Disclosure of Use of Proceeds, Real Effects and Underpricing in Private Equity-Backed Initial Public Offerings

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Abstract

This paper provides the first empirical investigation of the information content of use of proceeds disclosure in private equity (PE)-backed initial public offerings (IPOs). We find evidence consistent with the idea that PE-backed issuers primarily use the IPO as a means of repaying claimholders. PE-backed issuers that state 'repay debt' as the use of proceeds occur frequently in our sample. These issuers have high ex-ante leverage ratios and use the IPO proceeds to revert to more normal leverage ratios after the IPO. This finding suggests that PE ownership only leads to a temporary increase in optimal leverage ratio. Further results indicate that the overwhelming importance of repaying claimholders in PE-backed IPOs has negative ripple effects on the implementation of other stated use-of-proceeds categories such as R&D. Finally, we document that the certification effect of PE-backing mitigates the adverse impact of vague use of proceeds on underpricing. Hence, in PE-backed IPOs there is no costly tradeoff between higher underpricing due to vagueness and the risk of revealing proprietary information due to specificity.

This version: August 31, 2023

Keywords: Initial Public Offering, Underpricing, Disclosure, Use of Proceeds, Leveraged Buyout

JEL Classification: G12, G14, G23, G31, G32, D82

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1. Introduction

"As in any stock-picking strategy, the difficulty comes from understanding the differentiating factor that leads certain companies to market success (better corporate culture, better client base, better market positioning, disruptive technology etc.). This triage requires an extremely high level of experience and expertise for consistent success. In this regard, an IPO that is backed by a private equity firm should, in principle, outperform its non-PE backed counterparts as lots of research and scouting have gone into the investment decision well before the IPO phase" (Carrera et al., 2021).

Initial public offerings (IPOs) in Europe have thrived in recent years. Especially 2021 was a blockbuster year which recorded 476 IPOs worth US$ 90 billion, excluding SPACs (Esteve et al., 2022). As we show in this paper, the boom was largely fueled by private equity (PE)-backed IPOs which accounted for more than 20% of all listings in 2021. Despite the importance of PE firms for the IPO market, little is known about the economic consequences of PE-backing for the listing. The extant literature suggests that PE firms help mitigate information frictions in IPOs and thus resolve uncertainty about the valuation of shares – often referred to as a 'certification effect' (Levis, 2011). Yet the extant literature does not investigate the specificity of information production in PE-backed IPOs and the impact it has on underpricing and firm-level outcomes after the IPO. The major aim of this paper is to fill this literature gap. In particular, our objectives are threefold: (i) we explore the disclosure strategy in PE-backed IPOs, i.e., whether the stated use of proceeds differ from non-PE-backed IPOs, (ii) we explore the impact of the disclosure strategy on firm-level outcomes post IPO, and (iii) we explore whether the PE certification effect is contingent on the information content provided by the use of proceeds.

When a company files for an IPO, it must include the intended use of proceeds as a component of the prospectus. This requirement is mandated by regulations from the European Parliament in Europe and the Securities and Exchange Commission (SEC) in the United States. The intended use of proceeds information aims to protect investors and reduce information asymmetries during the IPO process. Different categorizations of intended use of proceeds information exist, but broadly, IPO proceeds are allocated to one or more of five main categories: (i) general corporate purposes, (ii) repay debt, (iii) research and development (R&D), (iv) repayment of selling shareholders, and (v) mergers and acquisitions (M&A) (Autore et al., 2009; Brau and Fawcett, 2006; Jin et al., 2017; Kim and Weisbach, 2008; Leone et al., 2007; Walker and Yost, 2008). Companies have considerable freedom in how they provide details about the intended use of proceeds. On occasion, firms opt to keep this section of the IPO prospectus intentionally vague, offering no useful information to potential investors, competitors, and other market participants. However, this approach comes with the drawback of potentially experiencing higher IPO underpricing (e.g., Leone et al., 2007). The issuer's discretion in use of proceeds disclosure creates an interesting laboratory to study whether PE firms differ in their capital market communication, and if they do so, how the differences translate into firm-level outcomes.

Using an up-to-date sample of 1,010 European IPOs from 2010 to 2021, and controlling for the endogenous decision to communicate specific information to the capital market, we show that PE-backed and non-PE-backed issuers differ significantly in their disclosed use of proceeds. In particular, PE-backed issuers are more likely to state 'repay debt' and 'repay selling shareholders' than non-PE-backed issuers, and they are less likely to state 'M&A'. These findings are consistent with the idea that PE-backed issuers have exploited much of their growth potential as a private firm and use the IPO as a means of repaying claimholders.

Next, we investigate the impact of use of proceeds disclosure on firm-level outcomes post IPO. We find that PE-backed issuers that state 'repay debt' as the use of proceeds reduce leverage considerably more after the IPO than non-PE-backed issuers that state 'repay debt'. That is because PE-backed issuers have much higher leverage ratios before going public. Our results suggest that the average PE-backed issuer that states 'repay debt' as the use of proceeds has a debt-to-assets ratio of 60% pre-IPO, which is about 20 percentage points (pp) higher than the debt-to-assets ratio of an average non-PE-backed issuer that states 'repay debt'. We find that the PE-backed issuer uses the proceeds to reduce the leverage ratio to approximately 35% until three years after the IPO, which is only slightly higher than the leverage ratio that a debt repaying non-PE-backed issuer has. Hence, these results suggest a mean reversion of the leverage ratio. Such a mean reversion is consistent with the idea that PE ownership only leads to a temporarily higher optimal capital structure which needs adjustment after the exit.

Furthermore, we find that the necessity to repay claimholders in PE-backed IPOs has ripple effects on the post-IPO implementation of other stated use of proceeds. We find that stating 'R&D' as the use of proceeds leads to higher R&D-to-sales ratios in non-PE-backed IPOs, but not in PE-backed IPOs. That is because literally every PE-backed IPO that states 'R&D' as the use of proceeds also states 'repay debt' or 'repay selling shareholders'. Our results suggest that the repayment of claimholders has priority and cannibalizes - at least partly- the increase in the R&D-expenses-to-sales ratio.

Finally, we investigate the impact of the information content of use of proceeds on IPO underpricing. Prior literature suggests that unspecific use of proceeds lead to higher underpricing due to greater uncertainty about the value of shares (Leone et al., 2007). We confirm this with our sample of European IPOs. However, we also find that PE-backing completely mitigates the

negative impact of non-specificity on underpricing due to a certification effect. This is an important contribution to the literature as it shows that non-PE-backed IPOs are in greater need to disclose use of proceeds, which is costly due to the risk of revealing proprietary information to competitors and due to limited flexibility post-IPO. At the same time, we do not find evidence for any PE certification effect if a specific use of proceeds is disclosed by the issuer. This finding provides an important extension of the Levis (2011) certification effect, as we show that it is contingent on the information content of the prospectus.

Our paper is most related to two streams of literature. First, we contribute to existing literature on the disclosure of use of proceeds in IPOs and SEOs. Amor and Kooli (2017) investigate whether use of proceeds contain useful information about the firm's future performance and survival profile. Leone et al. (2007) examine the dollar detail of use of proceeds specificity on underpricing. Autore et al. (2009) explore the signaling effects of disclosing specific use of proceeds categories in SEOs. Walker and Yost (2008) test whether ex-post use of funds matches the ex-ante disclosed use of proceeds in SEOs. To the best of our knowledge, this paper is the first to address the impact of PE firms, i.e. which account for a significant share of IPOs in Europe, on issuers' disclosed use of proceeds, post-IPO outcomes and underpricing.

Second, we contribute to previous literature on PE-backed IPOs. Michala (2019) examine the timing, maturity and valuation of PE-backed IPOs. Levis (2011) test for differences between PE-backed and VC-backed IPOs in terms of market size, industry classification, first-day returns, and key operating characteristics. Bruton et al. (2010) provide evidence for the positive impact of concentrated ownership through PE improves IPO performance. We extend this stream of literature by investigating the interrelation between disclosure, real effects and first-day returns.

This paper is organized as follows. Section 2 reviews the European IPO prospectus regulation. Section 3 discusses relevant literature and develops testable hypotheses. Section 4 describes the sample construction and methodology. Section 5 presents the empirical results. Section 6 concludes the paper.

2. Institutional background

The European IPO prospectus regulations underwent several changes in recent years. Two directives, namely (i) 2003/71/EC, and (ii) 2017/1129, are relevant for our sample period. The former prospectus regulation 2003/71/EC was in force from November 2003 until July 2019. Its objective was to facilitate the going public process for companies and regulate the disclosure of information in IPOs. Companies had to publish a prospectus including the intended use of proceeds unless an exemption applied. To lessen the reporting burden for small IPOs, a prospectus exemption was introduced for offerings of less than €2.5m (EUR-Lex, 2003).

The current prospectus regulation (2017/1129) is part of the EU Commission's capital markets union initiative and came into effect in July 2019 with the goal of establishing a unified capital market across the EU. It standardizes reporting requirements, updates rules for prospectus exemption, and introduces the EU growth prospectus. According to Article 1 (3) of the regulation, offerings valued below €1m are exempt from publishing a prospectus. Member states also have the option, under Article 3 (2), to exempt offers below €8m from prospectus publication. Furthermore, the directive allows companies meeting specific criteria (e.g., fewer than 250 employees, total assets of no more than €43m, and annual net sales of no more than €50m) to publish a so-called "growth prospectus", i.e., a lighter prospectus which simplifies the going public process for small issuers. The forthcoming prospectus regulation (2022/0411) is currently in proposal and aims to

further harmonize regulation across the EU by introducing a single threshold of €12m for prospectus exemption.

The EU prospectus regulation mandates a section on the intended use of proceeds for all non-exempt offerings. However, it does not specify the information content. Hence, issuers may choose to state use of proceeds vaguely or lump them into the "general corporate purposes" category. Appendix A1 provides examples of informative and non-informative use of proceeds disclosures. Both examples are fully compliant with the directive 2003/71/EC. Yet only the example in Panel A communicates a specific use of proceeds, i.e., repay debt, to the capital market. These examples illustrate that issuers have considerable discretion in use of proceeds disclosure. As a result, the information content varies considerably across issuers.

Although there is no legal requirement to classify use of proceeds into specific categories, most European stock exchanges provide examples which typically fall into five categories[1]:

(1) 'general corporate purpose',

(2) 'repay debt',

(3) 'R&D',

(4) 'repay selling shareholders', and

(5) 'M&A'.

These categories are consistent with the most important motives for IPOs discussed in the literature, i.e., rebalance accounts after periods of significant investment and growth (Pagano et al., 1998), finance R&D expenses (Kim and Weisbach, 2008), transfer wealth from new to existing

[1] For an example, please see the London Stock Exchange's listing guide for main market issuances, available at: https://docs.londonstockexchange.com/sites/default/files/documents/guide-main-market-pdf.pdf.

shareholders (Autore et al., 2009), and facilitate acquisitions in the market for corporate control (Brau and Fawcett, 2006; Celikyurt et al., 2010).

The disclosure of use of proceeds falls under general prospectus liability. Most European jurisdictions have introduced specific rules for false or misleading prospectuses. For example, according to the Financial Services and Markets Act 2000 in the United Kingdom, a litigation claim arises if the prospectus contains untrue or misleading statements, or material omissions (FSMA, 2000). Accordingly, the stated use of proceeds is legally binding. Nevertheless, it is possible to change the use the proceeds after the flotation. In this case, the issuer must publicly disclose the reallocation of funds and provide a justification.

3. Theoretical background and hypotheses

3.1 Use of proceeds categories in PE-backed IPOs

Leone et al. (2007) discuss a trade-off theory of use of proceeds disclosure. On the one hand, stating specific use of proceeds mitigates ex-ante uncertainty about the value of shares. As a result, the issuer requires less underpricing, and can reduce its cost of capital (Rock, 1986; Beatty and Ritter, 1986). On the other hand, stating specific use of proceeds limits flexibility and increases the risk of revealing proprietary information to competitors. Dye (2001) conclude that an optimal disclosure strategy communicates information as specifically as possible, as long as no proprietary information is revealed.

