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Abstract. This study develops a novel framework about how a firm's financing outcome will be shaped by its communication under different types of uncertainty. Whereas prior work has largely focused on uncertainties that arise because of founders having a knowledge advantage over investors, we examine a firm's communication in situations of more fundamental uncertainty when both founders and investors face knowledge problems. Our framework proposes that in situations where founders have a knowledge advantage over investors (i.e., when there is information asymmetry), firms that reduce uncertainty by sending signals of quality and express *less* uncertainty in their communications will enjoy better financing outcomes. However, we argue that in situations characterized by high unknowability, and where founders do not have a significant knowledge advantage over investors (i.e., when there is Knightian uncertainty), firms that acknowledge this unknowability by expressing *more* uncertainty in their communications will have more favorable financing outcomes. Studying the full population of special purpose acquisition companies (SPACs) that sought to complete an initial public offering from the emergence of the sector in 2003–2019, we find support for our predictions. This study expands our understanding of the role of uncertainty in investment decisions, offers deeper insight into how language operates in financial markets, and sheds light on the increasingly popular, but understudied, SPAC vehicle.

Introduction

Uncertainty about future performance is problematic for new ventures when they seek financing. When investors are uncertain about a firm's future performance, they find it more difficult to assess its value, which can lead to worse financing outcomes (Pollock and Rindova 2003, Sanders and Boivie 2004). As a result, scholars have long tried to understand how firms can reduce uncertainty for investors and improve their ability to raise the funds they need to develop and grow.

Past research has revealed that one way for firms to reduce investor uncertainty is through their communications with investors (e.g., Hanley and Hoberg 2010, Lounsbury and Glynn 2001, Ferris et al. 2013, and McLeod et al. 2022). For example, firms often communicate credible signals of competence (Spence 1978), such as patents (Heeley et al. 2007), relationships with prestigious partners (Gulati and Higgins 2003), or founders' experience or education (Cohen and Dean 2005, Lester et al. 2006, Beckman and Burton 2008), thereby reducing uncertainty about the firm's future performance and

producing better financing outcomes (Connelly et al. 2011). Beyond sending credible signals, firms that simply express less uncertainty about their future performance in their communication to investors also tend to build investor confidence and enjoy more favorable financing outcomes (Loughran and McDonald 2013; see also Pan et al. 2018 and McLeod et al. 2022).

Yet, we argue that prior work on firms trying to reduce uncertainty, especially in the context of initial public offerings (IPOs), has implicitly focused on performance factors characterized by information asymmetry, where founders have a knowledge advantage over investors. In traditional IPOs, founders "have access to extensive information regarding the internal operation of the firm, its economic potential, and the industriousness of its management and employees" (Cohen and Dean 2005, pp. 683–684). When it comes to these types of issues, where founders have a private information advantage over investors, firms will naturally try to overcome that information asymmetry by revealing information to the market (Leland and Pyle 1977, Ross

1977, Carter and Manaster 1990, Connelly et al. 2011). As a result, it makes sense that when firms successfully reduce information asymmetry surrounding specific performance factors—by sending credible signals and/or by expressing less uncertainty in their communications— they are able to build investor confidence and enjoy better financing outcomes (Cohen and Dean 2005, Loughran and McDonald 2013, McLeod et al. 2022).

However, a firm's performance can also be driven by factors and causal mechanisms for which information is largely unknowable to both the founders and investors alike. For example, when dealing with regulatory uncertainty (Gao and McDonald 2022), leveraging unproven new technologies (Atuahene-Gima and Li 2004), operating in a nascent market (Moeen et al. 2020), or facing "new and unpredictable interactions with unknown consequences, including unpredictable competitive interactions" (Rindova and Courtney 2020, p. 791), a firm and its founders often face knowledge problems and are just as uncertain as potential investors about the venture's future performance (Townsend et al. 2018). Such knowledge problems, which reflect more fundamental unknowability or Knightian uncertainty, encompass the unknowability in many real-world decisions, including uncertainties about the nature and number of possible acts, states, and consequences, as well as uncertainties about the probabilities of states (Knight 1921, Feduzi et al. 2022). Past literature, however, has largely neglected communication strategies and financing outcomes when firms are confronted by unknowability. As Stiglitz (2000) points out, the literature on uncertainty has put too much emphasis on asymmetries of information, as opposed to limited knowledge. Therefore, we ask: When it comes to situations where both founders and investors face knowledge problems (i.e., founders do not have a significant information advantage over investors), what impact does a firm's communication about uncertainty have on their financing outcome?

In this study, we develop and test a theoretical framework that broadens our understanding of how a firm's communications about uncertainty affect their financing success. We argue that the effects will depend on the *type of uncertainty* associated with the performance factors about which they are communicating. For factors where knowledge and information are available and founders have a significant advantage over investors (i.e., when there is information asymmetry), efforts to reduce the uncertainty surrounding these factors—by emitting credible signals and/or expressing *less* uncertainty in their communications—should produce better financing outcomes. In contrast, for factors where information is largely unknowable and founders do not have a significant advantage over investors—when there is Knightian uncertainty due to the limited availability of knowledge (Knight 1921)—we argue that firms that acknowledge the unknowability they face by expressing

more (not less) uncertainty will have better financing outcomes. This latter prediction builds on research about how expressing uncertainty surrounding issues of extreme unknowability—where the future is uncertain for the speaker and audience alike—can build credibility (Nakayachi et al. 2018, Howe et al. 2019), as it demonstrates that the speaker competently understands and is honestly acknowledging the uncertainty associated with a given issue.

To test our framework, we analyze IPOs in the sector of special purpose acquisition companies (SPACs), a largely understudied, but important, investment vehicle that emerged in 2003 in the United States and is becoming the key competitor of traditional IPOs (Huang et al. 2023). SPACs are ventures whereby founders create a shell company, seek financing from investors, and use the proceeds to find and acquire an operating firm that is unknown at the time of the fundraising process. The financing of a SPAC is implemented through the IPO of a "shell" or "blank check" company (i.e., the SPAC). Once the IPO is complete, the SPAC founders have between 18 and 24 months to find an operating business, whose acquisition is subject to investors' approval.

We chose SPACs because they represent a context where firms and their founders face issues that are associated with different sources and types of uncertainty about future performance. On the one hand, uncertainty can relate to performance factors, such as the founders' human capital, intentions, and possible future behaviors, where founders have a knowledge advantage over investors. On the other hand, SPACs also face uncertainties about future performance that stem from factors like the acquisition target and the novelty of the SPAC vehicle itself, which are unknowable to both founders and investors alike. In fact, founders do not start a search for an acquisition target until after the IPO has been completed, and it is illegal for them to do so earlier. Moreover, the opaque structure of the SPAC itself (e.g., the lack of coherence surrounding governance and the changing institutional environment) has contributed to significant knowledge problems in this sector for investors and founders alike (Murray 2017, Gahng et al. 2021, Klausner and Ohlrogge 2022). The SPAC context thus enables us to test both sides of our theoretical framework and explore the performance factors for which communicating more (or less) uncertainty should lead to more favorable financing outcomes.

We collect the S-1 IPO prospectuses of the full population of SPACs that sought an IPO from the emergence of the sector in 2003–2019 and explore how their communications affected their IPO success. After identifying the key sections in each S-1 that are associated with different performance factors and, thus, different types of uncertainty, we analyzed the uncertainty expressed in each section using a dictionary of uncertainty that has been used and validated in the finance literature (e.g.,

Loughran and McDonald 2011, 2013, Kearney and Liu 2014, Loughran and McDonald 2016, Blankespoor et al. 2017, Pham 2019, Yan et al. 2019, and Lowry et al. 2020). Our results demonstrate that in sections where founders communicate about performance factors for which they have a significant knowledge or information advantage over investors (i.e., their human capital and the deployment of it), emitting signals of quality and expressing *less* uncertainty increases their likelihood of successfully completing an IPO and getting financing. However, in the sections where founders communicate about performance factors where information is largely unknowable to founders and investors alike (i.e., the acquisition target and the investment in the SPAC vehicle), we show that expressing *more* uncertainty increases the SPAC's likelihood of successfully completing an IPO.

Our theoretical framework and findings thus offer new insights into research on uncertainty, investor decision making, and firm communication strategies (e.g., Pollock et al. 2008, Loughran and McDonald 2013, Petkova et al. 2013, and Petkova et al. 2014). For example, whereas prior work has focused on how uncertainty affects individual and firm judgements (Rindova and Courtney 2020), we examine how firms communicate with audiences about uncertainty itself and how that affects their financing outcomes. Furthermore, past work has examined situations primarily characterized by information and knowledge asymmetries between founders and investors, leading to the conclusion that firms should always seek to reduce and communicate less uncertainty. However, our study reveals how this overlooks factors for which there is limited knowledge for both founders and investors and why, in such cases, expressing more uncertainty can actually be beneficial for the firms. In doing so, our study builds on Knight's (1921) original argument that firm performance depends on a large number of factors and, therefore, why uncertainty is not always best conceptualized as pertaining to the firm in toto. For many performance factors, there is variability in the degree of knowledge, and, as a result, such factors require distinct strategies to handle. Finally, we also discuss how our findings have important implications for the emerging research on SPACs, which represent an important, yet underexplored, asset class (e.g., Blankespoor et al. 2022, Klausner et al. 2022, and Klausner and Ohlrogge 2022).

Communication under Uncertainty and Financing Outcomes

Communicating with others in the face of uncertainty poses numerous challenges. Whether such communications are with close friends (Teigen 1988, Berger 1997), the scientific community (Keohane et al. 2014, Abraham et al. 2015), or financial market participants (Huang 2007, Harmon 2019a, McLeod et al. 2022), uncertainty can limit one's ability to derive meaning, understand context, convey important information, and achieve one's goals. In entrepreneurial settings, which are the context of this study, the presence of uncertainty can impede investors' ability to make investment decisions and leads to worse financing outcomes for firms (Pollock and Rindova 2003, Sanders and Boivie 2004). As a result, a growing body of research has explored how firms—through their communications with investors—can reduce this uncertainty for investors (Lounsbury and Glynn 2001, Connelly et al. 2011, McLeod et al. 2022).

Although much of the research has implicitly focused on factors where founders have a knowledge advantage over investors, such a perspective offers an incomplete picture. Firms often have limited knowledge and, therefore, face uncertainties just as investors do (Aldrich and Fiol 1994, Navis and Glynn 2010, Gao and McDonald 2022). In this section, we develop a framework that extends our understanding of how a firm's communications under uncertainty affects their financing outcomes depending on the *type of uncertainty* that firms and investors face. Specifically, we distinguish between situations where investors' uncertainty arises from information asymmetry, as opposed to the fundamental unknowability faced by both founders and investors.

