

# **THE EFFECT OF BANKING RELATIONSHIPS AND PROSPECTUS TRANSPARENCY ON IPO UNDERPRICING**

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**ERIK AUDUN SØRENSEN**

**SEBASTIAN HOLM**

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# **The Effect of Banking Relationships and Prospectus Transparency on IPO Underpricing**

## **Abstract:**

This paper investigates whether (1) pre-IPO banking relationships with a potential IPO underwriter, and (2) transparency in the “Use of Proceeds” section in the IPO prospectus, ameliorate asymmetric information problems behind IPO underpricing. If pre-IPO banking relationships and prospectus transparency generate and transmit information to the market, and thus reduce asymmetric information, firms with these characteristics should exhibit lower underpricing when going public. The results indicate no support for any of the hypotheses. However, we find that firms with a greater size of certain financial firm characteristics, including total assets, EBIT and cash, face lower IPO underpricing.

## **Keywords:**

IPOs, Banking relationship, Prospectus, Asymmetric information, Underpricing

## **Authors:**

Erik Audun Sørensen (24846)  
Sebastian Holm (24838)

## **Tutors:**

Olga Obizhaeva, Assistant Professor, Department of Finance

## **Examiner:**

Adrien d’Avernas, Assistant Professor, Department of Finance

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This paper examines whether IPO underpricing is affected by (1) the firm having an established relationship with a bank that can manage IPOs prior to the offering, and (2) transparency in the “Use of Proceeds” section in the firm’s IPO prospectus, on a sample of firms going public in Sweden, Denmark, Norway, Finland, Iceland, Germany, the United Kingdom and France during 2000-2021. In a regression of variables representing asymmetric information, firm characteristics and IPO characteristics, we find results indicating that firms that have a pre-IPO relationship with a potential underwriter (owing to a loan or debt issue transaction) might experience lower underpricing than firms without such a relationship. These results are robust when controlling for size, industry-fixed effects and venture capital (VC) backing, but not, however, when controlling for country-fixed effects. We do not find any support for the effect of transparency in the firm’s IPO prospectus on IPO underpricing. Nevertheless, the results reveal that certain financial firm characteristics, including total assets, EBIT and cash, can reduce IPO underpricing.

As firms go public, there could be asymmetric information between the firm, the underwriter and investors regarding the true value of the firm. This constitutes, according to many researchers, the main reason for the existence of IPO underpricing<sup>1</sup>. The uncertainty requires investors to be compensated for the risk they take on when participating in IPO transactions, and this compensation can take the form of underpriced shares. Further, the research literature has extensively examined the effect of having a bank with borrower/issuer-specific information on various topics within the financial context. Parts of the information that the bank obtains might be unknown to the market because the firm-bank relationship enables the bank greater insight into the firm’s projects, investments and management team. Such relationships could work as information channels toward market participants as the existence and nature of the relationships are publicly available, which enables investors to become aware of the market actors that hold superior information. That is, market participants who hold private information can have a certification effect of the true value of a company toward the financial market if the remaining market participants are aware of the identity of the informed actor and its relationship with the firm going public. In such a situation, the knowledge about which players that hold superior information might to some extent help mitigate asymmetric information, and possibly reduce uncertainty of the true value of the company, as investors have a larger pool of data to infer information from.

Another possible way that a firm could reduce firm uncertainty at the time of the IPO is to include a detailed description of the intended use of IPO proceeds in the prospectus. Some firms are very accurate in the description of what it plans to use the raised capital for, while other firms are vague and only provide a generic and uninformative statement. Hence, IPO prospectuses provide firms with a channel of communication toward the market and could therefore have an impact on firm uncertainty. It is therefore interesting to investigate the effect of having a clear description of the use of proceeds in the prospectus on the subsequent IPO, and especially how this interplays with having a relationship with a potential IPO underwriter prior to the offering. In the following, the words “precise”, “accurate”, “detailed” and “transparent” will be used interchangeably for the examination of IPO prospectuses despite that these words have nuanced meanings in a strict sense.

In this paper, we investigate the intersection between the asymmetric information problems in IPOs and the possible mitigating effects of firm-bank relationships and transparency in the IPO prospectus. We combine a dataset comprising firms that have completed an initial public offering on one of the stock exchanges in the Nordics, Germany, the UK or France during the period 2000-2021 with loan data and debt issue data on these

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<sup>1</sup> See, for instance, Allen and Faulhaber (1989), Benveniste and Spindt (1989), Benveniste and Wilhelm (1990), Grinblatt and Hwang (1989), Rock (1986), and Welch (1989, 1992).

firms. This enables us to establish pre-IPO relationships between firms and banks, and examine whether this relationship affects the subsequent IPO in terms of underpricing. Furthermore, we retrieve IPO prospectuses for the firms in our sample to determine whether the firm is transparent in its “Use of Proceeds” section or not.

Given that asymmetric information between the issuing firm, the underwriter and investors is the explanation for IPO underpricing, and if firm-bank relationships can mitigate asymmetric information between market participants, then firms with these relationships should exhibit less underpricing than otherwise equal firms. Schenone (2004) examines this on a sample of US IPOs from 1998 to 2000 and finds that firms with a pre-existing relationship with a potential underwriter experience 17% less underpricing than firms without such a relationship. The purpose of our paper is to examine how the hypothesized effect of relationships on underpricing interacts with whether the firm going public is transparent in the IPO prospectus or not. This is especially interesting in light of the European Commission’s 2003/71 directive<sup>2</sup>, which requires firms in the EU to disclose information on the intended use of proceeds in more detail.

The results of this study could be valuable for issuing firms, banks and investors. Firstly, it is useful to discover how asymmetric information between market participants might be mitigated to limit the magnitude of “money left on the table” for firms going public. Given that the aftermarket demand for a firm’s shares is inelastic, i.e., the shares sold at the offer price could have been sold at the first-day close price, IPO underpricing is a costly phenomenon that inhibits value-maximization of raising funds through the process of going public. Second, whether IPO underwriter abilities affect the extent of IPO underpricing or not is valuable knowledge for banks. To illustrate, if private firms find that a pre-existing relationship with a potential underwriter reduces the underpricing in their subsequent IPO, they are more likely to choose banks with IPO underwriter abilities than otherwise equal banks to begin with. Hence, it is a reasonable proposition that banks without IPO underwriter abilities might suffer from reduced competitiveness. For investors, the implications of reduced asymmetric information are less clear. If a pre-existing relationship with a prospective underwriter mitigates IPO underpricing, then informed and uninformed investors will have more similar knowledge about the true firm value. Therefore, the wedge between the two groups should be smaller, which should be beneficial for uninformed investors who are less likely to be victims of adverse selection problems. In sum, the results can serve as novel insights for the key parties involved in European IPO transactions.

The remainder of this paper is structured as follows: Section I provides an overview of the most closely related literature and the way in which this paper extends on those papers. Section II presents our hypotheses and their underlying theoretical framework. Section III describes our data and the methods we use to test the hypotheses. In Section IV, we first examine if IPO underpricing is affected by the firm having a pre-IPO banking relationship with a potential underwriter. Secondly, we investigate how this potential effect interacts with the transparency in the “Use of proceeds” section of the IPO prospectus. These analyses are then made subject to robustness tests. Section V presents a discussion of the results. Lastly, Section VI concludes the paper.

## I. Literature review

Our paper contributes to the literature on IPO underpricing, such as Loughran, Ritter (2004), Schenone (2004) and Liu, Ritter (2011), by extending the method developed by Schenone (2004) and combining it with an examination of the extent of transparency in the firm’s IPO

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<sup>2</sup> The European Parliament and the Council of the European Union. (2022).

prospectus. Our dataset enables our paper to be a novel contribution to the literature, by investigating the effect of pre-IPO banking relationships with a potential underwriter in combination with the effect of the European Commission's 2003/71 directive on increased transparency in the "Use of proceeds" section in the prospectus. Section II.B. outlines how the extent of transparency in the description of use of proceeds is an intuitive approach to investigate the underpricing phenomenon for firms going public in the Nordics, Germany, the UK and France.

Duarte-Silva (2010) shows, holding other underwriter capabilities constant, that an underwriter that a priori has private information about the firm issuing new equity in a seasoned equity offering (SEO) is more credible at certifying the true value of the firm. Given this, more opaque firms have the greatest potential in using underwriters it has an established relationship with since they will have a higher certification effect for reducing asymmetric information in SEOs. However, even for firms that are less opaque, it is value-maximizing for the firm to use an underwriter that can decrease market uncertainty through a certification effect. Our paper develops the analysis of Duarte-Silva (2010) by extending the findings of underwriter certification in SEOs on IPOs. Here, our paper contributes to the literature by examining how underwriters participate in valuable information production and transmission toward the market through its greater due diligence incentives stemming from a loan and/or debt issue.

Consistent with these findings are the results provided by Fitza and Dean (2016) on the effect of venture capital-backing on IPO underpricing. They find results indicating that the identity, proxied by size, of the venture capital firm explains 20.07% of the variance in IPO underpricing. They propose that the results are driven by signaling and certification of firm quality to the market, thus reducing the asymmetric information component in the IPO. Hence, their findings indicate that firms going public with VC-backing are less prone to adverse selection issues. Our paper utilizes the findings by Fitza and Dean (2016), who suggest that VC-backing represents a more important information channel toward the financial market than the identity and abilities of the underwriter, by exploring whether VC-backing is more significant than a firm-bank relationship or prospectus transparency for underpricing.

