2002).

The IPO process reduces information asymmetry by requiring firms to disclose detailed financial and non-financial information and undergo regulatory and market scrutiny (Benveniste et al., 2002). Financial buyers may possess industry expertise and access to private information through due diligence yet remain uncertain about long-term value creation

(Achleitner & Figge, 2014; Bonini, 2015), whereas strategic buyers may better understand industry dynamics and potential synergies but have less insight into the target's standalone financial quality (Reuer et al., 2012). Benveniste et al. (2002) therefore view the IPO process as a credible signal where substantial costs, including underwriting, legal and accounting fees, management time, and reputational exposure, make it unlikely that low-quality firms would pursue an offering without serious intent. Even when withdrawn, the IPO process reveals valuable information, including the implied valuation range, investor demand, free float, and the willingness of reputable underwriters and institutional investors to participate. Prior to filing, firms often have complex ownership structures involving venture capital, corporate venture capital, private equity, and private debt investors with differing time horizons, risk preferences, and exit objectives. Consequently, IPO withdrawal may reflect strategic behaviour rather than adverse market conditions alone, as some owners may use the IPO process for price discovery and strategic positioning while retaining the flexibility to pursue alternative outcomes. These considerations may be particularly relevant when existing owners seek to preserve control through a lower free float, limiting ownership dispersion following a public listing. Likewise, differences in underwriter commitment can affect the risks associated with completing an offering. Accordingly, ownership structure and offering design may play an important role in shaping IPO withdrawal decisions.

From a real-options perspective, the IPO filing embeds an abandonment option whose value depends not only on conditions during book-building but also on the opportunities available after withdrawal. When public market valuations fall short of firms' continuation values, withdrawal may increase the attractiveness of alternative exit channels, such as mergers and acquisitions, allowing firms and their owners to realize value outside public markets. Examining post-withdrawal outcomes is therefore essential for understanding whether withdrawal reflects failure or the strategic exercise of an abandonment option. Following the real-options literature (Myers, 1977; McDonald & Siegel, 1986; Dixit & Pindyck, 1994; Trigeorgis, 1996), and consistent with the view that IPO withdrawal constitutes an abandonment decision (Busaba et al., 2001; Busaba & Chang, 2010), we estimate the value of the withdrawal option using both European and American option valuation models adjusted for the probability of withdrawal.

In addition, we define a value wedge as the difference between firm value under a withdrawal-option framework and firm value under a continuation-only framework. This wedge captures

the incremental value created by strategic flexibility during the IPO process and, consequently, the valuation impact associated with withdrawal risk. Put differently, it measures how much firm value changes when managers possess the option to withdraw an IPO (Myers, 1977). In this sense, the model captures the economic importance of withdrawal rather than merely its likelihood. To illustrate, consider two firms with an identical withdrawal probability of 20%. One firm may lose 10 MSEK by proceeding with the IPO, whereas another may lose 500 MSEK. A probability measure alone cannot distinguish between these cases. Our wedge measure therefore isolates the incremental value generated by the withdrawal mechanism itself.

Unlike traditional option-value measures, however, the wedge separates continuation value from option value and can therefore take both positive and negative values. This feature allows us to infer IPO firms' reservation valuations. Firms with a positive wedge have reservation values that exceed the valuation implied by the IPO offer and are therefore more likely to withdraw. By contrast, firms with a negative wedge have reservation values below the IPO-implied valuation and are consequently more likely to complete the offering. Naturally, the withdrawal decision is also influenced by the availability of outside options and alternative channels of corporate control. We argue that firms with larger positive wedges are more likely to pursue alternative exit outcomes, such as acquisitions, following an IPO withdrawal.

While prior IPO studies have largely focused on estimating withdrawal probabilities and identifying the determinants of withdrawal decisions (e.g., Busaba et al., 2001; Busaba & Chang, 2010), or on incorporating withdrawal probabilities into real-options models, our wedge measure quantifies the economic value of the withdrawal option in monetary terms. This makes economic significance directly interpretable and provides a benchmark for evaluating the extent to which alternative exit opportunities, such as acquisitions, influence IPO outcomes. A larger wedge indicates a greater divergence between IPO-implied and continuation values and therefore stronger incentives to pursue alternative transactions outside the public market. The novelty of our measure lies not in the existence of option value itself, but in the construction of a firm-specific IPO withdrawal value wedge and its link to subsequent acquisition outcomes.

Using a comprehensive sample of Swedish IPO filings from 2006–2023, combining prospectus data, nyemissioner.se¹, and the Serrano database, we estimate probit models of IPO withdrawal

¹ See, [Aktier, nyemissioner och börsnoteringar - Nyemissioner.se](https://nyemissioner.se).

and post-withdrawal acquisition outcomes. We show that IPO withdrawal probability is 7 percentage points (pp.) higher for venture capital—and corporate venture capital—backed firms, consistent with these owners treating the IPO as a real option rather than a commitment to public ownership, while withdrawal is significantly less likely in offerings with firm-commitment underwriting (7.5 pp.) and higher free float (9.7 pp.). We further document that a larger valuation wedge between IPO-implied prices and firms' continuation values increases the likelihood of becoming an acquisition target following an IPO attempt, with results robust to a standard real-option valuation framework.

These findings imply that IPO withdrawals should not be interpreted mechanically as failed offerings, but rather as strategic exit decisions shaped by ownership structure and IPO design. More broadly, the results highlight the informational and option value of the IPO process and its role in facilitating value-maximizing private transactions when public market valuations are unfavourable.

This paper makes two main contributions to the literature on IPOs and firms' exit decisions. First, it reframes IPO withdrawals as an ex-ante strategic choice rather than an ex-post failure. While prior studies typically interpret withdrawals as outcomes driven by weak investor demand or adverse information revealed during book-building (Busaba, 2006; Helbing, 2019), this paper emphasizes the issuer's right to withdraw as a valuable real option embedded in the IPO process (Benveniste & Spindt, 1989; Busaba, 2006). This perspective shifts attention away from IPO outcomes in isolation and toward the IPO process as part of a broader exit strategy, in which firms compare public and private market valuations when deciding whether to proceed with a listing (Zingales, 1995; Boeh & Dunbar, 2021).

Second, the paper contributes to the literature on information asymmetry and exit choice by highlighting the informational role of IPO filings beyond public equity markets. Existing work primarily focuses on how IPO disclosures and book-building reduce information asymmetry between issuers and public investors (Allen & Faulhaber, 1989; Sherman & Titman, 2002), but largely overlooks how the information revealed during the IPO process shapes alternative exit routes. We argue that IPO filings generate credible valuation signals that can be leveraged in private negotiations, particularly with strategic buyers, thereby linking the IPO and M&A literatures (Pagano et al., 1998; Wang & Wan, 2013) and extending real-options models of IPOs to incorporate post-withdrawal strategic opportunities.

The remainder of the paper is organized as follows. Section 2 reviews the related literature and develops the testable hypotheses, with particular emphasis on the strategic role of IPO withdrawals, ownership structure, and IPO design features. Section 3 describes the data, sample construction, and variable definitions. Section 4 outlines the empirical methodology, including the valuation framework, the construction of the value wedge, the real option model, and the empirical specifications. Section 5 presents the empirical results on IPO withdrawal probability, valuation disagreement, and the likelihood of becoming an acquisition target following an IPO attempt, and reports robustness analyses using alternative valuation frameworks. Section 6 concludes.

