

Does Direct Listing Mechanism Reduce Underpricing?

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Abstract

This paper focuses on direct listing, a newly introduced listing mechanism, and compares the difference between direct listing and IPO in terms of their representative influence on underpricing with empirical study. The result shows that direct listing does help to reduce underpricing. Furthermore, the paper looks into the reason for this difference and comes to the conclusion that the companies' industry sector is the key factor correlating listing mechanism and underpricing

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1 Introduction

On April 3, 2018, Spotify Technology S.A., or commonly known as Spotify, the famous Swedish audio streaming company providing media services worldwide, went public on New York Stock Exchange (NYSE). The deal triggered vast discussion among investors, investment bankers and scholars, not only because Spotify was one of the most prestigious “Unicorn” company, which refers to a privately held startup company valued at over \$1 billion, but also because the listing’s non-traditional approach of direct listing. Following the example of Spotify, Slack Technologies, Inc. (Slack), another technology unicorn, went public on NYSE through direct listing on June 20, 2019. Both Spotify and Slack are well-known startups even before listing, thus their unconventional choice on listing approach leads to academic reviews on direct listing, an innovative tool in equity capital market.

Direct listing is a methodology for companies to go listed. Though it has been around for some time, it wasn’t noticed by the majority of investors and academia until famous “Unicorns” reexplore its value. For example, in U.K., on both U.K. main market and AIM (LSE market for small and medium size growth companies), there has been direct listing, though known as “introduction” on contrary to IPO. However, as book building is gaining more popularity, direct listing is forgotten and lost until recent years. But what exactly are the difference between direct listing and IPO, and why would Spotify choose former over latter?

Direct listing differs from traditional IPO in many aspects, but there are two fundamental ones: no new shares issued and no underwriters involved. Though the first applies to all companies that are already direct listed, we may witness the change in a short future with SEC’s approval of a rule allowing issuing new shares on NASDAQ market in December 2020. No underwriters, nevertheless, is probably the more basic differentiator.

The key idea of no underwriters is no book building. As in conventional IPOs, underwriters, who usually are investment banks would decide the price of stocks

issued prior to the D-day. In direct listing, however, price is set not beforehand (though some issuers would set a price range) and is by auction instead.

One of the most common complaints of IPO from the issuer side comes from the characteristics of book building. Not only do issuers pay a large amount of spread, compensation to underwriters, but numberless of study has revealed the phenomenon of underpricing, presented by abnormally high first-day return, for example Ibbotson (1975), Ritter (2020). From the issuing company's perspective, this is clearly not favorable as the company could have raised more capital with the same amount of cost. As a matter of fact, one of the views of the reason why Spotify and Slack went public via atypical direct listing is that it could reduce "money left on the table", a metaphor for IPO underpricing cost. However, with limited study on direct listing, it is unclear that whether direct listing helps equity issuers from the cost perspective.

This thesis will dig further into this question, seeking to find out whether direct listing, as an emerging listing mechanism, could help companies to save money. It will be organized into five sections.

Section 2, literature review, unfolds academic researches on relevant issues, including direct listing, comparison of direct listing and IPO from different aspects.

Section 3 provides with an empirical study on the effectiveness of price discovery with the absence of underwriters in direct listing. Using the data sample of companies went public on London Stock Exchange (LSE) between 2015-2019 and the methodology of measuring true discount proposed by Ma and Tsai (2001), a linear regression model with dummy variable is built and run. The model aims to evaluate the influence of listing mechanism (traditional IPO or direct listing) on stock price discount, a measurement for underpricing. The regression result suggests that the factor of listing mechanism is significant at the significant level of 5%, supporting the argument that different going public mechanisms do impact the pricing of listed companies, and a positive coefficient suggests that companies that choose to go public by direct listing are more likely to experience less

underpricing than those go with conventional IPO.

Section 4 further explores the possible reasons of the difference between underpricing with two listing mechanisms. Using the theory of confounding variable, this sector further examines factors that are considered to be influencing factors of a company's choice on listing mechanism by including more company specific features, and checks their correlation. Then the correlation of company specific features and the level of underpricing is tested with empirical study in order to determine if they can alone impact underpricing. This sector suggests that the industry sector of a company influences its choice of listing mechanism, and in turn influences underpricing.

Section 5 looks into the possible future of this topic, and Section 6 concludes the thesis.

2 Literature Review

2.1 Direct Listing

Though gradually catching interest in academia, direct listing remains as a basically unexploited topic with limited coverage, partially due to the fact that most attention come after Spotify's listing in 2018. A proof is most of these researches are either Spotify case study or expansion analysis based on Spotify case. However, there are still some valuable sources of information.

One of the researchers with constant interest in direct listing is Ritter. On his personal website, he presents recent direct listing on major United States stock markets: NASDAQ and NYSE. Hereby follows his collected data.

Table 1: Recent Direct Listings on Major US Stock Markets¹

Name of IPO (ticker)	Date of Listing	Prices			First-day Return
		Reference	Open	Close	
Spotify Technology (SPOT)	20180403	\$132.00	\$165.90	\$149.01	-10.2%
Watford Holdings (WTRE)	20190328	\$25.26	\$25.26	\$27.00	6.9%
Slack (WORK)	20190620	\$26.00	\$38.50	\$38.62	0.3%
Asana (ASAN)	20200930	\$21.00	\$27.00	\$28.80	6.7%
Palantir Technologies (PLTR)	20200930	\$7.25	\$10.00	\$9.50	-5.0%
Thryv Holdings (THRY)	20201001	\$12.40	\$14.00	\$11.075	-20.9%
Roblox (RBLX)	20210310	\$45.00	\$64.50	\$69.50	7.8%
Coinbase Global (COIN)	20210414	\$250.00	\$381.00	\$328.28	-13.8%
SquareSpace (SQSP)	20210519	\$50.00	\$48.00	\$43.65	-9.1%
ZipRecruiter (ZIP)	20210526	\$18.00	\$20.00	\$21.10	5.5%
Amplitude (AMPL)	20210928	\$35.00	\$50.00	\$54.80	9.6%
Warby Parker (WRBY)	20210929	\$40.00	\$54.11	\$54.49	0.7%