The PE business model has several implications for the trade-off theory. Most importantly, the finite life of the PE fund requires an exit of the portfolio firm after a 3-5 year holding period. In about 20% of exits, PE firms make use of an IPO (Gompers et al., 2016). Even though PE firms do not fully cash out at IPO (Dong et al., 2020), they still sell a significant number of shares. As Fürth and Rauch (2014) document, the median PE ownership percentage goes down from 75.5% to 45.9%

through the IPO. It is important to note that, due to the finite fund life, PE funds have limited long-term upside. Hence, they are heavily dependent on the offer price. If we follow Leone et al. (2007)'s argumentation that specificity in use of proceeds disclosure reduces 'money left on the table', and if 'money left on the table' is particularly costly for PE firms due to the lack of long-term upside, then PE-backed issuers should have strong incentives to be specific in what they disclose.

Looking at the five use of proceeds categories, it should be easy for PE-backed issuers to be specific in at least two of them without revealing any proprietary information to competitors. First, a competitor most likely knows that the PE owner has to sell shares at IPO to return capital to limited partners. As a consequence, stating 'repay selling shareholders' as the intended use of proceeds is a rational strategy in the sense of Dye (2001): it reduces uncertainty for uninformed investors without revealing sensitive information to competitors. The same argument applies to 'repay debt'. Leveraged buyouts rely on a complex capital structure with several tranches of debt. The junior debt tranches have maturities that exceed the desired holding period, which is why they require refinancing at exit (Colla et al., 2012). It is unlikely that this information is new to competitors at the IPO. Hence, disclosing the refinancing need in the prospectus is not costly. Based on these arguments, we formulate the following two hypotheses:

H1.a: PE-backed IPOs are more likely to state 'repay selling shareholders' as the intended use of proceeds compared to non-PE-backed IPO firms.

H1.b: PE-backed IPOs are more likely to state 'repay debt' as the intended use of proceeds compared to non-PE-backed IPO firms.

Companies often go public to access the market for corporate control, thus facilitating inorganic growth (Brau and Fawcett, 2006; Celikyurt et al., 2010). In the case of PE-backed IPOs, however, it is likely that inorganic growth was already realized before the listing due to so-called buy-and-

build strategies. The idea behind these strategies is to buy a platform in a fragmented market and develop it into a market leader through additional acquisitions (Hammer et al., 2022). Hammer et al. (2017) report that about 40% of all buyouts rely on a buy-and-build strategy, quite often making double-digit acquisitions. They also report that buyouts with a buy-and-build strategy have a relatively high likelihood of going public because the additional acquisitions provide sufficient scale for the IPO (Hammer et al., 2017). As a result, it is reasonable to assume that the average PE-backed IPO already realized acquisitions before the listing, and is therefore unlikely to state 'M&A' as the use of proceeds.

H1.c: PE-backed companies are less likely to state 'M&A' as the intended use of proceeds compared to non-PE-backed IPO firms.

3.2 Firm-level outcomes post IPO

If specific use of proceeds categories are stated, the IPO proceeds must also be used for these categories post IPO in order to avoid a litigation risk, unless a reallocation announcement is made. The issuer has some leeway if he has not specified exact amounts in the prospectus. However, empirical evidence indicates that the average issuer delivers on its promises. Amor and Kooli (2017) find that US issuers invest more after going public if they have stated 'investment' as the use of proceeds in the Securities and Exchange Commission's S-1 form. And they significantly increase their advertising expenses if they have stated 'marketing and sales promotion'. Walker and Yost (2008) provide similar evidence for US SEOs. In their sample, the median 'investment' firm and the median 'general corporate purposes' firm grow significantly more than the median 'debt repayment' firm post SEO.

When 'repay debt' is specified as a use of proceeds, the extant literature suggests that the leverage ratio does not necessarily decrease (Walker and Yost, 2008). Amor and Kooli (2017) even

find evidence for increasing leverage ratios post IPO. This is because the issuer often states that the proceeds will be used to repay a specific tranche of debt (see also the example in Panel A of Appendix A1). Yet this does not prevent the issuer from raising new debt on more favorable terms after going public. Consequently, stating 'repay debt' is not at odds with increasing leverage ratios and must not be misunderstood as the substitution of debt for equity (Walker and Yost, 2008).

What happens to the capital structure after the IPO presumably depends on whether the issuer's leverage ratio is optimal or needs adjustment. Here, there are significant differences between PE-backed and non-PE-backed IPOs. Cao and Lerner (2009) document that PE-backed IPOs have higher leverage ratios at the time of the IPO. This is because the high debt levels used for acquisition financing cannot be fully deleveraged within a rather short holding period of 3-5 years. At the time of the IPO, a higher leverage ratio is not necessarily suboptimal. Haque (2022) points out that PE ownership reduces expected costs of financial distress, thus increasing the optimal leverage ratio. But with the exit of the PE owner, that should change. Because the PE owner loses control over the operating business through the IPO, it is likely that the optimal leverage ratio will revert back to more normal levels. As a result, a PE-backed firm stating 'repay debt' as the use of proceeds is more likely to reduce leverage relative to a non-PE-backed firm.

H2: PE-backed IPOs stating 'repay debt' as the use of proceeds category reduce leverage ratios by more than non-PE-backed IPOs.

How stating 'R&D' or 'M&A' as the use of proceeds category affects firm-level outcomes is also empirically testable.[2] Following Amor and Kooli (2017) and Walker and Yost (2008), we expect that these two use of proceeds categories lead to higher R&D-expense-to-sales ratios and

[2] For the other two categories, i.e. 'general corporate purpose' and 'repay selling shareholders', we lack empirical proxies. Hence, we do not discuss the theory further.

an increase in the number of M&A deals, respectively. But we do not suspect any differences between PE-backed and non-PE-backed IPOs. With regard to 'R&D', one could assume that there is a catch-up effect in PE-backed IPOs because the debt service during the PE holding period leaves little room for R&D spending (Rappaport, 1990). However, the empirical findings are mixed and do not unambiguously support this hypothesis (Tarsalewska, 2023). As already mentioned, it is unlikely that 'M&A' is stated as a use of proceeds category in PE-backed IPOs. In the few PE-backed IPOs that state 'M&A', the goal is presumably to expand the scope of operations through selected strategic acquisitions. Yet this is the same goal that an average non-PE-backed IPO with M&A motive has – at least in Europe (Ritter et al., 2013). As a result, we do not suspect that the number of post-IPO M&A deals differs significantly between PE-backed and non-PE-backed IPOs.

3.3 Information content of use of proceeds and IPO underpricing

Leone et al. (2007) show that issuers that provide unspecific information on the use of proceeds have greater uncertainty when going public, and therefore suffer from higher underpricing. One way to counteract this effect is to produce information through a financial intermediary (Chemmanur and Fulghieri, 1994; Megginson and Weiss, 1991). Nahata (2008, p. 127) notes that "*absent credible and adequate information about the companies, external investors tend to rely on the reputation of the companies' associates as certifiers of the companies' own quality."* Hence, if the issuer chooses not to disclose the use of proceeds, certification is likely important to avoid adverse effects of information asymmetry on first-day returns.

Booth and Smith (1986) outline three requirements for IPO stakeholders to have a certification effect: (i) their reputation must be at stake, (ii) the long-term loss of reputation must outweigh any short-term financial gain from cheating, and (iii) the third-party services they provide should not be easily imitable. All three criteria are met by PE owners. First, PE firms repeatedly interact with

the capital market because they rely on IPOs as an exit channel. As they seek to be active long-term players in financial markets, PE firms have incentives to maintain and enhance reputation (Nahata, 2008). Second, a short-term financial gain from cheating may have adverse effects on future IPOs. Yet future IPOs matter for PE firms because the indirect pay for performance from future funds is of similar importance as the direct pay for performance from the current fund (Chung et al., 2012). Third, the monitoring provided by PE firms serves as a substitute mechanism for limiting moral hazard (Demiroglu & James, 2010). PE firms keep monitoring the issuer post IPO due to lockup periods. They therefore provide a valuable, i.e. difficult-to-imitate, service to uninformed investors.

Consistent with the idea that PE firms have a certification role, Levis (2011) finds that underpricing in PE-backed IPOs is lower than in non-PE-backed IPOs. We extend this idea by conjecturing that the certification effect on underpricing depends on whether the issuer discloses use of proceeds or not.

H3: PE-backing reduces underpricing if no use of proceeds is stated.

4. Data and methodology

4.1 Sample construction

We gather a set of European IPOs by retrieving data from Bloomberg and S&P Capital IQ. We identify IPOs from the top-10 European stock exchanges between 2010 and 2021, resulting in a sample of 2,696 IPOs.[3] This sample is supplemented with information on offering details, stock price performance, IPO stakeholders and accounting variables. Following standard practice in IPO

[3] The top 10 European stock-exchanges include the London Stock Exchange, Nasdaq Nordic, Borsa Italiana, Euronext, Deutsche Börse, Warsaw Stock Exchange, Oslo Børs, Bolsas y Mercados Españoles, SIX Swiss Exchange and the Irish Stock Exchange.

literature (e.g., Abrahamson et al., 2011; Chen and Ritter, 2000; Lee et al., 1996; Kennedy et al., 2006; Michala, 2019; Walker and Yoost, 2008), we exclude firms with insufficient data, total assets below $5 million at IPO, Real Estate Investment Trusts (REITs), American Depositary Receipts (ADRs), rights issues, duplicates, and extreme first day share price reactions. As a result, our main dataset consists of 1,010 European IPOs.

Within these 1,010 IPOs, we categorize 253 as PE-backed and 84 as VC-backed. Categorization follows Fürth and Rauch (2014) and is based on the presence of at least one PE or VC fund as a shareholder at the time of going public. We collect data for PE and VC-backing using Bloomberg, Capital IQ, and manual research. We collect information on the intended use of proceeds from Bloomberg and cross-check it with the IPO prospectuses to ensure accuracy. We follow Bloomberg and prior literature and classify the intended use of proceeds as 'no use of proceeds' if we cannot assign the information to one of the five pre-defined categories (Autore et al., 2009; Amor and Kooli, 2017). The five different categories of intended use of proceeds are: (1) 'general corporate purpose', (2) 'repay debt', (3) 'R&D', (4) 'repay selling shareholders', and (5) 'M&A'. All share price information is retrieved from S&P Capital IQ and Refinitiv.

We follow Leone et al. (2007) and incorporate data on media attention garnered by the IPO firm. Media attention is defined as the number of news articles in the year prior to the IPO. This data is obtained from Refinitiv. In addition, we include a measure of European underwriter quality (the 2017 update) from Migliorati and Vismara (2014).[4] This measure is commonly used in studies on European IPOs (e.g., Helbing et al., 2019; Khurshed et al., 2016).

[4] This ranking of underwriter quality is preferred over the Carter-Manaster ranking due to better coverage of underwriters in European IPOs (Migliorati and Vismara, 2014).

Finally, to address firm-level outcomes post IPO, we complement our dataset with information on accounting variables and M&A activity in the three years before and after the IPO. We collect data on the accounting variables from S&P Capital IQ. We refer to previous studies (e.g., Hammer et al., 2017; Hammer et al., 2022) and retrieve the M&A history for each firm from Bureau van Dijk Zephyr. This information is easily matched with S&P Capital IQ and Bloomberg data using the company ISIN.

