# Does Direct Listing Reduce Intermediary Market Power? Evidence from U.S. IPO Pricing

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**Abstract**

This paper examines the competitive effects of the SEC's 2020 approval of primary direct listing (DL), which allows issuers to go public and raise capital without underwriters. If underwriters possess market power in the IPO market, DLs as an outside option can enhance competition and improve IPO pricing for issuers. Using the approval as an exogenous shock, I find that big-three underwriters reduced IPO underpricing by approximately 9 percentage points (28%) relative to others. Larger, older, VC-backed, and technology issuers experienced stronger reductions. These findings suggest that the introduction of primary DL reduced intermediary market power and benefited issuers.

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# 1. Introduction

Going public is one of the most significant events for a firm. Traditionally, a firm goes public through an initial public offering (IPO), in which it raises capital, and investment banks serve as underwriters. There are two main cost components of an IPO. The first is the underwriting fee, typically ~7% of the proceeds raised. The second is underpricing, usually measured as the first-day return based on the percentage difference between the offering price and the first-day closing price. The average underpricing cost was ~20% from 1980 to 2023 (Ritter, 2024). This represents the major cost of going public for issuers, while investors who receive IPO allocations enjoy high first-day returns.

One explanation for this IPO underpricing phenomenon is the presence of agency problems: underwriters who possess market power can benefit from money left on the table through soft-dollar arrangements with institutional investors that receive IPO allocations and, in turn, pay excessive commissions on their trading activities (e.g., Loughran and Ritter, 2002; Nimalendran, Ritter, and Zhang, 2007; Goldstein, Irvine, and Puckett, 2011). Supporting this view, IPO issues managed by underwriters with large market shares—such as the big-three underwriters, which together account for over half of aggregate IPO proceeds—tend to exhibit higher first-day returns than those managed by other underwriters (Ritter, 2019). Reducing the market power of underwriters, improving the efficiency of the going-public market, and lowering the cost of going public for issuers are important objectives for policymakers (e.g., SEC, 2018).

In response to these high costs, one proposed solution has been the development of an alternative going-public mechanism: direct listing (DL). The main feature of a DL is the

removal of underwriters from the going-public process. Instead, an opening auction conducted by the stock exchange determines the initial price and allocates shares. As a result, market participants have promoted DLs as a streamlined, market-based, and more democratic path to going public. For example, a DL conference backed by startups and venture capital investors was held in San Francisco in October 2019 to promote this model.[1]

There have been two generations of U.S. DL innovation. On February 2, 2018, the SEC approved the NYSE's proposal for secondary DL, which allowed companies to list existing shares but prohibited capital raising through the issuance of new shares. On December 22, 2020, the SEC approved another NYSE proposal on primary DL, which permitted firms to raise new capital. By offering firms an alternative path to public markets without underwriters, DL represents a financial innovation that can enhance competition in the IPO underwriting market. Anecdotal evidence suggests spillover effects into traditional IPO practices and greater bargaining power for IPO issuers following DL innovations: many underwriters relaxed lock-up restrictions that limit insider sales after IPOs, and some issuers—such as Airbnb and DoorDash—adopted hybrid IPO approaches that used auctions to set prices while giving issuers the discretion to allocate shares to investors. As market practitioners observed, "*largely because of the challenge of the direct listing structure, we are seeing real innovations in IPO practice*," and "*the possibility of a direct listing just gives a company more leverage and flexibility to negotiate with its bankers, and with investors.*" Overall, the evidence suggests that DLs are a competitive threat to traditional IPOs. The SEC's approval order also explicitly

[1] Reuters reports, "*Venture capitalists and executives from more than 100 startups including Airbnb Inc and Poshmark gathered on Tuesday to bash traditional initial public offerings and promote direct stock exchange listings…*" See Reuters, Startups hear about drawbacks of IPOs at San Francisco meeting, available at https://www.reuters.com/article/us-tech-venturecapital-ipo/startups-hear-about-drawbacks-of-ipos-at-san-francisco-meeting-idUSKBN1WG3JO.

stated that the DL market could "*facilitate the orderly distribution and trading of shares, as well as foster competition*."

This paper investigates the competitive effects of the U.S. DL initiations on IPO pricing. The main hypothesis is that the threat of the DL market as an outside option can reduce the market power of underwriters in IPO pricing. Therefore, the initiation of DL markets could result in lower underpricing in the IPO market, particularly for issues managed by underwriters with significant market power. For underwriters with limited market power, whose underpricing is already near competitive levels, we expect little change. Based on this hypothesis, the empirical strategy used in the paper is a straightforward before-and-after comparison, coupled with tests for confounding trends, using IPO issues managed by the big-three underwriters as the treatment group and IPO issues managed by other underwriters as the control group.[2] The main findings are as follows.

First, underpricing costs decreased by 5.35 percentage points, or 20% (5.35/27.39), during the post-period (2021 to 2023) relative to three years before the event. Second, the reduction is concentrated among the IPOs managed by the big-three underwriters. Specifically, underpricing costs of IPO issues managed by the big-three underwriters decreased by 9.16 percentage points, or 28% (9.16/33.01) relative to those managed by other underwriters. Third, there were no significant changes in underwriting fees. Since underwriters capture all underwriting fees but only a fraction of the money left on the table, they have stronger incentives to reduce underpricing than fees. Fourth, there was no significant change in IPO

[2] The big-three underwriters (Goldman Sachs, Morgan Stanley, and J.P. Morgan) dominate the IPO market. For example, they accounted for 74% of IPO proceeds during the 2018–2020 period.

underpricing following the 2018 approval of secondary DLs. Because most IPOs raise new capital, this result suggests that secondary DL posed little competitive threat to the IPO market.

I also conduct a series of robustness analyses. There are no significant pre-trends in underpricing costs. Placebo tests show no effects for issuers with a market valuation below $250 million. Because one requirement for a primary DL on the stock exchanges is a minimum market valuation of $250 million, these firms are ineligible for primary DLs and therefore unlikely to be affected by the primary DL. In addition, tests around the COVID period and the SPAC boom period show no significant changes in IPO underpricing, suggesting that the observed decline is not driven by these events. The results also remain robust under alternative classifications of underwriter market power.

I further explore the mechanism by analyzing the heterogeneity across issuers. The underpricing reduction was concentrated among IPO issuers that are more subject to underwriter market power. VC-backed companies and technology companies have a greater demand for all-star analyst coverage that is bundled with IPO underwriting, are more subject to underwriter market power, and historically incurred higher underpricing costs (Liu and Ritter, 2011). VCs and technology companies are strong advocates of the DL market. VC-backed IPOs experienced a decrease in underpricing by 13.22 percentage points relative to non-VC-backed IPOs, revealing the importance of existing large shareholders in responding to DL initiation. In addition, technology companies experienced a decrease in underpricing by 17.78 percentage points relative to non-tech companies. On the other hand, the reductions are also stronger for larger and more mature companies. These companies are less subject to informational frictions and are more able to go public through primary DLs. Therefore, the

primary DL is more likely to pose a credible threat. These findings provide further support for the causal role of the DL market initiation and the market power mechanism.

This paper contributes to the literature on underwriter market power and IPO pricing. Prior studies provide evidence that underwriter market power and conflicts of interest contribute to IPO underpricing (e.g., Loughran and Ritter, 2002; Reuter, 2006; Nimalendran, Ritter, and Zhang, 2007; Liu and Ritter, 2011; Goldstein, Irvine, and Puckett, 2011; Jenkinson, Jones, and Suntheim, 2018). These studies primarily rely on cross-sectional analyses to infer the role of market power. Whether IPO underpricing systematically reflects underwriter market power, rather than informational frictions or other factors, remains an open debate. By exploiting the regulatory approval of DLs as an exogenous increase in underwriter competition, this paper provides new causal evidence regarding the market-power channel.

More broadly, the paper contributes to research on financial innovation and intermediary market power, which highlights that financial innovations can increase competition in markets dominated by intermediaries (e.g., Philippon, 2016; Vives, 2019; Thakor, 2020). Consistent with this view, the findings indicate that innovations introducing an alternative going-public mechanism can discipline incumbent underwriters, reduce intermediary rents, and enhance IPO pricing efficiency.

The paper also contributes to the growing body of research on the changing dynamics of the U.S. going-public market (e.g., Gao, Ritter, and Zhu, 2013; Dambra, Field, and Gustafson, 2015; Doidge, Karolyi, and Stulz, 2017; Ewens and Farre-Mensa, 2020).[3] As the number of

[3] Other examples of related recent work include Iliev and Lowry (2020), Bernstein, Dev, and Lerner (2020), Field and Lowry (2022), Aggarwal et al. (2022), Gahng, Ritter, and Zhang (2023), Banerjee and Szydlowski (2024), Bai, Ma, and Zheng (2025), Feng et al. (2025), Lin et al. (2025), and Chemmanur et al. (2025).

publicly listed U.S. firms has declined since around 2000 (Gao, Ritter, and Zhu, 2013; Doidge, Karolyi, and Stulz, 2017), regulators have pursued reforms aimed at reducing the costs of going public. Dambra, Field, and Gustafson (2015) show that the 2012 Jumpstart Our Business Startups (JOBS) Act lowered disclosure costs and increased IPO activity among small growth firms. The results in this paper suggest that DL innovations have reduced going-public costs for large and mature firms.

The findings also have important policy implications. The evidence indicates that the SEC's 2020 approval of primary DLs fostered competition and reduced the costs of going public by constraining the market power of dominant underwriters. The 9.16-percentage-point decline in underpricing for IPOs underwritten by the big-three banks translates into roughly $25 million in savings for the median issuer and about $7.8 billion in aggregate savings over the three years following the SEC approval. These results suggest that financial innovations expanding firms' access to public markets can complement traditional regulatory approaches aimed at enhancing competition and reducing the cost of going public.

The rest of this paper is organized as follows. Section 2 provides the institutional background and develops the hypothesis. Section 3 describes the empirical methodology and presents the main results on changes in underpricing following the DL initiations. Section 4 examines the heterogeneity in the underpricing reduction across issuer characteristics. Section 5 concludes.