Name of IPO (ticker)	Trading Volume	Prices			(High-Low) ÷ Close, %
		Low	High	Close	
Spotify Technology (SPOT)	30,526,500	\$148.26	\$165.90	\$149.01	11.8%
Watford Holdings Ltd (WTRE)	129,131	\$25.26	\$27.40	\$27.00	7.9%
Slack (WORK)	137,364,188	\$38.25	\$42.00	\$38.62	9.7%
Asana (ASAN)	40,825,910	\$26.75	\$29.96	\$28.80	11.1%
Palantir Technologies (PLTR)	338,584,375	\$9.11	\$11.42	\$9.50	24.3%
Thryv Holdings (THRY)	9,569	\$10.60	\$14.00	\$11.075	30.7%
Roblox (RBLX)	97,069,344	\$60.50	\$74.83	\$69.50	20.6%
Coinbase Global (COIN)	81,065,750	\$310.00	\$429.54	\$328.28	36.4%
SquareSpace (SQSP)	5,471,014	\$42.82	\$50.02	\$43.65	16.5%
ZipRecruiter (ZIP)	16,606,301	\$19.32	\$21.69	\$21.10	11.2%
Amplitude (AMPL)	11,529,531	\$50.00	\$54.90	\$54.80	8.9%
Warby Parker (WRBY)	13,805,076	\$52.96	\$54.74	\$54.49	3.3%

¹ <https://site.warrington.ufl.edu/ritter/files/IPOs-Direct-Listings.pdf>

Table 1 demonstrates the most recent (2018-September 2021) direct listings on major US stock markets (NASDAQ and NYSE), including name and ticker of companies listed, date of listing, reference price, first-day open, close, low and high price, first-day return, trading volume and volatility of first-day price.

Table above illustrates companies that chose to go public by direct listing. The number of them is limited, especially when compared to companies went public on the same markets in the same time period. From the start of 2022 to March alone, there are in total 3,767 companies went IPO on NASDAQ, and 2,529 on NYSE. In conclusion, it is clear that direct listing serves still as a minor approach. That being said, after Spotify being the early pioneer, there are steadily growing number of companies to follow: 1 in 2018, 2 in 2019, 3 in 2020, 6 in 2021. It is a steadily growing figure, even taking into account of the impact of the Covid-19 pandemic. This might be perceived as a positive sign for increasing acknowledgement of direct listing as a functioning option among issuers. Another remarkable trait shown in the table is similarity of listed companies. Most of them can be classified as unicorns according to the definition, e.g., Spotify, Slack, Asana, Palantir. This might be because unicorns have better fit with direct listing, since they don't have capital raising concerns, and are renowned enough to not having underwriter certification or publicity. Non-unicorn companies are as well contained, yet much fewer than unicorn companies. Does that imply direct listing adopts only to unicorn companies and is unattractive to non-unicorn ones?

Zheng (2022) looks deeper into the raised question. Building predictive model based on sample of companies went listed on LSE from 1995, he models the attractiveness of the option of direct listing to different sizes of companies, categorized into late-stage firms and growth firms, and reaches the conclusion that traditional IPO caters to growth firms, while direct listing caters to late-stage firms. The prediction is further supported by data. In LSE, direct listed firms are on average 215% larger in value when compared to IPO firms and yield 36% lower investment rate.

Anand and Johnson (2005) look into direct listing from a different perspective

with a focus on Internet direct listing. By conducting survey, they reach the conclusion that despite some advantages of direct listing and disadvantages of IPO, issuers and investors are more willing to accept IPO due to many hidden edges. From the issuer side, issuers are concerned of the size of both the primary market and secondary market, as there are limited number of investors specifically focusing on Internet stock markets. Another interesting point of view is cost of regulation. They mention that with less familiarity of regulators to the mechanism of direct listing, issuers are likely to go under more prudent due diligence, which could increase information disclosure cost. Asides from those similar to issuers', investors have more reasons for not trusting an Internet direct listing. The major issue is the credibility of issuer. Without the verification of underwriters, it is difficult for individual investors to gather personal information and certificate issuer credibility. The other concern is the pricing mechanism. Worried about the fairness of the auction and lack of carefully suggested price by investment banks, investors are resistant to step into a direct listing.

As we can see, direct listing is gradually becoming a popular research topic in academia. However, relevant coverage is still limited, and is mainly focused on discussion from a legal perspective. Not so many researches do empirical study on direct listing, partly due to limited data accessibility.

2.2 Direct Listing versus IPO

To better deliberate the question raised in introduction, it is essential to first understand how direct listing differs from IPO from various perspectives. This part will discuss the difference of direct listing from mechanism and pricing perspectives.

2.2.1 Mechanism

To begin with, in a traditional IPO, companies usually seek to raise capital by issuing new shares. But in a direct listing, at least at the current stage, no new shares

are issued and all shares that are publicly traded are the existing ones held by company founders, employees and early-stage investors, which often are VC funds and other institutions.

Meanwhile, direct listing doesn't have lock-up period. Usually in traditional IPO, though not mandated to do so, existing shareholders would agree on a lock-up period of up to 180 days, during which they are not allowed to sell, hedge or distribute shares. The design seeks to stabilize stock price after listed and to drive it to the level that is close to the authentic value. Obviously, it doesn't apply to direct listing, since as explained in the first point, all distributed shares in direct listing are those in the hand of existing shareholders.

Another distinctive characteristic of direct listing is disintermediation (Zheng, 2022). Contrary to traditional IPO, where investment banks play the vital role of underwriters, there is theoretically no underwriters in direct listing. Of course, investment banks are still involved with the listing process, but only as financial advisors with no responsibility of book building, pricing and contacting potential buyers.

In direct listing, no price or range of price per share is set previous to the first day of trading, and the shares are sold through auction. This, however, leads to the question of efficiency. Even before the appearance of direct listing, auction method is applied in IPO stock pricing side by book building method. Some researchers argue that Dutch auction IPO is better in terms of price discovery, e.g., Beierlein (2002), yet more believe there's a reason for book building to almost rule out auction, e.g., Anand (2005), Sherman (2001), Sherman and Jagannathan (2006), Ljungqvist, Jenkinson and Wilhelm and (2003). As a matter of fact, according to the data sample of Ljungqvist, Jenkinson and Wilhelm (2003), in 1994, only 46.2% of the non-US IPOs are conducted via book building, yet the ratio raise to 80% in 1999.