2. Literature and Hypotheses

This paper examines IPO withdrawals as a strategic device rather than a failed outcome. We argue that the IPO process generates costly and credible information about firm value that can be leveraged in alternative exit channels, particularly mergers and acquisitions. Our empirical analysis tests whether firms withdraw from IPOs when public market valuations diverge from private continuation values, and whether such withdrawals facilitate subsequent strategic transactions. We examine firm and IPO characteristics that enable the strategic use of IPO withdrawals, focusing on underwriter commitment and free float offered with IPO as well as intangible asset intensity and other pre-IPO characteristics and market wide factors. Together, these hypotheses frame IPO withdrawals as part of an integrated exit strategy in which firms exploit the informational and option value of the IPO process.

2.1. Ownership and Strategic Use of IPO Withdrawals

We argue that IPO withdrawals can be strategically used to affect outcomes in alternative exit channels, particularly mergers and acquisitions. The IPO process generates publicly observable and credible information about firm value through extensive disclosure, underwriter certification, and investor demand during book-building (Sherman & Titman, 2002; Allen & Faulhaber, 1989). These signals are costly to produce (Leland & Pyle, 1977) and therefore difficult to mimic, enhancing their credibility (Lowry & Schwert, 2004). By initiating an IPO, firms allow potential acquirers to observe market-based valuations, investor interest, and the willingness of sophisticated intermediaries to support the offering (Helbing et al, 2019). A

subsequent withdrawal does not erase this information; rather, it preserves it while allowing owners to avoid committing to an undervalued public listing (Boeh & Dunbar, 2021).

From the perspective of founders and independent venture capital investors, the IPO represents only one of several potential exit routes. Unlike founders, who may value the continued independence and growth opportunities associated with becoming a publicly listed company, venture capitalists are primarily focused on realizing returns on their investments. As a result, VCs evaluate IPOs alongside alternative exit options, such as acquisitions by strategic buyers. Venture capital investors are active participants in the governance and strategic development of their portfolio firms through board representation, monitoring, and close involvement in major corporate decisions. This involvement provides VCs with extensive firm-specific information and allows them to assess the relative attractiveness of different exit opportunities. Prior research suggests that venture capitalists actively manage exit processes and select the exit route that maximizes shareholder value (Cumming & MacIntosh, 2003; Gompers & Lerner, 2004).

The IPO process itself may increase the attractiveness of alternative exits. By filing for an IPO, firms disclose information to the market, attract attention from potential acquirers, and generate external validation of their business model and growth prospects. This increased visibility can stimulate acquisition interest and strengthen the bargaining position of existing shareholders. Consequently, the IPO process may function not only as a path to public ownership but also as a mechanism for identifying and negotiating with potential strategic buyers, and sending a signal of a true stand-alone value.

Because venture capital investors have a clear mandate to exit their investments and realize financial returns, they may support withdrawing an IPO when a strategic acquisition offers greater value than a public listing. In this sense, VC backing may increase the likelihood of IPO withdrawal, as venture capitalists possess both the incentives and the ability to pursue alternative exit strategies when these are expected to generate superior outcomes. While the presence of corporate venture capital investors may alter these incentives due to their strategic objectives, independent venture capitalists are primarily motivated by financial returns and therefore more likely to view an acquisition as a substitute for an IPO rather than a complementary outcome. These considerations lead to the following hypothesis:

H1: The probability of IPO withdrawal is higher when the pre-IPO ownership structure includes a venture capital investor.

2.2. IPO Characteristics That Enable Strategic Use of IPO Withdrawals

Not all firms are equally positioned to exploit IPO withdrawals as a strategic tool. Underwriter commitment is one factor that is expected to play a central role in shaping IPO withdrawal decisions because it directly affects the allocation of downside risk when market conditions deteriorate. In firm-commitment offerings, underwriters guarantee the sale of shares and therefore internalize part of the risk associated with weak demand, reducing issuers' exposure to adverse market shocks and increasing the credibility of the offering. By contrast, in best-efforts offerings the issuer retains full placement risk, making withdrawal more likely when demand is uncertain or market conditions worsen (Ritter, 1987; Benveniste & Spindt, 1989). As a result, stronger underwriter commitment should be associated with lower IPO withdrawal probability, as committed underwriters provide both risk-sharing and certification that mitigate the incentives to abandon the offering.

In addition, firms whose owners prefer to retain control may be reluctant to accept the ownership dispersion implied by a public listing. A lower free float allows founders and early investors to preserve influence over strategic decisions and to avoid exposure to short-term market pressures. These considerations increase the attractiveness of treating the IPO process as a valuation and signalling mechanism rather than as a commitment to public ownership (Pagano et al., 1998).

A common feature of these described mechanisms is that firms with high intangible intensity are particularly prone to valuation challenges in public markets, as their assets are difficult to observe, verify, and price using standard financial disclosures (Amir & Lev, 1996; Gelb, 2002). As a result, public investors may discount growth opportunities that are more readily recognized by informed insiders or strategic buyers. Together, absence of underwriter commitment (best effort) and free float increase both the likelihood of IPO withdrawal and the potential gains from subsequent strategic transactions. These IPO characteristics therefore represent enabling conditions under which IPO withdrawals can be used strategically, and thus leading to our second hypothesis:

H2: The probability of IPO withdrawal is higher when companies (a) have no underwriter commitment, and (b) have no free float.

2.3. Valuation Disagreement as a Driver of Strategic Withdrawal

The ability to use IPO withdrawals strategically presupposes that firms can credibly assess whether public market valuations understate their private continuation value. During the IPO process, book-building produces an implicit market valuation that reflects investor beliefs, risk tolerance, and information constraints. This valuation may differ from the firm's internal assessment of long-term value, particularly for firms with complex growth opportunities (Benveniste & Spindt, 1989; Chemmanur & Fulghieri, 1999; Busaba et al., 2001).

A large wedge between the IPO-implied valuation and the firm's continuation value increases the likelihood that owners will rationally abandon the offering. Importantly, this decision is not indicative of failure but rather reflects the exercise of an abandonment option embedded in the IPO process. From a real-options perspective, firms incur upfront costs to preserve flexibility, proceeding with the IPO only if market valuations are sufficiently attractive (Dixit & Pindyck, 1994).

In the context of strategic exits, a large valuation wedge plays a dual role. First, it raises the probability of withdrawal. Second, it creates scope for strategic buyers to offer prices that exceed public market valuations, thereby facilitating acquisitions following withdrawal. Thus, valuation disagreement is a central mechanism through which IPO withdrawals can be used strategically. Moreover, when there exists a substantial wedge between the valuation implied by the IPO process and the firm's continuation value, strategic buyers may be able to offer acquisition prices that dominate the public market outcome while remaining below the firm's private valuation (Wang & Wan, 2013). In such cases, IPO withdrawals can facilitate value-enhancing transactions by improving the bargaining position of existing owners. This leads to the final hypothesis:

H3: Companies that exhibit a larger wedge between the IPO-implied valuation and the continuation value are more likely to become a target following an IPO attempt.