Research by Cai, Helwege and Warga (2007) on underpricing in the U.S. corporate bond market indicates that more opaque firms have more underpriced bond issues, and that initial bond offerings are more underpriced than seasoned bond offerings. They suggest that their results stem from informational frictions between the issuing firm, the underwriter and investors. As further evidence for the asymmetric information theory, they find that the most underpriced bond offerings are the initial bond offerings of private firms, i.e., potentially the first public issue ever by a firm. Our paper expands the analysis of Cai et al. (2007) by contributing to the findings that opaque firms are greater victims of underpriced issues. Firms in our sample that have not recorded any bank loans and/or debt issues prior to their IPO should exhibit higher underpricing due to greater ex ante uncertainty, similar to the findings of Cai et al. (2007) on corporate bond offerings. Applying their findings to the concept of the degree of transparency in IPO prospectuses, firms that ambiguously describe the use of IPO proceeds should experience higher underpricing in their subsequent IPO, and firms that precisely outline the ventures and investments it has intended to undertake with the proceeds should experience lower underpricing. Hence, we extend the findings by Cai et al. (2007) in the dimension of applying its framework on IPOs and combining it with the examination of IPO prospectuses.

## II. Hypothesis

### A. Relationship with a potential underwriter prior to the IPO

IPO underpricing can be defined as a wedge between the offer price and the “fair” firm value which is revealed by the market post-offering. Ljungqvist (2007) sets forth four main headings under which the theories of underpricing can be grouped based on the existing research: asymmetric information, institutional explanations, control theories, and behavior theories. Further, Ljungqvist argues that the best established models explaining underpricing are those based on asymmetric information, i.e., differences in levels of information held by the issuing firm, underwriter and investors. Hence, for the research purposes of this paper, uncertainty of the true value of a company going public will be hypothesized to be the core catalyst for the IPO underpricing phenomenon.

The theoretical models of asymmetric information in IPO underpricing differ in the assumed information structure between the issuing firm, the underwriter and the investors. It has been shown that banks which have provided credit to a firm through a loan and/or debt issue are able to obtain information that might not be available to other parties in the market (Campbell and Kracaw, 1980; Fama, 1985; Diamond, 1991). The bank is likely to have attained fundamental information about the issuing firm through the historical relationship because of increased incentives for tighter monitoring and due diligence. Repeated interaction with a firm should facilitate continuous transmission of information to the underwriter about the firm’s projects, management team and business outlooks. There are at least three explanations that should be considered when analyzing the effect of these firm-underwriter relationships, each linked with an assumption about which market participants are informed about the fair market value of the firm going public. Each of these three cases will be discussed below.

Firstly, the underwriter does not need to incentivize informed investors with low-priced shares to reveal their private information on the fair market value of the firm because the underwriter holds superior information itself. This should work against models for IPO underpricing presented by Benveniste and Spindt (1989) and Benveniste and Wilhelm (1990), who assume that both the underwriting bank and the firm are uninformed about the firm’s true value, but that there are some investors who repeatedly interact with the investment bank who are better informed about the firm’s prospects. It is expected that a firm-underwriter relationship will lead to lower underpricing because the underwriter does not need to compensate informed investors for truthfully revealing their private information before the offer price is finalized, as is assumed in these models.

Secondly, it is expected that these relationships enable high-quality firms to avoid IPO underpricing as a signaling instrument of high firm quality, as is set forth in the signaling games by Allen and Faulhaber (1989), Grinblatt and Hwang (1989), and Welch (1989, 1992). In these models, they assume that the issuing firm is the only informed party in the IPO, and that underpricing is the costly signal that high-quality firms choose to separate themselves from low-quality firms. In our hypothesis, high-quality firms would not need to make this costly choice because market participants are aware of the underwriter’s information advantage due to the firm-underwriter relationship. And since high-quality firms know that investors can see the nature of this relationship, the signaling mechanism of high firm quality is shifted from underpriced shares to the firm-bank relationship. This incentivizes the underwriter to price the issue close to the firm’s fair value because its reputation is at a larger stake than it would have been without the pre-existing relationship with the issuing firm.

Thirdly, Rock (1986) assumes that only a random group of investors are informed about the firm’s value, but that neither the firm nor its underwriting bank, nor the remaining

investors know the firm's true value. Since firms need participation from both informed and uninformed investors in the IPO market, underpricing works as a means for retaining uninformed investors in investing in IPOs. Here, underpricing compensates the uninformed investors for their biased purchases of lower value firms, investors who otherwise would be subject to the "winner's curse". However, since all investors, informed or uninformed, know that the price set by the underwriter reveals an approximate fair market price of the firm's shares, uninformed investors should not require any compensation for participating in the IPO market. Since all market participants can identify the nature of the firm-underwriter relationship, the information asymmetry between informed and uninformed investors should be abated.

In accordance with the above, our first hypothesis is the following: In cases where the firm going public has a relationship with a potential underwriter prior to the IPO, the asymmetric information between market participants is expected to be low, and this, in turn, should cause these firms to experience lower IPO underpricing, *ceteris paribus*.

### B. Transparency in the "Use of Proceeds" section in the IPO prospectus

Further, we aim to investigate the impact of accurately reporting the intended use of capital raised through the equity issue. If a firm discloses its intentions for its use of proceeds, and these intentions are clearly defined, precise and truthful, then the information asymmetry between the issuing company and market participants should, at least to some extent, be reduced. With the introduction of the European Commission's 2003/71 directive, companies planning to do an initial public offering on the European market are required to provide a certain level of information on its intended use of proceeds (2022). However, the degree of specificity in the "Use of Proceeds" section of the IPO prospectus might vary between firms. Hence, our second hypothesis is the following: Firms which accurately describe the planned allocation of IPO proceeds between different projects and ventures should experience lower IPO underpricing than firms that do not provide such detailed information. Transparency in the IPO prospectus should therefore have a negative correlation with IPO underpricing.

Accordingly, our proposed hypotheses are as follows: Firms that do not have a recorded bank loan and/or debt issue with a potential IPO underwriter and vaguely describe their intentions with the use of raised capital should exhibit greatest IPO underpricing. For these firms, market participants cannot infer information from the firm-bank relationship, nor can they deduce much information from the "Use of Proceeds" section in the IPO prospectus. On the opposite side of these dimensions, we find firms that display the combination of a recorded loan and/or debt issue with a bank that could take the firm public in the subsequent IPO and include rigorous explanations of what the IPO proceeds shall be used for. On average, firms in this group should be the least underpriced because market participants can obtain better information about the true firm value from both the firm-bank relationship and the IPO prospectus. For firms that have a relationship and are not transparent in the prospectus, and for firms that do not have a relationship while being transparent in the prospectus, we assume that firm-bank relationships are better channels of information transmission than the "Use of proceeds" section in IPO prospectuses due to two reasons: a firm-bank relationship enables a more critical examination and due diligence of the firm. Also, the above assumption is reasonable given the limited capacity of the "Use of Proceeds" section of an IPO prospectus versus the extensive potential of information transmission in a firm-bank relationship.

Table I below presents a summary of the hypotheses of this paper. The dataset that we introduce in this paper, discussed in the next section, enables us to test these hypotheses.

**Table I**  
**Does a pre-IPO banking relationship with a potential underwriter affect IPO underpricing? Does IPO prospectus transparency affect IPO underpricing?**  
**The hypotheses of the paper**

Does the firm have a pre-IPO relationship with a potential underwriter?				
	<i>Yes</i>		<i>No</i>	
	Transparent IPO prospectus?		Transparent IPO prospectus?	
	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>
Asymmetric information	Lower	Low	High	Higher
Underpricing	Lower	Low	High	Higher

### III. Method

#### A. Data description

We extract data on firms that have successfully completed an initial public offering on one of the stock exchanges in our sample countries<sup>3</sup> over the time period 2000 to 2021. The IPO data is extracted from the Refinitiv SDC Platinum platform. Our initial sample consists of 5,084 IPOs. From the IPO sample we exclude ADRs, financial institutions, real estate investment trusts (REITs), closed-end funds, private placements, rights issues and unit issues. Also, we exclude firms that have withdrawn from their IPO and firms that have registered for an IPO, but not successfully completed the offering.

Next, we extract all debt issues and loans recorded in the SDC Platinum platform starting 10 years prior to the starting date of the IPO sample. Here, it is assumed that the information gain of a loan or debt issue is decreasing over time as it gets older. Hence, our first observation in the debt dataset is in 1990 and the final is in 2021. As a preliminary filter, we apply a constraint to the dataset that restricts our sample to only include IPO firms that have a recorded debt issue and/or loan recorded in the debt dataset. This reduces the number of IPO firms to 340. Further, to establish a pre-existing bank relationship, we identify each firm's respective IPO issue date and debt issue/loan date. Some firms have been granted loans and/or issued debt after their IPO and are thereby irrelevant for the testing of our first hypothesis. We therefore exclude them from our dataset, which reduces the treated sample of IPO firms to 260.