Another huge difference between direct listing and IPO is compensation. In a traditional IPO, underwriters are usually compensated with underwriting fee, also

known as spread. In direct listing, however, compensation that goes to investment banks reduces by a lot. Though not clear what the standard spread for direct listing is, we can refer back to Spotify case. Horton (2019) disclosed Spotify's listing fees and clearly pointed out the underwriter fee (other advisors fee) is \$35 million. This figure alone doesn't reveal much, but when compared to other companies of similar size, it is evidently lower than that of traditional IPO. According to PricewaterhouseCoopers (PwC) research, the underwriting fee a large company (company that make an offering in excess of \$300 million) pays is \$37 million on average. For better contrast, Horton gives more examples, including Snap, which is about half of the size of Spotify, pays \$85 million; and Facebook, about three times the size of Spotify, pays \$176 million. Another notable fact is though named as direct listing, Spotify's case is, as a matter of fact, a combination of traditional IPO and direct listing. Unlike a more strictly defined direct listing, in this instance investment banks play not only as financial advisors, but some other roles as well. Even taken this into consideration, Spotify's underwriting fee is still significantly modest.

Ritter also collects data on IPO underpricing and spread with different underwriters. His data illustrates that the more prestigious an underwriter is, the higher the underpricing discount is, which is consistent with the theories of IPO advantages explained earlier. Nevertheless, the spread doesn't differ a lot among different underwriters and sticks around the level of 7%. The data he collects is integrated in the table below.

Table 2: IPO underpricing and spread of underwriters²

No. IPOs	Underwriter	Avg. Underpricing	Avg. Gross Spread	Issuer Net	Market Price	% Discount
110	Goldman Sachs	33.8%	6.6%	\$9.34	\$13.38	30%
117	Morgan Stanley	29.1%	6.7%	\$9.33	\$12.91	28%
97	JP Morgan	22.3%	6.9%	\$9.31	\$12.23	24%

² <https://site.warrington.ufl.edu/ritter/ipo-data/>

42	Jefferies	24.2%	7.0%	\$9.30	\$12.42	25%
50	Merrill Lynch	23.1%	6.9%	\$9.31	\$12.31	24%
15	Piper-Jaffray	16.1%	7.1%	\$9.29	\$11.61	20%
13	Cowen	15.8%	7.0%	\$9.30	\$11.58	20%
19	Barclays	14.7%	6.4%	\$9.36	\$11.47	18%
17	Stifel	10.6%	7.0%	\$9.30	\$11.06	18%
41	Citigroup	9.7%	6.7%	\$9.33	\$10.97	15%

Table 2 includes information of Top 10 underwriters in terms of IPO volume from June 2009 to June 2019. The IPOs in the table are all VC-backed IPOs.

2.2.2 Pricing

2.2.2.1 IPO advantages

The pricing of IPO is one of the most-discussed topics. As mentioned in the introduction, deciding on offer price is one of the biggest issue of going public with underwriter. The process is often referred as book building. A commonly admitted advantage of book building is related to underwriters' capability of allocate stock to investors flexibly. For example, Benveniste and Spindt (1989), Benveniste and Busaba (1997), Sherman (2000) considers the biggest advantage for book building method being allowing exchange of information between underwriters and investors, which improves IPO effectiveness. Sherman (2000) further develops the theory to a longer-term perspective, pointing out that by building stable relationship with investors, investment banks gain the ability to favor regular uninformed investors.

Krigman, Shaw, and Womack (2001), Cliff and Denis (2003), Degeorge, Derrien and Womack (2010) explain book building's popularity from other perspectives. Their researches illustrate that book building would in general increase analyst coverage, especially from highly ranked analysts. They argue that, despite the fact of direct listing being one of the costliest approaches in terms of direct costs to take a company public, it gains popularity among issuers as the costs are compensated with more positive analyst coverage. Not only applying to IPO, when issuers seek to switch lead underwriters, media coverage is as well one of

their most prominent reasons to do so and a measure standard on underwriter performance.

2.2.2.2 IPO underpricing

Despite all discussed advantages of book building, it is an all-the-time debated question if value of the stock is fully discovered by underwriters, as it is empirically proved that there's a common phenomenon of underpricing.

IPO underpricing usually refers to the difference between the offering price and closing price on the first day of trading. Another way of phrasing IPO underpricing is “money left on the table”. Intuitively, from an issuer's perspective, IPO underpricing does no benefit but harm. Companies could have raised more capital or have raised the same amount of capital at lower cost, as what IPO underpricing indicates is the expected price of the issued stock is higher than the offer price. So, one may simply say that by having IPO underpricing, an issuer sells off its stock at discount and transfers value to existing shareholders to other investors.

Some of the earliest researches on IPO underpricing can date back to 1970s. Stoll and Curley (1970) and Ibbotson (1975) both tracked, documented and conducted empirical research, proving the phenomenon of IPO underpricing in United States. Ever after, papers digging into this topic have been produced consistently until today. Ritter (2020) provides a simple visualization of underpricing in the United States from 1980 to 2020, as demonstrated in the table below.

Table 3: IPO underpricing from 1980 to 2020³

Year	Numbers of IPO	Mean first-day return		Aggregate amount left on the table (\$b)
		Equal-weighted	Proceeds-weighted	
1980-1989	2,047	7.2%	6.1%	3.30
1990-1998	3,614	14.8%	13.3%	30.07
1999-2000	856	64.6%	51.6%	66.79

³ <https://site.warrington.ufl.edu/ritter/ipo-data/>

2001-2020	2,258	16.7%	17.2%	101.57
1980-2020	8,775	18.4%	20.1%	201.73

And in fact, IPO underpricing with involvement of book building is considered to be more severe than auction underpricing, as demonstrated by the research of Kaneko and Pettway (2001). As Japan has allowed book building since 1997, while only price-competitive auctions were allowed earlier, it serves as a perfect test field. They study the initial returns of auction and IPO in Japanese OTC market from 1993 to 2001 and reach the conclusion that after controlling ex ante uncertainty variables, i.e., expected issue size, insider sales, underwriter reputation, partial adjustment phenomenon, firm age at the IPO, percent market change, and market volatility prior to the offer date book building, IPOs yield a significantly higher initial return than auctions, specifically in hot markets. They therefore argue that though seemingly gaining popularity, book building IPOs might not be an optimal choice for issuing companies as it “leave money on the table”.

Derrien and Womack (2003) did similar research on French initial listing from 1992 to 1998. Their first step conclusion is that market return in the past few months is a significant ex ante predictor of underpricing. With this in mind, they control for different listing methods, i.e., PG (resembles to book building), OPM (resembles to auction) and fixed price. The result shows that auction methods contain more past and future market information, and thus renders a lower initial return. Both studies suggest that though underpricing is a universal phenomenon, underwriter mechanism seems to aggravate this issue.