## 2. Institutional Background and Hypothesis Development

### *2.1. U.S. direct listing initiations*

A DL allows a company to list its shares on a stock exchange without using underwriters to price or distribute the shares. In a traditional IPO, investment banks negotiate the offer price with the issuer and allocate shares privately to institutional investors. In contrast, a DL relies on an exchange-run opening auction that aggregates buy and sell interest from all market participants to determine the initial trading price and allocate shares. DLs are descendants of auction IPOs, the main difference is that they replace the underwriter-organized bidding process with a centralized and transparent auction conducted by the exchange.[4] In a DL, the designated market maker (DMM) plays a central role in price discovery, setting the opening price through the auction process. Investment banks only act as financial advisors and provide consulting services to issuers.[5]

The U.S. DL framework emerged gradually through a sequence of regulatory changes initially proposed by the New York Stock Exchange (NYSE). On February 2, 2018, the SEC approved the NYSE's proposal to amend its listing rules to permit issuers to conduct a direct listing of existing shares under an effective resale registration statement without a related underwritten offering. This model, known as the "Selling Shareholder Direct Floor Listing,"

[4] Therefore, DLs are more streamlined and potentially less susceptible to collusion between investment banks and institutional investors. Ritter (2014) comments on Google's 2004 auction IPO: "*The second factor that lowered the offer price was the desire of the lead underwriters, Credit Suisse and Morgan Stanley, to sabotage the auction…The underwriters told many institutional investors that they were likely to receive shares if they bid $85 per share. Not surprisingly, there were a huge number of bids for shares at $85, and relatively little demand at a higher offer price. Google was forced to accept just $85 per share.*"

[5] The advisory fees associated with DLs are much lower compared to the underwriting fees in IPOs. For example, the advisory fees Spotify paid to its advisors (Goldman Sachs, Morgan Stanley, Barclays, and Allen & Company) were approximately $35 million. Based on a report from J.P. Morgan, the IPO underwriting fee for Spotify had it pursued a traditional IPO would be roughly $120 million. Therefore, Spotify saved approximately $65 million in underwriting fees. See J.P. Morgan, 2018, Corporate Finance Advisory Trending Topics, available at https://perma.cc/X3L2-UW3T.

allowed existing shareholders such as founders, venture capital investors, and employees to sell shares directly to the public.[6] However, it did not permit firms to issue new shares or raise capital. The first major case was Spotify's direct listing on April 3, 2018, followed by companies such as Slack in 2019 and Palantir in 2020. These early DLs could not raise capital and served primarily as liquidity events for existing shareholders rather than financing events for the company. In 2020, the NYSE proposed permitting issuers to sell newly issued shares as part of the opening auction. The SEC approved this "Primary Direct Floor Listing" model on December 22, 2020, enabling firms to raise capital directly from public investors without engaging underwriters.[7]

The development of DLs has influenced traditional IPO practices, and anecdotal evidence suggests that the threat of DLs has increased the bargaining power of issuers. One traditional IPO practice is the lock-up restriction. In an IPO, the underwriters typically impose a lock-up period of 90 to 180 days after a company begins to trade publicly. During this time, company founders, certain investors, and employees agree not to sell their shares. In comparison, DLs usually do not include lock-up restrictions. Since 2021, many IPOs have featured early lock-up releases. Market commentators have referred to this trend as the "disappearing lock-up" phenomenon. An article noted that: "*A number of trends have since conspired to whittle away*

[6] The approval order for the secondary DL is available at https://www.sec.gov/files/rules/sro/nyse/2018/34-82627.pdf. The approval order for the primary DL is available at https://www.sec.gov/files/rules/other/2020/34-90768.pdf.

[7] In December 2022, the SEC approved additional rule changes by the NYSE and Nasdaq that expanded the allowable price range for the opening auction in a primary DL. Under the prior rules, the opening price was required to fall within the range disclosed in the issuer's effective registration statement. The amended rules allow the auction to proceed at a price up to 20% below or 80% above the disclosed range. See https://www.sec.gov/files/rules/sro/nasdaq/2022/34-96443.pdf and https://www.sec.gov/files/rules/sro/nyse/2022/34-96514.pdf.

*such measures, from the longer stretch that many companies now operate as privately held concerns (creating greater demand for liquidity by insiders), to the advent of direct listings*."[8]

In addition to altering lock-up practices, DLs have also spurred further experimentation in the IPO process. Another recent innovation in the IPO market is the so-called "hybrid IPO," which uses auctions to set prices while giving issuers the discretion to allocate shares to investors. For example, Airbnb and DoorDash adopted this approach in their IPOs.[9] One commentator stated: "*largely because of the challenge of the direct listing structure, we are seeing real innovations in IPO practice*." Another commentator stated: "*the possibility of a direct listing just gives a company more leverage and flexibility to negotiate with its bankers, and with investors.*"[10] These changing dynamics in the IPO market underscore an important spillover effect of DL innovations: even for firms that do not pursue a DL, the mere availability of DLs as an outside option can strengthen issuers' bargaining power in traditional IPOs.

There is also anecdotal evidence that DL innovations have exerted competitive pressure on IPO pricing. In an article titled "*Disrupting the IPO Process: Direct Listing Threat to Banks*," one commentator observed: "*It behooves bankers then to understand which of the many services that they used to charge for in the old days still provide added value today and to set fees that reflect that value added. This will require revisiting practices that are taken as given,*

[8] See TechCrunch, The Year of the Disappearing Lock-Up, available at https://techcrunch.com/2022/01/04/the-year-of-the-disappearing-lock-up/; and Renaissance Capital, *The Erosion of the IPO Lock-Up*, available at https://www.renaissancecapital.com/IPO-Center/News/89910/The-erosion-of-the-IPO-lock-up. The article notes that most of the issuers with early lock-up provisions are technology companies.

[9] In an auction IPO, shares are allocated automatically to all bidders at or above the clearing price. In a hybrid IPO, by contrast, the issuer works with its underwriter to exercise discretion in allocating shares among eligible bidders. See CFO Dive, More Companies Using Hybrid Auction In Lieu Of Traditional IPO, available at https://www.cfodive.com/news/more-companies-using-hybrid-auction-in-lieu-of-traditional-ipo/597665/.

[10] See Reuters, New Direct Listings Won't Spell the Death of IPOs, available at https://www.reuters.com/article/business/new-direct-listings-won-t-spell-the-death-of-ipos-idUSKBN2920XR/; and Bloomberg Opinion, Direct Listings Are a Thing Now, available at https://www.bloomberg.com/opinion/articles/2019-01-11/direct-listings-are-a-thing-now.

*including the 6-7% underwriting fee and the notion that the offer price should be set about 15% below what you think the fair prices should be*."[11]

Together, these anecdotal accounts suggest that DL innovations may be reshaping competitive dynamics in IPO underwriting by providing issuers with an outside option. However, there is currently no systematic empirical evidence regarding the competitive effects of DL innovations on IPO pricing. This paper fills that gap by analyzing how DL approvals affected IPO underpricing.

### *2.2. IPO underpricing, underwriter market power, and direct listing*

An extensive literature has developed to explain the economic mechanisms underlying IPO underpricing. One class of explanations focuses on information asymmetry: underpricing compensates uninformed investors for the winner's curse problem (Rock, 1986) or rewards informed investors for producing information (Benveniste and Spindt, 1989).[12] Another explanation focuses on agency problems between issuers and underwriters: underwriters who possess market power may benefit from leaving money on the table by allocating underpriced shares to favored institutional clients and extracting rents through soft-dollar arrangements and excessive trading commissions (e.g., Loughran and Ritter, 2002; Loughran and Ritter, 2004; Reuter, 2006; Nimalendran, Ritter, and Zhang, 2007; Goldstein, Irvine, and Puckett, 2011; Jenkinson, Jones, and Suntheim, 2018). Goldstein, Irvine, and Puckett (2011) estimate that underwriters capture about 45% of the money left on the table through commission revenues.

[11] See Aswath Damodaran, *Disrupting the IPO Process: Direct Listing Threat to Banks*, available at https://pages.stern.nyu.edu/~adamodar/pdfiles/blog/IPOProcess.pdf.

[12] For example, empirical evidence suggests that institutional investors are compensated for their information production in the IPO bookbuilding process through the underpricing mechanism (Hanley and Wilhelm, 1995; Cornelli and Goldreich, 2001; Ljungqvist and Wilhelm, 2002; and Chemmanur, Hu, and Huang, 2010).

Liu and Ritter (2011) find evidence that some underwriters possess oligopolistic market power because they have all-star analysts who can provide research coverage on the issuer's stock.[13]

Anecdotal evidence from market participants is also consistent with the presence of agency problems that contribute to IPO underpricing. As Reuters reports, "*Benchmark Capital partner Bill Gurley, one of the organizers of Tuesday's event, said investment banks have long been 'fleecing' companies by pricing shares low so that they pop on their first trading day. That pop benefits institutional clients who buy at the offer price and can flip their shares when they soar*."[14]

The nature of competition in IPO gross spreads has also been an important topic of investigation in the IPO literature. Chen and Ritter (2000) show that U.S. IPO gross spreads cluster strikingly at 7%, consistent with implicit collusion or strategic pricing that keeps spreads above competitive levels. Cross-market evidence from Abrahamson, Jenkinson, and Jones (2011) reveals that U.S. spreads substantially exceed those in European markets, further suggesting limited competition among underwriters. More recently, Hatfield et al. (2020) show that the syndication structure in the IPO market facilitates collusion: lead underwriters can sustain collusion by refusing to syndicate with any firm that undercuts the collusive price.[15]

[13] Beyond information- and agency-based explanations, the literature identifies several additional perspectives on IPO underpricing. Institutional explanations emphasize legal liability (Tinic, 1988; Hughes and Thakor, 1992; Lowry and Shu, 2002) and mechanisms related to price stabilization (Hanley, Kumar, and Seguin, 1993; Benveniste, Busaba, and Wilhelm, 1996; Ellis, Michaely, and O'Hara, 2000). Ownership and control explanations focus on issuers' strategic objectives in post-IPO governance (Brennan and Franks, 1997; Stoughton and Zechner, 1998). Behavioral explanations emphasize psychological and sentiment-driven factors that affect issuers and investors (Welch, 1992; Purnanandam and Swaminathan, 2003; Derrien, 2005; Ljungqvist, Nanda, and Singh, 2006).

[14] See Reuters, Startups hear about drawbacks of IPOs at San Francisco meeting, available at https://www.reuters.com/article/us-tech-venturecapital-ipo/startups-hear-about-drawbacks-of-ipos-at-san-francisco-meeting-idUSKBN1WG3JO.

[15] Hansen (2001) argues that such clustering could arise from efficient contract design in a market characterized by low entry barriers and modest concentration.

Related evidence from corporate bond markets similarly shows that increased underwriting competition reduces issuance costs (Dyl and Joehnk, 1976; Kessel, 1971; Sorensen, 1979; Gande, Puri, and Saunders, 1999).

From 2018 to 2023, 16 companies went public via DL, all of which used the secondary DL.[16] Although no firm has yet completed a primary DL, anecdotal evidence indicates that many potential issuers have approached stock exchanges and law firms to ask how a primary direct listing would work.[17] This paper analyzes the competitive effect of the U.S. DL initiations on IPO underpricing costs through the underwriter market power channel. If underwriters have market power, the initiation of DLs as an outside option can reduce that market power and lower underpricing costs in the IPO market. In the next subsection, I develop a conceptual framework to illustrate the economic mechanism through which DLs influence IPO costs.