Research on IPOs has traditionally measured underpricing as a relative measure where the difference between the offer price and the first-day close price is divided by the offer price and multiplied by 100. Another measure of underpricing widely used in the literature is to calculate the "money left on the table", i.e., the cost of underpricing to the firm. An implicit assumption in this definition is that the aftermarket demand is price-inelastic, which means shares sold at the offer price could have been sold at the aftermarket price. Out of these two definitions, this paper uses the former one to measure the effect of pre-existing banking relationships with a potential underwriter and prospectus transparency on IPO underpricing. In well-developed capital markets, such as the Western and Nordic European markets, that do not have strict restrictions on intraday stock price fluctuations, IPO

<sup>3</sup> Sweden, Denmark, Norway, Finland, Iceland, Germany, the UK and France



underpricing can be measured by the close price on the first day of trading as the full extent of underpricing becomes evident relatively quickly (Ljungkvist, 2007). This paper follows this tradition, which results in the following definition of underpricing for firm  $i$ :

$$Underpricing_i = \frac{(First-day\ close\ price_i - Offer\ price_i)}{Offer\ price_i} \times 100$$

where the offer price is retrieved from SDC Platinum, and the first-day close price is taken from SDC Platinum, Compustat and the Swedish House of Finance's FinBas database.

## B. The firm-bank relationship

To identify the first two subgroups that are to be examined, we define a categorical variable named *Could*. If the firm had a pre-existing relationship with one or more banks that had the capabilities of managing IPOs, then we ascribe that company to the *Could = 1* group. If the company had a pre-existing relationship with a bank, but the bank did not have the capability to take the company public, then we ascribe that company to the *Could = 0* group.

In our final sample, most firms have had a loan/debt issue arranged by at least one bank with IPO capabilities, which differs from the US where there are more banks that do not underwrite IPOs (Schenone, 2004). Therefore, few firms end up in the *Could = 0* category, which results in a weak comparison between the groups. To create a more appropriate control group to the treatment group (*Could = 1*), we find the firms, out of those that did not have a relationship prior to the IPO, that are the most similar to the treatment group based on financial firm characteristics and IPO characteristics. To do this, we utilize the propensity score matching technique. This enables us to compare IPO underpricing between firms with a relationship bank that could take the company public with similar firms without a pre-existing banking relationship.

## C. Establishing a control group

The sample of IPO firms without a pre-existing banking relationship amounts to 3,561. To construct the control group, we extract data on financial firm characteristics from Compustat and SDC Platinum that former research has indicated have a significant effect on IPO underpricing. These characteristics are: revenue, EBIT, total assets, cash and cash equivalents, shareholder's equity, long-term debt, and net cash flow from operating activities. In addition, we gather IPO characteristics from the SDC Platinum platform. These IPO characteristics include principal amount and total proceeds. The financial firm characteristics and IPO characteristics enable us to determine which of the firms without a pre-existing banking relationship that should be matched with the firms in the treatment sample.

Since the IPOs in our sample involve different currencies and occur at different dates, all nominal values are normalized to beginning-of-year 2021 Euro to make the propensity score matching feasible across countries and years. Data on exchange rates for the respective currencies are collected from Eurostat (2022). From The World Bank's international financial statistics data files, we extract the Euro Area inflation measured by the consumer price index from 1999 to the beginning of 2021 (2020). The propensity score matching procedure renders a control group consisting of 260 firms, which together with the treatment group creates a final sample of 520 firms.

Figure AI in the Appendix reports the sample distribution of observations across propensity scores for unmatched treated units, matched treated units, matched control units and unmatched control units. For visual inspection of means in matched observations for each

specific IPO characteristic and firm characteristic across the propensity score distribution, see Figure AII and Figure AIII in the Appendix.

#### D. Descriptive statistics

Descriptive statistics over the firms in the *Could* = 1 and *Could* = 0 groups are presented in Table II. Firms with an established relationship with a potential underwriter issue lower principal amounts and obtain lower total proceeds. These differences are significant at the 1% level. The table displays that firms with established banking relationships are larger in general, but these differences are not statistically significant for total assets, equity, long-term debt, cash, revenue, EBIT and net cash flow. Unsurprisingly, the leverage ratio (long-term debt / total assets) is higher for firms in the *Could* = 1 group at the 1% level. Furthermore, the EBIT-margin (EBIT / revenue) is higher at the 5% level. To account for these differences between the treatment group and the control group, we will include the IPO characteristics and the firm characteristics when testing the hypothesis.

**Table II**

**Summary statistics for IPO characteristics and firm characteristics at IPO date**

Table II summarizes IPO characteristics collected from SDC Platinum and financial firm characteristics extracted from SDC Platinum and Compustat. The categorical variable *Could* equals 1 if the IPO firm could have gone public with the bank it had previously received a loan from and/or used as the underwriter in a debt issue, and 0 otherwise. A more detailed description of the categorical variable is provided in Section III.B. The values in the table are reported in 2021 Euro millions. F-tests reveal that the variances of the populations in the two groups are heteroscedastic. T-tests of equal means are therefore conducted on the condition of heteroscedastic variance between the *Could* = 1 and *Could* = 0 groups. Standard deviations are reported in brackets.

Mean 2021 Euro millions	<i>Could</i> = 1	<i>Could</i> = 0
<u><i>IPO characteristics</i></u>		
Principal amount***	345.74 (553.74)	610.33 (980.79)
Proceeds amount all markets***	515.18 (987.89)	793.52 (1159.87)
<u><i>Firm characteristics</i></u>		
Total assets	6279.38 (31827.31)	2973.61 (17931.44)
Equity	990.02 (2940.95)	589.74 (2860.99)
Long-term debt	2750.68 (24071.91)	709.28 (3794.13)
Cash	135.41 (947.76)	170.91 (676.60)
Revenue	2406.28 (6511.76)	1725.60 (7226.11)

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EBIT	355.93 (1887.98)	175.29 (663.61)
Net cash flow	255.78 (1737.93)	145.61 (618.09)
(Long-term debt / Total assets)***	0.29 (0.52)	0.15 (0.33)
(Cash / Total assets)	0.06 (0.51)	1.16 (12.40)
(EBIT / Revenue)**	0.10 (0.65)	-0.49 (4.41)
(Net cash flow / EBIT)	0.89 (12.85)	0.52 (8.59)
Number of observations	260 (50%)	260 (50%)

\*Significantly different at 10%, \*\*Significantly different at 5%, \*\*\*Significantly different at 1%.  
Standard deviations in brackets.

### E. Creating the *Transparency* variable

We create a categorical variable equal to 1 if the firm going public is transparent in their “Use of Proceeds” section in the prospectus published prior to the IPO, and equal to 0 otherwise. Our definition of transparent is a firm which, in its IPO prospectus, describes the use of proceeds in a way such that it is clear what the firm will use the proceeds for, for instance by including specific projects or investments and the amount or share of the proceeds that will be allocated to each specified area. In contrast, a non-transparent firm is one that writes a generic use of proceeds section with vague descriptions that are open for interpretation and that could imply many different scenarios. The following extract illustrates a firm in the *Transparency = 1* group:

*“[...] We currently intend to use these net proceeds in the following order of priority: (i) between €120 million and €140 million to fund our organic growth plan in the midterm including the market introduction and implementation (roll-out) strategy of our omnichannel model, investments in our technology platform and logistics automation and expansion, (ii) €30.0 to €35.0 million for the repayment of a bridge loan facility in the amount of €35.0 million (together with accrued (yet unpaid) interest, fees, costs and expenses) granted to the Company by Barclays and JIL, (iii) up to €30 million flexibility for strategic investments to drive current international market growth and expand tech leadership, (iv) the remainder of the net proceeds from the Offering, if any, for general corporate purposes.” (Mister Spex, 2021).*

The next example represents a *Transparency = 0* firm:

*“We intend to use the net offering proceeds to fund future capital expenditures and potential acquisitions, to repay short-term debt, and for working capital and other general corporate purposes.” (Infineon Technologies AG, 2001)*

F. Underpricing across the *Could* and *Transparency* categories

Next, we estimate the average underpricing across the two groups based on the *Could* variable. Panel A of Table III displays that the average underpricing for firms with a pre-IPO banking relationship with a potential underwriter is 21.29%, and 52.15% for firms without a relationship. A t-test of equal means between the two groups indicates that the difference in average IPO underpricing is statistically significant at the 1% level.

**Table III**  
**Underpricing across *Could* and *Transparency* categories**

Underpricing is computed as the difference between the offer price and the first trading day close price, divided by the offer price<sup>a</sup>. Offer prices are retrieved from SDC Platinum and close prices are extracted from SDC Platinum, Compustat and the Swedish House of Finance's FinBas. The *Could* = 1 group comprises firms that, prior to their IPO, had a relationship with a bank through a loan or debt issue where the bank could also have been underwriting the subsequent IPO. In the *Could* = 0 group, the firms have no pre-existing banking relationship. T-test of equal means in IPO underpricing across the two categorical groups created with the *Could* variable provide a p-value of 0.01%, indicating that IPO underpricing is different between firms belonging to the *Could* = 1 group and firms belonging to the *Could* = 0 group at the 1% significance level in our sample. We further create a categorical variable to examine the effect of accurately and precisely describing the intended use of IPO proceeds in the IPO prospectus, labeled *Transparency*. This variable is created with data gathered from IPO prospectuses published by firms going public during our sample period.