4.2 Sample distribution and descriptive statistics

Table 1 presents the distribution of 1,010 IPOs in our sample based on IPO years, exchanges, firm headquarters, industry, and market capitalization. In Panel A, the years 2014, 2015, 2018, and 2021 display the highest IPO activity. Panel B presents the IPO distribution across exchanges, with the London Stock Exchange (LSE) accounting for about a quarter of all IPOs. The distributions presented in both Panels align well with previous studies and industry reports (Helbing et al., 2019; PWC, 2018; PWC, 2023). The cross-sectional distribution of PE-backed versus non-PE-backed issuers is largely similar across the Panels, except for Borsa Italiana, which records notably fewer PE-backed IPOs. Panels C and D present IPO distributions by firm headquarters and industry. One-fourth of IPO firms are headquartered in Britain. As Panel E shows, 66.6% of observations have an IPO market capitalization below €300m. PE-backed IPOs tend to be larger, with only 47.9% falling below €300m. On average, our sample has an average IPO market capitalization of €758m.

— Insert Table 1 about here —

Table 2 presents summary statistics for the variables used in our regression models (see Appendix A2 for construction details and definitions). Looking at the main variables of interest, we note that around 19% of IPOs lack clear information about their intended use of proceeds. Hence, they are classified as having 'no use of proceeds.' The most common uses of proceeds are

'general corporate purpose' (46%) and 'repay selling shareholders' (52%).[5] The mean underpricing is 9%, which aligns with previous literature (Leone et al., 2007). PE-backing is a dichotomous dummy variable, with a value of one if a PE investor is involved, and zero otherwise. VC-backing is defined analogously. Accordingly, 25% of IPOs are PE-backed and 8% are VC-backed. This compares to 16% and 6%, respectively, in Helbing et al. (2019) who study a sample of European IPOs for the period 2001-2015. Control variables include firm-level and market-level characteristics similar to previous IPO studies (e.g., Amor and Kooli, 2017; Barry et al., 1990; Beatty and Ritter, 1986; Brennan and Franks, 1997; Leone et al., 2007; Loughran and Ritter, 1995; Walker and Yost, 2008). Leverage ratios are winsorized at the 1% and 99% levels.

— Insert Table 2 about here —

4.3 Methodology

4.3.1 Use of proceeds categories in PE-backed IPOs

We employ a probit model with sample selection, also known as the heckprobit model, to assess the relationship between PE-backing and the disclosure of use of proceeds categories (hypotheses 1a-1c). It allows for modelling the non-random observability of use of proceeds categories in IPOs. Controlling for sample selection is important because use of proceeds categories can only be observed if the issuer decides to provide specific information at all. Hence, the observability of use of proceeds categories is determined by a latent variable. Formally, the model can be written as:

$$UoP_i^T = \Phi[X'_{1i}\beta_1 + \varepsilon_{1i} > 0] \quad (1)$$

$$s_i = \Phi[X'_{2i}\beta_2 + \varepsilon_{2i} > 0] \quad (2)$$

[5] Issuers can state numerous uses of proceeds, i.e., the categories are not mutually exclusive.

where $\Phi[\cdot]$ is the indicator function, X_{1i} and X_{2i} denote vectors of covariates, and β_1 and β_2 represent estimates of the unknown population parameters. The error terms ε_{1i} and ε_{2i} are assumed to be independent of $X_i = (X'_{1i}, X'_{2i})$ and follow a bivariate normal distribution:

$$\begin{pmatrix}\varepsilon_{1i}\\ \varepsilon_{2i}\end{pmatrix} \sim N_2\left\{\begin{pmatrix}0\\0\end{pmatrix}, \begin{pmatrix}1\rho\\ \rho 1\end{pmatrix}\right\}. \tag{3}$$

The dependent variable of the outcome equation UoP_i^T is binary. In our case, it indicates any of the following five use of proceeds categories: (1) 'general corporate purpose', (2) 'repay debt', (3) 'R&D', (4) 'repay selling shareholders' or (5) 'M&A'. The vector X_{1i} contains our main variable of interest *PE-backing* and the following control variables: *VC-backing*, *High-quality Underwriter (Score)*, *Additional Financial Advisor, Carveout*, *LN (Amount of Proceeds)*, *Foreign IPO, Market Valuation (P/E Stoxx600)*, *LN (Age)*, *Leverage, Percent Insider*, *Startup*. It also contains exchange, industry and IPO-year fixed effects.

Note that UoP_i^T can only be observed if $s_i = 1$, i.e., if specific use of proceeds are stated by the issuer. Hence, if $\rho \neq 0$, a selection bias arises and a standard probit regression yields biased estimates. For $\beta = (\beta'_1, \beta'_2)$ to be correctly identified in the heckprobit model, X_{2i} needs to include at least one variable that is not part of X_{1i}. We follow Leone et al. (2017) and include *LN (News Stories)* as the identifying instrument. The idea is that media attention resolves ex-ante uncertainty about the issuer's motivation for going public. Because information was available anyway, disclosing the use of proceeds is not as costly for the issuer. As a consequence, *LN (News Stories)* is presumably a strong predictor of s_i. Yet it is unlikely that media coverage systematically correlates with a specific use of proceeds category. Put differently, *LN (News Stories)* and UoP_i^T are plausibly exogenous.

4.3.2 Firm-level outcomes post IPO

We turn to a panel sample to investigate the relationship between the disclosure of specific use of proceeds categories and firm-level outcomes post IPO (hypothesis 2). In particular, we rely on the following difference-in-differences regressions:

$$KPI_{i,t} = \beta_0 + \beta_1 Post_{i,t} + \gamma_i + \delta_t + \epsilon_{i,t} \quad (4)$$

$$KPI_{i,t} = \beta_0 + \beta_1 Post_{i,t} + \beta_2 Post_{i,t} \; x \; UoP_i + \gamma_i + \delta_t + \epsilon_{i,t} \quad (5)$$

$$KPI_{i,t} = \beta_0 + \beta_1 Post_{i,t} + \beta_2 Post_{i,t} \; x \; PE_i + \gamma_i + \delta_t + \epsilon_{i,t} \quad (6)$$

$$KPI_{i,t} = \beta_0 + \beta_1 Post_{i,t} + \beta_2 Post_{i,t} \; x \; UoP_i + \beta_3 Post_{i,t} \; x \; PE_i + \beta_4 Post_{i,t} \; x \; UoP_i \; x \; PE_i + \gamma_i + \delta_t + \epsilon_{i,t} \quad (7)$$

where *KPI* represents the leverage ratio, the R&D expense-to-sales ratio (with sales fixed at the IPO year), or the number of M&A deals of firm *i* in year *t*. If the dependent variable is the leverage ratio or the R&D expense-to-sales ratio, we use a linear panel regression. If the dependent variable is the number of M&A deals, i.e. a non-negative count variable, we use a Poisson regression. *Post* is a dummy variable that is set to zero in the year before the IPO and one in the two years after the IPO. *UoP* represents the use of proceeds categories (2) 'repay debt', (3) 'R&D', or (5) 'M&A'. The respective *UoP* category determines which *KPI* is used. I.e., we test whether stating 'repay debt' results in a reduction of the leverage ratio, whether 'R&D' results in an increase in the R&D expense-to-sales ratio, and whether 'M&A' results in an increase in the number of M&A deals per year. Note that for the test of hypothesis 2, only the relationship between stating 'repay debt' and the leverage ratio is important. We test the other two relationships for the sake of completeness. *PE* takes the value of one if the IPO is PE-backed, and zero otherwise. We rely on the within estimator, where γ_i and δ_t denote firm and year fixed effects, respectively. This implies that time-

invariant variables such as *UoP* or *PE* enter the regression model via their interaction terms with *Post*.

4.3.3 Information content of use of proceeds and IPO underpricing

Finally, we are interested in whether PE-backing mitigates the negative implications of non-informative use of proceeds on underpricing (hypothesis 3). Testing this relationship is complicated by the fact that PE-backing is not random. To address this problem, we follow Hirano et al. (2003) and employ inverse probability weighting. The idea is to "exogenize" treatment assignment by giving more weight to treated (non-treated) observations with a low (high) likelihood of receiving the treatment, and less weight to treated (non-treated) observations with a high (low) likelihood of receiving the treatment. This process balances treated and non-treated observations on the basis of observable characteristics.[6]

In a first step, we use a probit regression to estimate the propensity score for PE-backing $\Pr(PE_i = 1|\, Z'_i\,)$ of firm *i*. Z_i denotes a vector of covariates including *High-quality Underwriter (Score), Additional Financial Advisor, LN (Amount of Proceeds), Foreign IPO, Market Valuation (P/E Stoxx600), LN (Age), Leverage* and *Percent Insider.* We then compute the following weights:

$$w_i = \begin{cases} \dfrac{1}{\Pr(PE_i = 1|\, Z'_i\,)}, & for\ PE_i = 1 \\ \dfrac{1}{(1 - \Pr(PE_i = 1|\, Z'_i\,))}, & for\ PE_i = 0 \end{cases} \tag{8}$$

Appendix A5 shows the outcomes and balancing diagnostics. The significance of the covariates diminishes entirely after applying weights. This suggests the model effectively balances the two

[6] A matching procedure can be used as an alternative. However, in our case, it cannot be applied to the entire sample because for some treated observation we lack suitable counterfactuals.

groups. We use these weights, w, in the subsequent OLS regressions on underpricing to adjust for possible confounding:

$$Underpricing_i = \alpha + \beta_1 No\ Use\ of\ Proceeds_i + \beta_2 PE_i + \beta_3 No\ Use\ of\ Proceeds_i\ x\ PE_i + \beta_4 Controls'_i\ +\ EXCHANGE + INDUSTRY + IPO\ YEAR + \epsilon_i \quad (9)$$

$$Underpricing_i = \alpha + \beta_1 Use\ of\ Proceeds\ Category_i + \beta_2 PE_i + \beta_3 Use\ of\ Proceeds\ Category_i\ x\ PE_i + \beta_4 Controls'_i + EXCHANGE + INDUSTRY + IPO\ YEAR + \epsilon_i \quad (10)$$

where *Underpricing* is defined as:

$$\frac{Closing\ price - offer\ price}{Offer\ price}. \quad (11)$$

Use of Proceeds Category represents (1) 'general corporate purpose', (2) 'repay debt', (3) 'R&D', (4) 'repay selling shareholders', or (5) 'M&A'. *Controls'* is a vector of control variables similar to Z' plus an indicator for *VC-backing.* EXCHANGE, INDUSTRY, and IPO YEAR represent exchange, industry, and IPO-year fixed effects, respectively. Note that only the regression model in equation (9) is needed to test hypothesis 3. The regression model in equation (10) is employed as a litmus test for the certification role of PE-backing.

5. Results

5.1 Baseline results

5.1.1 Use of proceeds categories in PE-backed IPOs

Table 3 presents a univariate analysis of use of proceeds disclosure. PE-backed IPOs disclose their use of proceeds more often: about 90.9% of PE-backed IPOs state at least one use of proceeds, which compares to only 77.3% in case of non-PE-backed IPOs. Furthermore, PE-backed IPOs tend

to disclose multiple use of proceeds categories. Of the 230 PE-backed IPOs with disclosed use of proceeds, 148 (64%) state more than two categories, and 69 (30%) state more than three categories. In contrast, only 301 of the 585 non-PE-backed IPOs with disclosed use of proceeds state more than one category (51%), and only 127 state more than three (22%). The Chi2 tests are highly significant at the 1% level throughout. Relatively speaking, PE-backed IPOs state 'repay debt' and 'repay selling shareholders' more often than non-PE-backed IPOs (significant at the 1% level). They state 'M&A' financing less often (significant at the 5% level). Overall, the univariate statistics suggest that PE-backed IPOs are more specific in their use of proceeds communication. The cross-sectional differences across the use of proceeds categories are consistent with our conjectures in H1a-H1c.