### *2.3. A conceptual framework*

The implications of DLs for the IPO market depend on the degree of competition within the underwriting sector. When the IPO market is imperfectly competitive, the introduction of the DL mechanism can reduce underwriter market power without necessarily causing

[16] Appendix A.1 presents a list of DL firms from 2018 to 2023.

[17] For example, Nasdaq hosted a webinar on primary DLs in April 2023. Jay Heller, the head of capital markets at Nasdaq, stated that "*from our side of the house, there are a lot of conversations that are taking place and people are asking me questions*" about primary DLs. Greg Rodgers, vice chair of Latham & Watkins (a law firm that has advised on multiple DL transactions), similarly noted that the firm had received many questions from issuers about primary DLs. See https://www.nasdaq.com/videos/understanding-nasdaqs-direct-listing-with-capital-raise-amendment. Additional reporting also indicates that companies are exploring the primary DL option. For example, CNBC noted in 2021 that Databricks was considering a primary DL: "*UiPath and Databricks have another option available to them that wasn't there at the time of Snowflake's offering. In December, the SEC approved a rule from the New York Stock Exchange that lets companies raise primary capital at the same time as a direct listing. Ghodsi said Databricks is exploring that avenue as well*." See CNBC, UiPath and Databricks set the stage for direct listings with huge funding rounds, available at https://www.cnbc.com/2021/02/01/uipath-and-databricks-set-up-for-direct-listings-with-latest-funding.html.

disintermediation.

Let the firm value be $M$ if it remains private, and $A$ denotes the incremental dollar value of going public. The percentage underpricing cost is $U$. Following Liu and Ritter (2011), underwriters have incentives to underprice IPOs above the competitive level and can benefit from underpricing IPOs. Underwriting costs are assumed to be covered in the gross spread, which is treated as exogenous. The competitive level of underpricing cost in the IPO market is $U_{IPO}^{c}$, which compensates investors for the ex-ante uncertainty of issue valuation. I also assume that the issuer prefers going public to remaining private at the competitive underpricing level: $A \geq U_{IPO}^{c} M$.

In the IPO market, the offering price and the underpricing level are determined through negotiation and bargaining between the issuer and the underwriter. To capture the relative influence of each party in setting the offering price, the conceptual framework builds on an asymmetric Nash bargaining game between two players with differential market power (Osborne and Rubinstein, 1990; Cornelli, Goldreich, and Ljungqvist, 2006).[18] Let $\lambda$, on the interval [0,1], be the bargaining power of the underwriter. The bargaining power of the issuer is $1 - \lambda$.[19] The total surplus of the transaction is $A - U_{IPO}^{c} M$. The asymmetric Nash bargaining solution is given by the payoffs to the two parties, $x_1$ and $x_2$ that:

$$\arg\max_{x_1, x_2} (x_1 - outside\ option_1)^{\lambda} (x_2 - outside\ option_2)^{1-\lambda} \quad (1)$$

In the IPO market, if the company chooses to stay private, the underwriter earns zero profits,

[18] The asymmetric Nash bargaining solution satisfies three key properties: pareto efficiency, independence of irrelevant alternatives, and invariance to equivalent utility representations (Osborne and Rubinstein, 1990).

[19] Several factors influence the relative bargaining power between the issuer and the underwriter, including the value of analyst research coverage provided by the underwriter (Loughran and Ritter, 2002), the issuer's option to withdraw the offering late in the process (Daniel, 2002), and industry expertise of the underwriter (Liu and Ritter, 2011).

and the value of the firm for the issuer is $M$. Therefore, the value of the outside option for the underwriter is 0, and the value of the outside option for the issuer is $M$. Given these outside options, the solution is given by the IPO underpricing that maximizes the joint surplus:

$$\arg\max_{U_{IPO}}(U_{IPO}M - U_{IPO}^{c}M)^{\lambda}\,(A - U_{IPO}M)^{1-\lambda} \tag{2}$$

Solving the first-order condition yields the equilibrium level of IPO underpricing:

$$U_{IPO}^{*} = U_{IPO}^{c} + \lambda(\frac{A}{M} - U_{IPO}^{c}) \tag{3}$$

Next, we introduce the DL market as another outside option and analyze the effects on IPO underpricing. In the DL market, the issuer and underwriter do not have control over the offering pricing and the underpricing level. Assume the underpricing cost in the DL market is $U_{DL}$.

When the IPO market is perfectly competitive (i.e., $\lambda = 0$), then $U_{IPO}^{*} = U_{IPO}^{c}$. The introduction of the DL market either leads to disintermediation or has no effect on the IPO market. When $U_{DL} < U_{IPO}^{c}$, the issuer switches to the DL market. Otherwise, the issuer stays in the IPO market, and there is no effect on underpricing.

However, when the IPO market is not perfectly competitive and the underwriters have market power (i.e., $\lambda > 0$), three scenarios arise. If $U_{DL} < U_{IPO}^{c}$, the issuer switches to the DL market. If $U_{DL} \geq U_{IPO}^{*}$, the issuer stays in the IPO market, and there is no effect on underpricing. The most interesting case is the intermediate region $U_{IPO}^{c} \leq U_{DL} < U_{IPO}^{*}$. In this region, the DL market is a credible outside option, giving the underwriter incentives to reduce the underpricing level in the IPO market to retain the issuer. The new bargaining solution is given by the new underpricing level $U_{IPO}$ that

$$\arg\max_{U_{IPO}}(U_{IPO}M - U_{IPO}^{c}M)^{\lambda}\,(U_{DL}M - U_{IPO}M)^{1-\lambda} \tag{4}$$

Therefore, when the DL market becomes a credible outside option, the equilibrium underpricing adjusts to

$$U_{IPO}^{**} = U_{IPO}^{c} + \lambda(U_{DL} - U_{IPO}^{c}) \quad (5)$$

In this case, disintermediation does not occur, but issuers in the IPO market enjoy lower underpricing costs when going public. Competition from the DL market incentivizes underwriters to lower the costs for issuers in the IPO market. The reduction in the underpricing level in the IPO market is:

$$\triangle U_{IPO} = \lambda\left(\frac{A}{M} - U_{DL}\right) \quad (6)$$

*2.4. Hypotheses*

The above framework shows that if underwriters have market power in the IPO market, the existence of the DL market can serve as an outside option and force underwriters to lower the costs of going public for IPO issuers. It also generates predictions for when the reduction in underpricing should be larger. Based on the framework, the reduction in underpricing in the IPO market is larger when (1) the underwriters have more bargaining power ($\lambda$) in the IPO market, (2) the underpricing level of the issuer in the DL market ($U_{DL}$) is lower, and (3) the value of going public for the issuer ($\frac{A}{M}$) is higher.

**Hypotheses related to underwriter market power:** Big-three underwriters are likely to have more bargaining power ($\lambda$) than other underwriters. VC-backed and tech IPOs are subject to more market power of underwriters due to these issuers' reliance on analyst coverage (Liu and Ritter, 2011). There are three predictions:

*Hypothesis 1:* IPO issues managed by big-three underwriters experience larger reductions in the underpricing costs than IPO issues managed by other underwriters.

*Hypothesis 2:* VC-backed IPOs experience larger reductions in the underpricing costs than non-VC-backed IPOs.

*Hypothesis 3:* Technology IPOs experience larger reductions in the underpricing costs than non-technology IPOs.

**Hypothesis related to the underpricing level in the DL market:** larger and older firms are less subject to information asymmetry, and the underpricing level in the DL market ($U_{DL}$) is likely to be lower. Therefore, these companies are more able to go public through a DL, and the initiation of the DL market is more likely to impose a credible threat to the IPO market.

*Hypothesis 4:* Larger and more mature issuers experience larger reductions in the underpricing costs than relatively smaller and younger issuers.

**Hypotheses related to the value of going public:** Because capital raising represents the main benefit of going public in the IPO market (e.g., Kim and Weisbach, 2008), the value of going public for the issuer ($\frac{A}{M}$) through a DL is higher when the DL allows capital raising.

*Hypothesis 5:* The initiation of primary DL should result in larger reductions in the underpricing costs than the initiation of secondary DL.

The next sections test these hypotheses using a difference-in-differences framework centered on the SEC's approval of direct listings. In the main analysis, I examine whether the reduction in IPO underpricing is concentrated among issues underwritten by the big-three investment banks, which serves as a direct test of the underwriter market power channel. I then compare the effects of the primary and secondary DL approvals to evaluate whether the ability to raise capital through DLs amplifies the competitive pressure on traditional IPOs. Finally, I

explore heterogeneity across issuer characteristics to assess whether the effects are stronger for firms more exposed to underwriter power or more capable of pursuing a DL.

# 3. Effect of Direct Listing Initiation on IPO Underpricing

## *3.1. Data*

I obtain U.S. IPO data from the Thomson Reuters Securities Data Company (SDC) Platinum New Issues database, which provides information on IPO offer prices, gross spreads, and share information. Data for share prices after the IPO are drawn from the Center for Research in Security Prices (CRSP) database. Following standard practice in the IPO literature (e.g., Liu and Ritter, 2011; Gustafson and Iliev, 2017), I exclude regulated firms whose industry classification is in utilities (SIC codes between 4200 and 4299) or the financial sector (SIC codes between 6000 and 6999), IPOs with an offer price of less than $5.00 per share, small issues (raising less than $10 million), and IPOs with first-day returns higher than 400%. For the main analysis, the data span from 2018 to 2023. There are 634 IPOs in this sample.

The main variables are defined following the IPO literature (e.g., Liu and Ritter, 2011; Gustafson and Iliev, 2017). *Underpricing costs* equal the percentage change from the offer price to the first-day closing price. *Underwriting fees* equal the underwriter spread paid as a percentage of IPO proceeds. *Total costs* equal the sum of underpricing costs and underwriting fees. *Firm size* is market capitalization based on the offer price ($billion). *Proceeds* are the funds raised by the IPO ($million). *Firm age* is the difference between the IPO year and the founding year.[20] *Share overhang* is the ratio of retained shares to the public float. Table 1

[20] I thank Professor Jay Ritter for sharing the data on the issuers' founding years.

provides summary statistics for the IPO sample (Panel A). The average underpricing cost during this period is 24.66%, consistent with Ritter (2024). The majority of the underwriting fees are 7%, consistent with prior evidence that nearly all medium-sized U.S. IPOs are clustered at a 7% spread (e.g., Chen and Ritter, 2000).

**Insert Table 1 about Here**

### *3.2. IPO costs before and after the primary DL initiation*

Table 2 Panel A presents the average underpricing cost in the pre-primary-DL (2018–2020) and post-primary-DL (2021–2023) periods, along with estimates of the changes between the two periods. The average underpricing cost declined from 27.39% in the pre-period to 20.98% in the post-period, a difference of -6.40 percentage points, which is statistically significant. Table 2 Panel A also reports the average underwriting fees and their changes across the two periods. The results indicate that underwriting fees did not change significantly following the primary DL approval. The total IPO costs declined from 33.96% in the pre-period to 27.51% in the post-period, representing a 6.45 percentage-point reduction, primarily driven by lower underpricing.