Panel A: Underpricing for firms with and without an underwriter relationship prior to the IPO

Underpricing	<i>Could</i> = 1	<i>Could</i> = 0
Mean***	21.29	52.15
(Standard deviation)	(85.59)	(95.60)
Min	-98.47	-98.86
Max	606.18	1116.15
Median	14.31	47.80
No. of observations	260	260
Sample	50%	50%

\*\*\*Significantly different at 1%

Panel B: Underpricing for firms with and without transparent IPO prospectuses

Underpricing	<i>Transparency</i> = 1	<i>Transparency</i> = 0
Mean	32.81	26.65

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(Standard deviation)	(37.42)	(97.79)
Min	-88.66	-98.86
Max	123.85	660.51
Median	28.85	21.25
No. of observations	114	209
Sample (%)	22%	40%

Panel C: Underpricing across *Could* and *Transparency* subgroups

Underpricing	<i>Could</i> = 1		<i>Could</i> = 0	
	<i>Transparency</i> = 1	<i>Transparency</i> = 0	<i>Transparency</i> = 1	<i>Transparency</i> = 0
Mean	14.48	17.36	49.89	42.91
(Standard deviation)	(23.09)	(102.58)	(40.21)	(87.07)
Min	-60.75	-98.47	-88.66	-98.86
Max	71.01	606.18	123.85	660.51
Median	17.17	10.97	63.20	37.45
No. of observations	55	133	59	76
Sample	11%	26%	11%	14%

<sup>a</sup> 
$$\text{Underpricing}_i = \frac{(\text{First-day close price}_i - \text{Offer price}_i)}{\text{Offer price}_i} \times 100$$

In Panel B, the same procedure is undertaken for the *Transparency* variable. The descriptive statistics indicate that the mean IPO underpricing for firms that precisely describe their intended use of proceeds in the IPO prospectus is higher than for firms that use vague descriptions, something which stands in contradiction to our proposed hypothesis. Our data suggests that the mean underpricing for firms that belong to the *Transparency* = 1 group is 32.18% while the mean underpricing for firms that belong to the *Transparency* = 0 group is 26.65%. Note however, that this difference is not statistically significant, and that there is a certain amount of missing data on IPO prospectuses in our final data sample, which might render these averages unrepresentative for the true mean. Firms that went public in the earliest years in our sample, especially in the year 2000, are overrepresented in the group of firms for which we are unable to obtain IPO prospectuses. It must therefore be mentioned that the results of the *Transparency* variable might be skewed.

Panel C displays the mean IPO underpricing across our four categorical groups. As outlined in the hypothesis, Panel C indicates that the group of firms that are least prone to

IPO underpricing on average are firms that combine having a relationship with a bank that could take them public and including accurate descriptions of the intended use of proceeds in the IPO prospectus. These firms experience a level of IPO underpricing equal to 14.48% on average in our data sample. The differences between the *Transparency* subgroups within each *Could* category are inconsistent. In the *Could* = 1 group, transparent firms seem to exhibit lower underpricing than non-transparent firms. However, in the *Could* = 0 group, the opposite appears to be the case. Hence, the preliminary results of the *Transparency* variable are inconclusive, consistent with the findings in Panel B.

### G. Correlation between the independent variables

To see how the different explanatory variables correlate with each other and to avoid issues with multicollinearity, we create a correlation matrix including all independent variables, displayed in Table IV. *Principal amount in this market* and *Proceeds amount in this market*, as well as *Principal amount all markets* and *Proceeds amount all markets* correlate perfectly. Therefore, we exclude *Principal amount all markets* and *Proceeds amount in this market* to mitigate multicollinearity problems in the regression presented in Section IV.

Some variables have a correlation greater than 0.8, which implies a considerable risk of multicollinearity (*Principal amount in this market* and *Proceeds all markets* have a correlation of 0.823, *Revenue* and *Equity* have a correlation of 0.829, and *Long-term debt* and *Total assets* have a correlation of 0.852). Nevertheless, these variables are likely to have such an economic significance for the testing of our hypotheses that we choose not to exclude them.

**Table IV**  
**Correlation matrix**

The table reports the correlation between independent variables. The included variables are based on the descriptive statistics for the firms in our sample.

	<i>Could</i>	<i>Princp. amount in this mkt</i>	<i>Princp. amount all mkt</i>	<i>Proceeds amount in this mkt</i>	<i>Proceeds amount all mkt</i>	<i>Total Assets</i>	<i>Equity</i>	<i>Cash</i>	<i>Long -term debt</i>	<i>EBIT</i>	<i>Net Cash Flow</i>	<i>Revenue</i>
Could	-											
Principal amount in this market	-0.164	-										
Principal amount all markets	-0.128	0.823	-									
Proceeds amount in this market	-0.164	(1.000)	0.823	-								
Proceeds amount all markets	-0.128	0.823	(1.000)	0.823	-							
Total Assets	0.064	0.238	0.252	0.238	0.252	-						
Equity	0.069	0.345	0.401	0.345	0.401	0.601	-					
Cash	-0.022	0.150	0.150	0.150	0.150	0.425	0.329	-				
Long-term debt	0.059	0.040	0.038	0.040	0.038	0.852	0.313	0.505	-			
EBIT	0.064	0.220	0.245	0.220	0.245	0.332	0.507	0.202	0.187	-		
Net Cash Flow	0.042	0.037	0.053	0.037	0.053	0.460	0.341	0.508	0.566	0.293	-	
Revenue	0.050	0.454	0.455	0.454	0.455	0.513	0.829	0.248	0.131	0.612	0.181	-

#### IV. The effect of pre-existing underwriter relationships and transparency in IPO prospectuses on IPO underpricing

Table III above presents univariate results of IPO underpricing for firms with a pre-existing relationship with a potential underwriter and for firms without such a relationship, and for firms that provide precise descriptions of intended use of raised IPO proceeds and for firms that do not. Table III indicates that the mean IPO underpricing for firms that have an underwriter relationship prior to its IPO and for firms that do not have such a relationship is significantly different at the 1% level. However, the results in Table III do not indicate the effect of the independent variables on underpricing, nor do they control for IPO characteristics, financial firm characteristics and other factors that former research has indicated have significant effects on IPO underpricing. In part A, we examine whether there is an effect of having a pre-existing banking relationship with a potential underwriter on IPO underpricing. In part B, we investigate the effect of precise descriptions in the “Use of Proceeds” section in a firm’s IPO prospectus on IPO underpricing. We perform these analyses by means of multivariate regressions.

##### A. The effect of pre-IPO underwriter relationships on IPO underpricing

To examine the hypothesized effect of having an underwriter relationship prior to the IPO on the extent of IPO underpricing, we estimate a regression of the following form:

Regression equation I:

$$\begin{aligned} \text{Underpricing}_i = & \beta_0 + \beta_{\text{Could}} \text{Could}_i + \beta_{\text{IPO}} \text{IPO Characteristics}_i \\ & + \beta_{\text{Firm}} \text{Firm Characteristics}_i + \beta_{\text{Controls}} \text{Controls} + \epsilon_i \end{aligned}$$

If the hypothesis presented in Section II is supported by the data, the regression should result in the following:  $\beta_{\text{Could}}$  should be negative and statistically and economically significant. The intuition follows the reasoning presented in the hypothesis: because market participants can identify the firm-bank relationship and infer that the bank has superior information, underpricing should be reduced because the underwriter does not need to incentivize informed investors to truthfully reveal their information on firm value. Also, since the market knows that the underwriter is informed, incentives are higher for the underwriter to set the offer price close to the fair market price because its reputation is at greater stake. And finally, since all investors, informed and uninformed, know that the offer price is relatively close to the true firm value, uninformed investors will not be subject to the same extent of adverse selection problems in IPOs. Hence, asymmetric information between the issuing firm, the underwriter and investors should be mitigated for firms that have a relationship with a prospective IPO underwriter, consequently leading to lower IPO underpricing for these firms.

The results from Regression equation I presented above are reported in Table V. It is important to mention that the observable control variables included in the models are normalized to Euro billions, meaning that each coefficient of correlation should be interpreted in conjunction with the fact that larger increases in variables are required for each coefficient to be economically significant. The observable explanatory firm variables we include in our regression are: the logarithm of total assets, equity, cash, long-term debt, EBIT, net cash flow and revenue. We presume that the most relevant IPO characteristics to control for are principal amount and total IPO proceeds, the latter of which is labeled “proceeds amount all markets” in the regression table below. The basic model, displayed in column 1, indicates that IPO underpricing might be reduced as a result of having been



granted a loan and/or issued debt with a bank that could take the firm public. The coefficient on *Could* is negative and statistically significant at the 5% level ( $\beta_{could} = -21.38$ , t-statistic =  $-2.45$ , and p-value =  $0.0147$ ). Hence, our data suggests that firms with a pre-existing relationship with a potential underwriter face about 21% less IPO underpricing than firms without these relationships. Again, note that the correlation coefficients reported in Table V are displayed in percentage terms, suggesting firms that belong to the *Could = 1* group have considerably lower levels of IPO underpricing, thus making the coefficient on *Could* both economically and statistically significant.