3. Data

To construct our sample, we begin by collecting IPO filings from Nyemissioner.se, a comprehensive database of new issues and stock market listings in Sweden. For each filing, the database provides detailed information, including firm name, listing date, exchange, ownership structure prior to listing, and pre- and post-IPO valuations, as well as additional prospectus-based details. Using this source, we identify 1,938 IPO filings between 2006 and 2023, of which 1,543 (79.6%) are completed offerings and 395 (20.4%) are withdrawals. Because organization numbers are not consistently reported in the IPO data, we manually match each firm using its name to retrieve the correct organization number from Business Retriever and Bolagsverket. This ensures a reliable firm identifier for subsequent data collection. We then obtain accounting and financial data from the Serrano database using these organization numbers. Serrano is a comprehensive firm-level dataset covering both private and public Swedish firms, compiled by the Swedish House of Finance from Bolagsverket, Statistics Sweden (SCB), and Bisnode. It contains annual financial statements, firm characteristics, and group-structure information. Table 1 presents descriptive statistics for the key variables used in the empirical analysis. All continuous firm-specific financial variables are winsorized at the 1st and 99th percentiles. The definitions of all variables are given in Appendix A.

[Insert Table 1]

The primary outcome variable is IPO withdrawal, which captures whether a firm ultimately withdraws its offering; withdrawals account for 20.4% of all IPO attempts in the sample. Ownership is measured by a binary indicator equal to one if the issuing firm is backed by a VC investor prior to the IPO. Approximately 17.6% of firms in the sample are VC-backed. Underwriter commitment is defined as an indicator equal to one when the underwriter provides a firm commitment to the offering, as opposed to a best-efforts contract. Such commitment is observed in 25.6% of IPOs. Free float captures whether a fraction of shares is offered to public investors at the IPO; 26.1% of firms in the sample disclosed this information.²

² We also collect percentage free float from the prospectuses and include it in additional analyses. While the results remain qualitatively unchanged, the inclusion of this variable leads to a substantial reduction in the sample size due to missing observations.

The data further reveal that 12.4% of the firms become acquisition targets. The average firm age is 11.2 years. Approximately 46.0% of the IPO firms are managed by advisors that handled at least 1% of the deals in our sample. The average firm value at the IPO date is SEK 1,095.4 million. Furthermore, 8.9% of the IPO firms are headquartered abroad, while 77.9% are headquartered in urban areas. The average IPO size, measured as the natural logarithm of total assets, is 10.4, and average revenue is SEK 8.3 million. The average IPO firm exhibits slightly negative profitability (-0.002), has a leverage ratio of 1.8, and reports intangible assets equivalent to 20% of total assets. We define a hot IPO market as a year in which the total number of IPOs exceeds the sample median. The average value of the Swedish Policy Uncertainty Index is 101.7. Finally, the average value wedge is -SEK 1.6 million, while the average European and American option values are similar, although the latter is slightly higher, consistent with option pricing theory (SEK 89.6 million versus SEK 90.9 million, respectively).

Table 2 reports mean-difference tests comparing withdrawn and completed IPOs, with t-tests conducted under the assumption of unequal variances.

[Insert Table 2]

Several economically and statistically significant differences emerge between the two groups. Relative to completed IPOs, withdrawn IPOs exhibit 20.4 percentage points (pp.) lower underwriter commitment and 20.3 pp. lower free float. They are also 3.9 pp. less likely to become acquisition targets and are, on average, 1.9 years older. Furthermore, withdrawn IPOs are 22.2 pp. less likely to employ top underwriters during the IPO process and are 8.4 pp. less likely to be headquartered in urban areas. Withdrawn IPOs are also smaller (difference in $\ln$ size: -0.7) and exhibit substantially higher leverage ratios (85.5% higher). In addition, they are 14.3 pp. less likely to be withdrawn during hot IPO market periods. Finally, withdrawn IPOs tend to have higher option values, with mean European and American option values exceeding those of completed IPOs by SEK 195.2 million and SEK 197.9 million, respectively.

4. Method

Firms approaching an IPO face an option to withdraw. While withdrawals are typically studied as discrete outcomes, the probability of withdrawal affects firm value already ex ante. We show that this probability generates a firm-specific valuation wedge that captures the fragility of the

IPO path. We hypothesize that firms with larger wedges are more likely to engage in M&A following the IPO attempt, consistent with acquisitions serving as an alternative exit channel when public market access is uncertain.

4.1. Model

The model yields a firm-specific value wedge ΔV_i capturing the valuation loss associated with withdrawal probability.

4.1.1. Binomial Tree with Withdrawal Probability

Firm value evolves in discrete time according to a binomial process (Cox et al., 1979). At each node (t, j) , the IPO may be withdrawn with probability λ . Withdrawal is modelled as an absorbing state that terminates the IPO process and yields a node-specific outside value $V_{t,j}^W$, capturing the firm's best alternative to completing the IPO at that point, which is proxied by the pre-money value of the IPO drawn from the IPO prospectus. This is also the continuation value of the IPO at time 0. In this sense our valuation is similar to the executive stock options where the stock price at time 0 is equal to the exercise price (Carpenter et al., 2010).

4.1.2. Valuation

A. Continuation value $V_{t,j}^C$ (no withdrawal allowed)

$$V_{t,j}^C = \frac{1}{R} [p V_{t+1,j+1}^C + (1-p) V_{t+1,j}^C], \quad (1)$$

where $V_{t+1,j+1}^C$ is the one-year-ahead continuation value at node j if the IPO value moves up, and $V_{t+1,j}^C$ is the corresponding continuation value at node j if the IPO value moves down. Here, $R = (1+r)^{\Delta t}$ is the gross discount factor per time step, r is the risk-free rate, and p is the risk-neutral probability calculated in discrete form as $p = \frac{R-d}{u-d}$. The up (u) and down (d) factors in the binomial tree are defined as $u = e^{\sigma\sqrt{\Delta t}}$ and $d = 1/u$, where σ denotes the volatility of the firm's historical cash flows. The binomial time step, Δt , is assumed to be one year. The valuation horizon covers the period before the withdrawal or completed IPO event,

or the point at which the pre-money valuation becomes available in the IPO prospectus, and extends three years after the event. This implies a total valuation horizon of $T = 4$ years.

B. Value with withdrawal option, $V_{t,j}^{Wopt}$

$$V_{t,j}^{Wopt} = \frac{1}{R} [(1 - \lambda)(p V_{t+1,j+1}^C + (1 - p) V_{t+1,j}^C) + \lambda V_{t,j}^W], \quad (2)$$

where, $V_{t+1,j+1}^C$ is the one-year-ahead continuation value at node j if the IPO value moves up, and $V_{t+1,j}^C$ is the corresponding continuation value at node j if the IPO value moves down. The value in the event of withdrawal, $V_{t,j}^W$, is the pre-money value obtained from the IPO prospectuses and is assumed to remain constant until maturity.