**Insert Table 2 about Here**

The interpretation that the decline in IPO costs resulted from the primary DL approval rests on the assumption that no other determinants of IPO costs changed contemporaneously. To

examine the validity of this assumption, I assess robustness by estimating the following time-series regression of IPO costs on a post-primary-DL indicator, including controls and fixed effects:

$$IPO\ costs_i = \eta_i + \beta \times\ Post_t + \zeta' \times Controls_i + \varepsilon_i \quad (7)$$

where $i$ indexes issuers, and $IPO\ costs_i$ is the dependent variable. $\eta_i$ captures industry fixed effects.[21] $Post_t$ is a dummy variable that equals one if an observation is from the post-primary-DL period and zero if it is from the pre-primary-DL period. Following the IPO literature (e.g., Liu and Ritter, 2011; Gustafson and Iliev, 2017), $Controls_i$ denote issuer-level covariates, including firm size, firm age, share overhang, a VC-backed dummy, and a big-three-underwriter dummy.[22] $\varepsilon_i$ is the error term. The results reported in Table 2 Panel B indicate that adding controls does not materially alter the estimated change in IPO costs between the three-year pre- and post-primary-DL periods. The underpricing costs of U.S. issuers decreased by approximately 5.35 percentage points, or about 20%, within three years following the primary DL approval.

### *3.3. Changes in IPO costs by big-three vs. non-big-three underwriters*

The identification strategy relies on the assumption that no other event besides the primary DL approval caused the observed reduction in IPO costs. To rule out alternative explanations and

[21] Firm fixed effects are not used because an IPO is a one-time event, so each firm appears in the sample only once. Following standard practice in the IPO literature (e.g., Liu and Ritter 2011), industry fixed effects are incorporated to absorb sector-specific heterogeneity. In the difference-in-differences analyses, year fixed effects are also included to control for aggregate time trends and macroeconomic conditions.

[22] When the share overhang ratio is high, the fraction of the issuer that is sold is small. Therefore, the issuer's incentive to limit underpricing is lower (Bradley and Jordan, 2002; Liu and Ritter, 2011).

more clearly establish the causal role of the primary DL, I exploit cross-sectional variation in underwriter market power. Consistent with market power, top-tier underwriters have a high market share and exhibit high underpricing (Liu and Ritter, 2011). These underwriters have strong bargaining power and can extract larger rents from underpricing. In contrast, underwriters with lower market power are likely to set prices closer to the competitive level, capturing smaller rents from underpricing.

Therefore, if the primary DL reduced underpricing by weakening underwriters' market power, the effect should be stronger for top-tier underwriters. I divide the sample of firms into two groups. The treatment group comprises IPOs managed by the big-three underwriters, including Goldman Sachs, Morgan Stanley, and J.P. Morgan (Ritter, 2024). The control group consists of all other IPOs. Appendix A.2 reports the average costs of going public by major underwriters between 2018 and 2020. The ranking, based on market share of total IPO proceeds, shows that the top three underwriters collectively account for more than 74% of total proceeds, underscoring their dominant position in the IPO market.[23]

Table 3 Panel A presents IPO cost comparisons for big-three and non-big-three underwriters across the pre-primary-DL (2018–2020) and post-primary-DL (2021–2023) periods. Consistent with prior evidence, before the primary DL approval, average underpricing was substantially higher for IPOs managed by the big-three underwriters relative to others (33.01% versus 20.82%). Following the primary DL approval, underpricing for big-three underwriters declined from 33.01% to 23.81%, whereas underpricing for non-big-three

[23] BOA-Merrill and Credit Suisse each account for roughly 7 percent of the market. Expanding the definition to include these two underwriters (the big five) covers more than 88 percent of the market, and I use this broader group as an alternative definition of top-tier underwriters in robustness checks. Each of the underwriters outside of the big five accounts for less than 3 percent of the market.

underwriters remained virtually unchanged.

Table 3 Panel B reports difference-in-differences estimates of the effect of the primary DL on underpricing. The estimates are highly statistically significant, both with and without year fixed effects. With year fixed effects, the big-three underwriters reduced IPO underpricing by 9.16 percentage points, or roughly 28% (9.16/33.01), relative to other underwriters. Consistent with the full sample time-series results, the changes in the underwriting fees charged by the big-three underwriters and non-big-three underwriters are economically small. Because underwriters receive all the gross spreads but may only capture a fraction of the money left on the table from rent-seeking investors, they have less incentive to reduce underwriting fees.[24]

**Insert Table 3 about Here**

The estimated 9.16 percentage-point decline in underpricing for big-three-underwritten IPOs represents a substantial economic magnitude. Using the median proceeds of $273 million among these IPOs in the post-primary-DL period, this reduction translates to approximately $25 million in savings per issuer.[25] Aggregated across all big-three-underwritten IPOs in the post-primary-DL period, with total proceeds of $85.03 billion, the results imply roughly $7.8 billion in aggregate savings that would otherwise have been lost to underpricing. These

[24] Appendix A.3 reports the results analyzing the dynamic treatment effects of the SEC's approval of primary DL using expanding post windows. The results show that the reduction in underpricing costs emerges in the first year following the primary DL approval, although the estimate is not statistically significant due to the limited number of post-period IPOs. As the post window expands to include the second and third years, the estimated effect becomes stronger and statistically significant, suggesting that the competitive pressure from primary DLs intensified over time.

[25] The post-primary DL sample of IPOs underwritten by the big-three investment banks includes 149 issues, with average proceeds of $570.67 million (the median is $273 million).

magnitudes underscore the meaningful impact of the primary DL approval on the cost of going public and suggest that competition from the DL market significantly reduced the rents captured by dominant underwriters.

### *3.4. Changes in IPO costs following secondary DL initiation*

Table 4 reports the changes in IPO costs following the introduction of secondary DLs. Panel A presents time-series results comparing the pre-secondary-DL period (January 2015–January 2018) and the post-secondary-DL period (February 2018–December 2020). Panel B reports the corresponding difference-in-differences estimates. Both sets of results indicate that changes in IPO costs are economically small and statistically insignificant. Since the main purpose of IPOs is to raise capital and secondary DLs prohibit capital raising, the results suggest that the primary DL is more likely to pose a credible threat to the IPO market by reducing the market power of underwriters and incentivizing cost reductions for issuers.

**Insert Table 4 about Here**

### *3.5. Robustness checks*

The key identification assumption of the analysis is that the underpricing costs of the IPO issues managed by the big-three underwriters and non-big-three underwriters would move in tandem without the primary DL approval, i.e., the "parallel trend" assumption. To validate this assumption, I first examine pre-trends by comparing changes in underpricing between big-three and non-big-three underwriters before the primary DL approval. I also conduct placebo tests using issuers unlikely to be affected by the approval as the placebo group.

Table 5 Panel A reports the difference-in-differences results for one- and two-year placebo periods prior to the primary DL approval. In column (1), the post-period is December 2019–November 2020 (one year before approval), and the pre-period is January 2015–November 2019. In column (2), the post-period is December 2018–November 2019 (two years prior), and the pre-period is January 2015–November 2018. The results show no significant differences in underpricing changes between big-three and non-big-three underwriters during either placebo window, consistent with a parallel trend in underpricing before the primary DL approval.

**Insert Table 5 about Here**

The NYSE and NASDAQ both require that firms going public via a DL either have a market valuation of at least $250 million, as determined by an independent third party, or sell at least $100 million of newly issued shares in the listing.[26] Therefore, issuers with valuations below $250 million are less able to pursue a DL and are unlikely to be affected by the primary DL approval. I perform placebo tests using these smaller issuers as the control group. Table 5 Panel B shows no significant effects of primary DL approval on underpricing for this group, providing further support for the parallel trend assumption.

I next address concerns that contemporaneous events may have influenced IPO underpricing. One such event is the COVID-19–related liquidity shock beginning in March 2020; another is the surge in popularity of special purpose acquisition companies (SPACs), which could have introduced additional competitive pressure in the IPO market. To rule out

[26] For the listing requirements at NYSE, see https://www.nyse.com/direct-listings; for the listing requirements at Nasdaq, see https://listingcenter.nasdaq.com/assets/initialguide.pdf.

these possibilities, I conduct placebo tests around the onset of the COVID liquidity shock and the SPAC boom, as shown in Table 5 Panel C. In column (1), the post-period is March–November 2020 (after the COVID shock but before the primary DL approval), and the pre-period is January 2015–February 2020. In column (2), the post-period is January 2020–March 2021 (the SPAC boom), and the pre-period is January 2015–December 2019. The results show no significant changes in IPO underpricing during either period, suggesting that the post-primary-DL decline in underpricing is unlikely to have been driven by these contemporaneous factors. Appendix A.4 further shows that the main findings are robust to controlling for monthly market volatility (VIX) and investor sentiment (Baker and Wurgler, 2006).

Another potential concern is that serial correlation can overstate statistical significance in difference-in-differences regressions (Bertrand, Duflo, and Mullainathan, 2004). The IPO market moves in hot and cold cycles, making IPO underpricing autocorrelated (e.g., Ibbotson and Jaffe, 1975; Ritter, 1984). To address this concern, the specifications are also re-estimated using two-way clustered standard errors by industry and year, following Liu and Ritter (2011). Appendix A.5 shows that the results remain robust.

Table 6 re-estimates the effect of the primary DL on IPO pricing under alternative top-tier underwriter definitions. Panel A uses a big-four classification (Goldman Sachs, Morgan Stanley, J.P. Morgan, and Bank of America Merrill Lynch). Panel B expands the definition to a big-five group by additionally including Credit Suisse. Across both classifications, the interaction coefficients remain statistically significant and economically similar. The results confirm that the main effect is not sensitive to how top-tier underwriters are classified and reinforces the interpretation that primary DLs reduced the pricing power of large underwriters.

**Insert Table 6 about Here**

The preceding analyses show that the approval of primary DLs led to a significant reduction in IPO underpricing, particularly among offerings underwritten by the largest investment banks. The next section examines heterogeneity in the reduction of IPO underpricing following the approval of primary direct listings across different types of issuers. This analysis identifies which issuers benefited most from primary DLs and helps rule out alternative explanations for the observed decline in underpricing. If the approval of primary DLs drove the decrease in underpricing, the effect should be stronger among issuers more capable of going public through a primary DL—such as larger, more mature, VC-backed, and technology firms. In contrast, Gahng, Ritter, and Zhang (2023) find that non-VC-backed and non-technology firms are more likely to go public through SPACs, while Bai, Ma, and Zheng (2025) show that smaller and younger firms tend to use the SPAC route. Therefore, if competition from SPACs explains the decline, the opposite pattern would be expected.