Further, Table V indicates that firms that are able to gain large total IPO proceeds are more underpriced than firms that reach lower levels of total proceeds. This is an interesting finding because it suggests that even though a firm is able to gather a large pool of funds in their offering, it will not necessarily be associated with lower levels of IPO underpricing ( $\beta_{Proceeds\ amount\ all\ markets} = 9.83$ , t-statistic =  $2.02$ , and p-value =  $0.0435$ ). Consistent with former research, see for instance Ritter (1991), we find that firm size, here proxied by the logarithm of total assets, is negatively associated with IPO underpricing ( $\beta_{Log(assets)} = -16.07$ , t-statistic =  $-2.88$ , and p-value =  $0.0041$ ). Moreover, our data suggests that firms generating larger EBIT have lower levels of IPO underpricing ( $\beta_{EBIT} = -7.43$ , t-statistic =  $-3.83$ , and p-value =  $0.0001$ ). Another finding is that net cash flow has a positive, statistically and economically significant coefficient ( $\beta_{Net\ cash\ flow} = 20.06$ , t-statistic =  $2.83$ , and p-value =  $0.0049$ ). Schenone (2004) finds similar results in an investigation of IPO underpricing on a sample of US firms that went public between 1998 and 2000. She proposes that investors become wary of the reasons for the offering and demand larger premiums because they suspect a higher risk of wasteful spending. Thus, it may be that the positive correlation between IPO underpricing and net cash flow in our data is an expression of the “free cash flow hypothesis”, i.e., the view that wasteful spending is more likely to occur when the firm has excess cash over what is required to make all net present value-positive investments and repay all debt claimants (Berk, DeMarzo, 2017). We also find statistically and economically significant negative correlations with IPO underpricing for equity and cash ( $\beta_{equity} = -3.87$ , t-statistic =  $-2.32$ , and p-value =  $0.0210$ ,  $\beta_{cash} = -12.26$ , t-statistic =  $-2.64$ , and p-value =  $0.0084$ ). For long-term debt, we find a statistically but not economically significant negative correlation with underpricing ( $\beta_{Long-term\ debt} = -0.57$ , t-statistic =  $-2.03$ , and p-value =  $0.0433$ ).

**Table V**  
**The impact of pre-IPO banking relationships with a potential underwriter on IPO underpricing**

This table presents OLS estimates of the following regression equation:

$$Underpricing_i = \beta_0 + \beta_{could}Could_i + \beta_{IPO}IPO\ Characteristics_i + \beta_{Firm}Firm\ Characteristics_i + \beta_{Controls}Controls + \epsilon_i$$

The dependent variable is *Underpricing*. *Could* equals 1 if the firm has a pre-existing banking relationship with a prospective underwriter, and 0 otherwise. Column 1 presents the basic regression model. In column 2, we control for firm size by using a flexible firm-size specification: we replace *Total assets* with a categorical variable equal to 1 if the size of the firm’s total assets is greater than the sample median, and equal to 0 if it is smaller than the sample median. Column 3 includes industry-fixed effects on the basis of the first of the four digits in the SIC codes. Column 4 includes a binary variable equal to 1 for those firms that were VC backed at the time of the IPO, and equal to 0 otherwise. The numbers below are presented in percentage units, and variables are in Euro billions. Robust standard errors are reported in brackets.

# The Effect of Banking Relationships and Prospectus Transparency on IPO Underpricing

	Basic (1)	Size (2)	Industry F.E. (3)	VC backed (4)
<i><u>Asymmetric information</u></i>				
Could	-21.38** (8.74)	-19.79** (9.17)	-20.42** (8.78)	-20.99** (8.68)
<i><u>IPO characteristics</u></i>				
Principal amount	5.09 (6.31)	4.14 (6.36)	4.93 (6.74)	5.04 (6.29)
Proceeds amount all markets	9.83** (4.86)	8.99* (4.96)	9.38* (5.00)	9.99** (4.86)
<i><u>Firm characteristics</u></i>				
Log (assets)	-16.07*** (5.58)		-15.97*** (5.44)	-16.45*** (5.75)
Size		-27.39*** (8.02)		
Equity	-3.87** (1.67)	-4.59*** (1.64)	-4.10** (1.71)	-3.97** (1.68)
Cash	-12.26*** (4.63)	-11.40** (4.50)	-11.23** (4.53)	-12.40*** (4.73)
VC backed				-12.09 (8.94)
Long-term debt	-0.57** (0.28)	-0.63** (0.28)	-0.44 (0.35)	-0.58** (0.28)
EBIT	-7.43*** (1.94)	-7.17*** (1.99)	-7.49*** (1.92)	-7.56*** (1.97)
Net cash flow	20.06*** (7.09)	20.01*** (7.46)	20.42*** (7.20)	20.37*** (7.23)
Revenue	0.61 (0.68)	0.41 (0.65)	0.63 (0.69)	0.64 (0.68)
Flexible firm size	No	Yes	No	No
Year fixed effects	Yes	Yes	Yes	Yes
Observations	520	520	520	520
R <sup>2</sup>	0.18	0.18	0.19	0.19
Adjusted R <sup>2</sup>	0.13	0.13	0.12	0.13
Residual std. error	85.69	85.97	86.15	85.71

	(df = 488)	(df = 488)	(df = 480)	(df = 487)
F Statistic	3.53*** (df = 31; 488)	3.41*** (df = 31; 488)	2.85*** (df = 39; 480)	3.45*** (df = 32; 487)

\*Significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%. Robust standard errors in brackets.

#### A.1. Robustness of the results from Regression equation I

This section tests the robustness of the basic regression model in Table V. It might be that the effect of having a relationship with a potential underwriter on IPO underpricing is driven by characteristics not accounted for in the basic model reported in column 1 of Table V.

Therefore, we add several control variables to our basic model in order to mitigate omitted variable bias and obtain more robust results. In addition to year-fixed effects, which is already implemented to our basic model, we include the following control variables in the regression model: size-, industry-, and VC-effects.

##### A.1.1. Additional control for the firm size impact on IPO underpricing

Due to a great amount of research that has documented the impact of firm size on IPO underpricing, it is necessary to expose our basic model to a flexible firm size specification. Therefore, we replace the logarithm of total assets variable with a categorical variable equal to 1 if the size of the firm's total assets is greater than the sample median, and equal to 0 if it is smaller than the sample median. The results of this regression model are reported in column 2 of Table V. The findings suggest that our hypothesis is robust to this specification of firm size. Our data indicates that having a relationship with a potential underwriter prior to the firm's public listing is associated with around 20% lower IPO underpricing on a 5% level of significance ( $\beta_{could} = -19.79$ , t-statistic =  $-2.16$ , and p-value =  $0.0315$ ). Thus, the results of the basic regression model in column 1 is supported by the regression model which includes the flexible firm size specification.

##### A.1.2. Controlling for systemic differences between industries

In column 3 of Table V, the regression includes a variable based on the first digit of the firms' SIC codes in our sample. It might be that firms in certain industries display lower underpricing and are inherently more prone to end up in the *Could* = 1 category, or vice versa. For instance, high-technology firms are generally more human capital-intensive and less likely to have large tangible assets on their balance sheets (Schenone, 2004). They are, therefore, less likely to obtain loans/issue debt, and conversely, more likely to end up in the *Could* = 0 category. This could be problematic for the analysis if they are simultaneously more underpriced as this could lead to biased inferences of the coefficient on *Could*. The results from the regression in column 3 do not change vastly from the basic model reported in column 1 of Table V. The coefficient on *Could* still suggests that firms with a relationship with a bank that could take them public in a subsequent IPO face approximately 20% less underpricing than firms without such a relationship. Accordingly, the inclusion of industry-fixed effects does not alter the economic magnitude nor the statistical significance of *Could* at the 5% level ( $\beta_{could} = -20.42$ , t-statistic =  $-2.33$ , and p-value =  $0.0204$ ).

##### A.1.3. Venture capital backed IPOs

As discussed in the literature review section, Fitza and Dean (2016) find results suggesting

that venture capital-backing explains 20.07% of the variance in IPO underpricing and propose that VC-backing is of greater importance than the underwriter. In column 4 of Table V, we control for this by constructing a binary variable equal to 1 if the firm was backed by a venture capital firm at the time of the IPO, and 0 otherwise. From the regression, it seems that being backed by a venture capital firm at the time of the IPO does not affect IPO underpricing on any statistical significance level less than 10% ( $\beta_{vc} = -12.09$ , t-statistic =  $-1.35$ , and p-value =  $0.1771$ ). However, it should be recognized that the sign of the coefficient on *VC backed* is negative, indicating that our findings are consistent with Fitza and Dean (2016) had there been more statistical significance. The coefficient on *Could* is still significant at the 5% level and maintains its economic magnitude ( $\beta_{could} = -20.99$ , t-statistic =  $-2.42$ , and p-value =  $0.0160$ ). Overall, the results are robust when controlling for VC-backing.