— Insert Table 3 about here —

Table 4 presents formal tests of H1a-H1c. In Panel A, the results of the second-stage probit regression are depicted. We find that PE-backed IPOs are significantly more likely to disclose 'repay debt' and 'repay selling shareholders' as the use of proceeds in comparison to non-PE-backed IPOs. But they are significantly less likely to disclose 'M&A'. The respective coefficients are also economically meaningful. Marginal effects at the mean suggest that PE-backed IPOs are 13.7 pp more likely to state 'repay debt', and they are 7.1 pp more likely to state 'repay selling shareholders', relative to non-PE-backed IPOs. In contrast, they are 7.7 pp less likely to state 'M&A'. Hence, there is evidence for H1a-H1c. The control variables indicate that IPOs with a high percentage of selling shareholders (*Percentage Insider*) are more likely to disclose 'repay selling shareholders' as the use of proceeds – as one would expect. Issuers with more ex-ante leverage are more likely to state 'repay debt' – as one would expect. VC-backed IPOs have a higher likelihood for stating 'R&D' as compared to non-VC-backed IPOs. This is consistent with the idea that VC-

backed IPOs are younger firms with more intangible assets and growth options (Gompers et al., 1997).

— Insert Table 4 about here —

In Panel B, the results of the first-stage selection equation are depicted. In line with Leone et al. (2007), the coefficients of the instrument *LN (News Stories)* are highly statistically significant across all regression models. This suggests that issuers with significant information production before the IPO are more likely to disclose their intended use of proceeds. Similarly, larger issuers (*LN [Amount of Proceeds]*), and issuers with a high percentage of selling shareholders (*Percentage Insider*), are more likely to disclose their use of proceeds. In contrast, foreign issuers (*Foreign IPO*), and issuers with more *Leverage* before the IPO, are less likely to disclose their use of proceeds. Note that the coefficient on *PE-backing* is statistically insignificant in the first stage, which is inconsistent with the univariate tests in Table 3. That is because the first-stage regression controls for the size of the issuer through *LN [Amount of Proceeds]*. *LN (Amount of Proceeds)*, in turn, absorbs much of the correlation of *PE-backing* with the dependent variable because PE-backed IPOs are larger on average.

5.1.2 Disclosure of use of proceeds and firm-level outcomes post IPO

Table 5 presents tests of H2 using fixed-effects panel regressions. In Panel A, the results of linear difference-in-difference (diff-in-diff) regressions on the leverage ratio are depicted. We start with some baseline effects. Column (1) suggests that the average issuer decreases its leverage ratio by 12.1% post IPO. Results in Column (2) indicate that the disclosure strategy matters. Issuers that do not state 'repay debt' in their prospectus' reduce the leverage ratio by only 9.1 pp. However, issuers that state 'repay debt' reduce the leverage ratio by 15.3 pp more, i.e. the time-series reduction in leverage is about 24.4 pp from before to after the IPO. This finding contradicts Amor

and Kooli (2017) who cannot find evidence for decreasing leverage ratios in IPOs that state 'repay debt' as the use of proceeds. One possible explanation for this discrepancy is that the median leverage ratio in the IPO year in their sample of US issuers is considerably lower (4%) than in our sample of European issuers (35%). Consequently, the issuers in our sample are in greater need to reduce leverage post IPO. The differences in pre-IPO leverage are most likely due to the greater importance of debt financing for private firms in the traditionally bank-based European economies.

— Insert Table 5 about here —

Results in columns (3) and (4) indicate that PE-backing matters for deleveraging. As column (3) shows, non-PE-backed IPOs reduce the leverage ratio by 9.6 pp, and PE-backed IPOs reduce the leverage ratio by 8.0 pp more. Hence, the average PE-backed IPO deleverages by approximately 17.6 pp from before to after the IPO. Column (4) suggests that the differences between PE-backed and non-PE-backed IPOs are more pronounced if 'repay debt' is stated as the use of proceeds. We find that PE-backed IPOs that state 'repay debt' reduce the leverage ratio by 12.5 pp more than non-PE-backed IPOs that state 'repay debt'. The net reduction of the leverage ratio is sizeable and amounts to approximately 28.4 pp from before to after the IPO. This compares to a time-series reduction of the leverage ratio of 15.9 pp in case of non-PE-backed IPOs that state 'repay debt'.

The magnitude of the PE effect can also be seen in Figure 1 which depicts leverage trends around the IPO event. It is striking that the average PE-backed IPO with 'repay debt' as the stated use of proceeds has a leverage ratio of approximately 60% before the IPO. This is about a 20 pp higher leverage ratio than in a non-PE-backed IPO that states 'repay debt'. The differences between the two groups vanish until three years post IPO, which suggests a mean reversion of leverage in PE-backed IPOs. Overall, our results are consistent with H2.

— Insert Figure 1 about here —

Panel B of Table 5 presents linear diff-in-diff regressions on the R&D expense-to-sales ratio. We find that issuers increase their R&D expenses-to-sales ratio by 1.8% on average post IPO. Results in column (2) suggest that stating 'R&D' as the use of proceeds does not lead to a significant increase in the R&D expenses-to-sales ratio. Results in columns (3) and (4) indicate that PE-backed IPOs do not increase the R&D expenses-to-sales ratio by more than non-PE-backed IPOs – regardless of whether they state 'R&D' as the use of proceeds or not. However, once we control for the ownership type in column (4), the coefficient on *Post x U3 R&D* turns significant. Hence, non-PE-backed issuers that state 'R&D' as the use of proceeds increase the R&D expenses-to-sales ratio by more than non-PE-backed IPOs that do not state 'R&D' as the use of proceeds. This suggests that PE-backed IPOs absorb much of the positive effect of stating 'R&D' as the use of proceeds on the R&D expenses-to-sales ratio in column (2). One possible explanation for why PE-backed issuers that state 'R&D' as the use of proceeds do not significantly increase the R&D expenses-to-sales ratio after the flotation is that the vast majority of these issuers also state 'repay debt'. This signifies that there could be a cannibalization effect during the first two years after the IPO.

Panel C of Table 5 presents the results of a Poisson estimation on the number of M&A acquisitions. The results indicate that the number of M&A acquisitions increases significantly in the two years following the IPO – regardless of whether 'M&A' is stated as the use of proceeds or not. PE-backing does not have an effect on the number of acquisitions.

5.1.3 Information content of use of proceeds and IPO underpricing

Table 6 presents the results of weighted OLS regressions on underpricing. As column (1) shows, not disclosing or providing vague information about the intended use of proceeds leads to a 4.4% higher underpricing in non-PE-backed IPOs. These findings support Leone et al. (2007) who find

a negative relationship between intended use of proceeds specificity and underpricing. However, PE-backing significantly reduces underpricing if no use of proceeds is stated. The magnitude of the effect is sizeable. The coefficient estimates suggest that non-PE-backed IPOs without stated use of proceeds have a 12.3% underpricing, whereas PE-backed IPOs without stated use of proceeds have a 0.4% underpricing. Hence, there is evidence for H3. Columns (2)-(6) show that the certification effect is not contingent on the disclosed use of proceeds category.

— Insert Table 6 about here —

The control variables are consistent with the literature. We confirm a negative association between high-quality underwriters and underpricing at a 1% significance level. This can be explained by the certification effect (e.g., Beatty and Ritter, 1986). Interestingly, we also find a significant negative coefficient for leverage at the 1% level. This contradicts expectations, as higher leverage typically indicates higher risk and should therefore be associated with higher underpricing. We attribute the negative relationship to the correlation between leverage and PE-backing, with a Pearson correlation coefficient of 0.17, causing leverage to capture parts of the PE certification effect.[7] Overall, Table 6 provides strong evidence supporting H3.

5.2 Extensions and robustness tests

In this section, we perform additional analyses to ensure the robustness of our estimates. Firstly, we employ a multivariate probit regression as a substitute for the heckrpobit approach. The alternative estimation method is used to analyze the disclosed intended use of proceeds categories by PE-backed IPOs in comparison with non-PE-backed IPOs. It is important to note that intended use of proceeds categories are not mutually exclusive, and therefore, the multivariate probit

[7] See Appendix A4 for a multicollinearity matrix of all main variables used in our study.

regression is employed to account for this aspect. The multivariate probit analysis estimates M-equation probit models, where M represents the number of categories (in our case, M=5 intended use of proceeds categories). These models are estimated using the simulated maximum likelihood method. The results are presented in Table 7 and show that the coefficient signs, magnitudes, and statistical significances remain robust with those presented in Table 4. We consistently observe a positive relationship between PE-backing and 'repay debt' and 'repay selling shareholders', along with a negative relationship between PE-backing and 'M&A'.[8]

— Insert Table 7 about here —

Secondly, to substantiate our diff-in-diff results examining whether PE-backed IPOs implement the intended use of proceeds 'repay debt' more promptly than non-PE-backed IPOs, we adjust the time period. The baseline diff-in-diff model using regression equations (5) and (7) maximize the sample size and number of groups by comparing the year before the IPO with the two years after, using a balanced sample of firms that report in all years. IPO firms may make financial or management adjustments in the year before the IPO to facilitate the going public process. To remedy this, we extend the baseline model and assess leverage, the ratio of R&D expenses to sales in the IPO year, and the number of M&A acquisitions within two years before and after, as well as within three years before and after. Results across Panels A to C in Table 8 regarding the implementation of intended use of proceeds after IPO largely remain consistent with those presented in Table 5. Solely the coefficient for *Post x PE x U5 M&A* in column (2) of Panel C in Table 8 becomes statistically significant, indicating that PE-backed IPOs with the intended use of

[8] Appendix A3 provides a further robustness test regarding the intended use of proceeds categories of PE-backed and non-PE-backed IPOs test using six separate probit models.

proceeds category 'M&A' acquire fewer companies post-IPO than non-PE-backed IPOs of the intended use of proceeds category 'M&A'.

— Insert Table 8 about here —

Thirdly, Table 9 explores the sensitivity of our diff-in-diff results examining whether PE-backed IPOs implement the intended use of proceeds more promptly than non-PE-backed IPOs to alternative dependent variables. We re-estimate the baseline diff-in-diff model that applies regression equation (5) and (7) using the (i) debt to sales ratio as well as the net interest expense to sales ratio to proxy for leverage (Panel A) and the (ii) R&D expense to IPO proceeds as well as the intangible assets to total assets in IPO year to proxy for the R&D expense to sales in IPO year (Panel B).[9] The robustness results presented in Table 9 confirm our previous estimates. We continue to detect a negative and statistically significant relationship between post-IPO leverage and PE-backed IPOs stating the intended use of proceeds category 'repay debt'. Further, we do not witness that PE-backed IPOs stating the intended use of proceeds category 'R&D' increase their R&D spend by more than non-PE-backed IPOs.

— Insert Table 9 about here —

Fourthly, we review the sensitivity of our multivariate OLS regression results related to the impact of providing vague or no information on the intended use of proceeds and PE-backing on underpricing to alternative dependent variables in Table 10. We re-estimate the baseline multivariate OLS model that applies regression equation (9) using the discount of offer price and the position in the offer price range to proxy for underpricing. Whilst we are unaware of any previous study linking information asymmetry and certification theory to these dependent variables,

[9] We do not proxy for the number of M&A acquisitions as the closest proxy, the value behind the M&A acquisitions, is not available for all M&A acquisitions during the pre-IPO period.

we argue that both variables are suitable proxies for underpricing. The discount to offer price refers to the underwriting discount applicable on the security divided by the offer price of the security. Riskier IPOs witness higher discount to offer prices, suggesting that this is a valid measure of ex-ante uncertainty for the underwriter of an IPO. The position in the offer price range refers to whether the final offer price is at the lower bound of the offer price range stated in the IPO prospectus. Hence, it is a gauge for institutional investor interest during the book-building phase of an IPO. Results confirm our findings regarding the effect of not stating or providing vague intended use of proceeds information and the effect of PE-backing on underpricing. PE-backed IPOs display a 0.4 pp lower discount of the offer price and an 8.5 pp higher positioning in the offer price range (significant at the 1% and 5% level, respectively). Not stating or providing vague intended use of proceeds information is related to a 1.2 pp higher discount to the offer price and a 13.6 pp lower positioning in the offer price range (significant at the 1% and 10% level, respectively).