# 4. Heterogeneous Analyses Based on Issuer Characteristics

## *4.1. Issuers that are More Subject vs. Less Subject to Underwriter Market Power*

To better understand the mechanism underlying the main findings, I examine how the effect of the primary DL approval varies across issuer characteristics. Liu and Ritter (2011) posit that underwriters provide differentiated services and have oligopolistic market power, and venture-capitalist-backed (VC-backed) IPOs and technology IPOs are particularly subject to underwriter market power. VCs focus on the market price six months to 1 year after the IPO,

when shares in the company are distributed to limited partners. And the market price is boosted by analyst coverage. Technology companies derive more of their value from growth options, which also receive greater benefits from analyst coverage. Consequently, these issuers are more subject to underwriter market power and are associated with higher IPO underpricing.[27] This subsection examines how VC backing and technology affiliation influence changes in underpricing following the primary DL approval.

Table 7 Panel A reports the costs of VC-backed vs. non-VC-backed IPOs in the pre-primary-DL period and post-primary-DL period. The results show that VC-backed IPOs experienced a large decline in underpricing costs. The post-primary-DL average underpricing is 24.05%, in contrast to 32.83% in the pre-primary-DL period. The underpricing costs of non-VC-backed IPOs did not change significantly.

Table 7 Panel B reports the difference-in-differences estimates. The results show that the underpricing costs for VC-backed issuers declined by 13.22 percentage points relative to non-VC-backed issuers, representing a 40% decrease over the pre-period mean (13.22/32.83). There were no significant effects for underwriting fees. The total costs of VC-backed issuers decreased by 13.38 percentage points relative to non-VC-backed issuers, representing a 34% decrease over the pre-period mean (13.38/39.54).

**Insert Table 7 about Here**

[27] Because VC certification mitigates information asymmetry (e.g., Megginson and Weiss 1991) and technology issuers tend to have strong brand visibility, the DL is also a more viable option for these issuers.

Table 8 Panel A reports the costs of technology vs. non-technology IPOs in the pre-primary-DL period and post-primary-DL period. The definition of technology stocks follows Loughran and Ritter (2004). The underpricing costs for technology IPOs decreased to 25.15% in the post-primary-DL period from 40.48% in the pre-primary-DL period. The underpricing costs of non-technology IPOs did not change significantly.

Table 8 Panel B shows the difference-in-differences estimates. Following the primary DL approval, the underpricing costs of technology issuers decreased by 17.78 percentage points relative to non-technology firms, representing a 44% decrease over their pre-period mean (17.78/40.48). Again, there were no significant effects on underwriting fees. The total costs of technology issuers decreased by 17.77 percentage points relative to non-technology issuers, representing a 38% decrease over the pre-period mean (17.77/46.83). Overall, these findings indicate that the decline in IPO underpricing following the primary DL approval is concentrated among issuers more exposed to underwriter market power.

**Insert Table 8 about Here**

### *4.2. Issuers that are More Able vs. Less Able to Go Public through Primary DLs*

I now turn to the impact of the ability to go public through primary DLs. Larger and more mature companies are less subject to informational frictions, have lower demand for underwriter certification (e.g., Chemmanur and Fulghieri 1994), and therefore likely face a lower underpricing level in the DL market and are more able to go public through a DL. For these companies, the primary DL is more likely to pose a credible threat to the IPO business.

In contrast, smaller and younger firms face higher information asymmetry, making DLs less viable and less effective as a competitive constraint on traditional IPOs.

I first examine heterogeneity by issue size. Larger issuers are defined as those with above-median market valuation. Table 9 Panel A shows that only larger IPOs experienced a decline in underpricing costs: the average underpricing fell from 40.77% in the pre-primary-DL period to 25.95% in the post-primary-DL period. Underpricing for smaller IPOs did not change significantly.

Table 9 Panel B shows the difference-in-differences estimates. The results show that the underpricing costs of larger issuers decreased by 15.12 percentage points relative to smaller issuers, representing a 37% decrease over the pre-period mean (15.12/40.77). There were no significant effects for underwriting fees. The total costs of larger issuers decreased by 15.07 percentage points relative to smaller issuers, representing a 32% decrease over the pre-period mean (15.07/46.96).

**Insert Table 9 about Here**

Next, I examine differences by firm maturity. Firms are classified as mature or young based on whether their age is above or below the sample median. Panel A shows that for mature issuers, the underpricing costs significantly decreased to 20.31% in the post-primary-DL period from 29.11% in the pre-primary-DL period. In contrast, young issuers exhibited no significant change.

Table 10 Panel B shows the difference-in-differences estimates. Following the primary DL approval, underpricing costs for mature issuers decreased by 10.67 percentage points relative

to young issuers, corresponding to a 37% decline from the pre-period mean (10.67/29.11). Underwriting fees remained unchanged. The total costs for mature issuers fell by 10.80 percentage points relative to young issuers, or 30% of their pre-period mean (10.80/35.55). This pattern supports the interpretation that the competitive threat from primary DLs was more credible for larger and more mature firms and indicates that the decline in IPO underpricing following the primary DL approval is stronger among issuers more capable of pursuing a DL.

**Insert Table 10 about Here**

Taken together, the heterogeneous analyses provide consistent evidence that the reduction in IPO underpricing following the SEC's approval of primary DLs was driven by the competitive threat this new mechanism introduced to underwriters with substantial market power. The effects are concentrated among issuers that either rely heavily on services bundled with underwriting or are more capable of credibly pursuing a direct listing. These patterns suggest that primary DLs reshaped the competitive dynamics of the IPO market by constraining dominant underwriters' pricing discretion and enhancing issuers' bargaining power, thereby supporting the interpretation that DL innovations reduced intermediary market power.

## 5. Conclusion

The SEC's 2020 approval of primary direct listings (DLs) provided U.S. issuers with an outside option to go public and raise capital without underwriters. When underwriters hold significant market power in the IPO market, the threat of primary DLs can enhance competition and

incentivize underwriters to lower IPO costs for issuers. Using this event as a quasi-natural experiment within a difference-in-differences framework, this paper finds that IPOs underwritten by the big-three investment banks experienced a 9.16-percentage-point (approximately 28%) decline in underpricing relative to other underwriters following the primary DL approval. This evidence indicates that the approval reduced the market power of dominant underwriters by increasing competitive pressure.

There is considerable issuer-level heterogeneity in the reduction of IPO underpricing, which sheds light on the mechanism through which the introduction of the primary DL market affects IPO pricing. Issuers that are more capable of pursuing a DL and those more exposed to underwriter market power experienced larger declines in underpricing. These results show that both the credibility of the outside option and the degree of underwriter market power are key determinants of underwriters' response to the threat of primary DLs.

In economic terms, the estimated reduction in underpricing corresponds to roughly $25 million in savings for the median issuer and about $7.8 billion in aggregate offering proceeds across all big-three-underwritten IPOs in the post-approval period. These results demonstrate that financial innovations in the going-public market can have first-order effects on issuers' cost of raising capital. When underwriters possess substantial market power, primary DLs promote competition and benefit issuers. The resulting reduction in IPO costs may encourage more firms to go public, helping explain why issuers and venture capitalists supported the development of the primary DL market and why stock exchanges advocated for it. Overall, these findings suggest that DL innovations reduce intermediary market power and enhance efficiency in the going-public process.

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## Table 1

## Summary Statistics

In this table, I present the summary statistics for the IPO sample from 2018 to 2023. The sample includes all IPO issues that are non-utility and non-financial, with an offer price of at least $5.00 per share, raising at least $10 million, and with first-day returns lower than 400%. *Underpricing costs* equal the percentage change from the offer price to the first-day closing price. *Underwriting fees* equal the underwriter spread paid as a percentage of IPO proceeds. *Total costs* equal the sum of underpricing costs and underwriting fees. *Proceeds* are the funds raised by the IPO ($ million). *Firm size* is market capitalization based on the offer price ($ billion). *Firm age* is the difference between the IPO year and the founding year. *Share overhang* is the ratio of retained shares to the public float.

| | *N* | Mean | SD | 10% | 25% | 50% | 75% | 90% |
|---|---|---|---|---|---|---|---|---|
| Underpricing costs (%) | 634 | 24.66 | 40.71 | -12.4 | -0.31 | 14.82 | 41.38 | 70.59 |
| Underwriting fees (%) | 634 | 6.56 | 1.02 | 5.24 | 6.5 | 7 | 7 | 7 |
| Total costs (%) | 634 | 31.22 | 40.65 | -6.17 | 5.92 | 21.31 | 47.19 | 77.22 |
| Proceeds | 634 | 361.73 | 808.91 | 26.12 | 80.5 | 162.94 | 322 | 775.5 |
| Firm size | 634 | 1.61 | 5.57 | 0.09 | 0.22 | 0.52 | 1.1 | 2.61 |
| Firm age | 634 | 14.1 | 17.34 | 4 | 6 | 10 | 15 | 25 |
| Share overhang | 634 | 3.95 | 5.68 | 0 | 1.07 | 2.82 | 4.87 | 7.64 |

## Table 2

## IPO Costs before and after the Primary Direct Listing Approval

This table presents changes in IPO costs following the primary direct listing (DL) approval. Panel A reports the average values of the pre-primary-DL (2018-2020) and post-primary-DL (2021-2023) periods, as well as estimates of the changes between the two periods. Panel B reports the time-series regression results for IPO costs. The sample is defined in Table 1. *Underpricing costs* equal the percentage change from the offer price to the first-day closing price. *Underwriting fees* equal the underwriter spread paid as a percentage of IPO proceeds. *Total costs* equal the sum of underpricing costs and underwriting fees. *Controls* include firm size (measured as the natural log of market capitalization), firm age (measured as the natural log of one plus the difference between the IPO year and the founding year), share overhang (measured as the ratio of retained shares to the public float), a VC-backed dummy, and a big-three-underwriter dummy. The coefficients on the controls and the industry fixed effects are omitted for brevity. Standard errors are clustered at the industry level and shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Pre- and post-comparison: primary DL approval

| | Pre-primary-DL | Post-primary-DL | Difference (post-minus-pre) |
|---|---|---|---|
| | (1) | (2) | (3) |
| Underpricing costs | 27.39*** | 20.98*** | -6.40** |
| | (2.18) | (2.40) | (3.24) |
| Underwriting fees | 6.58*** | 6.53*** | -0.04 |
| | (0.05) | (0.06) | (0.08) |
| Total costs | 33.96*** | 27.51*** | -6.45** |
| | (2.17) | (2.39) | (3.23) |

Panel B: Time-series regression results: primary DL approval

| | Underpricing costs | Underwriting fees | Total costs |
|---|---|---|---|
| | (1) | (2) | (3) |
| Post | -5.35** | -0.05 | -5.40** |
| | (2.55) | (0.07) | (2.55) |
| Industry fixed effects | Y | Y | Y |
| Controls | Y | Y | Y |
| Cluster by industry | Y | Y | Y |
| *N* | 634 | 634 | 634 |
| $R^2$ | 0.11 | 0.46 | 0.11 |