#### A.1.4. Controlling for country-fixed effects

As a final control to Regression equation I, we include country-fixed effects to account for the variation between countries in our sample. It might be that the selection into the two *Could* categories is correlated with which country the firm is based. Given that the hypothesis on *Could* holds in the country-fixed effects models, we have a stronger point of evidence to show that a pre-existing relationship with a potential underwriter is associated with lower levels of IPO underpricing within countries, not only on an aggregate level. For this purpose, we create categorical variables for the countries in our data sample.

The results are reported in Table VI. Column 1 presents regression estimates of a model which builds on the basic regression from Table V, with the addition of a variable accounting for country-fixed effects. The coefficient on *Could* remains negative but is statistically insignificant ( $\beta_{could} = -2.32$ , t-statistic =  $-0.13$ , and p-value =  $0.8940$ ). Hence, the results in column 1 in Table VI do not support the results found in Table V above, but are consistent with the predicted sign of the *Could* coefficient. However, certain financial firm characteristics remain statistically significant and have economic magnitude: ( $\beta_{Proceeds\ amount\ all\ markets} = 9.39$ , t-statistic =  $1.99$ , and p-value =  $0.0473$ ,  $\beta_{Log\ (assets)} = -16.35$ , t-statistic =  $-2.85$ , and p-value =  $0.0045$ ,  $\beta_{Cash} = -10.92$ , t-statistic =  $-2.09$ , and p-value =  $0.0374$ ,  $\beta_{EBIT} = -7.94$ , t-statistic =  $-3.27$ , and p-value =  $0.0012$ ,  $\beta_{Net\ cash\ flow} = 19.33$ , t-statistic =  $2.41$ , and p-value =  $0.0164$ ).

To further investigate how the hypothesis holds under different geographical areas, we divide the total dataset into two subsections: We isolate all firms that have successfully completed an IPO on one of the stock exchanges in Sweden, Norway, Denmark, Finland and Iceland from firms that went public in the United Kingdom, Germany or France. The reason for bundling the countries into two groups is that some countries would be irrelevant to present in isolation due to them having few observations, either in total or in any of the *Could* subgroups. Thus, presenting regression estimates on a country level would not be fruitful. In column 2, we use the same regression as in column 1, but apply it on the subsample of Nordic firms and control for country-fixed effects. The results show that the coefficient on *Could* changes sign and becomes statistically insignificant ( $\beta_{could} = 28.09$ , t-statistic =  $0.61$ , and p-value =  $0.5440$ ). In column 3, we conduct the same methodology as we did on Nordic firms but apply it to firms that have gone public in either the United Kingdom, Germany, or France. In this model, the coefficient on *Could* is negative and statistically insignificant ( $\beta_{could} = -5.94$ , t-statistic =  $-0.30$ , and p-value =  $0.7641$ ). As a result, the hypothesis on *Could* does not hold when accounting for country-fixed effects. Therefore, it is plausible that the regressions presented in Table V, which do not include country-fixed effects, are subject to omitted variable bias.

**Table VI**

**The impact of pre-IPO banking relationships with a potential underwriter on IPO underpricing: Controlling for country-fixed effects**

This table presents OLS estimates of the basic regression model, but in addition to IPO variables, firm variables, and year-fixed effects, we include controls for country-fixed effects:

$$\text{Underpricing}_i = \beta_0 + \beta_{\text{Could}} \text{Could}_i + \beta_{\text{IPO}} \text{IPO Characteristics}_i + \beta_{\text{Firm}} \text{Firm Characteristics}_i + \beta_{\text{Controls}} \text{Controls} + \epsilon_i$$

The dependent variable is *Underpricing*. *Could* equals 1 if the firm has a pre-existing banking relationship with a potential underwriter, and 0 otherwise. Column 1 presents estimates of the basic model where we run a regression on the total sample of firms, i.e., on firms from all countries in our sample, but we include controls for country-fixed effects. Column 2 presents regression estimates of the same model to the one presented in column 1, but instead it is applied on the subsample of firms that have gone public on one of the stock exchanges in Sweden, Norway, Denmark, Finland or Iceland. Column 3 presents the estimates of the same regression model applied to the subsample of firms that have gone public on one of the stock exchanges in the United Kingdom, Germany or France. Year-fixed effects are included in all models reported in the table. The numbers below are presented in percentage units, and variables are in Euro billions. Robust standard errors are reported in brackets.

	Basic - all countries - (1)	Nordic countries (2)	Germany, the UK and France (3)
<u><i>Asymmetric information</i></u>			
Could	-2.32 (17.43)	28.09 (46.08)	-5.94 (19.79)
<u><i>IPO characteristics</i></u>			
Principal amount	1.22 (5.96)	32.19 (118.35)	-1.02 (5.98)
Proceeds amount all markets	9.39** (4.72)	-43.93 (83.33)	7.06 (4.88)
<u><i>Firm characteristics</i></u>			
Log (assets)	-16.35*** (5.73)	-28.77 (26.02)	-13.67** (6.51)
Equity	-2.72 (1.96)	4.45 (9.07)	-0.66 (1.20)
Cash	-10.92** (5.23)	42.32** (20.24)	-6.07 (5.63)
Long-term debt	-0.56* (0.31)	1.16 (10.18)	-0.33 (0.35)
EBIT	-7.94*** (2.43)	5.19 (6.71)	8.58 (8.42)
Net cash flow	19.33** (8.03)	24.10** (10.38)	0.67 (5.78)
Revenue	0.81 (0.66)	-11.38** (5.00)	-0.42 (0.78)

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Flexible firm size	No	No	No
Year fixed effects	Yes	Yes	Yes
Observations	520	106	414
R <sup>2</sup>	0.21	0.43	0.13
Adjusted R <sup>2</sup>	0.14	0.16	0.06
Residual Std. Error	85.14 (df = 481)	120.36 (df = 71)	74.231 (df = 380)
F Statistic	3.27*** (df = 38; 481)	1.57* (df = 34; 71)	1.75*** (df = 33; 380)

\*Significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%. Robust standard errors in brackets.

### B. The effect of transparency in the IPO prospectus on underpricing

The results in Table V and Table VI address the first part of the hypothesis, i.e., firms with a pre-IPO relationship with a potential underwriter should experience less underpricing than firms without such a relationship. Here, we examine the second part of the hypothesis by looking at whether transparency, defined as a binary variable equal to 1 if the firm in its IPO prospectus accurately describes its intended use of proceeds, influences IPO underpricing. We do this by adding the categorical variable *Transparency* to Regression equation I, such that it interacts with the categorical variable *Could*. Accordingly, we estimate a regression of the following form:

Regression equation II:

$$\begin{aligned}
 \text{Underpricing}_i = & \beta_0 + \beta_{\text{Could}} \text{Could}_i + \beta_{\text{Transparency}} \text{Transparency}_i \\
 & + \beta_{\text{Could} \cdot \text{Transparency}} \text{Could}_i \cdot \text{Transparency}_i + \beta_{\text{IPO}} \text{IPO Characteristics}_i \\
 & + \beta_{\text{Firm}} \text{Firm Characteristics}_i + \beta_{\text{Controls}} \text{Controls} + \epsilon_i
 \end{aligned}$$

The results from Regression equation II presented above are reported in Table VII. As previously mentioned, the observable control variables included are in Euro billions, meaning that each estimated coefficient of correlation should be interpreted in conjunction with the fact that larger increases in variables are required for each coefficient to be economically significant. The observable explanatory firm variables we include in this regression are the same as in Regression equation I, except for the categorical variable *Transparency* and the interaction variable *Could* · *Transparency*.

The basic model, displayed in column 1, indicates that the coefficient of the variable *Could* is not statistically significant, but the economic magnitude remains in essence ( $\beta_{\text{Could}} = -14.37$ , t-statistic =  $-1.01$ , and p-value =  $0.3116$ ). The coefficient of the *Transparency* variable is positive and statistically insignificant ( $\beta_{\text{Transparency}} = 0.90$ , t-statistic =  $0.08$ , and p-value =  $0.9374$ ). The coefficient of the interaction variable *Could* · *Transparency* is negative and greater than the *Could* variable, which contradicts the hypothesis that firms with the combination of a pre-IPO relationship with a potential underwriter and a transparent use of proceeds section in the IPO prospectus should have lower underpricing than those with the relationship only. However, the coefficient does not have the statistical significance required for any claims to be made ( $\beta_{\text{Could} \cdot \text{Transparency}} = -7.81$ , t-statistic =  $-0.51$ , and p-value =  $0.6090$ ). When controlling for firm size, industry-fixed effects and VC backing, the sign of the coefficients of *Could* and *Could* · *Transparency* do not shift and are still not statistically significant.

Table VII indicates that certain coefficients are robust when extending Regression equation I with the *Transparency* variable: coefficients of *Proceeds amount all markets*, *Net Cash Flow* and *EBIT* keep their statistical significance at the 1% level and their economic magnitudes prevail ( $\beta_{\text{Proceeds amount all markets}} = 19.16$ , t-statistic = 3.40, and p-value = 0.0008,  $\beta_{\text{Net Cash Flow}} = 21.27$ , t-statistic = 2.94, and p-value = 0.0035,  $\beta_{\text{EBIT}} = -8.05$ , t-statistic = -3.49, and p-value = 0.0006).