Sharpe and Woo (2005) further support their questioning on book building mechanism. Using the data of unseasoned equity market in Australia, they found out that one of the major concerns of issuing companies when deciding listing mechanism is the expected difference of underpricing caused by the choice between direct listing and IPO.

In conclusion, IPO with underwriters is extremely costly, partly due to underpricing and partly due to spread.

2.2.2.3 Theories on underpricing

There are a few theories on why there is IPO underpricing. I conclude them into a few categories: information asymmetry, ownership dispersion and corporate characteristics.

- **Information asymmetry**

Information asymmetry theory attributes IPO underpricing to different positions players are in IPO process. The players in IPO can be roughly categorized into issuers, underwriters who are usually investment banks, and investors. Information asymmetry can happen between different combination of these parties, e.g. between issuers and underwriters, among investors.

One of the most famous models on information asymmetry is proposed by Rock (1986), which is also commonly referred as “winner’s curse”. This model classifies players into two types: informed players (certain investors) and uninformed players (issuers, underwriters and other investors). There are a few key assumptions in this model.

- A. informed investors have perfect information about the realized value of the issued stock
- B. Informed investors cannot borrow securities or short-sell. They cannot sell their private information
- C. Informed demand is no greater than the mean value of the shares offered
- D. Uninformed investors have homogeneous expectations about the distribution of value
- E. All investors have the same wealth (equal to 1) and the same utility

Based on these assumptions, Rock builds a model explaining winner’s curse in different circumstances. When the offering is unattractive, uninformed investors tend to acquire all the shares offered; when the offering is attractive, uninformed investors obtain only a small portion of shares. As a result, uninformed investors have large volume invested in overpriced offerings and small volume on underpriced offerings, leading to low or even negative returns. Knowing this fact,

uninformed investors would stay out, leaving only those informed players in the field and no winner. As a result, Rock considers underpricing to be a must-have in public offerings to ensure there are always uninformed players in the market, as underpricing would guarantee a non-negative return. The model is questioned by some other researchers, however. Benveniste and Spindt (1989), for example, claim that the assumptions are arbitrary. They find evidence for informed investors' participating in unattractive offerings, pointing out that they are forced into this in order to not to lose opportunities on attractive offerings.

Chemmanur (1993) has a stronger focus on information asymmetry between issuers/underwriters and investors. He argues that there's cost for investors to obtain information and that investors would choose rationally between seeking for information and remaining uninformed after calculating information obtaining cost and expected return from investing in the offering. It is easy to derive the inference that the higher the cost of obtaining information is, the higher the return from investing is required by investors. As a result, in an offering with high information asymmetry where it is extremely costly to collect private information, the offering price has to be deeply discounted on value to attract investors.

Another famous theory is signaling theory. Advanced by Ibbotson (1975), signaling theory interprets underpricing not only relevant to primary offering, but to seasoned offering as well. Ibbotson believes that underpricing renders a positive signal of the issuer, so that investors are more willing to invest in other equities and debts issued by the same issuer. Welch (1989)'s research yields the same conclusion. He builds a model with two types of companies: low-quality companies and high-quality companies. Low-quality companies have the incentive to imitate high-quality companies to be valued at a higher price and gain a positive position in seasoned offerings. However, the imitation is considerably costly, as investors would gather information. Thus, underpricing would serve as a positive signal proving the company to be high-quality company, as low-quality company wouldn't be able to afford additional cost brought by underpricing. It is also very

similar to the argument of Chemmanur (1993), as Chemmanur's model implies that issuers would deliberately underprice their stock in initial public offering for the interest of higher future earnings on secondary market.

- **Ownership dispersion**

A lot of research touch upon ownership structural change and its relevance with underpricing. Ownership dispersion is an especially popular focus. One concern for owners and managers that might stop them from putting companies on stock exchange is ownership and control dilution. Yet there are also positive sides about ownership dispersion. For instance, with a more diversified ownership base brought about by ownership dispersion, the company would be less risky. Another example is that with ownership dispersion, the agency problem is mitigated, which in turn reduce agency costs.

Brennan and Franks (1997) conduct analysis on the data sample of IPOs in the United Kingdom between 1986 to 1989. Their empirical research shows that *“underpricing is used to ensure oversubscription and rationing in the share allocation process so as to allow owners to discriminate between applicants for shares and to reduce the block size of new shareholdings”*. In plain language, managers would deliberately choose to underprice the stock so that they would be able to allocate stocks among investors and thus protect their own control over the company. It also reduces the risk of hostile takeover, as with intentional allocation, the ownership base would be too diversified for any competitor to take over.

Stoughton and Zechner (1998) and Mello and Parsons (1998) deem ownership dispersion from a totally different aspect. Like Brennan and Franks, they agree that underpricing enables deliberate allocation. Nevertheless, they argue that the allocation is not for the purpose of retaining control, but for lowering agency costs. Stoughton and Zechner (1998) mention in their paper that the allocation of shares to smaller investors would capture the benefits associated with better monitoring by institutions. Mello and Parsons (1998) further promote the theory, explaining that aside from intentional allocation to small, passive investors for the benefit of corporate

governance, underpricing also allows for controlling blocks of stocks owned by active investors.

- **Corporate characteristics**

Some researches show that individual corporate characteristics would also distinct the extent of underpricing. Welch (1989) states that high-quality companies are more likely to undergo underpricing, though it is a deliberate choice. Brav and Gompers (1997) track long-term performance of listed companies, and find out that companies that are smaller in size are more likely to outperform larger companies after IPO. The same phenomenon applies to companies with low book-to-market ratio. Their conclusion is that smaller, growing firms in general have higher IPO discount.

Ritter (1991) has a similar conclusion. By comparing a set of companies that went public between 1975-1984 to their comparable peers, he combined short-term underpricing and long-term performance. He found that companies that experience large underpricing are usually due to investors' expectations, which are normally high to some industries and in some time windows.

Sharpe and Woo (2005) use approach that are commonly used in debt market that are to explain the choice of debt issuing mechanism on unseasoned equity. It is surprising to find that many factors that play an essential role in debt market apply as well to equity market, e.g., transaction cost, issue size, transparent operations. Companies with high reputation, represented by age and profit, however, contrary to debt market where they would usually prefer a public issuance, seem to prefer direct listing over IPO in equity market.