## Table 3

## IPO Costs by Big-Three vs. Non-Big-Three Underwriters

This table presents changes in IPO costs following the primary direct listing (DL) approval by big-three vs. non-big-three underwriters. The big-three underwriters include Goldman Sachs, Morgan Stanley, and J.P. Morgan. Panel A reports the average value of the pre-primary-DL (2018-2020) and post-primary-DL (2021-2023) periods, as well as estimates of the changes between the two periods. Panel B reports the difference-in-differences regression results for IPO costs. The sample is defined in Table 1. *Underpricing costs* equal the percentage change from the offer price to the first-day closing price. *Underwriting fees* equal the underwriter spread paid as a percentage of IPO proceeds. *Total costs* equal the sum of underpricing costs and underwriting fees. *Controls* include firm size (measured as the natural log of market capitalization), firm age (measured as the natural log of one plus the difference between the IPO year and the founding year), share overhang (measured as the ratio of retained shares to the public float), and a VC-backed dummy. The coefficients on the controls, industry fixed effects, year fixed effects, big-three-underwriter dummy, and Post dummy are omitted for brevity. Standard errors are clustered at the industry level and shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Pre- and post-comparison by big-three vs. non-big-three underwriters

| | Pre-primary-DL<br>(1) | Post-primary-DL<br>(2) | Difference (post-minus-pre)<br>(3) |
|---|---|---|---|
| Underpricing costs | 33.01*** | 23.81*** | -9.20** |
| (big-three) | (3.02) | (2.69) | (4.04) |
| Underpricing costs | 20.82*** | 17.49*** | -3.33 |
| (non-big-three) | (3.07) | (4.19) | (5.19) |
| Underwriting fees | 6.43*** | 6.22*** | -0.21* |
| (big-three) | (0.08) | (0.09) | (0.09) |
| Underwriting fees | 6.75*** | 6.92*** | 0.16* |
| (non-big-three) | (0.07) | (0.07) | (0.10) |
| Total costs | 39.44*** | 30.04*** | -9.40** |
| (big-three) | (3.02) | (2.69) | (4.04) |
| Total costs | 27.57*** | 24.41*** | -3.16 |
| (non-big-three) | (3.06) | (4.18) | (5.18) |

Panel B: Difference-in-differences regression results: big-three underwriters

| | Underpricing costs | | Underwriting fees | | Total costs | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Big-three underwriters ×Post | -9.63** | -9.16** | -0.18* | -0.19* | -9.81** | -9.35** |
| | (4.30) | (4.28) | (0.10) | (0.09) | (4.34) | (4.33) |
| Year fixed effects | N | Y | N | Y | N | Y |
| Industry fixed effects | Y | Y | Y | Y | Y | Y |
| Controls | Y | Y | Y | Y | Y | Y |
| Cluster by industry | Y | Y | Y | Y | Y | Y |
| *N* | 634 | 634 | 634 | 634 | 634 | 634 |
| $R^2$ | 0.12 | 0.14 | 0.47 | 0.47 | 0.11 | 0.14 |

## Table 4

## Changes in IPO Costs Following the Secondary Direct Listing Approval

This table presents changes in IPO costs following the approval of the secondary direct listing (DL). Panel A reports the time-series regression results for IPO costs. The pre-secondary-DL period is from January 2015 to January 2018; the post-secondary-DL period is from February 2018 to November 2020. Panel B reports the difference-in-differences regression results for IPO costs. The big-three underwriters include Goldman Sachs, Morgan Stanley, and J.P. Morgan. The sample is defined in Table 1. *Underpricing costs* equal the percentage change from the offer price to the first-day closing price. *Underwriting fees* equal the underwriter spread paid as a percentage of IPO proceeds. *Total costs* equal the sum of underpricing costs and underwriting fees. *Controls* include firm size (measured as the natural log of market capitalization), firm age (measured as the natural log of one plus the difference between the IPO year and the founding year), share overhang (measured as the ratio of retained shares to the public float), and a VC-backed dummy. The coefficients on the controls, industry fixed effects, year fixed effects, big-three-underwriter dummy, and Post dummy are omitted for brevity. Standard errors are clustered at the industry level and shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Time-series regression results: secondary DL approval

| | Underpricing costs | Underwriting fees | Total costs |
|---|---|---|---|
| | (1) | (2) | (3) |
| Post | 3.78 | 0.05 | 3.82 |
| | (3.32) | (0.05) | (3.36) |
| Industry fixed effects | Y | Y | Y |
| Controls | Y | Y | Y |
| Cluster by industry | Y | Y | Y |
| *N* | 578 | 578 | 578 |
| $R^2$ | 0.17 | 0.50 | 0.16 |

Panel B: Difference-in-differences regression results: secondary DL approval

| | Underpricing costs | | Underwriting fees | | Total costs | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Big-three underwriters ×Post | -4.08 | -3.75 | 0.05 | 0.07 | -4.03 | -3.68 |
| | (4.33) | (4.20) | (0.09) | (0.09) | (4.35) | (4.21) |
| Year fixed effects | N | Y | N | Y | N | Y |
| Industry fixed effects | Y | Y | Y | Y | Y | Y |
| Controls | Y | Y | Y | Y | Y | Y |
| Cluster by industry | Y | Y | Y | Y | Y | Y |
| *N* | 578 | 578 | 578 | 578 | 578 | 578 |
| $R^2$ | 0.17 | 0.19 | 0.50 | 0.51 | 0.16 | 0.18 |

## Table 5

## Robustness Checks: Pre-Trend Analysis and Placebo Tests

This table reports the results of the pre-trend analysis and placebo tests. Panel A presents the pre-trend analysis. In column (1), the post-period is from December 2019 to November 2020 (one year before primary DL approval); the pre-period is from January 2015 to November 2019. In column (2), the post-period is from December 2018 to November 2019 (two years before primary DL approval); the pre-period is from January 2015 to November 2018. Panel B reports the results of the placebo tests using the subset of issuers with market valuations of less than $250 million. Panel C reports the results of the placebo tests around contemporaneous events, including the SPAC boom period and the Covid period. In column (1), the post-period is from January 2020 to March 2021 (SPAC boom period); the pre-period is from January 2015 to December 2019. In column (2), the post-period is from March 2020 to November 2020 (after the Covid hit and before the primary DL approval); the pre-period is from January 2015 to February 2020. The big-three underwriters include Goldman Sachs, Morgan Stanley, and J.P. Morgan. *Underpricing costs* equal the percentage change from the offer price to the first-day closing price. *Underwriting fees* equal the underwriter spread paid as a percentage of IPO proceeds. *Total costs* equal the sum of underpricing costs and underwriting fees. *Controls* include firm size (measured as the natural log of market capitalization), firm age (measured as the natural log of one plus the difference between the IPO year and the founding year), share overhang (measured as the ratio of retained shares to the public float), and a VC-backed dummy. The coefficients on the controls, industry fixed effects, big-three-underwriter dummy, and Post dummy are omitted for brevity. Standard errors are clustered at the industry level and shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Pre-trend analysis

Dependent variable: underpricing costs

| | Post period: December 2019 – November 2020 (one year before primary DL approval) | Post period: December 2018 – November 2019 (two years before primary DL approval) |
|---|---|---|
| | (1) | (2) |
| Big-three underwriters ×Post | -0.12 | 3.58 |
| | (3.94) | (4.89) |
| Industry fixed effects | Y | Y |
| Controls | Y | Y |
| Cluster by industry | Y | Y |

| | | |
|---|---|---|
| *N* | 578 | 436 |
| $R^2$ | 0.19 | 0.16 |

Panel B: Placebo tests using the subset of issuers with market valuations of less than $250 million

Dependent variable: underpricing costs

| | Post period: January 2020 – December 2023 | |
|---|---|---|
| | (1) | (2) |
| Big-three underwriters ×Post | 3.71 | 3.66 |
| | (14.30) | (15.40) |
| Year fixed effects | N | Y |
| Industry fixed effects | Y | Y |
| Controls | Y | Y |
| Cluster by industry | Y | Y |
| *N* | 160 | 160 |
| $R^2$ | 0.08 | 0.08 |

Panel C: Placebo tests around Covid period and SPAC boom period

Dependent variable: underpricing costs

| | Post period: March 2020 – November 2020 (Covid period before primary DL approval) | Post period: January 2020 – March 2021 (SPAC boom period) |
|---|---|---|
| | (1) | (2) |
| Big-three underwriters ×Post | 4.58 | 3.84 |
| | (4.99) | (5.93) |
| Industry fixed effects | Y | Y |
| Controls | Y | Y |
| Cluster by industry | Y | Y |
| *N* | 578 | 658 |
| $R^2$ | 0.17 | 0.19 |

## Table 6

## Robustness Checks: Alternative Definitions of Top-Tier Underwriters

This table presents difference-in-differences regression results for IPO costs using alternative definitions of top-tier underwriters. Panel A reports the results for changes in IPO costs by big-four vs. non-big-four underwriters. The big-four underwriters include Goldman Sachs, Morgan Stanley, J.P. Morgan, and BOA-Merrill. Panel B reports the results for changes in IPO costs by big-five vs. non-big-five underwriters. The big-five underwriters include Goldman Sachs, Morgan Stanley, J.P. Morgan, BOA-Merrill, and Credit Suisse. The sample is defined in Table 1. *Underpricing costs* equal the percentage change from the offer price to the first-day closing price. *Underwriting fees* equal the underwriter spread paid as a percentage of IPO proceeds. *Total costs* equal the sum of underpricing costs and underwriting fees. *Controls* include firm size (measured as the natural log of market capitalization), firm age (measured as the natural log of one plus the difference between the IPO year and the founding year), share overhang (measured as the ratio of retained shares to the public float), and a VC-backed dummy. The coefficients on the controls, industry fixed effects, year fixed effects, big-four-underwriter (big-five-underwriter) dummy, and Post dummy are omitted for brevity. Standard errors are clustered at the industry level and shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Difference-in-differences regression results: big-four underwriters

| | Underpricing costs | | Underwriting fees | | Total costs | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Big-four underwriters ×Post | -11.19** | -9.04** | -0.07 | -0.07 | -11.06*** | -9.11** |
| | (4.34) | (4.35) | (0.11) | (0.08) | (4.29) | (4.33) |
| Year fixed effects | N | Y | N | Y | N | Y |
| Industry fixed effects | Y | Y | Y | Y | Y | Y |
| Controls | Y | Y | Y | Y | Y | Y |
| Cluster by industry | Y | Y | Y | Y | Y | Y |
| *N* | 634 | 634 | 634 | 634 | 634 | 634 |
| $R^2$ | 0.12 | 0.14 | 0.47 | 0.47 | 0.11 | 0.14 |