**Table VII**

**The effect of transparency in IPO prospectus and pre-IPO underwriter relationship on IPO underpricing**

This table presents OLS estimates of the following regression equation:

$$\text{Underpricing}_i = \beta_0 + \beta_{\text{Could}} \text{Could}_i + \beta_{\text{Transparency}} \text{Transparency}_i + \beta_{\text{Could} \cdot \text{Transparency}} \text{Could}_i \cdot \text{Transparency}_i + \beta_{\text{IPO Characteristics}} \text{IPO Characteristics}_i + \beta_{\text{Firm Characteristics}} \text{Firm Characteristics}_i + \beta_{\text{Controls}} \text{Controls}_i + \epsilon_i$$

The dependent variable is *Underpricing*. *Could* equals 1 if the firm has a pre-existing banking relationship with a prospective underwriter, and 0 otherwise. This regression includes an interactive variable which is a product of *Could* and *Transparency*. *Transparency* is a categorical variable equal to 1 if the firm, in its IPO prospectus, describes the use of proceeds in a specific and accurate manner, and equal to 0 otherwise. Column 1 presents the basic regression model. In column 2, we control for firm size by using a flexible firm-size specification: we replace *Total assets* with a categorical variable equal to 1 if the size of the firm's total assets is greater than the sample median, and equal to 0 if it is smaller than the sample median. Column 3 includes industry-fixed effects on the basis of the first of the four digits in the SIC codes. Column 4 includes a binary variable equal to 1 for those firms that were VC backed at the time of the IPO, and equal to 0 otherwise. The numbers below are presented in percentage units, and variables are in Euro billions. Robust standard errors are reported in brackets.

	Basic (1)	Size (2)	Industry F.E. (3)	VC backed (4)
<u><i>Asymmetric information</i></u>				
Could	-14.37 (14.18)	-9.68 (14.61)	-14.05 (15.20)	-14.17 (14.13)
Transparency	0.90 (11.46)	4.51 (10.98)	1.48 (12.06)	0.90 (11.48)
Could · Transparency	-7.81 (15.26)	-11.61 (15.55)	-8.24 (16.77)	-7.71 (15.30)
<u><i>IPO characteristics</i></u>				
Principal amount	-3.88 (6.98)	-3.91 (6.84)	-3.40 (7.14)	-3.73 (6.93)
Proceeds amount all markets	19.16*** (5.63)	19.71*** (5.68)	18.23*** (5.85)	19.08*** (5.66)
<u><i>Firm characteristics</i></u>				
Log (assets)	-10.67*		-10.81*	-10.93*

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	(5.68)		(5.86)	(6.08)
Size		-27.75** (12.38)		
Equity	-4.91** (1.97)	-5.14*** (1.92)	-5.01** (1.96)	-4.93** (1.99)
Cash	-12.27** (4.89)	-11.67** (4.85)	-9.66*** (3.73)	-12.28** (4.92)
VC backed				-4.20 (11.70)
Long-term debt	-0.45* (0.25)	-0.46* (0.26)	-0.08 (0.15)	-0.46* (0.25)
EBIT	-8.05*** (2.31)	-7.96*** (2.31)	-7.98*** (2.23)	-8.09*** (2.33)
Net cash flow	21.27*** (7.24)	21.32*** (7.53)	21.80*** (6.97)	21.39*** (7.26)
Revenue	0.65 (0.77)	0.42 (0.74)	0.48 (0.83)	0.64 (0.77)
Flexible firm size	No	Yes	No	No
Year fixed effect	Yes	Yes	Yes	Yes
Observations	323	323	323	323
R <sup>2</sup>	0.27	0.28	0.28	0.27
Adjusted R <sup>2</sup>	0.19	0.20	0.17	0.18
Residual std. error	73.74 (df = 289)	73.17 (df = 289)	74.32 (df = 281)	73.86 (df = 288)
F Statistic	3.22*** (df = 33; 289)	3.41*** (df = 33; 289)	2.64*** (df = 41; 281)	3.12*** (df = 34; 288)

\*Significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%. Robust standard errors in brackets.

### V. Discussion

The results of Section IV.A. indicate that we cannot make any inferences on the effect of banking relationships with a potential underwriter prior to the firm's offering on IPO underpricing. It seems, based on our data sample, that the hypothesis that firm-bank relationships mitigate asymmetric information and thus reduce IPO underpricing does not hold when controlling for variations between countries. Consequently, it is plausible that the regressions presented in Table V, which omits the country-fixed effects, are subject to biased coefficient estimates. Nevertheless, the regressions that control for country-fixed effects display interesting findings which can have implications for firms that consider going public in the Nordics, Germany, France or the UK. Certain financial firm characteristics seem to



enable firms going public to suffer less from IPO underpricing. This raises the question of why these characteristics might be better mitigators of asymmetric information than firm-bank relationships. We propose two possible explanations for this finding:

(1) In the hypothesis, we assume a high degree of efficiency in the financial market, where investors integrate all existing information into their decision-making. However, it might be that investors in practice do not find relationships with a potential IPO underwriter to provide sufficiently large information gains for it to be a worthwhile factor to consider. Alternatively, it might be that investors do not even contemplate the relationships at all. If this is true, i.e., either investors do not find relationships to reveal any significant informational advantage or they do not consider relationships at all, the effect of relationships on IPO underpricing might be irrelevant due to “self-fulfilling prophecy” problems: it could be that investors’ low expectations on the information gain from firm-bank relationships make the theoretical effect disappear. Hence, the assumptions underlying our first hypothesis are potentially unrealistic.

(2) Also, the results indicate that investors possibly learn more from financial firm characteristics than from pre-IPO relationships with a potential underwriter. This might not be so surprising given that firm characteristics constitute a more established and explicit source of information for the estimation of a firm’s true value. Firm valuation is commonly based on expected future performance and thus, the financial firm characteristics of today constitute the foundation for the estimation of the firm’s true value. Firm-bank relationships with a potential underwriter on the other hand, although possibly signaling that the offer price is an accurate reflection of the firm’s true value, does not in itself provide any tangible numbers that can be used directly in an estimation. Hence, it is reasonable that financial firm characteristics are better at mitigating asymmetric information problems in IPOs.

The results in Section IV.B. show that we cannot make any claims on the effect of transparency in the “Use of Proceeds” section in the prospectus on IPO underpricing. The “Use of Proceeds” section in an IPO prospectus is a relatively shallow and limited source of information, usually restricted to a few paragraphs. Furthermore, it might be that this set of information is not something that investors generally consider at all. Considering this, it seems reasonable that other sources of information are better mitigators of asymmetric information and subsequently IPO underpricing. Therefore, it is logical that our data supports that certain financial firm characteristics are the most prominent factors affecting underpricing.

## VI. Conclusion

The principal purpose of this paper has been to examine whether having a pre-IPO banking relationship with a potential underwriter and being transparent in the “Use of Proceeds” section in the IPO prospectus mitigate asymmetric information problems experienced by firms issuing equity in an IPO. Given that asymmetric information is the main explanation for IPO underpricing, then firms with an established relationship with a potential underwriter and/or a transparent prospectus should experience less underpricing on average. We test the first hypothesis by comparing firms that have obtained loans and/or issued debt prior to the IPO, with firms that have not. The second hypothesis we test by examining the degree of accuracy and precision in the IPO prospectuses. The insufficient findings reported here inhibits support for any of the hypotheses outlined in this paper. However, the results reveal that certain financial firm characteristics, including total assets, EBIT and cash, can reduce IPO underpricing. These insights can constitute practical points of reference for IPO market participants in the Nordics, Germany, the UK and France.