The withdrawal probability, λ_i , is estimated for each firm in a first-stage model as a function of ownership structure (e.g., VC-backed firms), underwriter commitment, free float, R&D intensity, and other firm-level and market-level controls. This first-stage model is also used to test Hypotheses 1 and 2. More formally,

$$\lambda_i \equiv \Pr(\text{Withdraw}_i = 1 \mid \mathbf{X}) = f(\text{Ownership}_i, \text{Underwriter Commitment}_i, \text{Free Float}_i, \text{R\&D Intensity}_i, \text{Controls}_i), \quad (3)$$

where Withdraw_i equals 1 for withdrawn IPOs and 0 for completed IPOs, yielding predicted withdrawal probabilities, λ_i , for each firm. The dummy Ownership_i equals 1 for VC backed IPOs and 0 for private equity or private debt backed IPOs. The dummy $\text{Underwriter Commitment}_i$ is 1 if an IPO has a firm commitment when the prospectus contains explicit language indicating the presence of such binding guarantees or undertakings to purchase or subscribe for shares not taken up by investors. From an economic perspective, these arrangements are equivalent to firm commitment underwriting in that they insure the issuer against demand shortfall. Our classification relies solely on explicit textual disclosures in the prospectus and retains all ambiguous cases as unclassified. The dummy Free Float_i indicates whether the free float in the prospectus is disclosed. Controls_i include firm-level characteristics and market and industry-wide controls commonly used in the IPO literature (e.g.,

Loughran & Ritter, 1995; Baker & Wurgler, 2002; Ritter & Welch, 2002; Lowry & Schwert, 2004; Helbing, 2019). We use probit specification and thus maximum likelihood method to estimate the coefficients and adjust standard errors for heteroskedasticity. The predicted withdrawal probability, λ_i , captures firm-specific exposure to IPO withdrawal risk and serves as a structural input into the valuation model.

C. Value wedge, $\Delta V_{t,j,i}$

Value wedge is defined as the difference between the value with withdrawal risk and the continuation only value

$$\Delta V_{t,j,i} = V_{t,j,i}^{Wopt} - V_{t,j,i}^C. \quad (4)$$

In the baseline analysis, the value wedge is evaluated at time 0, $\Delta V_{0,j,i}$, and used as an input in the regression model testing Hypothesis 3.³

4.1.3. Real option valuation

To benchmark our baseline results, we also consider a standard American-style real option model in which firms may optimally withdraw the IPO prior to completion. The IPO route is valued by backward induction on a binomial tree. At each node, the value of continuing with the IPO is compared with the value of withdrawal, where the withdrawal value is defined as the pre-money valuation. The option is exercised if the withdrawal value exceeds the continuation value. We then evaluate the discounted expected option value backward at each node, (t, j) , until reaching the root of the binomial tree at time 0.

Specifically, define the exercise value at time t and node j as $f_{t,j}^W = \lambda \max(V_{t,j}^W - V_{t,j}^C, 0)$.⁴ Thus, the withdrawal option value is equal to abandonment payoff multiplied by the estimated

³ We also compute the value wedge at each time step and node, (t, j) , for use in additional analyses.

⁴ For example, considering a two-step tree, at maturity the payoff of the withdrawal option is $f_{T,j}^W = \lambda \max(V_{T,j}^W - d^2 V_{t,j}^C, 0)$ if the IPO value moves in both steps down, $f_{T,j+1}^W = \lambda \max(V_{T,j}^W - ud V_{t,j}^C, 0)$ if the IPO value moves one step up and one step down, and $f_{T,j+2}^W = \lambda \max(V_{T,j}^W - u^2 V_{t,j}^C, 0)$ if the IPO value moves both steps up.

withdrawal probability. This adjustment reflects the idea that not every IPO with an in-the-money withdrawal option will actually be withdrawn.

Using the general multiplicative binomial option pricing approach of Cox et al. (1979), the expected discounted value of withdrawal at time t and node j can be written as follows, with the proof provided in the Appendix B:

$$f_{t,j}^{Wopt} = \frac{\lambda}{R^n} \sum_{k=0}^n \binom{n}{k} p^k (1-p)^{n-k} \max(V_{t,j}^W - u^k d^{n-k} V_{t,j}^C, 0), \quad (5)$$

where λ is the withdrawal probability, R^n is the n -period gross discount factor, $\binom{n}{k}$ is the binomial coefficient, p is the risk-neutral probability of an up move, and u and d are the up and down factors, respectively. The payoff from withdrawal is given by the positive difference between the withdrawal value, $V_{t,j}^W$, and the IPO continuation value at terminal node k , $u^k d^{n-k} V_{t,j}^C$. This expression is the standard binomial valuation of an abandonment option, adjusted by the estimated withdrawal probability λ .

We then extend the general n -step formulation to allow for withdrawal before maturity. If management can withdraw early, the American-style real option recursion is

$$F_{t,j}^{Wopt} = \max \left(\lambda \max(V_{t,j}^W - V_{t,j}^C, 0), \frac{1}{R} (p F_{t+1,j+1}^W + (1-p) F_{t+1,j}^W) \right). \quad (6)$$

Withdrawal occurs whenever the probability-adjusted immediate exercise value exceeds the discounted expected continuation value of the withdrawal option. Because the value with the withdrawal option weakly dominates the continuation-only value, the corresponding real option value is non-negative by construction. This framework isolates the value of exit flexibility and provides a benchmark for distinguishing strategic withdrawal options from valuation losses arising from exogenous withdrawal risk in the baseline model in Equation (4).

4.2. Estimating the Probability of M&A Activity

We estimate how the probability of M&A activity (the dependent variable) depends on the firm-level value wedge, controlling for firm characteristics, market conditions, and advisor- and issue-level features. Our probit specification is as follows:

$$\Pr(\text{MA}_{i,k} = 1) = \Phi(\alpha + \beta_1 \Delta V_i + X_i \boldsymbol{\gamma} + Z_{\text{industry}}), \quad (7)$$

where $\text{MA}_{i,k}$ equals one if firm i experiences an M&A event, being a target, within k periods (4 years) following the IPO attempt. The variable ΔV_i denotes the firm-level valuation wedge. It is measured as $\Delta V_{t,j,i}$ defined in Equation (4). The control variables in X_i include firm characteristics, while Z_{industry} represent industry fixed effects. Standard errors are adjusted for heteroscedasticity.

Our approach would motivate a valuation-based analysis of how pre-IPO ownership structure and ex ante IPO withdrawal probabilities shape post-IPO merger activity and exit outcomes. This framework sheds light on how the firm-level valuation wedge and market conditions affect firms' access to public equity markets and alternative channels of corporate control.

5. Empirical Results

5.1. IPO Withdrawal Probability

Table 3 examines IPO withdrawal probability using probit regressions that relate ownership structure (VC backing), underwriter commitment, and free float to the likelihood of withdrawal, controlling for pre-IPO firm characteristics and market-wide conditions. Reported coefficients are marginal effects, expressed in percentage points, with heteroscedasticity-robust standard errors.