To recapitulate, the pricing of direct listing differs from IPO in many perspectives. However, it still remains unsolved that whether direct listing would outweigh IPO on price.

3 Empirical Study

3.1 Methodology

As mentioned earlier, it is commonly agreed upon that one important function for underwriters in IPO is advising or setting price for stock. Thus, it is natural to raise the question: does the disengagement of underwriters in direct listing influences price discovery for listed companies? To solve this question, I would introduce a methodology proposed by Ma and Tsai (2001).

In their thesis, they seek to differentiate the concept of initial return from IPO discount. Arguing that initial return is not only consist of IPO discount and thus can't be taken as the same thing, they identify two problems with the usual methodology of not distinguishing initial return from IPO discount. The first is it is completely against the very nature of IPO discount. They believe that IPO discount stands for the deviation of stock price offered by the underwriters and the true value of the stock. By confusing initial return with IPO discount, one grantedly assumes that the market corrects itself accurately and rapidly, and the first-day closing price is thus a perfect evaluation of the true value of the stock. This is obviously an arbitrary assumption, given that we all know that market is not always effective, and even when it is effective it would take time to reflect. The other problem is that admitting the two concepts as the same would lead to contradictory conclusions. Here Ma and Tsai raise the example of the influence of underwriter reputation to IPO discount. One could argue that with more reputational underwriters, a low IPO discount is predictable as they hold responsibility to their clients. However, one could also contest, as reputational underwriters would trigger more positive market behavior and in turn heighten the initial return.

Believing the issue could only be solved by distinguishing these two concepts, Ma and Tsai hypothesize that there are more factors contributing to initial return. Their formula is listed below.

$$\text{Initial Return(IR)} = \text{true discount(TD)} + \text{market reaction(MR)}$$

$$IR = (P_m - P_o) / P_o$$

$$TD = (P_e - P_o) / P_o$$

$$MR = (P_m - P_e) / P_o$$

$$IR = (P_m - P_o) / P_o = (P_e - P_o) / P_o + (P_m - P_e) / P_o$$

Here, P_m refers to market price, which is represented by the first-day closing price. P_o is the price offered by the underwriters to the market. Last but not least, P_e is the equilibrium price, the price that reflects the true value of the stock. All variables are easily accessible but equilibrium price, as it cannot be observed. The authors compare the average abnormal stock return and standard deviation in different time horizons, and find out the time period that is most stable, which could be considered a period when the price is closer to the value of the stock.

As the authors have the ambition to differentiate true discount and market reaction to look more closely into each part, I would only use the first part of their model to empirically test if there's a significant gap of price discovery functions between direct listing and IPO.

Another reason for using this model is that traditional definition of IPO discount doesn't apply to the case of direct listing. Because in a direct listing, the price is determined by auction, it is almost for sure that the closing price would be higher than opening price. The sellers who are willing to accept a low price would be driven out at early stage, leaving only stock owners expecting a higher price. Consequently, one could even argue that the stock sold at early stage is essentially distinctive from those sold at closing price. Therefore, using the difference between opening price and closing price to evaluate direct listing underpricing is extremely irrational.

3.2 Data Sample

To test for the problems raised in the introduction part, I use the data of both IPO and direct listing companies went public between 2015-2019 on LSE. The stock information, including listed year, companies' name and sectors, issue price,

market capitalization and new money raised is derived from LSE website. Stock market return and FTSE data is from Yahoo Finance. Companies' specific features, including age, asset, Capital expenditure, sales, sales growth and insider information is sourced from Orbis, S&P Capital IQ and individual companies' websites.

A more direct choice would be using that of United States, yet as we can see from the data Ritter collects that there are limited number of direct listing cases in major US stock exchange markets, regardless of NYSE or NASDAQ. In LSE however, there have been more companies choosing to go public via direct listing, or as how LSE names it, introduction. Pitifully, not all data is available for all companies, as some were delisted in less than a year, some were taken private again later. That being said, there is still an ample number of companies with sufficient information for our empirical research.

The selection of the time period of 2015-2019 is because of two considerations. The first is to ensure abundant data, especially for direct listing companies. Though gaining popularity, direct listing is still a minor choice as in the case of United States. The other reason is to be able to track stock performance for a longer period of time. Specifically, when evaluating the suitable time period as estimation for stock's true value, it would be beneficial to keep record for at least a year, otherwise the result could be volatile.

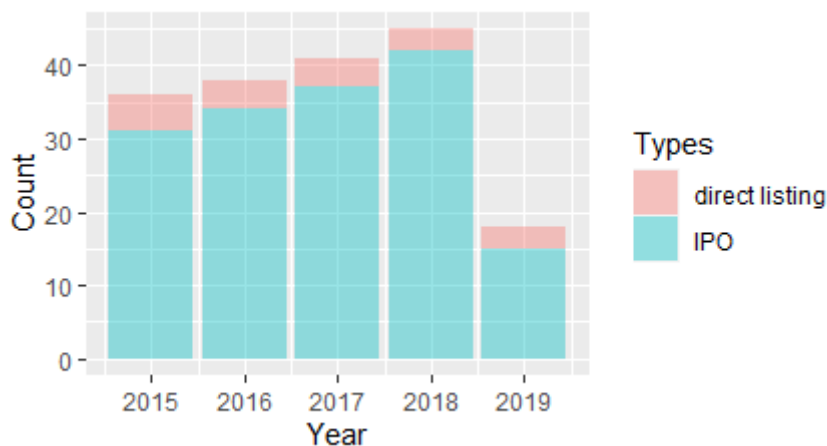


Figure 1: Distribution of direct listings and IPOs across different years

The figure above shows the distribution of direct listings and IPOs on LSE from the year of 2015-2019. Obviously, IPO cases outnumber direct listings by a lot. There are in total 19 direct listings and 159 IPOs in the five-year period. The table below provides basic description on these companies.

The sales growth of direct listing companies is in general lower and more consistent across different companies, which possibly suggests that direct listing companies are more likely to grow at a slower rate, yet this could as well be a result of comparably small sample size. No direct listing companies raised new capital, as the characteristic we introduced in introduction section. In both direct listing and IPO companies, insider holding is on a similar level, which is a proof of the liquidity provided to previous shareholders is identical across different listing approaches after a certain period after being listed.