Reducing Uncertainty for Performance Factors where Founders Have a Knowledge Advantage over Investors

When new ventures seek financing, there are many performance factors for which founders have a significant knowledge advantage over potential investors. For example, founders typically have access to extensive information about the firm's internal operations, intellectual property, strategic relationships (e.g., with suppliers, vendors, or partners), and human capital employed at the firm (Leland and Pyle 1977, Cohen and Dean 2005, Connelly et al. 2011). In contrast, investors have access to relatively limited knowledge regarding these factors (Carter and Manaster 1990, Stuart et al. 1999), creating information asymmetries between the two parties.

Prior work has demonstrated that when confronted with these factors, firms that reduce uncertainty for investors by sharing some of their private knowledge enjoy better financing outcomes. Founders generally know more about the venture's potential than investors do, so to reduce the information asymmetry and uncertainty for investors, firms often send credible signals about the firm's underlying quality, its founders, and its managers (Spence 1973, Connelly et al. 2011, Clough et al. 2019). For example, scholars have demonstrated that firms whose managers have relevant experience, prestige, and educational credentials build investor confidence and have more favorable financing outcomes

(e.g., Cohen and Dean 2005, Beckman and Burton 2008, and Hallen 2008).

In addition to sending these signals of quality in their communications, firms can also deploy other communication strategies to reduce investor uncertainty and improve their financing outcomes. Scholars have shown that firms using narratives (Lounsbury and Glynn 2001, Martens et al. 2007, Garud et al. 2014, Clarke et al. 2019); rhetorical strategies of logos, ethos, and pathos (McLeod et al. 2022); and more concrete language (Pan et al. 2018) can mobilize investors and obtain better access to capital. Similarly, recent research in finance shows that simply expressing less uncertainty in the IPO prospectus can build investor confidence. For example, Loughran and McDonald (2013) argued that using words that convey uncertainty makes future performance projections more ambiguous. They argued that using fewer words that convey uncertainty reduces information asymmetries between the founders and investors and showed that this increases the likelihood of more favorable financing outcomes, such as successfully securing financing (i.e., the IPO is not withdrawn) or experiencing lower underpricing during the first day of trading post-IPO.

Taken together, prior work has focused largely on issues and performance factors where founders have a knowledge advantage over investors and how reducing this uncertainty—by sending credible signals and/or expressing less uncertainty in communications—builds investor confidence and produces more favorable financing outcomes. However, we examine situations where founders may also need to communicate about performance factors for which they do *not* have a significant knowledge advantage over investors.

Acknowledging Uncertainty for Performance Factors where Information Is Largely Unknowable to Both Founders and Investors

There can be many types of uncertainty with respect to a firm's future performance that are fundamentally unknowable not only to investors, but also to firms and their founders (Townsend et al. 2018, Rindova and Courtney 2020). For example, when firms use entirely new and unproven technologies (Gao and McDonald 2022) or operate in a new or underdeveloped market (Aldrich and Fiol 1994, Navis and Glynn 2010), the firm and its founders are often just as uncertain about future performance as potential investors. Such performance factors are more akin to Knightian uncertainty or more fundamental uncertainty where there is little knowledge or ability to determine possible causal processes and outcomes (Feduzi et al. 2022). For such issues, founders cannot credibly reduce that uncertainty.

To examine what firms and their founders can do when uncertainty about future performance concerns these types of unknowable factors, we draw on research in communications studies (Jensen 2008, Howe et al.

2019) and judgments and decision making (Budescu and Du 2007). This work suggests that, when faced with such knowledge problems, speakers that acknowledge this unknowability by expressing *more* (not less) uncertainty are evaluated as more credible and enjoy more favorable reactions from their audiences. The increased credibility is primarily due to an increase in two factors: (1) perceptions of competence and (2) perceptions of honesty.

First, when a speaker recognizes the limited knowledge present in the setting, the audience tends to see the speaker as more competent. In fact, competence involves knowledge of the amount of uncertainty one faces (Knight 1921). Therefore, speakers that acknowledge the high level of uncertainty they face are seen as having greater competence compared with others that express unwarranted certainty. For example, Jensen (2008) shows that when journalists and scientists convey more uncertainty when discussing issues surrounding the implications of cancer research, a setting where there are numerous unknowable factors that drive the development and cure of cancer, they are perceived as more competent.

Second, when a speaker acknowledges the high level of uncertainty associated with unknowable issues, the audience also tends to see the speaker as more honest. For example, Howe and colleagues (2019, p. 863) showed that because "predictions about the effects of climate change cannot be made with complete certainty," expressing more uncertainty when communicating future forecasts leads to "increased trust in scientists and message acceptance" because the speaker is seen as more honest (see also Du et al. 2014). A similar effect has been shown when audiences evaluate speakers making other forecasts, such as about the weather (Joslyn and LeClerc 2012) or natural disasters (Nakayachi et al. 2018). For such factors with a greater degree of perceived unknowability, expressing uncertainty is thus seen as being more forthcoming and honest about what one does not (or cannot) know, especially compared with those who appear more certain about unknowable causal processes of success and future performance outcomes.

Taken together, this work suggests that, when communicating about performance factors characterized as fundamentally unknowable (i.e., Knightian uncertainty)—where founders face knowledge problems and do not have a significant advantage over investors—those that acknowledge this unknowability by expressing *more* uncertainty build credibility (Du et al. 2014, Howe et al. 2019), as it conveys that they competently understand and honestly acknowledge the uncertainty present in the context (c.f. McLeod et al. 2022). In the financing context, such an acknowledgment that conveys competence and honesty should mitigate both the lemons problem and the moral hazard problem (Stiglitz 2000), leading to more favorable investment outcomes.

We test our theoretical framework by examining IPOs in the sector for SPACs.

Communication under Uncertainty in SPAC IPOs

Special Purpose Acquisition Companies

SPACs emerged as a new investment vehicle in the United States in 2003 and have become increasingly popular in recent years. SPACs are ventures whereby founders create a shell company, seek financing from investors, and use this funding to find and acquire an existing operating firm that is unknown at the time of financing. The financing is implemented through the IPO of a shell or blank check company (i.e., the SPAC) by selling units, typically priced at $10. A unit consist of shares and derivative securities, such as warrants or rights that allow the unit-holder to buy additional shares at a future date. Once the IPO is complete, the proceeds of the IPO are placed in an escrow account, and the SPAC founders have between 18 and 24 months to find an operating target, whose acquisition is subject to investors' approval. This relatively novel sector has been characterized as "entrepreneurship through acquisition" (e.g., The Polsky Center for Entrepreneurship and Innovation 2021, FinTekCafe 2021, and Jones 2021). What is thus unique about a SPAC is that it is an empty shell firm with no actual business other than a stated intention to find and acquire an operating business. Importantly, investors who do not agree with a proposed acquisition have the option to redeem their shares at the issue price and will, on average, receive back a large portion of their initial investment.

Figure 1 depicts the number of SPACs that attempted to go public and those that succeeded between 2003 and 2019. Note that the failure rate of SPAC IPOs is about 25%, which is higher than the 12% failure rate of traditional IPOs (Helbing 2019). Like in most new investment vehicles, certain aspects of SPACs are characterized by an unusually high degree of uncertainty (Aldrich and Fiol 1994, Townsend et al. 2018), summarized vividly by the *New York Times* (2005) as follows: "Would you hand over wads of cash to a money manager you didn't know, to invest in a company he hadn't yet discovered?" As this quote illustrates, the challenge for SPAC founders is to persuade investors to invest in their shell company, while, at the same time, confronting uncertainty about future performance stemming from a wide variety of sources.

The examination of SPAC IPOs represents a unique opportunity to test our framework because uncertainty about future performance can arise from a variety of factors, where founders have different degrees of knowledge advantage over investors. Below, we consider performance factors for which founders have a high knowledge advantage over investors (i.e., human capital) and factors for which founders have a low knowledge advantage over investors (i.e., acquisition target and SPACs as an investment vehicle).

Performance Factors where Founders Have a High Knowledge Advantage over Investors (Human Capital)

Founders' human capital is one of the most important criteria by which investors screen and evaluate ventures

Figure 1. The Population of SPACs in the United States in the Period 2003–2019 (Number of S-1 Filings and Successful IPO Completions)
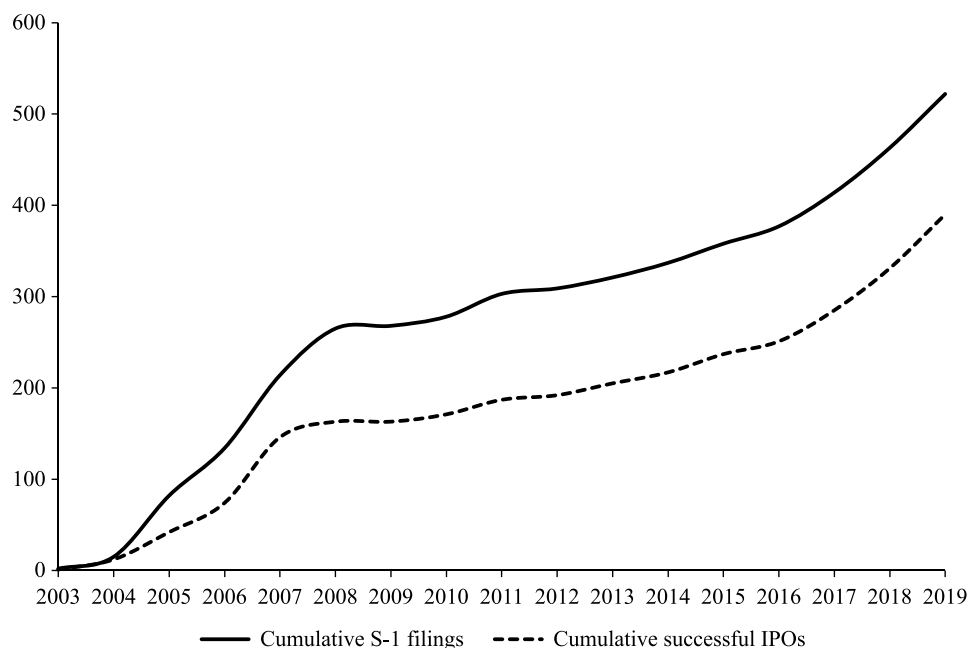
(Hallen 2008, Clough et al. 2019). In the SPAC sector, just like in traditional IPOs, firms have a strong knowledge or informational advantage over investors regarding the quality of their human capital and deployment intentions. Therefore, we would expect that if firms can act to alleviate investors' uncertainty about this key issue, it would lead to more favorable financing outcomes. There are two ways that firms can do this.

First, firms can communicate credible signals about their founders' human capital, such as education, expertise, and experience (Beckman and Burton 2008, Hallen 2008). SPACs that have human capital with relevant skills and capabilities have the potential to turn these empty shells into operating businesses and create shareholder value. Signals of human capital (e.g., prestigious careers) also have a reputational value, which ensures founders' commitment to and alignment with investor interest, providing a signal of both competence and intent because the most reputable founders will avoid being associated with firms without viable business strategies and substantial economic potential. Such high reputations make it more costly for them to engage with low-quality ventures, as individuals would seek to preserve their reputations.