— Insert Table 10 about here —

6. Conclusion

We investigate the impact of PE-backing and the intended use of proceeds information in an IPO setting using an up-to-date sample of 1,010 European IPOs for the period 2010-2021. Our focus is on three main aspects: (i) assessing whether the disclosure strategy differs in PE-backed IPOs, i.e., whether the use of proceeds are different from non-PE-backed IPOs, (ii) exploring the impact of the disclosure strategy on firm-level outcomes post IPO, and (iii) evaluating whether the PE certification effect is contingent on the information content provided by the use of proceeds.

Firstly, regarding the disclosure strategy, our study reveals that PE-backed IPOs are 13.7 pp more likely to disclose the use of proceeds category ‘repay debt’ and 7.1 pp more likely to disclose the category ‘repay selling shareholders’ than non-PE-backed IPOs. PE-backed issues are 7.7 pp

less likely to disclose the use of proceeds category 'M&A'. Secondly, we find that whilst non-PE-backed IPOs cut leverage by 9.6 pp, PE-backed IPOs cut 8.0 pp more, averaging a 17.6 pp reduction in leverage post-IPO. This effect is magnified when PE-backed IPOs state 'repay debt' as use of proceeds. We show that PE-backed IPOs that state 'repay debt' reduce the leverage ratio by 12.5 pp more than non-PE-backed IPOs that state 'repay debt'. We provide evidence showing a mean reversion of leverage for PE-backed IPOs, that is consistent with the idea that PE ownership only leads to a temporarily higher optimal capital structure which needs adjustment after the exit. Lastly, we show that the certification effect of PE-backing completely mitigates the negative impact of non-specific use of proceeds disclosure on underpricing. Coefficient estimates show non-PE-backed IPOs without stated use of proceeds have a 12.3% underpricing, while PE-backed IPOs without stated use of proceeds have a 0.4% underpricing. We contribute to two streams of academic research. Firstly, we extend the discourse on disclosure of use of proceeds in IPOs and SEOs. Prior studies review whether use of proceeds information provides insights on underpricing, as well as ex-post firm performance and use of proceeds implementation for SEOs (e.g., Amor and Kooli, 2017; Autore et al., 2009; Leone et al., 2007; Walker and Yost, 2008). This paper extends this discourse by being, to the best of our knowledge, the first to address the impact of PE on issuers' disclosed use of proceeds, post-IPO outcomes and underpricing. Secondly, we add to prior PE-backed IPO research. Earlier studies focus on timing, valuation, comparisons between PE-backed and VC-backed IPOs, and the impact of PE-backing on IPO performance (e.g., Bruton et al., 2009; Levis, 2011; Michala, 2019). This paper extends these investigations by studying the interrelation between disclosure, real effects, and first-day returns.

We recognize certain limitations in our analysis. Firstly, our sample size is moderate, limiting a deeper investigation into why post-IPO implementation of intended use of proceeds is prompter only for PE-backed IPOs in the 'repay debt' category. We suggest that the importance of debt

repayment and associated covenants might prioritize this category. Future studies drawing on larger, global samples can further explore conflicts of interest in IPOs stating multiple intended use of proceeds categories. Secondly, similar to Leone et al. (2007), we recognize endogeneity concerns in interpreting the effect of intended use of proceeds on underpricing. The timing of intended use of proceeds disclosure and the decision to go public can lead to alternative explanations, such as underlying firm characteristics affecting underpricing. While we address this concern with an extensive set of covariates in our baseline and robustness estimates, alternative explanations cannot be fully ruled out.

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Table 1

Sample distribution

This table presents the sample distribution for our European IPO sample across IPO years (Panel A), exchanges (Panel B), country of IPO firm headquarters (Panel C), industries (Panel D) and market capitalization (Panel E).

Panel A: Distribution by IPO year

	Total sample		PE-backed IPO		Non-PE-backed IPO	
IPO year	N	%	N	%	N	%
2010	36	3.6	6	2.4	30	4.0
2011	47	4.7	3	1.2	44	5.8
2012	21	2.1	3	1.2	18	2.4
2013	53	5.2	9	3.6	44	5.8
2014	112	11.1	33	13.0	79	10.4
2015	113	11.2	42	16.6	71	9.4
2016	79	7.8	27	10.7	52	6.9
2017	36	3.6	10	4.0	26	3.4
2018	112	11.1	29	11.5	83	11.0
2019	74	7.3	22	8.7	52	6.9
2020	74	7.3	17	6.7	57	7.5
2021	253	25.0	52	20.6	201	26.6
Total	1,010	100.0	253	100.0	757	100.0

Panel B: Distribution by exchange

	Total sample		PE-backed IPO		Non-PE-backed IPO	
Exchange	N	%	N	%	N	%
Bolsas y Mercados Esp.	32	3.2	9	3.6	23	3.0
Borsa Italiana	140	13.9	17	6.7	123	16.2
Deutsche Börse	82	8.1	27	10.7	55	7.3
Euronext	127	12.6	38	15.0	89	11.8
Warsaw Stock Exchange	53	5.2	4	1.6	49	6.5
Irish Stock Exchange	4	0.4	1	0.4	3	0.4
London Stock Exchange	264	26.1	71	28.1	193	25.5
Nasdaq Nordic	208	20.6	60	23.7	148	19.6
Oslo Børs	84	8.3	22	8.7	62	8.2
SIX Swiss Exchange	16	1.6	4	1.6	12	1.6
Total	1,010	100.0	253	100.0	757	100.0

Table 1

Sample distribution—*continued*

Panel C: Distribution by country of IPO firm headquarters

	Total sample		PE-backed IPO		Non-PE-backed IPO	
Industry	N	%	N	%	N	%
Belgium	13	1.3	5	2.0	8	1.1
Britain	220	21.8	63	24.9	157	20.7
Denmark	23	2.3	6	2.4	17	2.2
Finland	34	3.4	11	4.3	23	3.0
France	87	8.6	23	9.1	64	8.5
Germany	74	7.3	25	9.9	49	6.5
Italy	140	13.9	17	6.7	123	16.2
Luxembourg	8	0.8	2	0.8	6	0.8
Netherlands	24	2.4	11	4.3	13	1.7
Norway	72	7.1	19	7.5	53	7.0
Other	84	8.3	9	3.6	75	9.9
Poland	42	4.2	4	1.6	38	5.0
Spain	33	3.3	10	4.0	23	3.0
Sweden	134	13.3	41	16.2	93	12.3
Switzerland	22	2.2	7	2.8	15	2.0
Total	1,010	100.0	253	100.0	757	100.0

Panel D: Distribution by industry

	Total sample		PE-backed IPO		Non-PE-backed IPO	
Industry	N	%	N	%	N	%
Agriculture, forestry & fishing	5	0.5	1	0.4	4	0.5
Mining	28	2.8	6	2.4	22	2.9
Construction	32	3.2	10	4.0	22	2.9
Manufacturing	299	29.6	82	32.4	217	28.7
Transportation, communication, electric, gas & sanitary services	126	12.5	31	12.3	95	12.5
Wholesale trade	83	8.2	17	6.7	66	8.7
Retail trade	102	10.1	36	14.2	66	8.7
Finance, insurance & real estate	70	6.9	10	4.0	60	7.9
Services	263	26.0	60	23.7	203	26.8
Public Administration	2	0.2	0	0.0	2	0.3
Total	1,010	100.0	253	100.0	757	100.0

Panel E: Distribution by market capitalization at IPO

	Total sample		PE-backed IPO		Non-PE-backed IPO	
Market capitalization	N	%	N	%	N	%
Micro (<€50m)	278	27.5	27	10.7	251	33.2
Small (€50m-€300m)	395	39.1	94	37.2	301	39.8
Medium (€300m-€1,000m)	178	17.6	63	24.9	115	15.2
Large (€1,000m-€10,000m)	144	14.3	62	24.5	82	10.8
V. Large (€10,000-€50,000m)	15	1.5	7	2.8	8	1.1
Total	1,010	100.0	253	100.0	757	100.0

Table 2

Summary statistics

This table presents summary statistics for the dependent and independent variables used during the cross-sectional analyses in this paper. All variables are defined in Appendix A2.

	N	Mean	S.D.	Q1	Median	Q3
Underpricing	1,010	0.09	0.21	0.00	0.04	0.14
Discount of Offer Price %	210	0.03	0.01	0.02	0.03	0.04
Position in Offer Price Range %	392	0.41	0.36	0.00	0.41	0.67
No Use of Proceeds	1,010	0.19	0.39	0.00	0.00	0.00
1 or more Use of Proceeds	1,010	0.80	0.40	1.00	1.00	1.00
2 or more Use of Proceeds	1,010	0.44	0.50	0.00	0.00	1.00
3 or more Use of Proceeds	1,010	0.19	0.40	0.00	0.00	0.00
Number of Use of Proceeds	1,010	1.47	1.07	1.00	1.00	2.00
U1 – General Corporate Purpose	1,010	0.46	0.50	0.00	0.00	1.00
U2 – Repay Debt	1,010	0.17	0.38	0.00	0.00	0.00
U3 – R&D	1,010	0.12	0.33	0.00	0.00	0.00
U4 – Repay Selling Shareholders	1,010	0.52	0.50	0.00	1.00	1.00
U5 – M&A	1,010	0.19	0.40	0.00	0.00	0.00
PE-backing	1,010	0.25	0.43	0.00	0.00	1.00
VC-backing	1,010	0.08	0.28	0.00	0.00	0.00
High quality underwriter (Score)	1,010	0.27	0.38	0.00	0.01	0.51
High quality underwriter (Y/N)	1,010	0.27	0.44	0.00	0.00	1.00
Additional Financial Advisor	1,010	0.47	0.50	0.00	0.00	1.00
Carveout	1,010	0.04	0.19	0.00	0.00	0.00
Amounts of Proceeds mEUR	979	219.10	484.12	13.00	51.76	197.91
LN (Amount of Proceeds EUR)	979	17.78	1.80	16.38	17.76	19.10
Foreign IPO	1,010	0.15	0.35	0.00	0.00	0.00
Market Valuation (P/E Stoxx600)	1,010	17.14	3.30	15.16	17.18	19.00
LN (Age)	924	2.89	1.05	2.30	2.83	3.50
Leverage	888	0.22	0.30	0.06	0.15	0.32
Percentage Insider	1,010	0.32	0.39	0.00	0.07	0.67
LN (News stories)	1,010	1.07	1.03	0.00	1.10	1.79
Startup	1,010	0.06	0.24	0.00	0.00	0.00

Table 3

Distribution of Intended Use of Proceeds categories

This table presents the distribution of the different intended use of proceeds categories of the IPO sample. All variables are defined in Appendix A2. We compare the distribution in the total sample to the sub split for only those IPOs PE-backed. To test the significance of the difference, we calculate the corresponding Chi2 value for each category. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

	(1) Total sample		(2) PE-backed IPO		(3) Non-PE-backed IPO		Difference
	N	% Total	N	% PE	N	% Non-PE	Chi2
No Use of Proceeds	195	19.3	23	9.1	172	22.7	22.61***
1 or more Use of Proceeds	815	80.7	230	90.9	585	77.3	23.32***
2 or more Use of Proceeds	449	44.5	148	58.5	301	39.8	16.96***
3 or more Use of Proceeds	196	19.4	69	27.3	127	16.8	13.36***
U1 – General Corporate Purpose	466	46.1	118	46.6	348	46.0	0.03
U2 – Repay Debt	173	17.1	91	36.0	82	10.8	84.40***
U3 – R&D	126	12.5	26	10.3	100	13.2	1.49
U4 – Repay Selling Shareholders	524	51.9	186	73.5	338	44.6	63.30***
U5 – M&A	196	19.4	36	14.2	160	21.1	5.78**

Table 4

Results of the Heckman probit selection model on use of proceeds communication

This table presents the results of Heckman probit estimates of the decision to disclose intended use of proceeds information and the type of intended use of proceeds category disclosed. In Panel A we report the second step results of Heckman probit estimates and in Panel B we display the first step results of the Heckman probit estimates. The variable LN (News stories) is omitted in the second step of the Heckman probit models. Columns 1 to 5 refer to separate Heckman probit models per available use of proceeds category. We control for exchange, industry, and IPO year fixed effects. Robust standard errors are clustered at industry and year level and reported in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Panel A: Second step of the Heckman selection model incl. controls and fixed effects