Table 4: Data description

Listing types		Mean	STDV	Min	Max
Direct Listing	Sales growth (%)	0.3	0.11	-27	18
	New money raised (£m)	0	0	0	0
	Insider holding (%)	31	0.26	0	92
IPO	Sales growth (%)	31	1.51	-214	1500
	New money raised (£m)	55.21	138.76	0	1465.00
	Insider holding (%)	33	0.22	1	85

Finding the equilibrium price is one of the most challenging tasks. Referring to Ma and Tsai's methodology, I collected data and calculated market average return for first-day, first-month, first-month and first-year for each year, based on FTSE 100. FTSE 100 index is the return of Top 100 companies listed on LSE according to size, which I use as a substitute estimation of actual market return. With FTSE 100 obtained, I then match each company's opening price, closing price, the price in a week, the price in a month and the price in a year with FTSE 100 index in the same period of time, which, according to my assumption, indicates the general market return during representatively periods after listed.

Given the information we have, we can now move to finding the most suitable

substitute for P_e . By reducing market return from the stock return, we reduce the influence of initial return and IPO discount to minimum. By calculating average return and standard deviation for market adjusted return, it is clear that the stock price is stabilized from a week to a month after listed, as the market adjusted return in this period has the lowest standard deviation, as shown in table below. Thus, we would pick the price in the range of a week to a month as our assumed equilibrium price.

Table 5: Market adjusted return for different periods

	Mean return (%)	STDV
First day	2.49	0.1286
Day-week	4.07	0.1792
A week	7.32	0.3026
Week-month	0.05	0.1256
A month	7.59	0.4275
A year	93.04	10.5940

After determine an equilibrium price, we can now calculate IPO discount based on it. According to the definition of Ma and Tsai, true discount is represented by $(P_e - P_o)/P_o$, where P_e is equilibrium price, and P_o is opening price. To make sure that true discount exists as we assumed, a t-test is conducted, and the result is listed below. It is clearly demonstrated that true discount does exist, and that it is significant.

Table 6: t-test for true discount

Mean	t	p-value
7.51%	3.33	0.0011

3.3 Regression Model

With all the data needed, we can now proceed to building regression model. The regression formula is listed as below.

$$TD = \alpha + \beta_1 D + \beta_2 \text{Growth} + \beta_3 \text{Insider} + \beta_4 \text{STDV}$$

The first variable D is a dummy variable distinguishing direct listing

companies and IPO companies. As mentioned in the literature review part, there are a few factors that are commonly believed to have influence on IPO discount, and they are included in the regression to guarantee consistency. The second variable Growth reflects the sales growth of a company in the past three years (in some cases the growth during the past two years is used due to data incompleteness). The variable Insider measures the portion of stocks held by insiders. Last but not least, STDV illustrates the information asymmetry, and is measured by the standard deviation of abnormal returns in the first week after initial listing.

3.4 Results and Analysis

The regression result is listed in the table below.

Table 7: Regression results

Variables	Coefficient	p value
Intercept	-0.251	0.00139 **
D	0.100	0.01171 *
Growth	0.002	0.77827
Insider	0.001	0.99104
STDV	2.066	< 2e-16 ***
Adjusted R square	0.72	

*Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1*

The result of regression indicates that both D and STDV are significant at the significant level of 0.05. Other variables that we include, Growth and Insider are not significant. How do we interpret this result? Obviously, what we are concerned of the most, listing mechanisms, do influence the true discount of listed firms. Most other factors that are considered to impact underpricing don't seem to apply in our dataset, except for information asymmetry. Meanwhile, the coefficient of D is positive, which indicates that direct listing firms (marked by D=0) are more likely to experience lower true discount than IPO firms. As a result, one could say that direct listing mechanism does seem to partly solve IPO underpricing issue and is more efficient in price discovery.

4 Further Exploration

With the result presented above, it is natural to ask: why would direct listing be more efficient? Are there some factors that contribute to the reduced underpricing? To further explore the reasons behind the difference of underpricing in two listing mechanisms, I introduce more factors.

As the example of Spotify and Slack we provided in the introduction sector, in the U.S. market, though there are only limited number of direct listing cases, a key reason for its high attention in investors and academia is those companies' well-known names. This might seem like a selection bias, yet there is further rationale. In a conventional IPO, investment banks serve not only as bookbuilder and regulator, but they have the responsibility of promotion as well, which is usually conducted through roadshows. In a direct listing, however, with no promotion or guarantee of underwriting, it is only reasonable for companies with reputation to go public with direct listing. Thus, I introduce the factors of Age and Market Capitalization as a close estimation of a corporate's reputation, as it is nearly impossible to define and measure reputation. Age represents the difference between the year of a company's incorporation to the year of its going public. Market Capitalization is derived from the number of shares outstanding times the opening price when a firm is introduced to the public for the first time and thus can be deemed as size.

Other than reputation, another feature commonly shared by U.S. direct listing companies is maturity. Most of these companies were previously owned by venture capital and private equity, and by the time they go public, they are already at a later stage of their life cycle, represented by a stagnant growth rate. This feature is also aligned with the fact that though SEC has approved capital raising in a direct listing, there's no such case until today. As IPO is also considered a method of raising capital to support growth, it is reasonable to assume that direct listing companies are not in urgent need of expanding. As a result, I bring in a few factors that measure the growth of a company. To start with, I collect the Dividend Payout Ratio of each

company in the year they went public. The Dividend Payout Ratio is a measurement of a company's maturity, as growing companies tend not to pay or only pay a small amount of dividend in order to keep the profit in for future investment. Mature companies, on the other hand, would normally pay dividend on a stable basis, as argued by Rozeff (1982), who empirically proves that dividend payout ratio is a significantly negative function of past and expected sales growth rate. Another parameter is Investment. Here I divide companies' capital expenditure by asset as a measurement of investment level. Asset growth rate represents the 3-year asset growth rate of a company from the year of being listed on going, measuring the change of size and scale. Last but not least, I include the 3-year Employee Growth rate as well, as a mature company of its optimal size would not increase its employee by a lot.

The description of data mentioned above is listed below.