Founders can also signal their human capital by investing in their own ventures (Leland and Pyle 1977, Barney et al. 1989, Grinblatt and Hwang 1989). For example, "skin in the game" signals the founders' personal assessment of their human capital. Moreover, it signals and ensures the founders' commitment and alignment with investor interests. The commitment of personal resources provides a signal of both capability ("the lemons problem") and intent ("the moral hazard problem") (Stiglitz 2000). Founders with higher human capital should thus be willing to take on more ownership, making a high ownership stake a signal of their quality.

Because investors value founders' human capital as a credible signal of the SPAC's economic potential, it will be associated with a higher likelihood of successfully completing an IPO. Thus, in line with past research, our baseline hypothesis is:

Hypothesis_baseline. *In the SPAC sector, signaling stronger human capital of founders will be positively related to securing financing through an IPO.*

The second way that firms can reduce investors' uncertainty about their founders' human capital is by expressing *less* uncertainty about it when communicating with investors. This is likely to hold when founders communicate through formal channels (e.g., IPO prospectuses filed with the Securities and Exchange Commission (SEC)) because these forms are legally binding and, thus, create incentives for truthful communication. Loughran and McDonald (2013) offer some preliminary evidence for this idea. In particular, they demonstrate that firms that expressed *less* uncertainty in their overall

S-1 had a higher likelihood of securing financing (i.e., an IPO was less likely to be withdrawn). However, our theoretical framework posits that this relationship is bounded only to performance factors, where founders have a knowledge advantage over investors and, thus, are characterized by information asymmetry (e.g., the founders' human capital). Because founders have a knowledge advantage about their own experience and skills (such as industry-specific expertise, leadership abilities, target sourcing, and mergers and acquisitions transactions), as well as commitments to allocate their time for target search, the expression of a higher degree of certainty and precision concerning its human capital will reduce information asymmetry and the uncertainty that investors face. Thus, with respect to founders' human capital, expressing less uncertainty should build investor confidence and increase the likelihood of successfully completing an IPO.

Hypothesis 1. *In the SPAC sector, expressing less uncertainty about founders' human capital will be positively related to securing financing through an IPO.*

Performance Factors where Founders Have a Low Knowledge Advantage over Investors (Acquisition of a Target and SPAC Vehicle)

There are also performance factors within the SPAC context where founders do *not* have as strong of a knowledge advantage over investors, and information is largely unknowable to both parties. Two key performance factors that exhibit unknowability for both founders and investors alike are (1) the acquisition target and (2) investment in the SPAC itself as a novel and emerging vehicle. According to our framework, we would expect that if SPACs acknowledge this unknowability by expressing *more* (not less) uncertainty about these performance factors, it should lead to more favorable financing outcomes because the founders would be seen as more competent and honest.

The first of these factors, the acquisition target, represents a major source of uncertainty for both investors and SPAC founders. SPACs represent blank check companies, and, in fact, it is illegal for the founders to have identified a potential set of targets prior to the IPO. The SEC mandates that the IPO prospectus disclose that no specific business combination is currently being considered by the SPAC and that neither the SPAC's officers nor directors have individually chosen or considered a target business for the business combination, nor have they had any discussions regarding potential target businesses among themselves or with underwriters or other advisors (Layne and Lenahan 2018). As a result, SPACs' founders do not start searching for an acquisition target until after the IPO has been successfully completed, and investors must decide whether to invest in the SPAC based only on their belief that the founders

will find a quality target within the allotted timeframe after the IPO.

The uncertainty that founders face regarding the acquisition target also stems from the shareholders' vote and approval of the proposed targets. After the IPO is completed, founders start their search for acquisition targets. When they identify a target, they first propose that target to the SPAC's shareholders. Shareholders who do not agree with the target have the option to redeem their shares at the issue price and will, on average, receive back a large portion of their initial investment. However, if a certain number of investors oppose a proposed target, then the acquisition will not proceed. As such, investors' use of their voting and redemption rights represents a key source of uncertainty about the SPAC's ability to complete an acquisition, creating substantial knowledge problems for founders and investors alike prior to the IPO.

For these reasons, the acquisition of a target is highly uncertain for both founders and investors. Therefore, we argue that SPACs that acknowledge this unknowability by expressing more uncertainty about the issue will be viewed by investors as more competent and honest and that this will lead to more favorable financing outcomes.

Hypothesis 2. *In the SPAC sector, expressing more uncertainty about the acquisition of a target will be positively related to securing financing through an IPO.*

The SPAC vehicle itself represents a second issue where founders do not have a significant knowledge advantage over investors. There are several reasons for this. First, as is common for new investment vehicles and organizational forms, the SPAC structure itself has undergone frequent modification as new founders have entered the sector and introduced new variations (Murray 2017, Gahng et al. 2021, Klausner and Ohlrogge 2022). One of the most salient aspects of SPACs is that they avoid Rule 419 of the Securities Exchange Act of 1933, allowing them to bypass many of the regulations that pertain to shell companies and enabling experimentation within the organizational form.[1] For example, SPAC founders have experimented with different time limits to find a target, increasing the conversion threshold, changing voting rights, adjusting the number of warrants and rights that can dilute shareholders, and provisions for using a tender offer in place of stockholder voting.

Second, the institutional and regulatory environment in which SPACs operate has been highly dynamic, which has contributed to broader uncertainty about the overall sector. Initially, SPAC IPOs were restricted to over-the-counter (OTC) markets; however, AMEX began accepting SPACs in 2005, and then NASDAQ and the NYSE did so in 2008. These exchanges also have different and evolving rules. For example, in November 2010, NYSE AMEX put in place new rules for SPAC issues as Section 119 of the NYSE AMEX Company Guide, which required 90% of the IPO proceeds to be held in trust and a shareholder vote on the proposed acquisition. Then, in 2011, the rules were modified to allow business combinations to occur without shareholder votes. In 2011, SPACs were also subjected to the reverse mergers' seasoning rules, which, among other things, required the company to trade on OTC markets or another exchange for a period of 12 months after an acquisition was approved before being allowed to list on AMEX, NASDAQ, or NYSE.[2]

Third, there are numerous opaque costs that investors face and that scholars and practitioners have only recently started to understand. First, the SPAC founders are compensated with a "promote" consisting of 20%–25% of the IPO's proceeds. Second, at the time of the IPO, SPACs pay the investment bank an underwriting fee, which is typically around 5.5% of the full IPO proceeds. Third, rights and warrants allow unit holders to buy more shares at a future date, diluting the value of the existing shares. These three factors result in considerable costs for the shareholders of the SPAC or for those holding shares in the company that goes public through the SPAC (Klausner et al. 2022). For these reasons, SPACs are rife with uncertainty, with the media characterizing them as "the new blind pools" and asking whether investors "crave huge risk? This investment may be for you" (Savitz 2005). In a similar fashion, "securities experts cautioned that blank-check companies are highly risky investments" (Keehner 2006). Given these characteristics, the SPAC sector is highly uncertain, and SPACs as investment vehicles contain many important considerations that are fundamentally unknowable at the time of the IPO.

Taken together, because so much about investing in the SPAC vehicle itself is highly uncertain to founders and investors alike, SPACs that acknowledge this unknowability by expressing more uncertainty about it will be viewed by investors as more competent and honest, leading to more favorable financing outcomes.

Hypothesis 3. *In the SPAC sector, expressing more uncertainty about the investment in the SPAC vehicle will be positively related to securing financing through an IPO.*

Methods
Data
Using manually collected data available from the Securities and Exchange Commission's website, we collected the IPO prospectus filings (Form S-1) of SPACs. The S-1 is a prospectus filing that companies planning on going public use to register their securities with the U.S. Securities and Exchange Commission as the "registration statement under the Securities Act of 1933." The S-1 form contains the venture's business information, and

investors use this form to assess the merits of an offering and make their investment decisions. "Managers and underwriters co-author the S-1" (Loughran and McDonald 2013, p. 308), and the characteristics of the filing's content shape IPO outcomes (e.g., Loughran and McDonald 2013 and Bédard et al. 2016). The S-1 has been used by scholars to study the effects of expressing uncertainty in financial markets outcomes (Loughran and McDonald 2011, 2013, Huang et al. 2018, Allee et al. 2021).

We collected the S-1 filings by the population of SPACs that attempted to go public in the period from the emergence of SPACs in 2003 through 2019. As depicted in Figure 1, in that period, 523 such firms filed S-1 forms, and 394 of them successfully completed an IPO. We used these filings to gather data about the SPAC deals' structures. We also used them to identify the members of each SPAC's founding team. Drawing on the information in the S-1 forms and biographies found in *BoardEx*, *Who's Who in America*, and *Who's Who in Finance and Industry*, we coded the founders' characteristics (e.g., education, prior working experience) that were identified as relevant based on prior literature on IPOs and interviews that the authors conducted with professionals with rich experience in the SPAC industry.

Model Specification and Dependent Variable

Our dependent variable is *IPO completion*, which we coded one when a SPAC's attempt to go public resulted in a successful IPO completion, and zero when the attempt failed (Loughran and McDonald 2013, Dimic et al. 2020).[3] In other words, we estimated the likelihood of successfully raising capital through an IPO. If a sufficient number of investors are interested in the offering, the firm successfully completes its IPO; if the offering is not met with sufficient support, the IPO fails and is withdrawn. This variable thus captures one key measure that scholars have used to assess the success of a firm's financing efforts (Loughran and McDonald 2013).

The S-1 filing process is a transparent, costly, and public announcement of a company's plan to go public. Moreover, cancelling an IPO is a conspicuous, costly, and public announcement of a change in plan. Companies that cancel their IPOs often experience a negative impact to their reputations as they are seen as more unreliable (Lian and Wang 2009, Helbing 2019). There is rich literature in finance explaining IPO withdrawals as performance outcomes (Welch 1992, Dunbar and Foerster 2008, Boeh and Southam 2011, Owen-Smith et al. 2015, Helbing 2019, Helbing et al. 2019).

We test our hypotheses using a logit model with robust estimates of the standard errors.[4] Furthermore, to correct for the possibility of a small number of zeros in our outcome and include year dummies, we used Firth logit regression with penalized likelihood (Firth

1993, Heinze and Schemper 2002), and all results were supported.

