

Family involvement signals in initial public offerings

Jeffrey A. Chandler^{a,*}, G. Tyge Payne^a, Curt Moore^b, Keith H. Brigham^a

^a Area of Management, Rawls College of Business, Texas Tech University, 703 Flint | Box 42101, Lubbock, TX 79409-2101, United States

^b School of Entrepreneurship, Spears College of Business, Oklahoma State University, 428 Business Building, Stillwater, OK, 74078-4011, United States

ARTICLE INFO

Keywords:

Family involvement signals
Signaling theory
Initial public offering
Underpricing
High-tech firms
Content analysis

ABSTRACT

Utilizing signaling theory, this study examines the relationship between signals of family involvement (i.e., family ownership and management) and the performance of firms undergoing an initial public offering (IPO). Specifically, we argue that firms using family-oriented language in their IPO prospectus results in greater IPO underpricing due to the misalignment between IPO investors' general perceptions of family business and their expectations for the IPO. Additionally, we argue that this misalignment is more pronounced for firms in high-tech industries, which are commonly more risk- and growth-oriented. Using a sample of 155 U.S.-based firms that made their IPO between 2009 and 2012, we find support for our hypotheses. Overall, our findings demonstrate that more observable signals of family involvement in an IPO may negatively influence IPO performance, particularly in high-tech industries.

1. Introduction

The initial public offering (IPO), where firms begin to sell equity shares publicly, represents a critical transition point in a firm's development because going public provides access to capital resources that can be utilized to help stimulate growth or address other financial needs (Certo, Covin, Daily, & Dalton, 2001; Certo, Daily, & Dalton, 2001; Welbourne, Neck, & Meyer, 2012). As such, much research has been dedicated to understanding the antecedents and consequences associated with the IPO, particularly regarding the topics of corporate governance, upper echelons, social influence, and innovation (Certo, Holcomb, & Holmes, 2009).

Signaling theory—the “dominant theoretical perspective” applied to the examination of IPOs (Daily, Certo, Dalton, & Roengpitya, 2003: 276)—argues that organizations undertake actions that communicate information about the quality of the firm to outside audiences to influence perceptions and behaviors (Connelly, Certo, Ireland, & Reutzel, 2011; Spence, 1973). Signaling, along with the associated concept of information asymmetry, is a key consideration during the IPO process because signals can affect investing behaviors (Connelly et al., 2011; Daily et al., 2003). Previous research has revealed the importance of many different signals such as the presence of the founder (Fischer & Pollock, 2004), involvement of prestigious top managers (Lester, Certo, Dalton, Dalton, & Cannella, 2006), relationships with prominent stakeholders (Stuart, Hoang, & Hybels, 1999), and the espousal of

organizational virtues (Payne, Moore, Bell, & Zachary, 2013). These signals are commonly presented in the IPO prospectus, as this document is the primary means of communicating information to investors about the firm (Daily, Certo, & Dalton, 2005; McLeod, Moore, Payne, Sexton, & Evert, 2018).

Building on the signaling and IPO literatures, this study conceptually and empirically explores if more observable (i.e., stronger, more frequent) signals of family involvement influence IPO outcomes. Herein, signals of family involvement would include communications of the family's role or importance in the business, including functioning as owners or managers of the business. Previous research has shown that firms often communicate the family's history and involvement to outside audiences by marketing the family name (Binz Astrachan & Botero, 2018; Botero, 2014; Craig, Dibrell, & Davis, 2008), conveying family ownership (Zahra, 2012), and declaring family goals (McKenny, Short, Zachary, & Payne, 2012). Such activities may represent efforts to demonstrate to external constituents that family involvement is linked to sources of competitive advantages such as customer loyalty (Craig et al., 2008), organizational trustworthiness (Tagiuri & Davis, 1996), good reputation (Beck & Prügl, 2018), and superior human capital (Fombrun & Shanley, 1990; Kahlert, Botero, & Prügl, 2017). However, in the IPO context, communicating family involvement may not be viewed positively by investors since firms with high family involvement—such as through high percentage ownership and/or heavy participation in the management of the firm—are often more

* Corresponding author.

E-mail addresses: jeff.chandler@ttu.edu (J.A. Chandler), tyge.payne@ttu.edu (G.T. Payne), curt.moore@okstate.edu (C. Moore), keith.brigham@ttu.edu (K.H. Brigham).

<https://doi.org/10.1016/j.jfbs.2019.01.004>

willing to prioritize noneconomic utility over economic gains (Chrisman & Patel, 2012). In other words, signals of family involvement may negatively influence IPO performance (e.g., underpricing) because the signal is misaligned with the expectations or motivations of many investors, who are often primarily seeking quick monetary returns on investment (Arthurs, Hoskisson, Busenitz, & Johnson, 2008; Sahlman, 1990).