Table 8: Data description 2

Listing types		Mean	STDV	Min	Max
Direct Listing	Age	5.53	4.83469	1	17
	Market capitalization (£m)	1214.01	4156.18	0.81	18287.71
	Dividend payout ratio	0.13	0.22	0	0.59
	Investment	0.0001	0.0003	0	0.0013
	Asset growth rate	0.36	0.60	-0.29	2.04
	Employee growth rate	0.15	0.18	-0.06	0.67
IPO	Age	8.36	10.98	1	62
	Market capitalization (£m)	348.08	697.57	0.10	4878.68
	Dividend payout ratio	0.19	0.03	0	3.89
	Investment	0.0019	0.0145	0	0.1677
	Asset growth rate	0.31	0.52	-0.47	6.14
	Employee growth rate	0.19	0.58	-1	0.17

From the table above, we can clearly tell some patterns. To begin with, from the age perspective, direct listing companies are in general younger than IPO companies. Direct listing companies, commonly speaking, are larger in terms of size, yet the standard deviation is large even given a small sample, revealing that direct listing companies are at either extremes. Dividend payout ratio doesn't vary much between two groups, contrary to our assumption. IPO firms tend to invest

more portion than direct listing firms. Asset growth rate and employee growth rate are almost identical among groups.

Another guess would be relevant to industry. As brought forward in introduction, most direct listing companies in the U.S. are “Unicorn” companies, the majority of which are in the technology sector. Would it be the case that companies from certain industries are more willing to go public by direct listing and that the lower underpricing of direct listing companies is actually related to industries?

I hereby divide these companies into five sectors referring to their main business: Communication and Information Technology, Consumer Staples and Discretionary, Financials and Real Estates, Health Care, Industrials and Materials and Utilities. The cross table of listing mechanisms and industries are presented below.

Table 9: Distribution by industry

	Direct Listing		IPO	
	Total	%	Total	%
Communication and Information Technology	1	0.56	29	16.29
Consumer Staples and Discretionary	3	1.69	40	22.47
Financials and Real Estates	9	5.06	46	25.94
Health Care	0	0	16	8.99
Industrials and Materials	5	2.81	27	15.17
Utilities	1	0.56	1	0.56

A curious observation is that among half of the companies that choose direct listing are Financials and Real Estates companies. Though the portion of Financials and Real Estates companies is also high in IPO firms, yet in some industries that include large portion of IPO firms, e.g., Communication and Information Technology and Consumer Staples and Discretionary, companies seem to prefer IPO over direct listing by a lot.

In order to find out how come direct listing underpricing is lower than that of IPO, I made some assumptions based on earlier arguments. I assume that the factors mentioned above: Age, Market capitalization, Dividend payout ratio, Investment,

Asset growth rate, Employee growth rate and Industries are the factors that enable a company to choose direct listing over IPO or vice versa, and in turn influences underpricing. However, the issue is even when remove the factor of listing mechanisms, these factors would also separately impact an individual company's underpricing as they reflect its features, to be more specific, size, growing opportunities, and industries, which are commonly believed to have an impact on IPO underpricing, as mentioned in the literature review section. As a result, I would use the methodology of confounding variables and promote the following two assumptions:

Assumption 1: These factors are correlated to the choice of listing mechanisms

Assumption 2: Regardless of listing mechanisms, these factors are correlated to listing underpricing

In order to prove the correlation of these factors, listing mechanisms and underpricing, both assumptions much hold.

For Assumption 1, I test the correlation between variables and listing mechanism. The regression model is as below.

$$D = \alpha + \beta_1 \text{Age} + \beta_2 \text{Market capitalization} + \beta_3 \text{Dividend} + \beta_4 \text{Investment} + \beta_5 \text{Asset growth rate} + \beta_6 \text{Employee growth rate} + \beta_8 \text{Industry}$$

As there are six industries, I build five dummy variables to represent each. Meanwhile, as D is a categorical variable with values of 0 and 1 only, instead of the linear regression model, I use logistic regression. The result is as below.

Table 10: Regression results 2

Variables	Coefficient	p value
Intercept	0.954	<2e-16 ***
Age	2.473e-03	0.2652
Market capitalization	-4.011e-05	0.0097 **
Dividend	3.048e-02	0.5135
Investment	4.902e-01	0.7732
Asset growth rate	-1.087e-02	0.8149
Employee growth rate	2.147e-02	0.6234
Dummy_1	-1.918e-02	0.7957
Dummy_2	-1.321e-01	0.0602 .

Dummy_3	3.938e-02	0.6798
Dummy_4	-1.282e-01	0.1041
Dummy_5	-4.642e-01	0.0381 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

The result shows that most variables are not correlated to the choice of listing mechanism, except for Market capitalization, Dummy_2, and Dummy_5. From the size perspective, it shows that the larger the size of a company is, the more likely it is to choose direct listing over IPO. Industrial difference does influence companies' choice on listing options, especially for Consumer Staples and Discretionary Industrial and materials industries.

Moving on to Assumption 2, I remove D from the original regression model and add variables from the first part. The regression model is as below.

$$TD = \alpha + \beta_1 \text{Growth} + \beta_2 \text{Insider} + \beta_3 \text{STDV} + \beta_4 \text{Age} + \beta_5 \text{Market capitalization} + \beta_6 \text{Dividend} + \beta_7 \text{Investment} + \beta_8 \text{Asset growth rate} + \beta_9 \text{Employee growth rate} + \beta_{10} \text{Industry}$$

The regression result is as below.

Table 11: Regression results 3

Variables	Coefficient	p value
Intercept	-6.237e-02	0.1195
Growth	6.689e-03	0.4463
Insider	2.429e-02	0.6784
STDV	2.057	<2e-16 ***
Age	7.489e-04	0.5287
Market capitalization	-4.295e-07	0.9583
Dividend	1.466e-02	0.5568
Investment	5.851e-01	0.5275
Asset growth rate	1.371e-03	0.9571
Employee growth rate	-1.527e-02	0.5159
Dummy_1	9.316e-03	0.8159
Dummy_2	1.058e-03	0.9777
Dummy_3	-1.245e-02	0.8106
Dummy_4	-8.626e-02	0.0422 *
Dummy_5	-8.668e-02	0.4684
Adjusted R square	0.71	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

The result shows that only STDV and Dummy_4 are significant. Combined

with the result from regression for Assumption 1, we can derive the conclusion that Age, Market capitalization, Investment, Asset growth rate, and Employee growth rate influence neither the selection of listing mechanism nor underpricing. Size influences the listing mechanism, as companies with a larger scale tend to go with direct listing more, but it is not correlated with underpricing. Though the significant dummy variables in the test for Assumption 1 and Assumption 2 are different, this suggests that the industry sector of a company does influence both its choice between direct listing and IPO, and its underpricing upon going public.