Independent Variables

To test our baseline hypothesis, we considered a variety of founder characteristics that could be signals of human capital and its deployment. First, we considered the average age of a firm's founders (*Founders' age*) because investors may consider this an indicator of the founders' general experience and expertise (Gimmon and Levie 2010). Second, for similar reasons, we also accounted for the number of founders with Ivy League degrees (*Founders with Ivy League education*). Third, given that SPAC founding teams need to identify a firm that is suitable for public listing, we measured the number of founders who had top management experience in publicly listed firms (*Founders with top management team (TMT) experience*). Fourth, we accounted for the number of founders with experience in private equity (PE) and venture capital (VC) (*Founders with PE/VC experience*). This is relevant because PE and VC professionals and SPAC founders share the goal of finding private targets to acquire. SPACs follow the recent trend in the PE and VC industry of fundraising on a deal-by-deal basis and are part of the broader trend of private firms using shell companies to get public listing through reverse mergers (Feldman and Dresner 2009, Naumovska et al. 2021). Fifth, we measured the prominence of founders by including the sum of media articles mentioning all founders in a focal SPAC in leading U.S. business media in the year before the Form S-1 was filed (*Founders' media prominence*). We included this measure because SPACs are often associated with celebrity founders (Solomon 2013), and this may be another signal on which investors rely when deciding whether to invest in a given SPAC. We also accounted for the number of *Founders with successful SPAC experience* (i.e., founders in a focal SPAC who had been involved in at least one other SPAC in the past that successfully acquired a target), as this signals expertise and skills that are relevant to the SPAC sector. Finally, we account for the dollar amount of the founders' investment in the SPAC (*Founders' investment*). Founders' personal investment and stock ownership is often taken as a signal of the founders' own assessment of a venture and of the alignment of their interests with those of the other investors (Leland and Pyle 1977, Grinblatt and Hwang 1989).

To test Hypotheses 1–3, we measured the amount of uncertainty expressed (*Uncertain language*) in specific sections of the firm's S-1 prospectus that pertained to our predictions: (1) SPAC founders and their human capital in the management team section (Hypothesis 1), (2) performance factors that relate to the acquisition of a target in the proposed business section (Hypothesis 2), and (3) the risks associated with SPACs as a vehicle in the risks section (Hypothesis 3). To do so, we use the

"uncertain word list" created specifically for financial documents by Loughran and McDonald (2011, 2013), which has been used to analyze traditional IPOs (Loughran and McDonald 2013). The list includes 297 words denoting uncertainty, including *may*, *could*, *believe*, *possible*, *anticipate*, *depending*, *might*, and *likelihood*. The dictionary accounts for all possible conjugations.[5] Such words represent epistemic qualifiers and are used to express a degree of uncertainty (Brun and Teigen 1988, Wallsten 1990). Considerable past research has examined the psychological processes underlying the use and interpretation of epistemic qualifiers as expressions of uncertainty (e.g., Budescu and Wallsten 1995 and Dhami and Wallsten 2005). Importantly, the dictionary created by Loughran and McDonald (2013) was specifically made to capture the expression of uncertainty in the domain of financial disclosure; it represents a significant improvement over general English-language dictionaries and has become predominant in recent studies on the role of language in Finance (see Kearney and Liu 2014 for a review). Consistent with prior work (Guo et al. 2017, Pan et al. 2018), we quantify the uncertainty expressed in each of these three sections by dividing the number of uncertainty-related words within each section by the total number of words in that section.

To test Hypothesis 1, we examine the uncertainty expressed in relation to the founders and their human capital. This information comes from the management team section and lists all the names, ages, and positions of executive officers and directors. This section also provides brief biographies of each executive officer, together with their relevant skills, executive compensation, and possible conflicts of interest.

To test Hypothesis 2, we examine the uncertainty expressed in the proposed business section, which contains information about the acquisition of a target. For example, this section contains general information about the search process and the risks associated with finding a target, valuing it, conducting due diligence, securing shareholder approval, and the negotiation, drafting, and execution of relevant agreements.

To test Hypothesis 3, we examine the uncertainty expressed in the risk factors section, which contains information and broader concerns about investing in SPACs as an emergent vehicle itself. For example, this section identifies certain risks associated with SPACs as blank check companies, including dilution of shareholders, SEC rules, and the uncertain regulatory environment.

Control Variables
We controlled for several characteristics that could affect the success of an IPO at the SPAC-, market-, and firm-level. The outcome of an IPO is influenced by a variety of firm-specific (e.g., governance characteristics) and non-firm-specific characteristics (e.g., market conditions) (Welch 1992, Helbing et al. 2019, Dimic et al. 2020).

The first SPAC characteristic for which we controlled was the logarithm of the dollar amount of the proceeding stated as a goal for the IPO in Form S-1 (*Capital sought $*). Raising higher dollar amounts generally means attracting a larger number of investors. We also controlled for whether the SPAC stated in their prospectus that they would focus their search for an acquisition target either geographically or by industry. Some SPACs do not specify a focus, whereas other SPACs indicate a preference for a target that operates in certain industries and/or geographies (while still making clear that these preferences are nonbinding). To account for SPACs that indicate an industry and/or geographical orientation, we included a dummy variable indicating whether the SPAC identified a geography, typically a country (e.g., United States, United Kingdom, China). The variable *Geography orientation* is equal to one if the SPAC indicated such a geographic preference, and zero if not. Some SPACs also indicate possible industries for their search, whereas other SPACs leave it wide open.[6] We included three variables to capture the heterogeneity in industry focus. First, we created a dummy variable indicating whether the SPAC listed exactly one industry: *Industry orientation (one)*, taking the value one if so, and zero otherwise. Second, we created a dummy variable indicating whether the SPAC listed multiple industries: *Industry orientation (multiple)*, taking the value one if so, and zero otherwise. Third, if any of the preferred industries were in technology, we included a dummy variable, *Technology industry.*

We also controlled for each SPAC's dollar amount of the base portion of the capital sought plus the maximum "greenshoe" overallotment option scaled by the base capital sought (*Overallotment*). This option allows the underwriters to buy additional shares in the 30–45 days after an IPO. Larger overallotment options indicate that founders are paying underwriters more and diluting investors' shares (Hale 2007). We also included a control for whether the SPAC sought to get listed on the NYSE or NASDAQ versus OTC, given the stricter listing requirements of the two former exchanges.

Next, we controlled for potential effects of third-party certifying agents on IPO outcomes. We used Carter and Manaster (1990) rankings, further updated by Carter et al. (1998) and Loughran and Ritter (2004). Specifically, we controlled for the reputation of the underwriter with a dummy variable set to one if the lead underwriter had a value greater than eight (*Top-tier underwriter*) (Rodrigues and Stegemoller 2014). We also controlled for the prestige of the auditors, with a top auditor dummy that is equal to one if the auditor is one of the Big 4 auditors: KPMG Peat Marwick, Ernst and Young, Deloitte and Touche, and PriceWaterhouseCoopers (Titman and Trueman 1986). In terms of founders' characteristics, we controlled for the number of founders (*# Founders*). It has been argued that the number of founders influences

a venture's financing and ultimate success (Colombo and Grilli 2005, Hsu 2007).

To account for macro trends, and specifically investor sentiment related to IPO activity (Ritter and Welch 2002), we used the survey conducted by the American Association of Individual Investors (AAII) and accounted for the percentage of respondents that indicated they were bullish in the year that a specific SPAC's S-1 was filed (*Investor sentiment*).

With respect to the language used in an S-1 form, we controlled for the number of words in each of the three specific sections of the prospectus scaled by 1,000 (*Number of words*), given that longer documents tend to convey more information, thus reducing uncertainty. We also controlled for the use of *negative, positive, strong modal,* and *legal language* in each of the aforementioned sections. Loughran and McDonald's dictionary consists of 2,345 negative words (e.g., *loss, failure,* and *difficult*), 357 positive words (e.g., *beneficial, successful,* and *strong*), 903 legal words (e.g., *contract, lawsuits,* and *plaintiff*), and 21 strong modal words (e.g., *must, never, clearly,* and *best*). Just as for our independent variable, we counted the number of dictionary words in each section and scaled it by the total number of words. We also controlled for the *negative, positive, legal, strong modal,* and *uncertain* words in the corpus of the S-1, excluding the text in the three key sections.

Results

Tables 1–4 illustrate the 10 most frequently occurring words in the S-1 s, in each of the three sections. In line with Loughran and McDonald's (2013) findings in the context of traditional IPOs, we find that the three most frequently used words in our prospectuses—"may," "could," and "believe"—make up 68% of the cumulative uncertain language variable. This is encouraging because it validates Loughran and McDonald's measure, which denotes "a general notion of imprecision." These three words are some of the most common English qualifiers that, when added to a sentence,

Table 1. Frequency of Top 10 Uncertain Words in the Full S-1 Forms

Uncertain word	Form S-1: Percent of uncertain count (%)	Form S-1: Cumulative percent of uncertain count (%)
"May"	52.97	52.97
"Could"	10.21	63.18
"Believe"	4.78	67.96
"Approximately"	3.91	71.87
"Risks"	3.54	75.41
"Possible"	3.10	78.51
"Risk"	2.20	80.71
"Assuming"	1.96	82.67
"Anticipate"	1.25	83.92
"Anticipated"	1.00	84.92

Table 2. Frequency of Top 10 Uncertain Words in the Section Discussing Founders' Human Capital

Uncertain word	S-1 human capital: Percent of uncertain count (%)	S-1 human capital: Cumulative percent of uncertain count (%)
"May"	44.73	44.73
"Dependent"	31.07	75.80
"Believe"	6.34	82.14
"Dependence"	3.81	85.96
"Could"	3.30	89.26
"Risk"	1.65	90.91
"Approximately"	1.62	92.53
"Might"	1.41	93.95
"Believes"	1.01	94.96
"Possible"	0.81	95.77

introduce imprecision by reducing the level of certainty expressed in that statement (Harmon 2019a). Table 5 provides examples of how these uncertainty-related words are used to indicate uncertainty.

Table 6 shows the summary statistics and correlations for the sample that we used to test our hypotheses. According to their S-1 forms, the average funding that SPACs sought in their IPOs was $156.839 million. With respect to their intended target search, 28% of the SPACs indicated a preferred geography, 60% indicated a single preferred industry, and 14% indicated multiple preferred industries. The average SPAC had 3.231 founders, and the founders' average age was 49.320 years. The average SPAC had 0.933 founders with an Ivy League degree, 0.971 founders with prior PE or VC experience, and 1.857 founders with prior TMT experience at a publicly listed firm. With respect to the language in the prospectus, we found that, on average, there were 41,178 words per prospectus, and uncertain language made up 3.392% of it, on average, or 1,397 words. It is notable that the uncertain language was more prevalent than positive, negative, strong modal, or legal language. Furthermore, the proportion of uncertain language

Table 3. Frequency of Top 10 Uncertain Words in the Section Discussing the Acquisition of a Target

Uncertain word	S-1 acquisition of a target section: Percent of uncertain count (%)	S-1 acquisition of a target section: Cumulative percent of uncertain count (%)
"May"	42.94	42.94
"Could"	9.11	52.05
"Believe"	8.41	60.46
"Dependent"	5.80	66.26
"Possible"	4.50	70.76
"Approximately"	4.34	75.10
"Risks"	3.74	78.83
"Anticipate"	2.32	81.15
"Pending"	1.76	82.91
"Anticipated"	1.57	84.47

Table 4. Frequency of Top 10 Uncertain Words in the Section Discussing the Risks of SPACs As an Investment Vehicle

Uncertain word	S-1 SPAC vehicle: Percent of uncertain count (%)	S-1 SPAC vehicle: Cumulative percent of uncertain count (%)
"May"	53.92	53.92
"Could"	14.66	68.58
"Risks"	4.97	73.55
"Dependent"	3.77	77.32
"Possible"	2.43	79.75
"Approximately"	2.12	81.87
"Risk"	2.08	83.95
"Differ"	1.99	85.94
"Believe"	1.87	87.81
"Assuming"	1.28	89.09

varied across different sections. Specifically, the section discussing the founders' human capital contained 2.960% uncertain words, on average, whereas the sections discussing the acquisition of a target and the risks of SPACs as a new vehicle had 3.330% and 5.688%, respectively.