[Insert Table 3]

Consistent with Hypothesis 1, we find that VC backed firms exhibit withdrawal probabilities that are approximately 7 percentage points (pp.) higher than firms backed by private equity and private debt. This finding supports the view that sophisticated investors treat the IPO process as a flexible option rather than a binding commitment, entering the process to generate information while preserving alternative exit routes (Busaba et al., 2001; Chemmanur &

Fulghieri, 1999). In the presence of VC investors, withdrawal is particularly likely to reflect valuation discipline when public market prices fail to fully incorporate strategic synergies observable to informed insiders (Dushnitsky & Lenox, 2005; Ma, 2020).

Underwriter commitment is associated with a substantially lower probability of withdrawal, reducing withdrawal likelihood by approximately 7.5 pp. This result supports Hypothesis 2a and is consistent with classic IPO theories emphasizing the risk-sharing and certification roles of firm-commitment underwriting (Ritter, 1987; Benveniste & Spindt, 1989). Similarly, consistent with Hypothesis 2b, offerings that disclose a free float are about 9.7 pp. less likely to be withdrawn, suggesting that willingness to accept ownership dispersion reflects stronger commitment to public ownership rather than strategic valuation discovery (Pagano et al., 1998).

To calculate the withdrawal probability, λ_i , which incorporates all key variables of interest, we use the specification reported in Model 4. Although the marginal effect of underwriter commitment weakens somewhat in the full specification, its sign and economic magnitude remain consistent with the theoretical predictions. Among the control variables, the probability of withdrawal decreases with underwriter reputation, firm size, and hot IPO market conditions, while it increases with firm valuation and macroeconomic uncertainty, as measured by the Swedish Policy Uncertainty (SPU) Index. These patterns are consistent across all specifications (Models 1–4) and are also in line with theories suggesting that uncertainty amplifies valuation disagreement between public and private markets (Pastor & Veronesi, 2003).

5.2. *Probability of Becoming an Acquisition Target Following IPO Attempt*

Table 4 examines whether IPO withdrawals facilitate subsequent acquisitions by relating post-IPO-attempt M&A activity to the valuation wedge derived from the hazard-based framework (Eq. 4), the European option value (Eq. 5), and the American option value (Eq. 6). The table reports results both with and without control variables. All specifications include stock exchange fixed effects, crisis indicators capturing financial crises and pandemics, and industry fixed effects. Robust standard errors are used throughout, and marginal effects from probit regressions are reported.

[Insert Table 4]

The economic magnitudes are substantial. Based on the fully specified models, a one-standard-deviation increase in the value wedge (21.1 MSEK) increases the probability of becoming an acquisition target by approximately 3.6 pp. (0.00170×21.103). Similarly, a one-standard-deviation increase in the logarithm of the European option value increases the probability of acquisition by 1.6 pp. (0.02067×0.767), while a comparable increase in the logarithm of the American option value increases acquisition probability by 1.6 pp. (0.02079×0.784). Given that 12.4% of firms in the sample subsequently become acquisition targets (see Table 1), these effects correspond to increases of approximately 29.0% ($3.59/12.4$), 12.8% ($1.59/12.4$), and 13.1% ($1.63/12.4$), respectively, relative to the unconditional probability of becoming a target.

These results support Hypothesis 3, suggesting that IPO firms exhibit a larger wedge between the IPO-implied valuation and the firm's continuation value. Thus, a greater withdrawal option value is more likely to become acquisition targets following an IPO attempt. From a bargaining perspective, a large valuation wedge indicates that public market investors discount the firm relative to its private continuation value. This creates an opportunity for strategic acquirers to offer prices that exceed the value attainable through the IPO while remaining below insiders' reservation values, thereby facilitating value-enhancing private transactions (Pagano et al., 1998; Sherman & Titman, 2002).

The control variables also exhibit economically meaningful effects. The probability of becoming an acquisition target increases by 4.5 pp. when the IPO firm employs a top-tier underwriter. This result suggests that reputable intermediaries may enhance firm visibility and certification, making firms more attractive to potential acquirers. In addition, a one-standard-deviation increase in revenue (2.576) increases the probability of becoming a target by approximately 4.5 pp. (0.01739×2.576). This finding is consistent with larger and more established firms possessing greater strategic value and attracting more interest from potential buyers. More generally, the control variables indicate that both firm quality and market visibility play important roles in shaping post-IPO-attempt acquisition outcomes.

6. Conclusion

This paper provides evidence that IPO withdrawals can represent rational and strategic choices rather than failed offerings. We show that withdrawal probability is systematically related to ownership structure (VC backing), IPO design features, and market conditions, and that

valuation disagreement between public and private markets plays a central role in shaping both withdrawal decisions and post-withdrawal acquisition outcomes. Specifically, we document that venture-backed firms exhibit a withdrawal probability that is approximately 7 percentage points higher than that of non-VC-backed firms, typically private equity and private debt-backed firms. Withdrawal probability decreases by 7.5 percentage points when offerings are supported by firm-commitment underwriting and by 9.7 percentage points as free float increases, suggesting that IPO design choices play an important role in shaping the trade-off between commitment and flexibility. Moreover, the economic magnitudes associated with our value-wedge and option-value measures are substantial. These effects imply economically meaningful increases in acquisition probability, ranging from 13% to 29% relative to the unconditional probability of becoming a target. These findings suggest that acquisitions serve as an important alternative exit channel when IPO firms possess valuable outside options.

Our findings highlight both the informational role of the IPO process and the option value embedded in the decision to go public. More broadly, they underscore the importance of considering alternative exit routes when interpreting IPO outcomes. In particular, the results suggest that venture-backed firms use the IPO process not only to access public capital markets but also to generate credible valuation signals that can be leveraged in private negotiations with potential acquirers.

These insights have important implications for investors, underwriters, and policymakers. For investors and issuers, they emphasize the role of IPO design choices in balancing commitment and flexibility. For underwriters, they highlight how offering structure and certification can influence both the likelihood of completion and the availability of alternative exit opportunities. For regulators, the results suggest that IPO withdrawals should not be interpreted mechanically as failures but rather as part of a broader strategic exit landscape in which firms actively evaluate competing sources of value. Future research could examine how these mechanisms vary across institutional environments, interact with corporate governance structures, and evolve over time as public and private capital markets become increasingly interconnected.

References

Achleitner, A. K., & Figge, C. (2014). Private equity lemons? Evidence on value creation in secondary buyouts. *European Financial Management*, 20(2), 406-433.