	Dependent variable				
	(1) U1 – General Corporate Purpose	(2) U2 – Repay Debt	(3) U3 – R&D	(4) U4 – Repay Selling Shareholders	(5) U5 – M&A
PE-backing	-0.100	0.564***	-0.170	0.333**	-0.403***
	(0.11)	(0.12)	(0.15)	(0.17)	(0.13)
VC-backing	0.414*	-0.002	0.297**	-0.281	-0.129
	(0.22)	(0.24)	(0.15)	(0.20)	(0.22)
High-quality underwriter (Score)	-0.138	0.046	-0.154	0.221	-0.228
	(0.17)	(0.23)	(0.21)	(0.27)	(0.23)
Additional Financial Advisor	-0.077	0.215*	0.030	0.126	0.145
	(0.11)	(0.13)	(0.11)	(0.12)	(0.12)
Carveout	-0.820***	-0.089	-0.143	0.500	-0.654*
	(0.28)	(0.30)	(0.35)	(0.54)	(0.39)
LN (Amount of Proceeds)	0.067	0.251***	-0.202***	0.215***	0.000
	(0.05)	(0.07)	(0.05)	(0.06)	(0.07)
Foreign IPO	0.187	0.134	0.546***	-0.493***	0.235
	(0.23)	(0.17)	(0.13)	(0.14)	(0.16)
Market Valuation (P/E Stoxx600)	-0.005	-0.020	-0.012	0.110**	0.006
	(0.04)	(0.05)	(0.02)	(0.04)	(0.04)
LN (Age)	-0.132**	0.007	-0.141*	0.012	-0.033
	(0.07)	(0.06)	(0.07)	(0.07)	(0.05)
Leverage	-0.022	1.223***	-0.228	-0.435	-0.227
	(0.29)	(0.33)	(0.36)	(0.54)	(0.40)
Percentage Insider	-1.402***	-0.817***	-0.723***	2.802***	-0.777***
	(0.15)	(0.20)	(0.20)	(0.62)	(0.15)
Startup	0.484*	-0.117	0.045	-0.673***	-1.115***
	(0.26)	(0.25)	(0.18)	(0.22)	(0.29)
Exchange FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
IPO year FE	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes
N	801	801	801	801	801
p-value	0.000	0.000	0.000	0.000	0.000

Table 4

Results of the Heckman probit selection model on use of proceeds communication—*continued*

Panel B: First step of the Heckman selection model incl. controls and fixed effects

	Dependent variable				
	(1) 1 or more Use of Proceeds	(2) 1 or more Use of Proceeds	(3) 1 or more Use of Proceeds	(4) 1 or more Use of Proceeds	(5) 1 or more Use of Proceeds
LN (News stories)	0.227***	0.231***	0.263***	0.242***	0.204**
	(0.08)	(0.08)	(0.07)	(0.08)	(0.09)
PE-backing	0.175	0.175	0.107	0.212	0.167
	(0.20)	(0.20)	(0.22)	(0.22)	(0.20)
VC-backing	0.076	0.076	0.093	0.036	0.069
	(0.28)	(0.28)	(0.31)	(0.27)	(0.29)
High-quality underwriter (Score)	-0.061	-0.064	-0.037	-0.030	-0.004
	(0.24)	(0.25)	(0.24)	(0.23)	(0.24)
Additional Financial Advisor	-0.064	-0.066	-0.021	-0.066	-0.049
	(0.12)	(0.13)	(0.12)	(0.13)	(0.13)
Carveout	0.625	0.631	0.678	0.631	0.620
	(0.48)	(0.49)	(0.55)	(0.50)	(0.47)
LN (Amount of Proceeds)	0.275***	0.274***	0.284***	0.274***	0.283***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Foreign IPO	-0.530***	-0.528***	-0.472***	-0.510***	-0.558***
	(0.17)	(0.17)	(0.18)	(0.17)	(0.17)
Market Valuation (P/E Stoxx600)	0.016	0.018	0.031	0.007	0.009
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
LN (Age)	0.018	0.022	0.071	0.040	0.029
	(0.06)	(0.06)	(0.07)	(0.05)	(0.05)
Leverage	-0.833***	-0.824**	-0.747**	-0.759**	-0.831**
	(0.32)	(0.32)	(0.38)	(0.34)	(0.33)
Percentage Insider	0.515**	0.510**	0.620**	0.513**	0.502**
	(0.23)	(0.23)	(0.28)	(0.23)	(0.24)
Startup	0.138	0.141	0.082	0.180	0.208
	(0.29)	(0.29)	(0.25)	(0.29)	(0.32)
Exchange FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
IPO year FE	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes

Table 5

Results on Difference-in-difference Regressions

This table presents difference-in-difference estimates for the differential changes in the Leverage Ratio (Panel A) and R&D Expense to Sales in IPO year Ratio (Panel B) and Poisson estimates for the number of M&A acquisitions (Panel C). All variables are defined in Appendix A2. The balanced difference-in-difference regressions measure the significance of change in the figures between 1 year before the IPO and 2 years thereafter in order check the reliability of the intended use of proceeds information of PE-backed IPOs. All regression models include control variables for firm fixed effects and year fixed effects. Robust standard errors are clustered at year level and displayed in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Panel A: Repay Debt				
	Dependent variable: Leverage (-1 to +2 years)			
	(1)	(2)	(3)	(4)
Post	-0.121***	-0.091***	-0.096***	-0.089***
	(0.01)	(0.01)	(0.01)	(0.01)
Post x U2 Repay Debt		-0.153***		-0.070**
		(0.03)		(0.04)
Post x PE-backing			-0.080***	-0.008
			(0.02)	(0.03)
Post x PE x U2 Repay Debt				-0.125**
				(0.06)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Number of Observations	1,722	1,722	1,722	1,722
Number of Groups	574	574	574	574
Panel B: R&D Activity				
	Dependent variable: R&D Expense to Sales in IPO year ratio (-1 to +2 years)			
	(1)	(2)	(3)	(4)
Post	0.018***	0.017***	0.019***	0.016***
	(0.00)	(0.00)	(0.00)	(0.00)
Post x U3 R&D		0.016		0.034***
		(0.01)		(0.02)
Post x PE-backing			-0.002	0.001
			(0.01)	(0.01)
Post x PE x U3 R&D				-0.042
				(0.03)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Number of Observations	243	243	243	243
Number of Groups	81	81	81	81
Panel C: M&A Activity				
	Dependent variable: Number of M&A acquisitions (-1 to +2 years)			
	(1)	(2)	(3)	(4)
Post	1.239***	1.249***	1.256***	1.203***
	(0.13)	(0.14)	(0.16)	(0.19)
Post x U5 M&A		-0.037		0.159
		(0.29)		(0.33)
Post x PE-backing			-0.051	0.118
			(0.25)	(0.27)
Post x PE x U5 M&A				-0.883
				(0.68)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Number of Observations	3,030	3,030	3,030	3,030
Number of Groups	1,010	1,010	1,010	1,010

Table 6

Results of multivariate regression models on underpricing

This table presents the results of the multivariate OLS regression models on underpricing with inverse probability weighting as described in the text. All variables are defined in Appendix A2. For each use of proceeds category, an OLS model is calculated to estimate the effect of each use of proceeds category on underpricing. Marginal mean underpricing effects including the constant are reported at the bottom of the panels. Robust standard errors are clustered at industry and year level and displayed in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

	Dependent variable: Underpricing					
	(1)	(2)	(3)	(4)	(5)	(6)
No Use of Proceeds	0.044**					
	(0.02)					
U1 – General Corporate Purpose		-0.002				
		(0.01)				
U2 – Repay Debt			-0.021			
			(0.02)			
U3 – R&D				0.007		
				(0.03)		
U4 – Repay Selling Shareholders					-0.052***	
					(0.02)	
U5 – M&A						-0.024
						(0.02)
No Use of Proceeds x PE	-0.089***					
	(0.03)					
U1 – Gen. Corp. Purpose x PE		0.008				
		(0.02)				
U2 – Repay Debt x PE			0.043*			
			(0.03)			
U3 – R&D x PE				-0.042		
				(0.03)		
U4 – Repay Selling Shareh. x PE					0.080***	
					(0.02)	
U5 – M&A x PE						0.026
						(0.03)
PE-backing	-0.030**	-0.046***	-0.052***	-0.038***	-0.089***	-0.048***
	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)
VC-backing	0.012	0.011	0.009	0.008	0.004	0.010
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
High-quality underwriter (Score)	-0.063***	-0.062***	-0.063***	-0.062***	-0.059***	-0.062***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Additional Financial Advisor	-0.013	-0.015	-0.018	-0.015	-0.013	-0.015
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
LN (Amount of Proceeds)	0.013***	0.012***	0.012***	0.011***	0.012***	0.012***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Foreign IPO	0.023	0.021	0.023	0.021	0.023	0.022
	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)	(0.01)
Market Valuation (P/E Stoxx600)	0.003	0.004	0.004	0.005	0.004	0.004
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
LN (Age)	0.005	0.004	0.004	0.003	0.005	0.003
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Leverage	-0.048*	-0.043	-0.048*	-0.046*	-0.056**	-0.046*
	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)
Percentage Insider	0.020	0.022	0.022	0.021	0.031**	0.019
	(0.01)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)
Exchange FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
IPO year FE	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes
N	801	801	801	801	801	801
Marginaml mean Underpricing						
(1) UoP Category	*0.123*	*0.085*	*0.069*	*0.093*	*0.064*	*0.068*
(2) UoP Category & PE-backing	*0.004*	*0.048*	*0.060*	*0.012*	*0.055*	*0.046*

Table 7

Robustness: Results of the multivariate probit regression on use of proceeds category

This table presents the results of the multivariate probit regressions for all five possible intended use of proceeds categories. All variables are defined in Appendix A2. The mvprobit analysis estimates M-equation probit models, by the method of simulated maximum likelihood (SML) including control variables. The columns show the results for each intended use of proceeds category. Control variables include VC-backing, High-quality underwriter (Score), Additional Financial Advisor, Carveout, LN (Amount of Proceeds), Foreign IPO, Market Valuation (P/E Stoxx600), LN (Age), Leverage, Percentage Insider, LN (News stories) and Startup. Robust standard errors are clustered at industry and year level and reported in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

	Dependent variables				
	U1 – General Corporate Purpose	U2 – Repay Debt	U3 – R&D	U4 – Repay Selling Shareholders	U5 – M&A
PE-backing	-0.006	0.548***	-0.116	0.307**	-0.310**
	(0.11)	(0.12)	(0.15)	(0.16)	(0.13)
Controls included	Yes	Yes	Yes	Yes	Yes
Exchange FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
IPO year FE	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes
N	801	801	801	801	801

Table 8

Robustness: Alternative Difference-in-difference Regression Times

This table presents difference-in-difference estimates for the differential changes in the Total Debt to Total Asset Ratio (Panel A), R&D Expense to Sales in IPO year Ratio (Panel B) and Poisson estimates for the number of M&A acquisitions (Panel C). All variables are defined in Appendix A2. The balanced difference-in-difference regressions measure the significance of change in the figures between 2 years before the IPO and 2 years thereafter (Columns (1) to (2)) and between 3 years before the IPO and 3 years thereafter (Columns (3) to (4)) in order to check the reliability of the intended use of proceeds information of PE-backed IPOs. All models include control variables for firm and year fixed effects. Robust standard errors are clustered at year level and displayed in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Panel A: Repay Debt