Table 7 reports the results of the logit model that predicts the likelihood of a SPAC successfully completing an IPO. The analyses begin with Model 1, which includes the controls. In Model 2, we include the variables relating

to signals of the founders' human capital. In Models 3, 4, and 5, we test Hypotheses 1, 2, and 3, and we include the variables measuring *Uncertain language* in the three different sections focusing on (1) the human capital of founders, (2) the acquisition of a target, and (3) the SPAC vehicle. In Model 6, we include all the variables measuring the percentage of uncertain language across the three sections.

As predicted by our baseline hypothesis, in Model 2, we see that some of the human capital signals were associated with a higher probability of completing the IPO. Specifically, SPACs with more founders who had TMT experience in a publicly listed firm had an increased likelihood of going public ($b = 0.444$, $p = 0.001$). Also, SPACs with more founders who had Ivy League educations had an increased likelihood of successfully completing an IPO ($b = 0.241$, $p = 0.064$). Moreover, SPACs whose founders made larger investments in the vehicle had a higher likelihood of going public ($b = 0.379$, $p = 0.076$). Finally, SPACs with founders who already had SPAC experience were more likely to successfully complete an IPO ($b = 0.778$, $p = 0.000$). We did not find evidence that founders' age, PE/VC experience, or media prominence were associated with the IPO outcome.

In Model 3, we test Hypothesis 1, which predicted that expressing less uncertainty about founders' human

Table 5. Examples of Expression of Uncertainty in the S-1 Forms

Category	Examples
Human capital	We *believe* that the skills and experience of these individuals, their collective access to acquisition opportunities and ideas, their contacts, and their transaction expertise should enable them to successfully identify and effect an acquisition transaction although we cannot assure you that they will, in fact, be able to do so.
	Although we currently *anticipate* that some members of our management team will remain with us postacquisition transaction, some or all of our current executive officers and directors *may* or may not remain with us following our initial acquisition transaction.
	Source: S-1 form, Chardan Metropol Acquisition Corp., April 25, 2012
Acquisition target	While we *may* seek to effect simultaneous business combinations with more than one target business, we will *probably* have the ability, as a result of our limited resources, to effect only a single business combination.
	We *anticipate* that target business candidates will be brought to our attention from various unaffiliated sources, including investment bankers, venture capital funds, private equity funds, leveraged buyout funds, management buyout funds and other members of the financial community.
	In identifying, evaluating, and selecting a target business, we *may* encounter intense competition from other entities having a business objective similar to ours
	While we *believe* there *may* be numerous potential target businesses that we *could* acquire with the net proceeds of this offering, our ability to compete in acquiring certain sizable target businesses *may* be limited by our available financial resources.
	Source: Andina Acquisition Corp., September 18, 2015
SPACs as an investment vehicle	If we are deemed to be an investment company under the Investment Company Act, we *may* be required to institute burdensome compliance requirements and our activities may be restricted, which *may* make it difficult for us to complete our business combination.
	Changes in laws or regulations, or a failure to comply with any laws and regulations, may adversely affect our business, investments and results of operations.
	We *may* be a passive foreign investment company, or "PFIC," which *could* result in adverse United States federal income tax consequences to U.S. investors.
	Depending on the particular circumstances the application of the start-up exception *may* be subject to *uncertainty*, and there cannot be any assurance that we will qualify for the start-up exception.
	Source: Double Eagle Acquisition Corp., August 13, 2015

Table 6. Correlation Matrix

		Mean	S.D.	(1)	(2)	(3)	(4)	(5)
1	IPO completion	0.753	0.431					
2	Uncertain language – S1 human capital	2.960	0.793	−0.003				
3	Uncertain language – S1 acquisition of a target	3.330	0.332	0.065	0.149			
4	Uncertain language – S1 SPAC vehicle	5.688	0.466	0.255	−0.093	0.184		
5	Founders' age	49.320	6.879	0.040	0.130	−0.049	0.010	
6	Founders with Ivy League education	0.933	1.051	−0.024	−0.065	0.006	0.000	0.027
7	Founders with TMT experience	1.857	1.391	0.148	−0.010	−0.066	−0.045	0.097
8	Founders with PE/VC experience	0.971	1.103	−0.027	−0.081	−0.041	−0.043	−0.006
9	Founders' media prominence	13.801	60.058	0.098	0.110	−0.066	−0.070	0.016
10	Founders with successful SPAC experience	0.337	0.834	0.130	0.014	0.088	−0.045	0.074
11	Capital sought $	156.839	127.927	−0.038	0.261	−0.100	−0.103	0.155
12	Founders' investment	4.709	3.637	0.113	0.369	−0.059	−0.102	0.153
13	# Founders	3.231	1.250	−0.068	−0.108	−0.138	−0.039	−0.039
14	Geographic orientation	0.283	0.451	0.143	0.121	0.061	−0.063	−0.051
15	Industry orientation (one)	0.604	0.489	0.099	0.084	−0.018	0.185	0.162
16	Industry orientation (multiple)	0.140	0.347	−0.102	−0.058	−0.031	0.032	−0.019
17	Technology industry	0.130	0.337	0.010	−0.007	−0.045	−0.027	0.108
18	Overallotment	114.165	3.247	−0.137	0.074	0.058	−0.062	−0.112
19	NYSE/NASDAQ	0.744	0.437	−0.001	0.495	0.037	−0.076	0.146
20	Top-tier underwriter	0.314	0.464	−0.053	0.280	−0.093	−0.093	0.000
21	Top auditor	0.065	0.247	−0.011	0.095	−0.104	0.009	0.036
22	Investor sentiment	0.021	0.168	0.317	−0.112	−0.020	0.159	−0.058
	S-1 without three sections							
23	Number of words	23.014	8.426	0.055	0.486	−0.135	−0.318	0.173
24	Negative language	6.890	0.467	−0.221	0.314	0.077	−0.295	0.042
25	Positive language	2.548	0.231	−0.196	0.114	−0.127	−0.274	0.022
26	Legal language	4.865	0.393	0.195	−0.080	0.023	0.238	−0.025
27	Strong modal language	1.930	0.212	−0.247	0.318	0.066	−0.307	−0.002
28	Uncertain language	2.540	0.215	−0.112	−0.029	0.368	0.274	−0.050
	S-1 human capital							
29	Number of words	2.614	1.051	0.034	0.285	−0.053	−0.246	0.134
30	Negative language	6.435	1.091	0.013	0.555	−0.029	−0.128	0.129
31	Positive language	2.482	0.556	0.010	0.581	0.096	0.001	0.037
32	Legal language	2.521	1.149	0.134	0.477	−0.107	0.015	0.154
33	Strong modal language	1.558	0.405	−0.010	0.571	−0.009	−0.131	0.078
	S1 acquisition of a target							
34	Number of words	7.165	2.522	−0.002	0.417	−0.243	−0.371	0.149
35	Negative language	7.588	0.824	−0.259	0.210	0.149	−0.302	0.019
36	Positive language	3.274	0.419	−0.147	0.249	0.057	−0.187	0.075
37	Legal language	3.744	0.808	−0.093	0.250	0.032	−0.325	−0.007
38	Strong modal language	2.352	0.307	−0.162	−0.264	0.096	0.065	−0.076
	S-1 SPAC as investment vehicle							
39	Number of words	8.926	3.427	0.042	0.389	−0.212	−0.365	0.119
40	Negative language	9.570	0.623	−0.005	0.030	−0.035	0.143	0.107
41	Positive language	3.558	0.353	−0.164	0.132	0.050	0.018	0.124
42	Legal language	4.927	0.724	0.163	0.128	−0.141	−0.178	0.069
43	Strong modal language	2.051	0.291	−0.132	−0.375	0.052	0.030	−0.114

		(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
7	Founders with TMT experience	0.043							
8	Founders with PE/VC experience	0.207	−0.109						
9	Founders' media prominence	0.004	0.159	0.030					
10	Founders with successful SPAC experience	0.074	0.038	0.058	0.002				
11	Capital sought $	0.094	0.097	−0.006	0.220	0.145			
12	Founders' investment	0.087	0.153	0.055	0.131	0.163	0.728		
13	# Founders	0.358	0.473	0.304	0.131	−0.001	0.059	0.094	
14	Geographic orientation	0.076	0.086	0.047	0.052	0.139	0.053	0.215	0.040
15	Industry orientation (one)	−0.066	0.085	−0.113	−0.104	−0.058	0.014	0.093	−0.010
16	Industry orientation (multiple)	0.041	−0.046	0.081	0.053	0.010	0.098	0.027	−0.004
17	Technology industry	0.052	0.019	0.082	−0.005	−0.033	0.055	0.108	−0.035
18	Overallotment	0.026	−0.039	0.040	−0.147	0.050	0.061	0.160	−0.015

Table 6. (Continued)