Panel B: Difference-in-differences regression results: big-five underwriters

| | Underpricing costs | | Underwriting fees | | Total costs | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Big-five underwriters ×Post | -11.97*** | -10.04** | -0.08 | -0.08 | -12.04*** | -10.12** |
| | (4.16) | (4.40) | (0.10) | (0.08) | (4.13) | (4.39) |
| Year fixed effects | N | Y | N | Y | N | Y |
| Industry fixed effects | Y | Y | Y | Y | Y | Y |
| Controls | Y | Y | Y | Y | Y | Y |
| Cluster by industry | Y | Y | Y | Y | Y | Y |
| *N* | 634 | 634 | 634 | 634 | 634 | 634 |
| $R^2$ | 0.12 | 0.14 | 0.47 | 0.47 | 0.11 | 0.14 |

## Table 7

## Heterogeneity Analyses: VC-Backed vs. Non-VC-Backed Issuers

This table presents changes in IPO costs following the primary direct listing (DL) approval by VC-backed vs. non-VC-backed issuers. Panel A reports the average values of the pre-primary-DL (2018-2020) and post-primary-DL (2021-2023) periods, as well as estimates of the changes between the two periods. Panel B reports the difference-in-differences regression results for IPO costs. The sample is defined in Table 1. *Underpricing costs* equal the percentage change from the offer price to the first-day closing price. *Underwriting fees* equal the underwriter spread paid as a percentage of IPO proceeds. *Total costs* equal the sum of underpricing costs and underwriting fees. *Controls* include issue size (measured as the natural log of proceeds) and share overhang (measured as the ratio of retained shares to the public float). The coefficients on the controls, industry fixed effects, year fixed effects, VC-backed issuers dummy, and Post dummy are omitted for brevity. Standard errors are clustered at the industry level and shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Pre- and post-comparison by VC-backed vs. non-VC-backed issuers

| | Pre-primary-DL<br>(1) | Post-primary-DL<br>(2) | Difference (post-minus-pre)<br>(3) |
|---|---|---|---|
| Underpricing costs | 32.83*** | 24.05*** | -8.78** |
| (VC-backed) | (2.68) | (3.18) | (4.16) |
| Underpricing costs | 13.76*** | 16.51*** | 2.75 |
| (non-VC-backed) | (3.28) | (3.61) | (4.88) |
| Underwriting fees | 6.70*** | 6.58*** | -0.13 |
| (VC-backed) | (0.06) | (0.08) | (0.10) |
| Underwriting fees | 6.26*** | 6.47*** | 0.21 |
| (non-VC-backed) | (0.12) | (0.10) | (0.16) |
| Total costs | 39.54*** | 30.63*** | -8.90** |
| (VC-backed) | (2.68) | (3.17) | (4.15) |
| Total costs | 20.03*** | 22.98*** | 2.95 |
| (non-VC-backed) | (3.26) | (3.60) | (4.86) |

| Panel B: Difference-in-differences regression results: VC-backed vs. non-VC-backed issuers | | | | | | |
|---|---|---|---|---|---|---|
| | Underpricing costs | | Underwriting fees | | Total costs | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| VC-backed issuers | -14.03** | -13.22** | -0.16 | -0.16 | -14.19** | -13.38** |
| ×Post | (5.85) | (5.91) | (0.12) | (0.14) | (5.92) | (6.00) |
| Year fixed effects | N | Y | N | Y | N | Y |
| Industry fixed effects | Y | Y | Y | Y | Y | Y |
| Controls | Y | Y | Y | Y | Y | Y |
| Cluster by industry | Y | Y | Y | Y | Y | Y |
| *N* | 634 | 634 | 634 | 634 | 634 | 634 |
| $R^2$ | 0.12 | 0.14 | 0.46 | 0.47 | 0.12 | 0.14 |

## Table 8

## Heterogeneity Analyses: Technology vs. Non-Technology Issuers

This table presents changes in IPO costs following the primary direct listing (DL) approval by technology vs. non-technology issuers. The definition of technology stocks follows Loughran and Ritter (2004). Panel A reports the average values of the pre-primary-DL (2018-2020) and post-primary-DL (2021-2023) periods, as well as estimates of the changes between the two periods. Panel B reports the difference-in-differences regression results for IPO costs. The sample is defined in Table 1. *Underpricing costs* equal the percentage change from the offer price to the first-day closing price. *Underwriting fees* equal the underwriter spread paid as a percentage of IPO proceeds. *Total costs* equal the sum of underpricing costs and underwriting fees. *Controls* include issue size (measured as the natural log of proceeds) and share overhang (measured as the ratio of retained shares to the public float). The coefficients on the controls, industry fixed effects, year fixed effects, technology issuers dummy, and Post dummy are omitted for brevity. Standard errors are clustered at the industry level and shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

| Panel A: Pre- and post-comparison by technology vs. non-technology issuers | | | |
|---|---|---|---|
| | Pre-primary-DL<br>(1) | Post-primary-DL<br>(2) | Difference (post-minus-pre)<br>(3) |
| Underpricing costs | 40.48*** | 25.15*** | -15.33*** |
| (technology) | (4.37) | (3.53) | (5.62) |
| Underpricing costs | 21.86*** | 19.03*** | -2.83 |
| (non-technology) | (2.41) | (3.09) | (3.92) |
| Underwriting fees | 6.34*** | 6.19*** | -0.15 |
| (technology) | (0.12) | (0.11) | (0.17) |
| Underwriting fees | 6.68*** | 6.70*** | 0.02 |
| (non-technology) | (0.05) | (0.07) | (0.09) |
| Total costs | 46.83*** | 31.35*** | -15.48*** |
| (technology) | (4.38) | (3.57) | (5.65) |
| Total costs | 28.54*** | 25.72*** | -2.81 |
| (non-technology) | (2.40) | (3.08) | (3.91) |

Panel B: Difference-in-differences regression results: technology vs. non-technology issuers

| | Underpricing costs | | Underwriting fees | | Total costs | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Technology issuers | -17.89*** | -17.78*** | 0.02 | 0.01 | -17.87*** | -17.77*** |
| ×Post | (5.52) | (5.27) | (0.10) | (0.10) | (5.45) | (5.20) |
| Year fixed effects | N | Y | N | Y | N | Y |
| Industry fixed effects | Y | Y | Y | Y | Y | Y |
| Controls | Y | Y | Y | Y | Y | Y |
| Cluster by industry | Y | Y | Y | Y | Y | Y |
| *N* | 634 | 634 | 634 | 634 | 634 | 634 |
| $R^2$ | 0.12 | 0.15 | 0.46 | 0.47 | 0.12 | 0.15 |

## Table 9

## Heterogeneity Analyses: Larger vs. Smaller Issuers

This table presents changes in IPO costs following the primary direct listing (DL) approval by larger vs. smaller issuers. Larger issuers are defined as companies that have an above-median market cap. Panel A reports the average values of the pre-primary-DL (2018-2020) and post-primary-DL (2021-2023) periods, as well as estimates of the changes between the two periods. Panel B reports the difference-in-differences regression results for IPO costs. The sample is defined in Table 1. *Underpricing costs* equal the percentage change from the offer price to the first-day closing price. *Underwriting fees* equal the underwriter spread paid as a percentage of IPO proceeds. *Total costs* equal the sum of underpricing costs and underwriting fees. *Controls* include issue size (measured as the natural log of proceeds) and share overhang (measured as the ratio of retained shares to the public float). The coefficients on the controls, industry fixed effects, year fixed effects, larger-issuers dummy, and Post dummy are omitted for brevity. Standard errors are clustered at the industry level and shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

| Panel A: Pre- and post-comparison by larger vs. smaller issuers | | | |
|---|---|---|---|
| | Pre-primary-DL<br>(1) | Post-primary-DL<br>(2) | Difference (post-minus-pre)<br>(3) |
| Underpricing costs | 40.77*** | 25.95*** | -14.82*** |
| (larger) | (3.43) | (2.66) | (4.34) |
| Underpricing costs | 14.71*** | 15.62*** | 0.91 |
| (smaller) | (2.38) | (4.03) | (4.68) |
| Underwriting fees | 6.19*** | 6.19*** | 0.00 |
| (larger) | (0.09) | (0.09) | (0.13) |
| Underwriting fees | 6.95*** | 6.90*** | -0.05 |
| (smaller) | (0.04) | (0.07) | (0.08) |
| Total costs | 46.96*** | 32.14*** | -14.81*** |
| (larger) | (3.45) | (2.65) | (4.35) |
| Total costs | 21.66*** | 22.52*** | 0.86 |
| (smaller) | (2.37) | (4.03) | (4.67) |

Panel B: Difference-in-differences regression results: larger vs. smaller issuers

| | Underpricing costs | | Underwriting fees | | Total costs | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Larger issuers | -17.38*** | -15.12** | 0.07 | 0.05 | -17.31*** | -15.07** |
| ×Post | (5.76) | (6.11) | (0.09) | (0.10) | (5.78) | (6.15) |
| Year fixed effects | N | Y | N | Y | N | Y |
| Industry fixed effects | Y | Y | Y | Y | Y | Y |
| Controls | Y | Y | Y | Y | Y | Y |
| Cluster by industry | Y | Y | Y | Y | Y | Y |
| *N* | 634 | 634 | 634 | 634 | 634 | 634 |
| $R^2$ | 0.14 | 0.16 | 0.47 | 0.48 | 0.14 | 0.16 |

## Table 10

## Heterogeneity Analyses: Mature vs. Young Issuers

This table presents changes in IPO costs following the primary direct listing (DL) approval by mature vs. young issuers. Mature issuers are defined as those that have above-median age. Panel A reports the average values of the pre-primary-DL (2018-2020) and post-primary-DL (2021-2023) periods, as well as estimates of the changes between the two periods. Panel B reports the difference-in-differences regression results for IPO costs. The sample is defined in Table 1. *Underpricing costs* equal the percentage change from the offer price to the first-day closing price. *Underwriting fees* equal the underwriter spread paid as a percentage of IPO proceeds. *Total costs* equal the sum of underpricing costs and underwriting fees. *Controls* include issue size (measured as the natural log of proceeds) and share overhang (measured as the ratio of retained shares to the public float). The coefficients on the controls, industry fixed effects, year fixed effects, mature-issuers dummy, and Post dummy are omitted for brevity. Standard errors are clustered at the industry level and shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

| Panel A: Pre- and post-comparison by mature vs. young issuers | | | |
|---|---|---|---|
| | Pre-primary-DL<br>(1) | Post-primary-DL<br>(2) | Difference (post-minus-pre)<br>(3) |
| Underpricing costs | 29.11*** | 20.31*** | -8.80** |
| (mature) | (3.09) | (2.77) | (4.15) |
| Underpricing costs | 25.81*** | 21.81*** | -4.03 |
| (young) | (3.06) | (4.13) | (5.14) |
| Underwriting fees | 6.44*** | 6.30*** | -0.14 |
| (mature) | (0.08) | (0.09) | (0.12) |
| Underwriting fees | 6.70*** | 6.83*** | 0.12 |
| (young) | (0.07) | (0.08) | (0.11) |
| Total costs | 35.55*** | 26.61*** | -8.95** |
| (mature) | (3.10) | (2.77) | (4.16) |
| Total costs | 32.54*** | 28.63*** | -3.91 |
| (young) | (3.04) | (4.11) | (5.12) |