- Allen, F., & Faulhaber, G. R. (1989). Signalling by underpricing in the IPO market. *Journal of Financial Economics*, 23(2), 303-323.
- Amir, E., & Lev, B. (1996). Value relevance of nonfinancial information: The wireless telecommunications industry. *Journal of Accounting and Economics*, 22, 3-30.
- Baker, M., & Wurgler, J. (2002). Market timing and capital structure. *The Journal of Finance*, 57(1), 1-32.
- Benninga, S., Helmantel, M., & Sarig, O. (2005). The timing of initial public offerings. *Journal of Financial Economics*, 75, 115-132.
- Benveniste, L. M., & Spindt, P. A. (1989). How investment bankers determine the offer price and allocation of new issues. *Journal of Financial Economics*, 24(2), 343-361.
- Benveniste, L. M., Busaba, W. Y., & Wilhelm, W. J. (2002). Information externalities and the role of underwriters in primary equity markets. *Journal of Financial Intermediation*, 11(1), 61-86.
- Boeh, K. K., & Dunbar, C. G. (2021). Raising capital after IPO withdrawal. *Journal of Corporate Finance*, 69, 102020.
- Bonini, S. (2015). Secondary buyouts: Operating performance and investment determinants. *Financial Management*, 44(2), 431-470.
- Busaba, W. Y. (2006). Bookbuilding, the option to withdraw, and the timing of IPOs. *Journal of Corporate Finance*, 12(2), 159-186.
- Busaba, W. Y., Benveniste, L. M., & Guo, R. J. (2001). The option to withdraw IPOs during the premarket: empirical analysis. *Journal of Financial Economics*, 60(1), 73-102.
- Busaba, W. Y., & Chang, C. (2010). Bookbuilding vs. fixed price revisited: The effect of aftermarket trading. *Journal of Corporate Finance*, 16(3), 370-381.
- Busaba, W. Y., Liu, Z., & Restrepo, F. (2020). Do underwriters price up IPOs to prevent withdrawal?. *Journal of Financial and Quantitative Analysis*, 55(6), 2005-2036.
- Carpenter, J. N., Stanton, R., & Wallace, N. (2010). Optimal exercise of executive stock options and implications for firm cost. *Journal of Financial Economics*, 98(2), 315-337.
- Chemmanur, T. J., & Fulghieri, P. (1999). A theory of the going-public decision. *The review of Financial Studies*, 12(2), 249-279.
- Cox, J. C., Ross, S. A., & Rubinstein, M. (1979). Option pricing: A simplified approach. *Journal of Financial Economics*, 7(3), 229-263.
- Cumming, D. J., & MacIntosh, J. G. 2003. Venture capital exits in Canada and the United States. *University of Toronto Law Journal*, 53(2): 101-199.
- Dixit, A. K., & Pindyck, R. S. (1994). *Investment under uncertainty*. Princeton University Press.
- Dushnitsky, G., & Lenox, M. J. (2005). When do incumbents learn from entrepreneurial ventures? *Research Policy*, 34(5), 615-639.
- Folus, D., & Boutron, E. (2015). Exit strategies in private equity. Private equity: Opportunities and risks, 215.
- Gelb, D. S. (2002). Intangible assets and firms' disclosures: An empirical investigation. *Journal of Business Finance & Accounting*, 29(3-4), 457-476.
- Gompers, P. A., & Lerner, J. 2004. *The Venture Capital Cycle* (2nd ed.). Cambridge, MA: MIT Press.
- Helbing, P. (2019). A review on IPO withdrawal. *International Review of Financial Analysis*, 62, 200-208.
- Leland, H. E., & Pyle, D. H. (1977). Informational asymmetries, financial structure, and financial intermediation. *The Journal of Finance*, 32(2), 371-387.
- Lemley, M. A., & McCreary, Andrew. (2021). Exit strategy. *Boston University Law Review*, 101(1), 1-102.
- Loughran, T., & Ritter, J. R. (1995). The new issues puzzle. *The Journal of Finance*, 50(1), 23-51.

- Lowry, M., & Schwert, G. W. (2004). Is the IPO pricing process efficient? *Journal of Financial Economics*, 71, 3-26.
- Ma, S. 2020. The Life Cycle of Corporate Venture Capital. *Review of Financial Studies*, 33(1), 358-394.
- Myers, S. C. (1977). Determinants of corporate borrowing. *Journal of Financial Economics*, 5(2), 147-175.
- McDonald, R. L., & Siegel, D. R. (1986). The value of waiting to invest. *Quarterly Journal of Economics*, 101(4), 707-727.
- Pagano, M., Panetta, F., & Zingales, L. (1998). Why do companies go public? An empirical analysis. *Journal of Finance*, 53(1), 27-64.
- Pastor, L., & Veronesi, P. (2003). Stock prices and IPO waves. NBER Working Paper 9858.
- Reuer, J. J., Tong, T. W., & Wu, C. W. (2012). A signaling theory of acquisition premiums: Evidence from IPO targets. *Academy of Management Journal*, 55(3), 667-683.
- Ritter, J. R. (1987). The costs of going public. *Journal of Financial Economics*, 19(2), 269-281.
- Ritter, J. R., & Welch, I. (2002). A review of IPO activity, pricing, and allocations. *The Journal of Finance*, 57, 1795-1828.
- Sherman, A. E., & Titman, S. (2002). Building the IPO order book: underpricing and participation limits with costly information. *Journal of Financial economics*, 65(1), 3-29.
- Shuwaikh, F., Dubocage, E., & Murer, D. (2023). Underpricing of corporate and independent venture capital-backed IPOs: Do they differ?. *Review of Quantitative Finance and Accounting*, 60(4), 1629-1650.
- Trigeorgis, L. (1996). *Real Options: Managerial Flexibility and Strategy in Resource Allocation*. Cambridge, MA: MIT Press.
- Wang, X. A., & Wan, W. P. (2013). Explaining the variance in underpricing among venture capital-backed IPOs: A comparison between private and corporate VC Firms. *Strategic Entrepreneurship Journal*, 7(4), 331-342.
- Yang, Y., Narayanan, V. K., & Zahra, S. (2009). Developing the selection and valuation capabilities through learning: The case of corporate venture capital. *Journal of Business Venturing*, 24(3), 261-273.
- Zingales, L. (1995). Insider ownership and the decision to go public. *The Review of Economic Studies*, 62(3), 425-448.

Table 1. Descriptive statistics

The table presents the descriptive statistics used in all analyses. IPO data are obtained from the webpage nyemissioner.se, and pre-IPO firm characteristics are sourced from the Serrano database. Continuous variables are winsorized at the 1% and 99% levels.

Variable	N	Min	p25	p50	Mean	p75	Max	SD
IPO withdrawals	1938	0.000	0.000	0.000	0.204	0.000	1.000	0.403
Ownership	1938	0.000	0.000	0.000	0.176	0.000	1.000	0.381
Underwriter commitment	1938	0.000	0.000	0.000	0.256	1.000	1.000	0.437
Free float	1938	0.000	0.000	0.000	0.261	1.000	1.000	0.439
Target	1938	0.000	0.000	0.000	0.124	0.000	1.000	0.330
Age	1938	0.000	3.000	7.000	11.194	14.000	146.000	14.563
Top underwriter	1938	0.000	0.000	0.000	0.460	1.000	1.000	0.499
Firm value	1401	8.000	45.200	120.000	1095.385	570.000	16351.000	2869.094
Foreign	1938	0.000	0.000	0.000	0.087	0.000	1.000	0.281
Urban	1938	0.000	1.000	1.000	0.779	1.000	1.000	0.415
Size	1613	1.099	9.051	10.332	10.427	11.952	18.940	2.423
Revenue	1161	0.000	6.681	8.328	8.297	10.041	15.740	2.576
Profitability	1160	-0.072	0.000	0.000	-0.002	0.000	0.001	0.008
Leverage	1567	0.000	0.118	0.482	1.813	1.589	22.211	3.860
Intangibles	1613	0.000	0.000	0.000	0.150	0.201	0.929	0.257
Hot IPO period	1938	0.000	0.000	1.000	0.501	1.000	1.000	0.500
SPU	1938	65.217	98.389	101.589	101.693	107.981	122.170	11.465
Value wedge	813	-355.962	-0.150	0.013	-1.648	0.122	108.270	21.103
European option	813	0.008	0.767	2.956	89.626	17.592	5615.598	411.719
American option	813	0.008	0.784	3.027	90.886	17.939	5715.938	418.407

Table 2. Bivariate analysis

This table presents mean-difference tests (assuming unequal variances) for the variables for completed and withdrawn IPOs. IPO Withdrawal is a dummy variable equal to one if a filed IPO is withdrawn and zero if it is completed.