		(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
19	*NYSE/NASDAQ*	−0.012	0.040	−0.007	0.039	0.074	0.454	0.489	0.004
20	*Top-tier underwriter*	0.067	0.049	0.051	0.102	0.118	0.450	0.423	0.056
21	*Top auditor*	0.061	0.033	0.021	0.230	0.024	0.378	0.230	0.094
22	*Investor sentiment*	−0.042	−0.020	−0.014	0.037	0.007	−0.156	−0.048	−0.040
	S-1 without three sections								
23	*Number of words*	0.057	0.067	0.073	0.149	0.161	0.437	0.567	0.053
24	*Negative language*	−0.004	0.042	−0.024	0.021	0.028	0.270	0.282	0.004
25	*Positive language*	−0.007	0.050	0.064	0.065	−0.067	0.069	0.017	0.100
26	*Legal language*	−0.168	−0.047	0.002	0.015	−0.092	−0.203	−0.161	−0.091
27	*Strong modal language*	0.075	0.056	−0.023	0.025	0.060	0.351	0.312	0.059
28	*Uncertain language*	−0.039	−0.091	−0.091	−0.033	−0.032	−0.148	−0.159	−0.116
	S-1 human capital								
29	*Number of words*	0.111	0.131	0.079	0.148	0.241	0.370	0.441	0.151
30	*Negative language*	−0.024	−0.019	0.010	0.037	−0.023	0.225	0.304	−0.066
31	*Positive language*	−0.003	−0.073	−0.009	0.017	−0.035	0.150	0.225	−0.125
32	*Legal language*	0.044	0.023	0.070	0.016	0.087	0.281	0.440	0.023
33	*Strong modal language*	0.015	−0.077	−0.039	0.031	−0.008	0.358	0.419	−0.107
	S-1 acquisition of a target								
34	*Number of words*	0.096	0.122	0.080	0.140	0.146	0.404	0.530	0.117
35	*Negative language*	0.094	0.024	−0.031	0.083	0.039	0.333	0.244	0.005
36	*Positive language*	0.026	−0.010	0.086	0.164	−0.038	0.166	0.166	0.043
37	*Legal language*	0.025	0.177	−0.066	0.075	0.081	0.214	0.313	0.081
38	*Strong modal language*	0.010	−0.135	−0.027	−0.010	−0.139	−0.075	−0.300	−0.103
	S-1 SPAC as investment vehicle								
39	*Number of words*	0.037	0.099	0.067	0.077	0.114	0.325	0.471	0.096
40	*Negative language*	0.004	0.031	−0.044	0.032	−0.078	0.170	0.066	0.015
41	*Positive language*	0.049	−0.060	0.009	−0.091	0.028	0.137	0.126	0.032
42	*Legal language*	0.003	0.034	0.077	0.055	0.069	0.097	0.214	0.022
43	*Strong modal language*	−0.023	−0.121	−0.047	−0.132	−0.120	−0.221	−0.411	−0.106

		(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
15	*Industry orientation (one)*	−0.038								
16	*Industry orientation (multiple)*	0.029	−0.498							
17	*Technology industry*	−0.003	0.022	0.254						
18	*Overallotment*	0.107	−0.016	0.005	−0.022					
19	*NYSE/NASDAQ*	0.087	0.080	0.034	0.045	0.051				
20	*Top-tier underwriter*	0.143	0.075	−0.058	−0.016	0.084	0.293			
21	*Top auditor*	0.041	−0.072	0.118	0.059	−0.102	0.101	0.173		
22	*Investor sentiment*	0.192	−0.035	0.036	0.022	−0.001	−0.147	−0.122	−0.041	
	S-1 without three sections									
23	*Number of words*	0.321	0.038	0.032	0.082	0.181	0.489	0.368	0.066	−0.099
24	*Negative language*	0.024	−0.049	−0.007	0.032	0.117	0.368	0.218	0.049	−0.275
25	*Positive language*	−0.054	−0.095	−0.022	0.000	0.001	0.067	0.118	0.081	−0.135
26	*Legal language*	−0.164	0.210	−0.001	0.090	−0.025	−0.139	−0.066	−0.140	0.093
27	*Strong modal language*	0.029	−0.074	−0.027	−0.003	0.104	0.409	0.235	0.134	−0.272
28	*Uncertain language*	0.051	−0.080	0.074	−0.069	0.033	−0.045	−0.172	−0.032	−0.032
	S-1 human capital									
29	*Number of words*	0.222	0.032	0.050	0.024	0.123	0.432	0.244	−0.006	−0.063
30	*Negative language*	0.233	0.013	−0.018	−0.040	0.115	0.245	0.252	0.103	−0.078
31	*Positive language*	0.200	−0.015	0.019	0.028	0.050	0.270	0.131	0.100	−0.056
32	*Legal language*	0.294	0.113	−0.020	0.088	0.125	0.333	0.292	0.067	−0.007
33	*Strong modal language*	0.219	0.023	0.021	0.036	0.205	0.366	0.293	0.138	−0.133
	S-1 acquisition of a target									
34	*Number of words*	0.348	0.049	−0.018	0.035	0.172	0.424	0.386	0.100	−0.109
35	*Negative language*	−0.080	−0.077	0.017	−0.029	0.112	0.296	0.181	0.099	−0.238
36	*Positive language*	−0.001	0.014	0.035	0.104	0.040	0.207	0.216	0.042	−0.095
37	*Legal language*	0.146	−0.002	−0.088	0.056	0.119	0.287	0.197	0.044	−0.191
38	*Strong modal language*	−0.327	−0.115	0.073	−0.045	−0.122	−0.264	−0.128	−0.045	−0.017
	S-1 SPAC as investment vehicle									
39	*Number of words*	0.293	0.079	−0.052	0.043	0.163	0.353	0.369	0.035	−0.147
40	*Negative language*	−0.249	0.236	−0.070	−0.017	−0.025	0.091	0.119	0.081	−0.026

Table 6. (Continued)

		(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
41	*Positive language*	−0.173	0.101	0.061	0.008	−0.008	0.156	0.117	0.015	−0.107
42	*Legal language*	0.150	0.097	−0.085	0.040	0.123	0.149	0.127	−0.032	−0.091
43	*Strong modal language*	−0.347	−0.146	0.058	−0.035	−0.139	−0.361	−0.268	−0.064	0.072

		(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)
	S-1 without three sections										
24	*Negative language*	0.364									
25	*Positive language*	0.106	0.129								
26	*Legal language*	−0.196	−0.120	−0.075							
27	*Strong modal language*	0.343	0.756	0.237	−0.354						
28	*Uncertain language*	−0.287	0.007	−0.091	0.049	−0.053					
	S-1 human capital										
29	*Number of words*	0.765	0.278	−0.019	−0.206	0.241	−0.186				
30	*Negative language*	0.458	0.316	0.034	−0.133	0.235	−0.027	0.223			
31	*Positive language*	0.360	0.206	0.142	−0.132	0.209	0.017	0.211	0.497		
32	*Legal language*	0.652	0.184	0.005	0.010	0.101	−0.085	0.462	0.564	0.408	
33	*Strong modal language*	0.511	0.353	0.049	−0.166	0.347	0.014	0.205	0.645	0.485	0.512
	S-1 acquisition of a target										
34	*Number of words*	0.855	0.333	0.180	−0.231	0.325	−0.219	0.708	0.399	0.302	0.592
35	*Negative language*	0.194	0.695	0.137	−0.125	0.620	−0.038	0.143	0.203	0.071	−0.011
36	*Positive language*	0.198	0.219	0.327	−0.027	0.231	0.024	0.145	0.170	0.180	0.141
37	*Legal language*	0.393	0.512	0.214	−0.057	0.473	−0.092	0.277	0.156	0.094	0.289
38	*Strong modal language*	−0.477	−0.073	−0.012	0.187	−0.021	0.057	−0.420	−0.180	−0.179	−0.376
	S-1 SPAC as investment vehicle										
39	*Number of words*	0.856	0.298	0.161	−0.177	0.284	−0.224	0.687	0.405	0.274	0.630
40	*Negative language*	−0.114	0.216	−0.017	0.113	0.129	−0.053	−0.059	0.033	−0.090	−0.090
41	*Positive language*	−0.034	0.171	0.146	−0.015	0.171	−0.045	−0.035	−0.009	0.040	0.006
42	*Legal language*	0.505	0.178	0.091	0.009	0.148	−0.258	0.325	0.182	0.074	0.390
43	*Strong modal language*	−0.672	−0.145	−0.038	0.146	−0.103	0.044	−0.532	−0.351	−0.256	−0.571

		(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)
	S-1 acquisition of a target										
34	*Number of words*	0.471									
35	*Negative language*	0.241	0.178								
36	*Positive language*	0.120	0.125	0.293							
37	*Legal language*	0.272	0.471	0.496	0.128						
38	*Strong modal language*	−0.222	−0.595	0.228	0.044	−0.327					
	S-1 SPAC as investment vehicle										
39	*Number of words*	0.446	0.855	0.102	0.182	0.429	−0.517				
40	*Negative language*	0.001	−0.099	0.409	0.158	0.026	0.241	−0.095			
41	*Positive language*	0.114	−0.055	0.273	0.169	0.007	0.162	−0.087	0.318		
42	*Legal language*	0.239	0.477	0.056	0.037	0.394	−0.395	0.618	0.047	−0.126	
43	*Strong modal language*	−0.363	−0.663	0.035	−0.101	−0.332	0.633	−0.734	0.156	0.191	−0.527

Note. Correlations above |0.087| are significant at 5% level.

capital would be associated with a higher likelihood of completing the IPO. Supporting Hypothesis 1, we find that the lower the expression of uncertainty when discussing the founders and their human capital, the higher the likelihood of successfully completing an IPO. Conversely, the higher the expression of uncertainty, the lower the likelihood of successfully completing an IPO ($b = -0.450$, $p = 0.007$). Specifically, when the number of uncertain words increased by one standard deviation (i.e., by 0.798 percentage points), the probability of going public decreased by 3.794%.

In Model 4, we test Hypothesis 2, which predicted that expressing more uncertainty about the acquisition of a target would be associated with a higher likelihood

of completing the IPO. In line with our expectation, we find that the higher the expression of uncertainty related to the acquisition of a target, the higher the likelihood of completing an IPO ($b = 1.370$, $p = 0.034$). This finding lends support to Hypothesis 3. More precisely, when the number of uncertain words increased by one standard deviation (i.e., by 0.332 percentage points), the probability of going public increased by 4.34%. We also see that, once we include the variable on the uncertain language related to the acquisition of a target, the variable for Hypothesis 1 improves its significance.