	Dependent variable: Debt to Total Asset Ratio (-2 to +2 years)		Dependent variable: Debt to Total Asset Ratio (-3 to +3years)	
	(1)	(2)	(3)	(4)
Post	-0.097***	-0.097***	-0.082***	-0.080***
	(0.01)	(0.01)	(0.02)	(0.02)
Post x U2 Repay Debt	-0.134***	-0.064**	-0.133***	-0.034
	(0.02)	(0.03)	(0.03)	(0.03)
Post x PE-backing		-0.001		-0.006
		(0.02)		(0.02)
Post x PE x U2 Repay Debt		-0.109**		-0.144***
		(0.04)		(0.05)
Firm FE and Year FE	Yes	Yes	Yes	Yes
Number of Observations	2,196	2,196	2,484	2,484
Number of Groups	549	549	414	414

Panel B: R&D Activity

	Dependent variable: R&D Expense to Sales in IPO year (-2 to +2 years)		Dependent variable: R&D Expense to Sales in IPO year (-3 to +3 years)	
	(1)	(2)	(3)	(4)
Post	0.018***	0.018***	0.031***	0.033***
	(0.00)	(0.00)	(0.01)	(0.01)
Post x U3 R&D	0.023**	0.026***	0.024***	0.022***
	(0.01)	(0.01)	(0.00)	(0.01)
Post x PE-backing		-0.000		-0.004
		(0.00)		(0.01)
Post x PE x U3 R&D		-0.009		0.000
		(0.01)		(0.00)
Firm FE and Year FE	Yes	Yes	Yes	Yes
Number of Observations	316	316	144	144
Number of Groups	79	79	24	24

Panel C: M&A Activity

	Dependent variable Number of M&A acquisitions (-2 to +2 years)		Dependent variable: Number of M&A acquisitions (-3 to +3 years)	
	(1)	(2)	(3)	(4)
Post	1.327***	1.264***	1.025***	0.972***
	(0.14)	(0.16)	(0.16)	(0.18)
Post x U5 M&A	-0.291*	-0.131	-0.295	-0.224
	(0.17)	(0.20)	(0.16)	(0.19)
Post x PE-backing		0.164		0.139
		(0.19)		(0.18)
Post x PE x U5 M&A		-0.711**		-0.233
		(0.33)		(0.33)
Firm FE and Year FE	Yes	Yes	Yes	Yes
Number of Observations	4,040	4,040	6,060	6,060
Number of Groups	1,010	1,010	1,010	1,010

Table 9

Robustness: Alternative Dependent Variables in Difference-in-difference Regressions

This table presents difference-in-difference estimates for the differential changes in the alternative dependent variables within the balanced difference-in-difference regression. It includes the variables Debt to Sales Ratio and Net Interest Expense to Sales Ratio (Panel A) and R&D Expense to IPO proceeds ratio and Intangible Assets to Total Assets in IPO year (Panel B). All variables are defined in Appendix A2. The regressions measure the significance of change in the figures between 1 years before the IPO and 2 years thereafter to check the reliability of the intended use of proceeds information of PE-backed IPOs. All regression models include control variables for firm fixed effects and year fixed effects. Robust standard errors are clustered at year level and displayed in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Panel A: Repay Debt

	Alternative dependent variable: Debt to Sales Ratio (-1 to +2 years)		Alternative dependent variable: Net Interest Expense to Sales Ratio (-1 to +2 years)	
	(1)	(2)	(3)	(4)
Post	-0.158*	-0.144	-0.015***	-0.014***
	(0.09)	(0.12)	(0.00)	(0.00)
Post x U2 Repay Debt	-0.299**	-0.018	-0.030***	-0.010
	(0.13)	(0.14)	(0.01)	(0.01)
Post x PE-backing		-0.061		-0.007
		(0.13)		(0.00)
Post x PE x U2 Repay Debt		-0.402**		-0.029**
		(0.20)		(0.01)
Firm FE and Year FE	Yes	Yes	Yes	Yes
Number of Observations	1,710	1,710	2,001	2,001
Number of Groups	570	570	667	667

Panel B: R&D Activity

	Alternative dependent variable: R&D Expense to IPO proceeds (-1 to +2 years)		Alternative dependent variable: Intangible Assets to Total Assets in IPO year (-1 to +2 years)	
	(1)	(2)	(3)	(4)
Post	0.030***	0.029***	0.090***	0.105***
	(0.01)	(0.01)	(0.01)	(0.01)
Post x U3 R&D	0.025**	0.034**	0.009	-0.003
	(0.01)	(0.01)	(0.02)	(0.07)
Post x PE-backing		0.004		-0.048***
		(0.01)		(0.01)
Post x PE x U3 R&D		-0.027		0.034
		(0.02)		(0.04)
Firm FE and Year FE	Yes	Yes	Yes	Yes
Number of Observations	208	208	1,638	1,638
Number of Groups	73	73	546	546

Table 10

Robustness: Results using alternative dependent variables

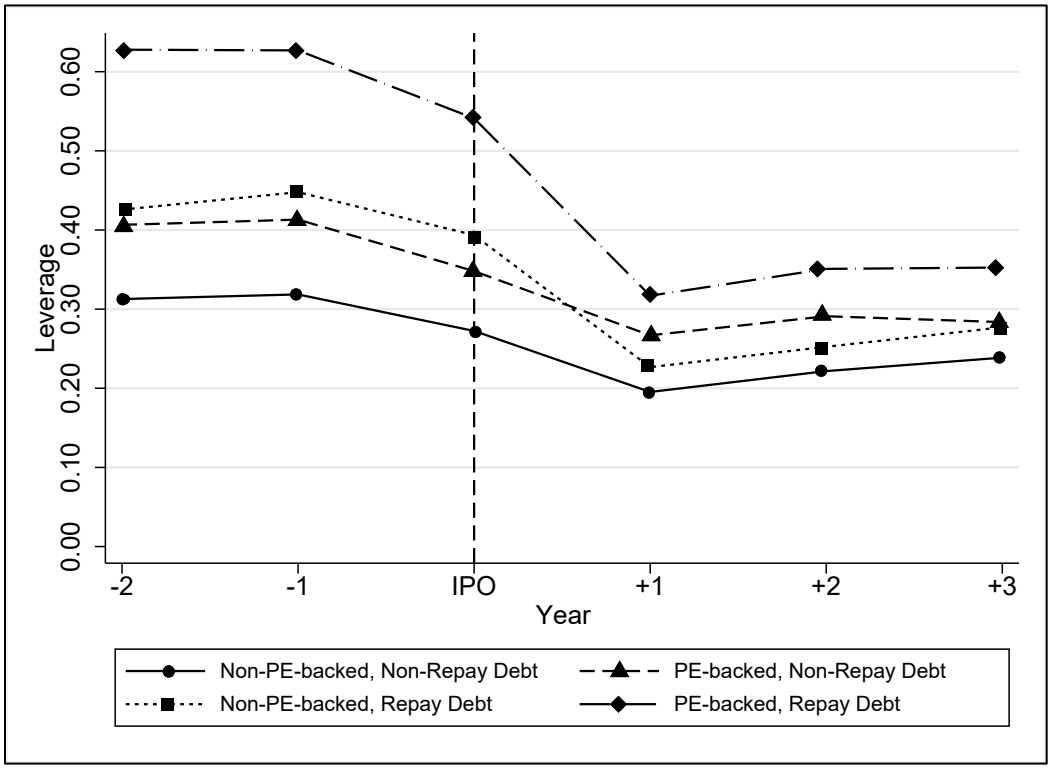
This table presents the results of the robustness tests using multivariate OLS regression models on alternative dependent variables for underpricing with inverse probability weighting as described in the text. All variables are defined in Appendix A2. Control variables include VC-backing, High-quality underwriter (Score), Additional Financial Advisor, LN (Amount of Proceeds), Foreign IPO, Market Valuation (P/E Stoxx600), LN (Age), Leverage and Percentage Insider. We control for exchange, year, and industry fixed effects. Robust standard errors are clustered at industry and year level and displayed in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

	Dependent variable: Discount of Offer Price %	Dependent variable: Position in Offer Price Range %
	(1)	(2)
No Use of Proceeds	0.013***	-0.092
	(0.00)	(0.08)
No Use of Proceeds x PE	-0.010***	0.271***
	(0.00)	(0.10)
PE-backing	-0.004***	0.058
	(0.00)	(0.03)
Controls included	Yes	Yes
Exchange FE	Yes	Yes
Industry FE	Yes	Yes
IPO year FE	Yes	Yes
Constant	Yes	Yes
N	165	341

Figure 1

Leverage trends around the IPO

This figure presents the pre- and post-IPO leverage for PE- and non-PE-backed IPOs stating and not stating the use of proceeds category 'repay debt'. All variables are defined in Appendix A2**.**



Appendix

Appendix A1

Example of intended Use of Proceeds information in IPO prospectuses

Panel A: Informative use of proceed disclosure	
Scout 24 AG – Prospectus dated at September 18, 2015	
Reasons for the offer, use of proceeds, estimated net amount of proceeds.	The Company intends to list its shares on the regulated market segment (regulierter Markt) of the Frankfurt Stock Exchange, with simultaneous admission to the sub-segment of the regulated market with additional post admission obligations (Prime Standard) of the Frankfurt Stock Exchange, to get better direct access to the capital markets and diversify its shareholders' base. The Company will use the net proceeds in the amount of approximately EUR 211.3 million to partly repay the term loan facility B under the SFA with an outstanding amount of EUR 595 million as of June 30, 2015 in order to strengthen its financial position and equity base and to support growth. As of June 30, 2015, the total outstanding indebtedness under the SFA (including term loan facility B and term loan facility C) amounted to EUR 995 million with a final maturity on February 12, 2021 (term loan facility B) and April 20, 2022 (term loan facility C).
Panel B: Non-informative use of proceeds disclosure	
Telefónica Deutschland Holding AG – Prospectus dated on October 16, 2012	
Reasons for the offer, use of proceeds, estimated net amount of proceeds.	The Offering is part of the asset portfolio management strategy of the Telefónica Group. Through the listing of the Shares on the Frankfurt Stock Exchange, Telefónica Group aims to increase the profile and market awareness of one of its most attractive assets. Telefónica Group also aims to improve our embedded value within Telefónica Group's market capitalization. In addition, the admission to trading of the Shares provides us with a higher degree of flexibility and direct access to capital markets and fully aligns with Telefónica Group's strategy to increase financial flexibility and reduce leverage.

Appendix A2

Variable definitions

This table describes the construction and sources of the dependent and independent variables used in this paper.