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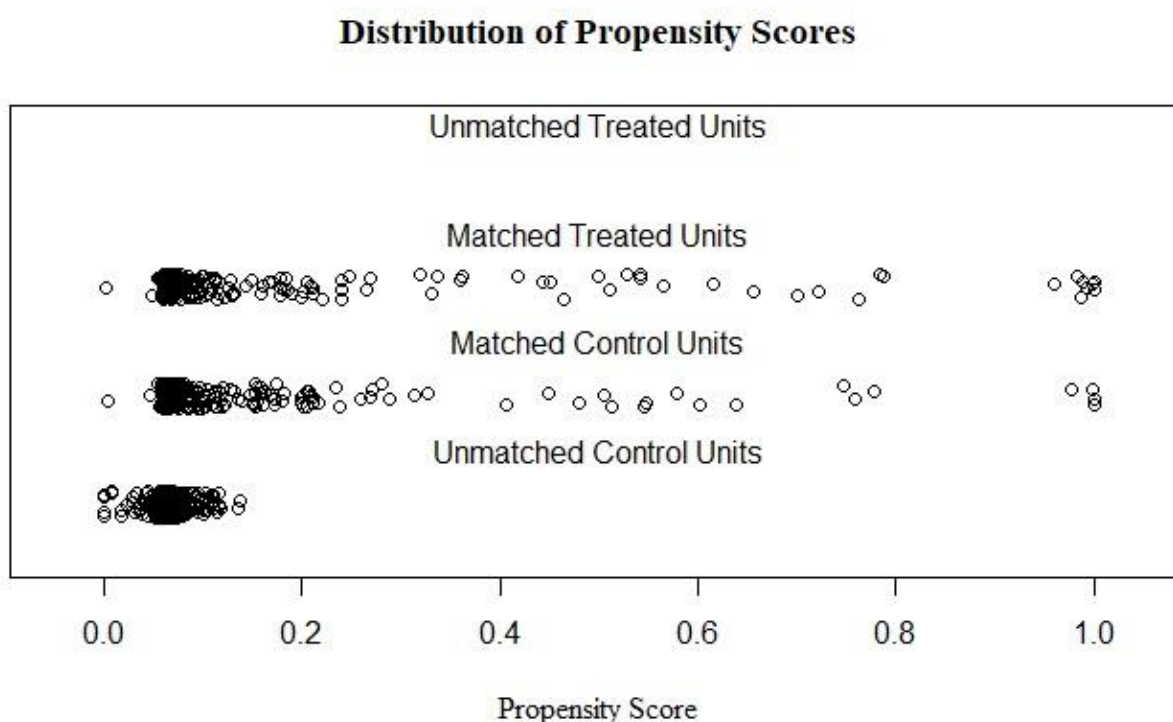
## Appendix

Figure AI indicates that unmatched control units are clustered around lower levels of the propensity score distribution, and matched control units are dispersed more evenly across propensity scores. The propensity scores for matched treated units and for matched control units indicate that the treatment group and the control group have similar distributions.

**Figure AI**

### **The sample distribution of propensity scores across unmatched treated units, matched treated units, matched control units and unmatched control units**

This figure presents the distribution of propensity scores across IPO-firms allocated to groups based on the *Could* dummy variable as defined in Section III.B. The propensity score matching method matches propensity scores of treated units and control units, resulting in a minimized distance between the propensity score of matched treated units and matched control units. The figure shows that matched observations in treated and control groups are distributed evenly across the propensity score interval. Further, the unmatched control units are all concentrated at the lower end of the propensity score distribution.

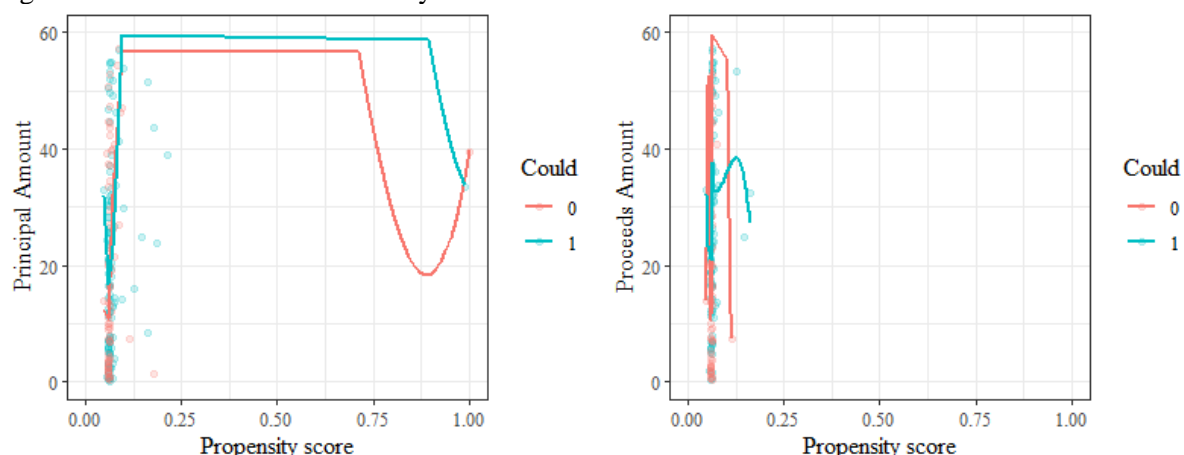


**Figure AII**

### **Mean in IPO characteristic covariates against the level of propensity score for treated and control groups**

The two diagrams below each plot the mean (solid lines) of an IPO characteristic against the estimated propensity score for IPO-firms with a pre-existing banking relationship with a potential underwriter and IPO-firms without such relationships, that is, the *Could* dummy variable as defined in Section III.B. Ideally, the means of the control group and the treated group should be near each other at each level of propensity score. The left diagram below indicates that the principal amount in IPOs for firms in both groups are fairly similar for all propensity scores, especially for scores below 0.75. The diagram to the right, which shows the mean proceeds amount, displays an even more profound clustering of firms than the diagram depicting principal amount. However, the two diagrams also reflect that there are fundamental differences in IPO characteristics between the two groups, which is supported by Table II. More specifically, Table II depicts that principal amount and proceeds amount between the groups belonging to the *Could* = 1 group and *Could* = 0 group are different at the 1%

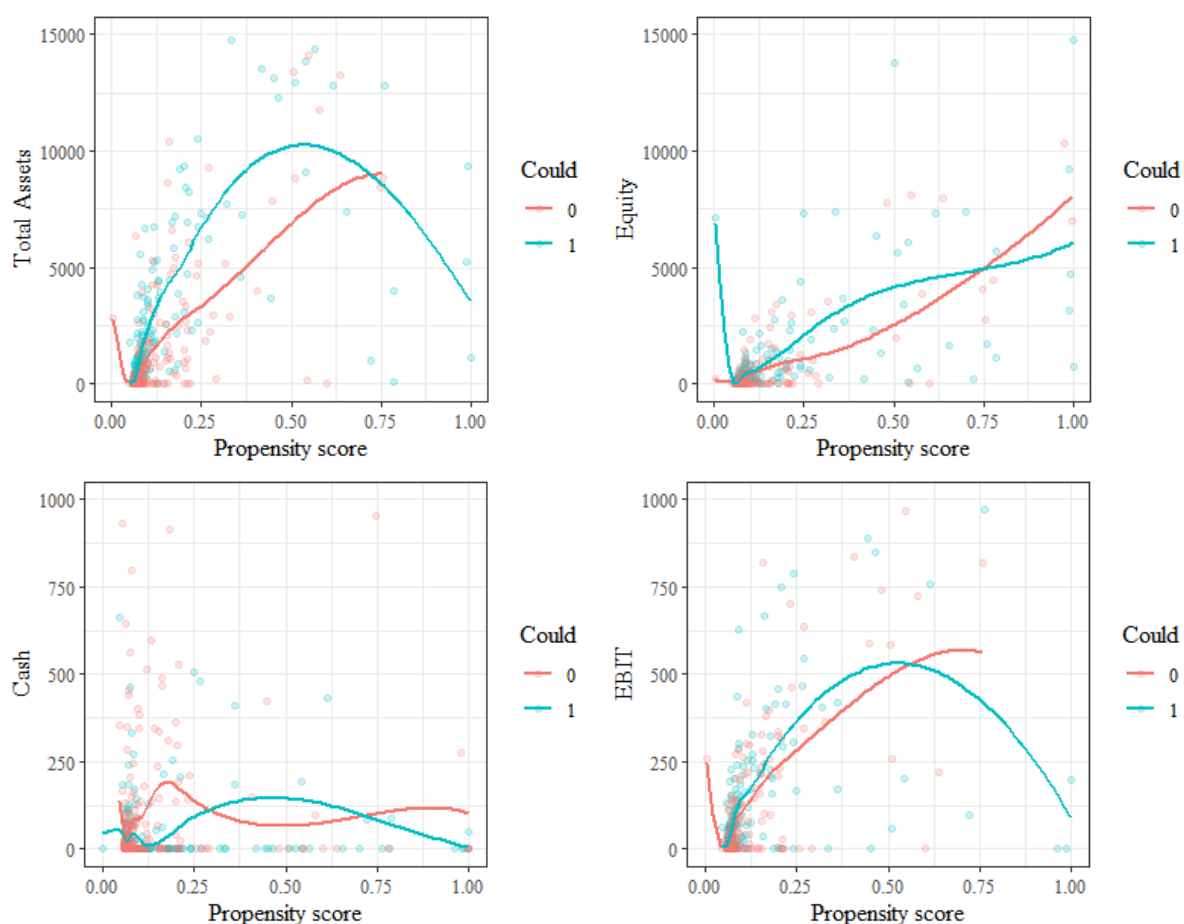
significance level. The units on the y-axis are normalized to 2021 Euro millions.



**Figure AIII**

## Mean in firm characteristic covariates against the level of propensity score for treated and control groups

The seven diagrams below each plot the mean (solid lines) of a firm characteristic against the estimated propensity score for IPO firms with a pre-existing banking relationship with a potential underwriter and IPO-firms without such relationships, that is, the *Could* dummy variable as defined in Section III.B. Matching done well should lead to little difference in means for the treatment and control group for each level of estimated propensity score. The diagrams below indicate that most firm characteristics are similar for treated IPO-firms and control IPO-firms. It should be noted however, that means are not equal across all propensity scores for both groups, something which is in conjunction with what is reflected in Table II. The units on the y-axis are normalized to 2021 Euro millions.



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