Hypothesis 3 predicted that expressing more uncertainty about the SPAC vehicle itself would be associated with a higher likelihood of completing the IPO. In

Table 7. Logistic Regression Models Predicting the Likelihood of a Successful IPO Completion

IPO completion	(1)	(2)	(3)	(4)	(5)	(6)
Uncertain language – S1 human capital			−0.450**			−0.611***
			(0.166)			(0.147)
Uncertain language – S1 acquisition of a target				1.370*		1.570*
				(0.646)		(0.702)
Uncertain language – S1 SPAC vehicle					1.719**	1.642*
					(0.639)	(0.662)
Founders' age		−0.019	−0.016	−0.017	−0.020	−0.015
		(0.023)	(0.024)	(0.022)	(0.025)	(0.025)
Founders with Ivy League education		0.241[†]	0.236[†]	0.219	0.230	0.203
		(0.130)	(0.123)	(0.138)	(0.150)	(0.149)
Founders with TMT experience		0.444**	0.450**	0.449**	0.452***	0.471***
		(0.137)	(0.140)	(0.139)	(0.135)	(0.143)
Founders with PE/VC experience		−0.033	−0.045	−0.027	−0.002	−0.013
		(0.123)	(0.125)	(0.125)	(0.129)	(0.134)
Founders' media prominence		0.033	0.034	0.034	0.029	0.031
		(0.024)	(0.027)	(0.025)	(0.023)	(0.026)
Founders with successful SPAC experience		0.778***	0.784***	0.708**	0.934***	0.870**
		(0.190)	(0.190)	(0.223)	(0.273)	(0.332)
Founders' investment		0.379[†]	0.395[†]	0.380[†]	0.386[†]	0.405[†]
	(0.004)	(0.213)	(0.219)	(0.215)	(0.228)	(0.229)
Capital sought $	0.003[†]	−0.004	−0.004	−0.004	−0.004	−0.005
	(0.002)	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)
# Founders	−0.106[†]	−0.450**	−0.472**	−0.447**	−0.434**	−0.460**
	(0.062)	(0.139)	(0.144)	(0.142)	(0.146)	(0.154)
Geographic orientation	0.648	0.109	0.096	0.051	0.208	0.120
	(0.495)	(0.532)	(0.523)	(0.531)	(0.534)	(0.524)
Industry orientation (one)	−0.414	−0.337	−0.359	−0.296	−0.528	−0.493
	(0.525)	(0.530)	(0.558)	(0.519)	(0.552)	(0.579)
Industry orientation (multiple)	−1.174**	−1.227*	−1.263*	−1.059*	−1.594**	−1.430*
	(0.447)	(0.480)	(0.502)	(0.499)	(0.584)	(0.615)
Technology industry	−0.074	−0.207	−0.298	−0.132	0.015	−0.044
	(0.208)	(0.282)	(0.287)	(0.303)	(0.284)	(0.295)
Overallotment	−0.306***	−0.298***	−0.301***	−0.292***	−0.306***	−0.312***
	(0.062)	(0.053)	(0.057)	(0.049)	(0.044)	(0.047)
NYSE/NASDAQ	0.512	0.414	0.621	0.439	0.461	0.744
	(0.480)	(0.549)	(0.576)	(0.580)	(0.589)	(0.600)
Top-tier underwriter	−0.388	−0.544*	−0.520*	−0.533*	−0.663*	−0.619[†]
	(0.240)	(0.247)	(0.257)	(0.262)	(0.282)	(0.320)
Top auditor	0.145	−0.246	−0.274	−0.202	−0.385	−0.381
	(0.541)	(0.626)	(0.638)	(0.585)	(0.753)	(0.738)
Investor sentiment	3.829*	3.632*	3.617*	3.850*	3.623[†]	3.811*
	(1.764)	(1.780)	(1.771)	(1.741)	(1.878)	(1.771)
S-1 without three sections						
Number of words	0.027	0.020	0.030	0.003	0.014	0.009
	(0.050)	(0.043)	(0.041)	(0.040)	(0.044)	(0.039)
Negative language	−0.572	−0.446	−0.504	−0.391	−0.492	−0.493
	(0.584)	(0.508)	(0.503)	(0.494)	(0.556)	(0.535)
Positive language	−1.185*	−0.927	−0.917	−0.760	−0.659	−0.515
	(0.572)	(0.567)	(0.567)	(0.610)	(0.626)	(0.667)
Legal language	1.356***	1.628***	1.668***	1.645***	1.554***	1.637***
	(0.374)	(0.404)	(0.423)	(0.412)	(0.387)	(0.440)
Strong modal language	−0.056	−0.275	−0.155	−0.397	−0.436	−0.404
	(1.074)	(1.048)	(1.059)	(1.020)	(1.022)	(1.143)
Uncertain language	−1.402*	−1.455*	−1.457*	−2.321**	−1.893**	−2.821**
	(0.604)	(0.566)	(0.599)	(0.770)	(0.710)	(1.027)
S-1 human capital						
Number of words	0.035	−0.186	−0.256	−0.228	−0.212	−0.366
	(0.173)	(0.294)	(0.279)	(0.293)	(0.313)	(0.301)
Negative language	0.041	0.059	0.096	0.094	0.153	0.249
	(0.265)	(0.233)	(0.228)	(0.219)	(0.231)	(0.198)
Positive language	0.226	0.295	0.454	0.178	0.200	0.302
	(0.247)	(0.318)	(0.328)	(0.340)	(0.298)	(0.332)

Table 7. (Continued)

IPO completion	(1)	(2)	(3)	(4)	(5)	(6)
Legal language	0.063	0.017	0.037	0.039	−0.206	−0.148
	(0.256)	(0.223)	(0.224)	(0.214)	(0.211)	(0.213)
Strong modal language	0.242	0.060	0.241	0.082	0.217	0.489
	(0.550)	(0.676)	(0.620)	(0.648)	(0.666)	(0.574)
S-1 acquisition of a target						
Number of words	−0.320*	−0.370**	−0.384**	−0.262[†]	−0.275[†]	−0.166
	(0.151)	(0.141)	(0.141)	(0.148)	(0.160)	(0.167)
Negative language	−0.230	−0.147	−0.138	−0.257	0.124	−0.007
	(0.300)	(0.339)	(0.349)	(0.370)	(0.359)	(0.385)
Positive language	−0.385	−0.470	−0.410	−0.593	−0.308	−0.352
	(0.361)	(0.497)	(0.513)	(0.452)	(0.502)	(0.485)
Legal language	−0.302*	−0.571***	−0.591***	−0.599***	−0.542***	−0.599***
	(0.144)	(0.145)	(0.152)	(0.146)	(0.111)	(0.133)
Strong modal language	−1.822**	−1.943***	−2.085***	−1.718***	−2.044***	−1.951**
	(0.624)	(0.500)	(0.512)	(0.522)	(0.564)	(0.679)
S-1 SPAC as investment vehicle						
Number of words	0.006	0.083	0.087	0.095	0.197	0.203
	(0.161)	(0.162)	(0.164)	(0.165)	(0.190)	(0.192)
Negative language	0.575	0.471	0.510	0.544	0.220	0.361
	(0.432)	(0.359)	(0.375)	(0.335)	(0.301)	(0.316)
Positive language	−0.578	−0.997*	−0.954*	−1.142**	−1.242*	−1.352*
	(0.387)	(0.437)	(0.451)	(0.430)	(0.530)	(0.549)
Legal language	0.625	0.501	0.425	0.472	0.490	0.369
	(0.455)	(0.421)	(0.422)	(0.407)	(0.420)	(0.422)
Strong modal language	−0.505	0.040	−0.066	0.160	1.280	1.199
	(1.096)	(0.995)	(1.034)	(0.964)	(0.980)	(1.035)
Intercept	43.604***	44.222***	44.895***	40.431***	33.755***	31.674***
	(5.750)	(6.387)	(6.461)	(5.582)	(6.703)	(6.263)
n	516	516	516	516	516	516
Log pseudolikelihood	−199.038	−168.776	−167.515	−165.913	−161.368	−156.884
Pseudo R^2	0.306	0.412	0.416	0.422	0.437	0.453

Note. Robust standard errors are in parentheses.
[†]$p < 0.10$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Model 5, we include the measure of uncertain language that discusses SPACs as an investment vehicle and see a positive and significant effect ($b = 1.719$, $p = 0.007$). That is, when the number of uncertain words increased by one standard deviation (i.e., by 0.467 percentage points), the probability of going public increased by 7.396%.

Finally, in Model 6, we include all the independent variables, and the hypothesized results remain supported.

These findings suggest that, when it concerns performance factors for which firms have significant knowledge advantages over investors (e.g., founders' human capital), communication that reduces uncertainty—by sending credible signals or by expressing less uncertainty—leads to better financing outcomes. However, when it concerns factors for which firms have little knowledge advantage over investors (e.g., the SPAC acquisition target and the SPAC vehicle itself), acknowledging this unknowability by expressing *more* (not less) uncertainty improves financing outcomes.

Supplemental Analyses

To build confidence in our interpretation of the findings, we conducted several robustness tests. First, we considered the possibility that, for performance factors where

founders have a low information advantage over investors, expressing more uncertainty might only be beneficial up to a point. That is, it is theoretically possible that some SPAC founders might simply go too far in acknowledging their uncertainty. To explore this, we examined whether there was a curvilinear effect between the amount of uncertainty expressed and the likelihood of successfully completing an IPO. When we added a quadratic term of the variables measuring *Uncertain language* across the different sections (in addition to the linear term), we did not find evidence for a curvilinear relationship.

Second, we further dissected the text in the S-1 forms that relates to the founders' human capital in the management team section, by removing the subsections that relate to conflicts of interest. Specifically, we removed the parts where the SPACs acknowledge their founders' conflicts of interest to address potential concerns that the expression of uncertainty is confounded with the expression of conflicts of interest. We therefore recoded the data by removing the parts relating to conflicts of interest and created a new measure of the expression of uncertainty. The findings are included in Table 1A in the online appendix, and our hypothesized results hold.

We also examined the specific text about conflicts of interest and observed that part of it related to the founders' ability to devote their time to target searching, given that most founders keep their full-time jobs. Theoretically, this relates to intentions and the deployment of their human capital; this is a performance factor for which founders have an information advantage.

Third, when fixed effects are combined with rare events data, they create a "separation" problem, common to conventional logit functions. In other words, observations whose dependent variable values do not vary within a fixed-effect unit are excluded from the model. In our case, the inclusion of year fixed effects decreases the number of observations from 516 to 453 because some years contained only SPACs that succeeded in going public. We lose more than 10% of the observations, and these excluded observations may bias our results. That is the reason why we did not include year dummies in our main analyses. Our decision to not include these controls in our main analyses is in line with research that examined dichotomous financing outcomes of new ventures (i.e., whether the firm succeeded in getting financing) (e.g., Plummer et al. 2016). This work points out that logistic regressions have the disadvantage of not supporting fixed effects when samples are small and fixed-effect covariates (quasi-) perfectly predict the outcome (Albert and Anderson 1984, Heinze and Schemper 2002). To address possible concerns related to the smaller number of observations that did not succeed in their IPO, we used logit regression with penalized likelihood (Firth 1993, Heinze and Schemper 2002). The results are presented in Table 2A in the online appendix and support our findings.

Fourth, we also run a logit model with year dummies. Although the sample size drops, the results remain supported, as reported in Table 3A in the online appendix. Finally, we estimated our models without control variables, still finding support for our hypotheses, thus ruling out a possible collider bias.

Discussion

This study developed a theoretical framework that sought to extend our understanding of how a firm's communication under uncertainty affects its financing success. In particular, we argue that the effects of a firm's communication under uncertainty will depend on the type of uncertainty about which it is communicating. For performance factors where firms and their founders have a clear knowledge advantage over investors (i.e., those characterized by information asymmetry), sending signals of quality and expressing *less* uncertainty produces better financing outcomes. However, when a performance factor is largely unknowable to founders and they do not have a clear information advantage over investors (i.e., those characterized by

Knightian uncertainty), acknowledging this high degree of unknowability by expressing *more* uncertainty produces better financing outcomes.