	Withdrawal=1		Withdrawal=0		t-test	
	N	Mean	N	Mean	diff-in-mean	t
Ownership	395	0.162	1543	0.18	0.018	0.86
Underwriter commitment	395	0.094	1543	0.298	0.204***	10.91
Free float	395	0.099	1543	0.302	0.203***	10.68
Target	395	0.094	1543	0.132	0.039**	2.26
Age	395	12.752	1543	10.795	-1.957**	-2.01
Top underwriter	395	0.284	1543	0.506	0.222***	8.53
Firm value	215	1391.15	1186	1041.77	-349.377	-1.33
Foreign	395	0.084	1543	0.087	0.004	0.25
Urban	395	0.711	1543	0.796	0.084***	3.37
Size	283	9.882	1330	10.543	0.661***	3.68
Revenue	209	8.538	952	8.244	-0.294	-1.36
Profitability	209	-0.003	951	-0.001	0.002*	1.9
Leverage	265	2.523	1302	1.668	-0.855***	-2.91
Intangible	283	0.134	1330	0.153	0.019	1.17
Hot IPO period	395	0.387	1543	0.53	0.143***	5.17
SPU	395	101.923	1543	101.634	-0.289	-0.48
Value wedge	112	-3.293	701	-1.385	-1.908	-0.61
European option	112	257.902	701	62.741	195.161***	2.68
American option	112	261.533	701	63.621	197.912***	2.67

Table 3. IPO withdrawal probability

Regression results showing the effect of Ownership, Underwriter commitment, and Free float on the decision to withdraw an IPO. The dependent variable is binary and equals one if the IPO is withdrawn and zero if it is completed. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

VARIABLES	Model 1	Model 2	Model 3	Model 4
Dependent variable	IPO Withdraw	IPO Withdraw	IPO Withdraw	IPO Withdraw
Ownership	0.07455*** (0.026)			0.07138*** (0.025)
Underwriter commitment		-0.07490*** (0.027)		-0.03778 (0.028)
Free float			-0.09717*** (0.029)	-0.08180*** (0.030)
Age	0.00096 (0.001)	0.00081 (0.001)	0.00068 (0.001)	0.00069 (0.001)
Top underwriter	-0.07970*** (0.023)	-0.06243*** (0.023)	-0.05884** (0.023)	-0.06548*** (0.023)
Firm value	0.00001** (0.000)	0.00001** (0.000)	0.00001** (0.000)	0.00001** (0.000)
Foreign	0.05108 (0.076)	0.04469 (0.073)	0.03706 (0.071)	0.03367 (0.074)
Urban	0.00293 (0.025)	0.01102 (0.026)	0.01336 (0.026)	0.00819 (0.025)
Size	-0.03000*** (0.008)	-0.02783*** (0.008)	-0.02809*** (0.008)	-0.02934*** (0.008)
Revenue	-0.00098 (0.006)	-0.00293 (0.006)	-0.00188 (0.006)	-0.00175 (0.006)
Profitability	-0.51310 (1.107)	-0.43297 (1.151)	-0.36652 (1.199)	-0.47452 (1.193)
Leverage	0.00272 (0.003)	0.00181 (0.003)	0.00155 (0.003)	0.00236 (0.003)
Intangible	0.01907 (0.043)	0.02023 (0.044)	0.01503 (0.044)	0.02265 (0.045)
Hot IPO period	-0.08580*** (0.024)	-0.07158*** (0.023)	-0.06720*** (0.023)	-0.07323*** (0.023)
SPU	0.00336*** (0.001)	0.00399*** (0.001)	0.00389*** (0.001)	0.00375*** (0.001)
Exchange group FE	Yes	Yes	Yes	Yes
Crisis FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	813	813	813	813
Wald chi2	127.77	131.87	131.89	129.11
Pseudo R2	0.2514	0.2522	0.2602	0.273

Table 4. Probability of being a target following the IPO attempt

Regression results showing the effect of the value wedge on the probability of becoming a takeover target after withdrawal. The dependent variable is binary and equals one if the firm becomes a target in an M&A transaction and zero otherwise. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Dependent variable	Being target	Being target	Being target	Being target	Being target	Being target
Value wedge	0.00157* (0.001)	0.00170** (0.001)				
European option			0.01516** (0.007)	0.02067** (0.009)		
American option					0.01528** (0.007)	0.02079** (0.009)
Age		0.00088 (0.001)		0.00022 (0.001)		0.00022 (0.001)
Top underwriter		0.02799 (0.024)		0.04887** (0.025)		0.04905** (0.025)
Firm value		0.00000 (0.000)		-0.00001 (0.000)		-0.00001 (0.000)
Urban		0.01795 (0.029)		0.00559 (0.029)		0.00564 (0.029)
Size		-0.00040 (0.010)		-0.00022 (0.009)		-0.00022 (0.009)
Revenue		0.01627*** (0.006)		0.01739*** (0.006)		0.01738*** (0.006)
Profitability		-0.56222 (1.931)		-0.60850 (1.933)		-0.60632 (1.934)
Leverage		0.00052 (0.003)		-0.00020 (0.003)		-0.00020 (0.003)
Intangible		-0.05760 (0.050)		-0.05701 (0.051)		-0.05696 (0.051)
Hot IPO period		-0.05378** (0.027)		-0.03194 (0.027)		-0.03137 (0.027)
SPU		0.00124 (0.001)		0.00057 (0.001)		0.00057 (0.001)
Exchange group FE	Yes	Yes	Yes	Yes	Yes	Yes
Crisis FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	803	803	803	803	803	803
Wald chi2(21)	48.39	75.45	50.16	79.45	50.24	79.52
Pseudo R2	0.0735	0.107	0.0759	0.1047	0.076	0.1048