Panel B: Difference-in-differences regression results: mature vs. young issuers

| | Underpricing costs | | Underwriting fees | | Total costs | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Mature issuers | -10.57** | -10.67** | -0.12* | -0.13* | -10.69** | -10.80** |
| ×Post | (4.52) | (4.90) | (0.06) | (0.07) | (4.50) | (4.88) |
| Year fixed effects | N | Y | N | Y | N | Y |
| Industry fixed effects | Y | Y | Y | Y | Y | Y |
| Controls | Y | Y | Y | Y | Y | Y |
| Cluster by industry | Y | Y | Y | Y | Y | Y |
| *N* | 634 | 634 | 634 | 634 | 634 | 634 |
| $R^2$ | 0.12 | 0.14 | 0.47 | 0.47 | 0.11 | 0.14 |

## Appendix Table A.1

## U.S. Direct Listing Firms (2018 through 2023)

This table presents information on U.S. direct listing firms from 2018 through 2023. Market capitalization is calculated using the opening price on the first trading day. Information on private-market funding before the DL is obtained from https://www.crunchbase.com/.

| Name | Ticker | Listing Exchange | Listing Date | Market Cap ($ Billion) | Founding Year | Main Business | Private Market Funding Rounds |
|---|---|---|---|---|---|---|---|
| Spotify | SPOT | NYSE | 20180403 | 29.36 | 2006 | Music streaming platform | 17 |
| Slack | WORK | NYSE | 20190620 | 4.56 | 2009 | Team communication platform | 13 |
| Asana | ASAN | NYSE | 20200930 | 4.16 | 2008 | Team communication platform | 12 |
| Palantir | PLTR | NYSE | 20200930 | 23.86 | 2003 | Software for big data analytics | 31 |
| Roblox | RBLX | NYSE | 20210310 | 41.90 | 2004 | Online gaming platform | 10 |
| Squarespace | SQSP | NYSE | 20210519 | 6.50 | 2003 | Website building and hosting | 4 |
| ZipRecruiter | ZIP | NYSE | 20210526 | 2.65 | 2010 | Online employment marketplace | 3 |
| Warby Parker | WRBY | NYSE | 20210929 | 6.65 | 2010 | Eyewear retailer | 9 |
| Surf Air | SRFM | NYSE | 20230727 | 0.25 | 2012 | Aviation and air travel | 16 |
| Watford | WTRE | NASDAQ | 20190328 | 0.57 | 2014 | Property and casualty insurance | - |
| Thryv | THRY | NASDAQ | 20201001 | 0.43 | 2013 | Marketing automation software | - |
| Coinbase | COIN | NASDAQ | 20210414 | 99.81 | 2012 | Cryptocurrency exchange platform | 16 |
| Amplitude | AMPL | NASDAQ | 20210928 | 6.48 | 2012 | Product analytics | 12 |
| Bright Green | BGXX | NASDAQ | 20220517 | 2.51 | 2019 | Cannabis producer | 1 |
| Courtside | PODC | NASDAQ | 20230908 | 0.09 | 2010 | Podcast platform | 1 |
| ReAlpha Tech | AIRE | NASDAQ | 20231023 | 0.98 | 2020 | Real estate platform | 4 |

## Appendix Table A.2

## Average Costs of Going Public by Underwriter

This table reports the average costs of going public by underwriter from 2018 to 2020. The ranking is based on the market share of total IPO proceeds. The big-three underwriters dominate IPO activity, accounting for over 74% of total proceeds. The sample includes all IPO issues that are non-utility and non-financial, with an offer price of at least $5.00 per share, raising at least $10 million, and with first-day returns lower than 400%. *Underpricing costs* equal the percentage change from the offer price to the first-day closing price. *Underwriting fees* equal the underwriter spread paid as a percentage of IPO proceeds. *Total costs* equal the sum of underpricing costs and underwriting fees.

| Ranking | Underwriter | Total Proceeds | Market Share | # of IPOs | Average Proceeds | Underpricing Costs (%) | Underwriting Fee (%) | Total Costs (%) |
|---|---|---|---|---|---|---|---|---|
| 1 | Morgan Stanley | 40,389 | 30.99% | 72 | 561.08 | 30.55 | 6.36 | 36.91 |
| 2 | Goldman Sachs | 37,793 | 29.00% | 66 | 572.62 | 33.08 | 6.27 | 39.35 |
| 3 | J.P. Morgan | 18,680 | 14.33% | 58 | 322.07 | 35.99 | 6.71 | 42.70 |
| 4 | BOA-Merrill | 9,582 | 7.35% | 36 | 266.17 | 28.05 | 6.65 | 34.70 |
| 5 | Credit Suisse | 9,123 | 7.00% | 19 | 480.15 | 20.53 | 6.07 | 26.59 |
| 6 | Barclays | 3,902 | 2.99% | 6 | 650.26 | 19.12 | 5.83 | 24.95 |
| 7 | Jefferies | 2,908 | 2.23% | 24 | 121.17 | 21.27 | 6.80 | 28.07 |
| 8 | Citigroup | 2,328 | 1.79% | 16 | 145.49 | 11.26 | 7.06 | 18.32 |
| | Others | 5,636 | 4.32% | 67 | 84.12 | 19.29 | 6.99 | 26.28 |

## Appendix Table A.3

## Robustness Checks: Dynamic Treatment Effects of Primary DL

This table reports the results of the dynamic treatment effects of the primary DL using different post periods. Columns (1)–(6) expand the post period from 6 months to 36 months following the primary DL approval in December 2020. The big-three underwriters include Goldman Sachs, Morgan Stanley, and J.P. Morgan. *Underpricing costs* equal the percentage change from the offer price to the first-day closing price. *Underwriting fees* equal the underwriter spread paid as a percentage of IPO proceeds. *Total costs* equal the sum of underpricing costs and underwriting fees. *Controls* include firm size (measured as the natural log of market capitalization), firm age (measured as the natural log of one plus the difference between the IPO year and the founding year), share overhang (measured as the ratio of retained shares to the public float), and a VC-backed dummy. The coefficients on the controls, industry fixed effects, big-three-underwriter dummy, and Post dummy are omitted for brevity. Standard errors are clustered at the industry level and shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

| Dependent variable: underpricing costs | | | | | | |
|---|---|---|---|---|---|---|
| | Post period | | | | | |
| | 6 months | 12 months | 18 months | 24 months | 30 months | 36 months |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Big-three underwriters ×Post | -6.45 | -7.94 | -7.48 | -9.92* | -9.58** | -9.63** |
| | (7.78) | (5.93) | (5.30) | (5.45) | (4.50) | (4.30) |
| Industry fixed effects | Y | Y | Y | Y | Y | Y |
| Controls | Y | Y | Y | Y | Y | Y |
| Cluster by industry | Y | Y | Y | Y | Y | Y |
| *N* | 474 | 584 | 596 | 606 | 623 | 634 |
| $R^2$ | 0.13 | 0.12 | 0.12 | 0.11 | 0.11 | 0.12 |

## Appendix Table A.4

## Robustness Checks: Market Volatility and Investor Sentiment

This table reports the results of robustness checks for the main analyses after controlling for monthly market volatility (VIX) and investor sentiment (Baker and Wurgler, 2006). Column (1) presents the results controlling for monthly VIX. Column (2) presents the results controlling for monthly investor sentiment. Column (3) presents the results controlling for monthly VIX and investor sentiment simultaneously. The big-three underwriters include Goldman Sachs, Morgan Stanley, and J.P. Morgan. *Underpricing costs* equal the percentage change from the offer price to the first-day closing price. *Underwriting fees* equal the underwriter spread paid as a percentage of IPO proceeds. *Total costs* equal the sum of underpricing costs and underwriting fees. *Controls* include firm size (measured as the natural log of market capitalization), firm age (measured as the natural log of one plus the difference between the IPO year and the founding year), share overhang (measured as the ratio of retained shares to the public float), and a VC-backed dummy. The coefficients on the controls, year fixed effects, industry fixed effects, big-three-underwriter dummy, and Post dummy are omitted for brevity. Standard errors are clustered at the industry level and shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

| Dependent variable: underpricing costs | | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| Big-three underwriters ×Post | -9.20** | -9.32** | -9.36** |
| | (4.28) | (4.09) | (4.09) |
| VIX | -0.49 | - | -0.49 |
| | (0.44) | | (0.44) |
| Investor sentiment | - | -2.54 | -2.52 |
| | | (3.79) | (3.87) |
| Year fixed effects | Y | Y | Y |
| Industry fixed effects | Y | Y | Y |
| Controls | Y | Y | Y |
| Cluster by industry | Y | Y | Y |
| *N* | 634 | 634 | 634 |
| $R^2$ | 0.14 | 0.14 | 0.14 |

## Appendix Table A.5

## Robustness Checks: Two-Way Clustered Standard Errors

This table reports the results of robustness checks for the main analyses after clustering the standard errors by both industry and year. Column (1) presents the results controlling for monthly VIX. Column (2) presents the results controlling for monthly investor sentiment. Column (3) presents the results controlling for monthly VIX and investor sentiment simultaneously. The big-three underwriters include Goldman Sachs, Morgan Stanley, and J.P. Morgan. *Underpricing costs* equal the percentage change from the offer price to the first-day closing price. *Underwriting fees* equal the underwriter spread paid as a percentage of IPO proceeds. *Total costs* equal the sum of underpricing costs and underwriting fees. *Controls* include firm size (measured as the natural log of market capitalization), firm age (measured as the natural log of one plus the difference between the IPO year and the founding year), share overhang (measured as the ratio of retained shares to the public float), and a VC-backed dummy. The coefficients on the controls, year fixed effects, industry fixed effects, big-three-underwriter dummy, and Post dummy are omitted for brevity. Standard errors are two-way clustered by industry and year and shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

| Dependent variable: underpricing costs | | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| Big-three underwriters ×Post | -9.20*** | -9.32*** | -9.36*** |
| | (2.96) | (2.59) | (2.51) |
| VIX | -0.49 | - | -0.49 |
| | (0.94) | | (0.95) |
| Investor sentiment | - | -2.54 | -2.52 |
| | | (2.34) | (2.28) |
| Year fixed effects | Y | Y | Y |
| Industry fixed effects | Y | Y | Y |
| Controls | Y | Y | Y |
| Cluster by industry and year | Y | Y | Y |
| *N* | 634 | 634 | 634 |
| $R^2$ | 0.14 | 0.14 | 0.14 |