We tested and demonstrated support for our framework by examining IPOs in the novel market of SPACs, a largely understudied, but important, sector that emerged in 2003 in the United States. This study broadens our understanding of the role that communications under uncertainty plays in investment decisions, offers deeper insight into how language operates in financial markets, and sheds light on an increasingly popular, but understudied, investment vehicle.

Firms' Communication under Different Types of Uncertainty

This study expands our understanding of how firms communicate in the face of uncertainty, and the effect this has on financing outcomes, in two ways. First, our theoretical framework and findings provide a broader understanding of the role of uncertainty in market settings. Prior work has focused primarily on situations in which there are information asymmetries between founders and investors (Stiglitz 2000), leading to the widely accepted notion that firms that reduce uncertainty will enjoy better financing outcomes (e.g., Lounsbury and Glynn 2001, Connelly et al. 2011, Loughran and McDonald 2013, Pan et al. 2018, McLeod et al. 2022). However, we argued that this overlooks performance factors characterized by more fundamental uncertainty (e.g., Knightian uncertainty), for which there are knowledge problems for firms and investors alike (Townsend et al. 2018, Rindova and Courtney 2020, Feduzi et al. 2022) and where reducing uncertainty is not possible. Instead, when confronted with such issues, we showed that acknowledging this unknowability by expressing more uncertainty can lead to better financing outcomes. By examining different sources and types of uncertainties, our study has demonstrated that it is not always in the best interest of firms and their founders to seek to reduce uncertainty by communicating less of it.

Second, our approach offers a more nuanced understanding of a firm's heterogeneous sources and types of uncertainty. Prior work has largely portrayed uncertainty as pertaining to the firm as a whole (Connelly et al. 2011, Loughran and McDonald 2013). However, our study argues that different issues that firms and their founders face can create entirely different types of uncertainty, and this, in turn, will alter how they should manage and communicate this uncertainty with investors. For some performance factors (e.g., human capital), founders have private knowledge that investors do not have, and uncertainty is, thus, best characterized as arising from information asymmetry. However, for other performance factors (e.g., the SPAC acquisition target or the SPAC vehicle itself), information is largely unavailable to firms and investors alike, and uncertainty in

these cases is best characterized as arising from fundamental unknowability.

This observation is important because it means that a firm and its founders often simultaneously confront different types of uncertainty and, thus, must think more carefully about how to communicate with investors to achieve their optimal financial outcome. In this sense, our findings not only confirm prior work, but also move it forward. Although we replicate the finding that reducing uncertainty leads to better financing outcomes (e.g., Connelly et al. 2011, Loughran and McDonald 2013), we show that this is only for performance factors where founders have a knowledge advantage over investors. For factors where founders also face uncertainty, expressing more (not less) uncertainty is more beneficial.

Generalizability, Limitations, and Directions for Future Research

By applying our framework in other settings, scholars may be able to deepen our understanding of communication under uncertainty and expand our understanding of existing phenomena. For example, our framework might be particularly useful in nascent or emerging market contexts. Nascent markets (e.g., the internet in the 1990s, biotech in the 1990s, or cryptocurrency in the early 2010s) are generally seen as settings where more performance factors are fundamentally unknowable, especially when compared with more established markets (Goldfarb et al. 2012). Compared with more established settings, nascent markets lack industry coherence (Georgallis et al. 2019), widespread legitimacy (Kennedy 2008, Navis and Glynn 2010), and agreed-upon routines and expectations (Santos and Eisenhardt 2009). Moreover, given that nascent markets are contexts in which ventures have not operated for very long, knowledge about what it takes to succeed is less likely to be readily available to investors or founders (Sommer et al. 2009, Huang and Pearce 2015, Townsend et al. 2018). Future work might explore the conditions and performance factors in nascent market settings for which expressing more or less uncertainty produces more favorable outcomes.

Another extension of our theoretical framework might be to examine how different types of stakeholders react to the expression of uncertainty regarding different issues. For example, different investors are part of different information environments, and some are more informed or sophisticated than others (e.g., Grinblatt et al. 1995). This suggests that the effect of trying to reduce uncertainty through credible signals or expressing less uncertainty may vary across investors. For example, novice investors may know little about a particular issue, whereas highly sophisticated investors with insider information may know more. Some investors may also be attracted to more nascent, and therefore uncertain, ideas, firms, or sectors than other investors. As Petkova

et al. (2014, p. 426) suggest, for some, investing in the "potential next big thing appears to be a more important consideration than understanding the dynamics of the emerging sector or being able to estimate the potential returns on investment from it." Under these differing conditions, communicating under uncertainty could have different effects for different investors. Although our study examines an aggregate market response to performance factors with different loci of uncertainty, future research might examine how and when different investors react differently to firms' communication of uncertainty.

Although our theoretical and empirical approach to disaggregating different types of performance factors and expressions of uncertainty within the same setting represents a significant improvement over prior research, which largely examines in toto counts of uncertain words in S-1 filings (e.g., Loughran and McDonald 2013 and McLeod et al. 2022), we acknowledge that our approach has important limitations. For example, we cannot exclude the possibility of some content overlap in the sections of the S-1 documents discussing the management (founders') team and the target acquisition. Similarly, even though the target section typically discusses the uncertainty associated with the targets' general business characteristics, the economic conditions surrounding different industries and geographies, and target approval (the governance structure allowing for redemption of shares), it may also refer to how well-equipped the management is in relation to market and business conditions. Future work could potentially replicate and extend our findings and mechanisms with an experimental design that better controls for the content of what exactly is being communicated.

Our framework and findings also raise interesting possible avenues for future work with respect to stakeholder communication in other settings. In particular, prior work on stakeholder communications has focused to a large degree on the effects of positive or negative sentiment on stakeholders' reactions (Tetlock 2007, Harmon 2019b). Although sentiment is powerful, our study highlights the potential usefulness of uncertainty as a way to measure the degree to which firms qualify their own claims in relation to underlying or perceived uncertainty in the environment. In this respect, sentiment and the expression of uncertainty are potentially orthogonal dimensions, offering scholars a wider range of potential predictions to explore. For example, an overly positive, but highly imprecise, statement may be less credible than a negative, but precise, statement. In this way, the degree to which firms qualify their own claims, whether positive or negative, could be particularly important when trying to evaluate the firms' or speakers' level of confidence in their own underlying strategy.

The expression of uncertainty, along with related constructs like language concreteness (Pan et al. 2018),

vagueness (Guo et al. 2017), and rhetorical strategies of logos, ethos, and pathos (McLeod et al. 2022), might, in turn, be especially useful for research that examines how corporate communication manages responses to crises (Bundy and Pfarrer 2015), competitive interactions (Guo et al. 2020), or organizational changes (Sonenshein 2010). These contexts are often characterized by different sources and types of uncertainty, some more unknowable than others. To the extent that something is plausibly unknowable to all parties, including the focal firm, our findings suggest that expressing uncertainty to stakeholders may build confidence. These ideas connect to a broader discussion about the effects of uncertainty for organizations. Future research might consider expanding our understanding of the role of uncertainty in corporate communication with different stakeholders (e.g., investors, analysts, employees) and how the effect of language can be moderated by the information environment (Pan et al. 2018, Guo et al. 2021).

Special-Purpose Acquisition Companies

Our study also sheds light on a relatively novel, but increasingly important, empirical setting that has remained underexamined by scholars: SPACs. In 2021, SPAC IPOs raised over $160 billion, surpassing the total capital raised through traditional IPOs, making this an increasingly important empirical setting for scholars who are interested in how firms acquire financing. As a new asset class, SPACs represent both an investment substitute and a complement to investments in other financial assets, such as publicly listed operating businesses, publicly listed financial companies, and cryptocurrency. Research on SPACs is emerging, with studies only recently unpacking the opacity of these investment vehicles, the heterogeneity of their returns as a function of different SPAC characteristics (Gahng et al. 2021, Klausner et al. 2022), and their evolving structures (Murray 2017, Klausner and Ohlrogge 2022). What makes the SPAC context particularly intriguing is how founders sway investors to commit their capital because these firms have no business fundamentals, and the emerging evidence is that, on average, SPAC returns are negative (Gahng et al. 2021, Klausner et al. 2022). Investor communications and sensegiving are arguably among the most important factors investors use when making their decisions.

Conclusion

Taken together, this study expands our understanding of how firms communicate under uncertainty by developing a novel theoretical framework that distinguishes between different types of performance factors and the different uncertainties with which they are associated. In doing so, we demonstrate that firms should try to reduce uncertainties for investors when they have a knowledge advantage over investors, but acknowledge

the uncertainty when confronted by issues that are unknowable to both founders and investors. We also demonstrated support for this argument in the novel, but increasingly important, empirical setting of SPAC IPOs, a market that has raised more capital than traditional IPOs of late (Saha 2020), making our findings not only theoretically relevant, but also practically important.

Endnotes

[1] SPACs typically have a provision that they may not redeem a number of public shares such that their net tangible assets will fall below $5,000,001. For this reason, SPACs can avoid the Rule 419 restrictions.

[2] See https://www.sec.gov/news/press/2011/2011-235.htm.

[3] Loughran and McDonald (2013) also use withdrawals as a key performance measure for successful financing, in addition to underpricing. We also considered underpricing as an additional dependent variable because IPO studies often use this when examining the success of an IPO. However, unlike traditional IPOs, SPACs, on average, do not experience underpricing. This is because the valuation process of a SPAC is not associated with risks pertaining to the real value of the asset, because at the time of the IPO, there is no underlying asset, and the IPO proceeds are placed in a trust account with the investors having the right to redeem their shares (Lakicevic and Vulanovic 2013, Rodrigues and Stegemoller 2014). In contrast, for traditional IPOs of an existing business, the difference between the offering price and the price at which the shares trade on the first day represents an undervaluation of the firm. The higher the pre-IPO ex ante uncertainty, the more positive the first-day trading return, and the more "money left on the table" (Ritter 1984).

[4] In our main analyses, we did not include year fixed effects in our models, in line with past work that examined dichotomous financing outcomes of new ventures (i.e., whether the firm did or did not succeed in getting financing) (e.g., Plummer et al. 2016). Logistic regressions have the disadvantage of not supporting fixed effects when samples are small and fixed effects (quasi-) perfectly predict the outcome (Albert and Anderson 1984, Heinze and Schemper 2002). Nevertheless, in our supplemental analyses, we reran our models including year fixed effects, and the results remain supported.

[5] This dictionary is continuously refined and extended and can be found on the following website: https://sraf.nd.edu/loughranmc donald-master-dictionary/. We used the version that was available in October 2022.

[6] In our setting, it does not make sense to control for specific industries because (1) most SPACs list a number of potential industries that they are considering (e.g., the SPAC "JK Acquisition" in its S-1 form states "we intend to focus our efforts on acquiring an operating business in the manufacturing, distribution or services sectors headquartered in North America"); and (2) such claims are

nonbinding, as founders can and do search for targets across a wider range of industries.

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