5 Future Research

One possible future research topic is to further expand the underpricing issue with SEC's approval of introducing capital raising into direct listing, as at this stage the data is limited.

Another possible improvement is that this topic can be supported with more data, and probably data from other countries as well. At the current stage, the data availability of direct listing companies is quite limited partly due to a rather small amount. In the 2015-2019 time period of five years, only 31 companies went listed via direct listing in the UK. When compared to IPO firms, the dataset is quite unbalanced, which might lead to statistical issues when studying. The small size of the dataset itself would also lead to problems, e.g., non-normal distribution, extreme observations. Meanwhile, the data accessibility is also low, as many direct listing companies are listed on AIM market rather than the UK main market, causing difficulties in collecting data especially when there are multiple factors. One possible solution is to extend to a longer time horizon, yet in this circumstance, it is necessary to control the year of companies going public, as time windows play a significant role in underpricing with companies going public in a hot market usually witness a higher underpricing and worse performance in long run, as marked by Ritter (1991). Another possible solution is to manually select comparable IPO companies. This method, however, requires careful selection and reasonable inference.

6 Conclusion

Direct listing, as an atypical going public option that recently gains attention, still has many questions unsolved to researchers. This thesis seeks to explore the difference between listing mechanisms, i.e., direct listing and IPO from the underpricing perspective. The thesis defines true discount as a replacement of the traditional method of deriving underpricing, eliminating the influence of market reaction. With that, an empirical study is run with data of companies that went public in the UK between 2015 to 2019. The result proves that direct listing, as a listing mechanism, reduces underpricing when compared to IPO. The paper further looks into the possible reasons for the difference, and comes to the conclusion that industry sector is the key factor correlating listing mechanism and underpricing.

References

- Anand, Johnson. 2005 . "The Role of Underwriters in Nontraditional Offerings: Empirical Evidence." Queen's Univ. Law & Economics Paper No. 2005-05.
- Beierlein, J., & Kato, H. K. 2003. "Do Uniform Price Auctions Trade-off Higher Risk for Higher Return?" *International Review of Finance*, 4(1/2), 1–27.
- Benveniste, Busaba. 1997. "Bookbuilding vs. fixed price: An analysis of competing strategies for marketing IPOs." *Journal of Financial and Quantitative Analysis*, 32(4), 383–.
- Benveniste, Spindt. "How Investment Bankers Determine the Offer Price and Allocation of New Issues." *Journal of Financial Economics*, vol. 24, no. 2, Elsevier B.V, 1989, pp. 343–61.
- Brav, Gompers. 1997. "Myth or Reality? The Long-Run Underperformance of Initial Public Offerings: Evidence from Venture and Nonventure Capital-Backed Companies." *The Journal of Finance (New York)*, 52(5), 1791–1821.
- Brennan, Franks. 1997. "Underpricing, ownership and control in initial public offerings of equity securities in the UK." *Journal of Financial Economics*, 45(3), 391–413.
- Chemmanur. 1993. "The Pricing of Initial Public Offerings: A Dynamic Model with Information Production." *The Journal of Finance (New York)*, 48(1), 285–304.
- Cliff, Denis, D. J. 2004. "Do Initial Public Offering Firms Purchase Analyst Coverage with Underpricing?" *The Journal of Finance (New York)*, 59(6), 2871–2901.
- Degeorge, Derrien, F., & Womack, K. L. 2010. "Auctioned IPOs: The US evidence." *Journal of Financial Economics*, 98(2), 177–194.
- Derrien, Womack. 2003. "Auctions vs. Bookbuilding and the Control of Underpricing in Hot IPO Markets." *The Review of Financial Studies*, 16(1), 31–61.
- Horton. 2022. "Direct Listings and the Weakening of Investor Protections." Working paper, *Florida State University Law Review*.
- Ibbotson. 1975. "Price Performance of Common Stock New Issues." *Journal of Financial Economics*, vol. 2, no. 3, Elsevier B.V, 1975, pp. 235–72.
- Kaneko, Pettway. 2003. "Auctions versus book building of Japanese IPOs." *Pacific-Basin*

Finance Journal, 11(4), 439–462.

Krigman, Shaw, W. H., & Womack, K. L. 2001. “Why do firms switch underwriters?” *Journal of Financial Economics*, 60(2), 245–284.

Ljungqvist, Alexander, and William J. Wilhelm Jr. 2003. “IPO Pricing in the Dot-Com Bubble.” *The Journal of Finance (New York)*, vol. 58, no. 2, Blackwell Publishing Inc, 2003, pp. 723–52.

Ma, Tsai. 2001. “Are Initial Return and IPO Discount the Same Thing? A Comparison of Direct Public Offerings and Underwritten Ipos.”.

Mello, Parsons. 1998. “Going public and the ownership structure of the firm.” *Journal of Financial Economics*, 49(1), 79–109.

Ritter. “The Long-Run Performance of Initial Public Offerings.” *Journal of Finance* (Wiley-Blackwell), vol. 46, no. 1, Mar. 1991, pp. 3–27.

Rock. 1986. “Why new issues are underpriced.” *Journal of Financial Economics*, 15(1), 187–212.

Sharpe, Woo. 2005. “Corporate control, expected underpricing, and the choice of issuance mechanism in unseasoned equity markets.” *Journal of Corporate Finance (Amsterdam, Netherlands)*, 11(4), 716–735.

Sherman, Jagannathan. 2006. “Why Do IPO Auctions Fail?”.

Sherman. 2000. “Ipos and Long Term Relationships: An Advantage of Book Building.”

Sherman. 2001. “Underwriter Certification and the Effect of Shelf Registration on Due Diligence.” *Financial Management*, Vol. 28, No. 1, pp. 5-20, 1999.

Stoll, Curley, A. J. 1970. “Small Business and the New Issues Market for Equities.” *Journal of Financial and Quantitative Analysis*, 5(3), 309–322.

Welch. 1989. “Seasoned Offerings, Imitation Costs, and the Underpricing of Initial Public Offerings.” *The Journal of Finance (New York)*, 44(2), 421–449.

Zechner, Stoughton. 1998. “IPO-mechanisms, monitoring and ownership structure.” *Journal of Financial Economics*, 49(1), 45–77.

Zheng. 2022. ”Direct Listing vs. IPO: The Anatomy of the Going-Public Market.”Working paper, University of Illinois at Urbana-Champaign.