Panel A: Dependent variables		
Category	Variable	Description
IPO pricing	Underpricing	Underpricing represents the first day return of stocks, calculated by the difference of the closing share price at the end of the first trading day and the offer price over the offer price of the stock at IPO. Source: Refinitiv, CapitalIQ
	Discount of Offer Price %	Continuous variable taking on the value of the underwriting discount applicable on the security divided by the offer price of the security. The underwriting discount is defined as the difference between the price at which the underwriters buy the security from the issuer and the price at which these securities are sold further by the underwriters in the public offering. Source: CapitalIQ
	Position in Offer Price Range %	Continuous variable between 0 and 1 depending on whether the final offer price is at the lower bound of the offer price range stated in the prospectus (0) or at the upper bound of the offer price range (1). Source: CapitalIQ
Use of Proceeds	No Use of Proceeds	Dichotomous dummy variable taking the value of 1 if the IPO firm has not stated any use of proceeds or left the field "Intended use of proceeds" in the IPO prospectus ambiguous, i.e. giving no useful information or data which cannot be assigned to one of the five pre-defined categories Source: Bloomberg
	1 to 3 or more Use of Proceeds	Dichotomous dummy variable taking the value of 1 if the IPO firm has 1 to 4 or more of the five pre-defined categories U1, U2, U3, U4, or U5 in the "Intended use of proceeds" of the IPO prospectus. Source: Bloomberg
	Number of Use of Proceeds	Integer variable taking a value between 0 and 5 depending on the number of identified "Intended use of proceeds" categories U1, U2, U3, U4, or U5 in the IPO prospectus. Source: Bloomberg
	U1 – General Corporate Purpose	Dichotomous dummy variable taking the value of 1 if the IPO firm has stated on of the points listed below as intended uses of proceeds in its IPO prospectus, and 0 otherwise: Investment motives, such as to finance internal growth, increase capital expenditures, improve production processes or use the proceeds for working capital management. Source: Bloomberg
	U2 – Repay Debt	Dichotomous dummy variable taking the value of 1 if the IPO firm has stated on of the points listed below as intended uses of proceeds in its IPO prospectus, and 0 otherwise: Repay outstanding debt, reduce bank loans or improve their balance sheet structure by swapping debt with equity. Source: Bloomberg
	U3 – R&D	Dichotomous dummy variable taking the value of 1 if the IPO firm has stated on of the points listed below as intended uses of proceeds in its IPO prospectus, and 0 otherwise: All topics correlating to investing in innovation or planning to increase the R&D expenditures. Source: Bloomberg
	U4 – Repay Selling Shareholders	Dichotomous dummy variable taking the value of 1 if the IPO firm has stated to repay its existing shareholders with the proceeds received from the IPO and 0 otherwise. Issuers where the existing shareholders use the IPO to capitalize their investment and sell their shares to new investors, also called "secondary offering" (a process where shares are only transferred from one investor to the other. The IPO firm does not see any cash inflow). Source: Bloomberg
	U5 – M&A	Dichotomous dummy variable taking the value of 1 if the IPO firm has stated on of the points listed below as intended uses of proceeds in its IPO prospectus, and 0 otherwise: Using the proceeds for financing external growth via acquisitions and common M&A activities, such as buy-and-build measures. Source: Bloomberg

Appendix A2

Variable definitions—*continued*

Panel B: Independent variables		
IPO stakeholders	PE-backing	Dichotomous dummy variable that takes the value of 1 if the IPO was backed by a private equity firm and 0 otherwise, regardless of whether the private equity was a majority shareholder or not. Information was retrieved from Bloomberg but supplemented by hand-collected research. Source: Bloomberg.
	VC-backing	Like PE backing, a dummy variable for VC backing was created, which takes the value of 1 if the IPO was backed by a venture capitalist and 0 otherwise, regardless of the size of the share in the firm. Source: Bloomberg
	High quality underwriter (Score)	Continuous variable between 0 and 1 based on the 2017 update of the proceeds weighted ranking of high-quality underwriters from Migliorati & Vismara's (2014). In the case of numerous underwriters of an IPO, the maximum proceeds weighted ranking of high-quality underwriters is assigned to the IPO. Source: Migliorati & Vismara (2014), CapitalIQ
	High quality underwriter (Y/N)	Dichotomous dummy variable taking the value of 1 for high quality underwriters and 0 otherwise. To split underwriters into high- and low-quality underwriters, we used the high-quality underwriter (score) variable above, which is in turn based on the 2017 update of the proceeds weighted score of Migliorati & Vismara's (2014) ranking of underwriters of European IPOs. Scores above 0.8 are assigned the value of 1 and scores below are assigned the value of 0. The score of 0.8 was chosen as this leads to a similar mean of the score and dichotomous dummy variable for high quality underwriters. Source: Migliorati & Vismara (2014), CapitalIQ
	Additional Financial Advisor	Dichotomous dummy variable stating the value of 1 if the IPO firm decided for an additional financial advisor to support their IPO process, and 0 otherwise. Source: Bloomberg, CapitalIQ
	Carveout	Dichotomous dummy variable representing any IPO firm which is split up by the parent company and where the IPO proceeds mainly go to the existing shareholders of the parent company, also called spin-off. Source: CapitalIQ
Transaction details	Amounts of Proceeds (mEUR)	Continuous variable stating the amount of proceeds (mEUR) received through the IPO, meaning the capital inflow to the IPO firm. This value is not automatically equal to market cap or company size. Source: CapitalIQ
	LN (Amount of Proceeds)	Continuous variable representing the natural logarithm of amounts received through the IPO, meaning the capital inflow to the IPO firm, not automatically equal to market cap or company size. Source: CapitalIQ
	Foreign IPO	Dichotomous dummy variable which takes the value of 1 if the country of the headquarter of the IPO firm and the country of the stock exchange of the IPO are different and 0 if they are the same. Source: Capital IQ
	Market Valuation (P/E Stoxx600)	Continuous variable representing the current valuation of the stock market at the IPO date, measured by the price/earnings ratio of the respective Stoxx600 industry sector index of the IPO firm at the IPO date. Source: Refinitiv
IPO company details	LN (Age)	Continuous variable representing the natural logarithm of the age of the firm in years plus one. The age of the IPO firm is calculated by the time difference (in years) between the date being founded and the IPO date. Source: Capital IQ
	Leverage	Continuous variable calculated as the debt to total assets ratio, whereas both values equal the numbers reported on IPO date. Winsorized at the 1% and 99% level. Source: CapitalIQ

Appendix A2

Variable definitions—*continued*

Panel B: Independent variables		
	Percentage Insider	Continuous variable calculated as the number of shares sold by selling shareholders divided by the total shares sold in the IPO. Source: CapitalIQ
	LN (News stories)	Continuous variable representing the natural logarithm of the number of news stories in the year prior to going public. Source: Refinitiv
	Startup	Dichotomous dummy variable which takes the value of 1 if the pre-IPO annual revenues are less than 3 mEUR and 0 otherwise. This specification is based on Leone et al. (2007). Source: CapitalIQ
IPO company details	Debt to Sales Ratio	Continuous variable calculated as the debt to total sales ratio between two years before the IPO and two years thereafter. Winsorized at the 1% and 99% level. Source: CapitalIQ
	Net Interest Expense to Sales Ratio	Continuous variable calculated as the net interest expense to total sales ratio between two years before the IPO and two years thereafter. Winsorized at the 1% and 99% level. Source: CapitalIQ
	R&D Expense to Sales in IPO year	Continuous variable calculated as the research and development expense to total sales in IPO year ratio between two years before the IPO and two years thereafter. Winsorized at the 2.5% and 90% level. Source: CapitalIQ
	R&D Expense to IPO proceeds	Continuous variable calculated as the research and development expense to IPO proceeds ratio between two years before the IPO and two years thereafter. Winsorized at the 1% and 99% level. Source: CapitalIQ
	Intangible Assets to Total Assets in IPO year	Continuous variable calculated as the intangible assets to the total assets in IPO year ratio between two years before the IPO and two years thereafter. Winsorized at the 1% and 99% level. Source: CapitalIQ
	Number of M&A acquisitions	Integer variable taking on the annual number of M&A acquisitions performed by the company of the IPO between two years before the IPO and two years thereafter. Source: BvD Zephyr

Appendix A3

Robustness: Results of six separate probit models on use of proceeds category

This table presents the results of the robustness test of separate probit regressions for six possible intended use of proceeds. All variables are defined in Appendix A2. Column 1 shows the results when No Use of Proceeds information is reported, column 2 if U1 – General Corporate Purpose is selected and so forth. Control variables include VC-backing, High-quality underwriter (Score), Additional Financial Advisor, Carveout, LN (Amount of Proceeds), Foreign IPO, Market Valuation (P/E Stoxx600), LN (Age), Leverage, Percentage Insider, LN (News stories) and Startup. Robust standard errors are clustered at industry and year level and reported in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

	Dependent variable: Intended Use of Proceeds Category					
	(1) No Use of Proceeds	(2) U1 – General Corporate Purpose	(3) U2 – Repay Debt	(4) U3 – R&D	(5) U4 – Repay Selling Shareholders	(6) U5 – M&A
PE-backing	-0.145	-0.024	0.489***	-0.076	0.267	-0.332**
	(0.21)	(0.11)	(0.12)	(0.16)	(0.17)	(0.14)
Controls included	Yes	Yes	Yes	Yes	Yes	Yes
Exchange FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
IPO year FE	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes
N	801	801	801	801	801	801

Appendix A4

Correlation matrix

This table presents a correlation matrix of the main cross-sectional regression variables used throughout the analyses of this study.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(1) No Use of Proceeds	1.00																			
(2) U1 – General Corp. Purpose	-0.45	1.00																		
(3) U2 – Repay Debt	-0.22	0.12	1.00																	
(4) U3 – R&D	-0.18	0.22	-0.02	1.00																
(5) U4 – Repay Selling Shareh.	-0.51	-0.07	0.17	-0.14	1.00															
(6) U5 – M&A	-0.24	0.19	0.11	0.04	0.05	1.00														
(7) Underpricing	0.03	0.00	-0.06	0.00	-0.05	-0.04	1.00													
(8) PE-backing	-0.15	0.01	0.29	-0.04	0.25	-0.08	-0.11	1.00												
(9) VC-backing	-0.03	0.11	-0.06	0.15	-0.06	0.05	0.04	-0.17	1.00											
(10) High-quality underwriter	-0.21	-0.01	0.25	-0.10	0.32	-0.07	-0.10	0.24	-0.03	1.00										
(11) Additional financial adv.	0.02	-0.03	0.09	0.00	0.02	0.03	0.02	-0.01	-0.04	0.01	1.00									
(12) Carveout	-0.06	-0.06	0.01	-0.03	0.09	-0.04	-0.01	-0.06	-0.06	0.22	-0.04	1.00								
(13) LN (Amount of Proceeds)	-0.32	0.02	0.29	-0.10	0.45	0.01	-0.06	0.28	-0.04	0.66	-0.07	0.19	1.00							
(14) Foreign IPO	0.10	-0.02	0.02	0.01	-0.08	0.02	0.00	-0.02	0.01	0.10	-0.07	-0.01	0.10	1.00						
(15) Market Val. (P/E Stoxx600)	-0.09	0.03	0.03	0.02	0.17	0.06	0.12	0.05	0.05	-0.06	0.05	-0.01	0.07	-0.03	1.00					
(16) LN (Age)	-0.07	-0.12	0.06	-0.09	0.17	-0.02	-0.03	0.10	-0.15	0.17	0.07	0.01	0.18	-0.02	-0.04	1.00				
(17) Leverage	0.04	-0.04	0.18	-0.15	0.02	-0.08	-0.09	0.17	-0.15	0.16	-0.01	0.11	0.15	-0.01	-0.13	0.15	1.00			
(18) Percentage Insider	-0.24	-0.20	0.03	-0.15	0.58	-0.11	0.01	0.17	-0.08	0.37	-0.02	0.17	0.48	0.00	0.02	0.21	0.02	1.00		
(19) Startup	0.04	0.07	-0.08	0.15	-0.18	-0.05	0.03	-0.05	0.12	-0.15	-0.02	-0.05	-0.18	0.01	0.17	-0.18	-0.18	-0.20	1.00	
(20) LN (News stories)	-0.20	0.01	0.05	0.02	0.22	-0.01	0.01	0.11	0.03	0.42	-0.06	0.10	0.44	0.02	0.07	0.15	0.09	0.20	-0.04	1.00

Appendix A5

Weighting regression and balancing diagnostics

This table presents probit regression that explain the probability of PE-backing at IPO before and after weighting with inverse probability weights. Robust standard errors are clustered at industry and year level and reported in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

	PE-backing	
	Before matching	After matching
High-quality underwriter (Score)	0.217	-0.021
	(0.23)	(0.26)
Additional Financial Advisor	-0.052	-0.086
	(0.10)	(0.12)
LN (Amount of Proceeds)	0.184***	0.005
	(0.05)	(0.06)
Foreign IPO	-0.195	-0.005
	(0.19)	(0.23)
Market Valuation (P/E Stoxx600)	0.003	-0.003
	(0.03)	(0.03)
LN (Age)	0.050	0.054
	(0.05)	(0.06)
Leverage	0.804***	-0.443
	(0.27)	(0.30)
Percentage Insider	0.084	-0.073
	(0.13)	(0.16)
Exchange FE	Yes	Yes
Industry FE	Yes	Yes
IPO year FE	Yes	Yes
Constant	Yes	Yes
N	801	801