Appendix A: Variable's definition

Variable	Definition	Source
IPO withdrawal	A binary variable that takes the value of 1 if IPO is withdrawn and zero if it is completed	Nyemissioner
Ownership	A binary variable that takes the value of 1 if the IPO firm is VC-backed and zero otherwise. Zeros include mainly private equity and private debt-backed firms.	Nyemissioner
Underwriter commitment	A binary variable equal to 1 when the underwriter provides a firm commitment to the offering, as opposed to a best-efforts contract	Prospectus
Free float	A binary variable equal to 1 if the firm discloses that a fraction of its shares is offered to public investors, and 0 otherwise	Prospectus
Target	A binary indicator equal to 1 if the firm that withdrew its IPO becomes a takeover target, and 0 otherwise	LSEG
Value wedge	Value wedge is the difference between value with withdrawal probability and continuation value (Eq. 4)	Authors' calculation
Option value	Computed as a standard European and American-style real option model, using a binomial model, in which firms may optimally withdraw the IPO at any time prior to completion.	Authors' calculation
Age	Difference between the firm establishment year and the year of the IPO	Serrano & Nyemissioner
Top underwriter	A binary variable that takes the value of 1 if the IPO underwriters is one of those that managed at least 1% of the deals in our sample	Nyemissioner
Firm value	The value of the firm at the IPO date	Nyemissioner
Foreign	A binary variable equal to 1 if the IPO firm is a non-Swedish company (headquartered abroad), and 0 if the company is Swedish.	Nyemissioner
Urban	Dummy variable equal to 1 if the IPO firm is headquartered in an urban area, and 0 if located in a non-urban area.	Serrano
Size	Log of total assets of the firm in the year prior to the IPO year	Serrano
Revenue	Total sales of the firm in the year prior to the IPO year	Serrano
Profitability	Profit margin divided by the total assets in the year prior to the IPO year	Serrano
Leverage	Debt to equity ratio in the year prior to the IPO year	Serrano
Intangibles	Intangible assets divided by total assets in the year prior to the IPO year	Serrano
Hot IPO Period	A binary variable equal to 1 for years in which the total number of IPOs exceeds the sample median, and 0 otherwise.	Authors' calculation
SPU	Measure of Swedish policy uncertainty	https://www.policyuncertainty.com/sweden_monthly.html

Appendix B

Here we provide the derivation of Equation (5) in the main text. Equation (5) is the risk-neutral binomial value of a European-style withdrawal, or abandonment, option, multiplied by the estimated withdrawal probability λ .

At node (t, j) , suppose the firm has two relevant values: $V_{t,j}^W$, which is the value obtained if the IPO is withdrawn, and $V_{t,j}^C$, which is the current continuation value of proceeding with the IPO. The withdrawal option is valuable only if withdrawal produces a higher payoff than continuation. Therefore, at any future terminal node, the payoff from withdrawing is the positive difference between the withdrawal value and the terminal continuation value, $\max(V_{t,j}^W - V_{t,j}^C, 0)$.

In the binomial model, the continuation value evolves multiplicatively. Over one period, it moves either up by a factor u or down by a factor d . Therefore, after n periods, if there are k up moves and $n - k$ down moves, the continuation value becomes $V_{t+n,k}^C = u^k d^{n-k} V_{t,j}^C$. Hence, conditional on reaching a terminal node with k up moves, the abandonment payoff is $\max(V_{t,j}^W - u^k d^{n-k} V_{t,j}^C, 0)$. The term inside the maximum compares the withdrawal value with the terminal IPO continuation value. If the withdrawal value is higher, the option is exercised. If not, the payoff is zero.

Under the risk-neutral binomial measure, the probability of an up move is p , and the probability of a down move is $1 - p$. Over n periods, the probability of exactly k up moves and $n - k$ down moves is given by the binomial probability $\binom{n}{k} p^k (1 - p)^{n-k}$, because there are $\binom{n}{k}$ different paths with exactly k up moves, and each such path has probability $p^k (1 - p)^{n-k}$.

Therefore, the expected withdrawal payoff under the risk-neutral measure is

$$\sum_{k=0}^n \binom{n}{k} p^k (1 - p)^{n-k} \max(V_{t,j}^W - u^k d^{n-k} V_{t,j}^C, 0). \quad (\text{A1})$$

Because this payoff occurs n periods in the future, it must be discounted back to node (t, j) . If R is the one-period gross discount factor, then the n -period gross discount factor is R^n . Thus, the present value of the expected abandonment payoff is

$$\frac{1}{R^n} \sum_{k=0}^n \binom{n}{k} p^k (1-p)^{n-k} \max(V_{t,j}^W - u^k d^{n-k} V_{t,j}^C, 0). \quad (\text{A2})$$

Finally, the model assumes that not every IPO with an in-the-money withdrawal option is actually withdrawn. Instead, withdrawal occurs with estimated probability λ . Multiplying Equation (A2) by λ gives Equation (5) defined in the main text.⁵ It can be shown that as $n \rightarrow \infty$, the binomial formula defined in Equation (A2) converges to the continuous-time Black-Scholes formula (Cox et al., 1979).

Equation (6) generalizes the European-style abandonment option by allowing withdrawal at every immediate node. Instead of waiting until maturity and averaging terminal payoffs, the American option is valued recursively by backward induction.

Define the immediate exercise payoff at node (t, j) as $H_{t,j} = \lambda \max(V_{t,j}^W - V_{t,j}^C, 0)$. The withdrawal option has positive immediate exercise value only when the withdrawal value exceeds the IPO continuation value. Let $F_{t,j}^W$ denote the American-style withdrawal option value at node (t, j) . At this node, management has two choices: withdraw immediately and receive $H_{t,j}$, or continue one more period.

If management continues, then in the next period the process moves to node $(t+1, j+1)$ with risk-neutral probability p , or to node $(t+1, j)$ with risk-neutral probability $1-p$. At those future nodes, the withdrawal option remains alive and is worth $F_{t+1,j+1}^W$ in the up state and $F_{t+1,j}^W$

⁵ For illustration, consider the two-step tree in Footnote 4, with $T = t+2$. The terminal withdrawal payoffs are $f_{T,j}^W = \lambda \max(V_{T,j}^W - d^2 V_{t,j}^C, 0)$, $f_{T,j+1}^W = \lambda \max(V_{T,j+1}^W - u d V_{t,j}^C, 0)$, and $f_{T,j+2}^W = \lambda \max(V_{T,j+2}^W - u^2 V_{t,j}^C, 0)$. The value of the withdrawal option at node (t, j) is the discounted risk-neutral expectation of these terminal payoffs: $f_{t,j}^{Wopt} = \frac{1}{R^2} (p^2 f_{T,j+2}^W + 2p(1-p) f_{T,j+1}^W + (1-p)^2 f_{T,j}^W)$. Substituting the terminal withdrawal payoffs gives Equation (5) for the special case $n = 2$.

in the down state. Therefore, the expected risk-neutral value of continuing is $pF_{t+1,j+1}^W + (1-p)F_{t+1,j}^W$.

Because this value is received one period in the future, it must be discounted by the one-period gross discount factor R . Hence, the continuation value is

$$\frac{1}{R} (pF_{t+1,j+1}^W + (1-p)F_{t+1,j}^W). \quad (\text{A3})$$

At the final decision date T , there is no remaining opportunity to continue. Therefore, the terminal condition is $H_{t,j}$. For each earlier node, the American-style withdrawal option value is the maximum of the immediate exercise value and the discounted expected continuation value. Therefore,

$$F_{t,j}^{Wopt} = \max \left(H_{t,j}, \frac{1}{R} (pF_{t+1,j+1}^W + (1-p)F_{t+1,j}^W) \right). \quad (\text{A4})$$

Substituting the definition of $H_{t,j}$ gives Equation (6) in the main text.