We also explore if family involvement signals are more drastically misaligned with the IPO investor expectations for high-tech firms, as compared to other industries, since these firms tend to be more risk- and growth-oriented. While exceptions exist, firms high in family involvement often exhibit and are often perceived to have more conservative profiles (e.g., Naldi, Nordqvist, Sjöberg, & Wiklund, 2007; Short, Payne, Brigham, Lumpkin, & Broberg, 2009; Schulze, Lubatkin, Dino, & Buchholtz, 2001); this may lead investors to further devalue firms with high family involvement operating in high-tech industries. Our two hypotheses are empirically supported in this study of 155 U.S. IPO firms going public between 2009 and 2012. Specifically, we find a significant positive relationship between signals of family involvement and IPO underpricing, which is the most commonly utilized indicator of IPO performance and measured as the difference between offer price and the closing price of the stock on the first day of trading (Certo et al., 2009; Chan, Wang, & Wei, 2004). Also, we find that this relationship is strengthened in high-tech industries, indicating a more detrimental effect in those contexts in terms of performance.

With these findings, our study makes three key contributions to the strategy, entrepreneurship, and family business literatures. First, our study situates family involvement within signaling theory and argues that signals of family involvement can influence perceptions and behaviors of key stakeholders. This provides an important and meaningful theoretical perspective to better understand how the family and the associated perceptions of their involvement can impact the business; signaling theory can apply to a wide variety of stakeholders and allows scholars to move beyond family branding perspectives that are largely customer focused (e.g., Craig et al., 2008). Indeed, by explicitly considering family involvement signals in IPOs, we very practically demonstrate that stronger signals of family involvement can have negative effects on the performance of an IPO. This moves the literature beyond a dichotomous view of family versus non-family in relation to IPO outcomes to a more nuanced understanding of investor responses to the degree of family-centricity in IPO firms.

Our study also contributes to the literature by demonstrating the importance of context in relationship to signals of family involvement. While our study specifically demonstrates how family signals are more likely to be negatively received within high-tech industries, this finding more generally reiterates the argument that firm managers should carefully consider the motivations and expectations of the receiver when making decisions about the signals they choose to send. Further, managers should be aware of the likelihood that there are competing signals, from both the focal firm and other stakeholders, that may interact to create complex and difficult-to-interpret information streams for investors (Plummer, Allison, & Connelly, 2016).

Finally, our study methodologically contributes to family business research by creating a new, theory-based, continuous measure of family involvement signals. Utilizing a unique word-list and computer-aided content analysis, we capture the level of family involvement that is signaled by the firm throughout their IPO prospectus, which is a dedicated business narrative. This technique can be utilized in other business-dedicated narratives, such as shareholder letters and press releases (McKenny et al., 2012), to provide another means of examining signals of family involvement in communications between firms and stakeholders.

2. Theory and hypotheses

Signaling theory refers to the idea that one party (the signaler) credibly conveys some information about itself to another party (the

receiver) (Spence, 1973). Organizations, or business firms, often function as signalers by undertaking specific actions that communicate information about the “positive imperceptible qualities” of the organization from insiders to outsiders (Connelly et al., 2011: 45). Receivers, who are often customers, shareholders, or investors, then distill the information provided by the signaler to interpret whether or not the signal contains positive or negative information (Connelly et al., 2011). For family firms, these signals are central components of many strategic actions. For example, Deng, Huang, Carraher, and Duan, (2009) found that family firms send salient signals to the foreign market during international expansion efforts. In another study, Shepherd (2009) suggests that family firms may be able to recover from a business loss more quickly by sending signals of grief to external stakeholders.

Throughout the literature, scholars note that the impact of signals is dependent upon two central characteristics associated with sending a successful signal: signal cost and signal observability. Cost refers to the level of expense associated with sending the signal (Connelly et al., 2011). Signals that are associated with higher costs are normally perceived of as higher quality since the costs represent “importance, commitment, and genuineness” (Payne et al., 2013: 232; Stewart & Hitt, 2012). These costs are so central to signaling theory that it has been referred to as the theory of costly signaling (e.g. Connelly et al., 2011; Smith & Bird, 2005). Some signals that are associated with very low costs—or even costless signals—may be utilized to communicate inaccurate information about the organization; this is generally termed “false signaling” and may incur costs a later point in time, should receivers realize the falsity (Payne et al., 2013). Other signals are extremely costly, such as ISO9000 certifications (Connelly et al., 2011) or prestigious educational degrees (Moss, Neubaum, & Meyskens, 2015), due to the time and effort of producing the signal (i.e., obtaining the certification or degree). Past research has found that family firms often send signals with extremely high costs when hiring major international accounting firms (Yeung & Soh, 2000) or restraining from tax aggressiveness (Chen, Chen, Cheng, & Shevlin, 2010) to signal their good faith to the public (Stewart & Hitt, 2012).

Observability refers to the level to which the signal is noticeable or recognizable by the receiving party. Signaling research suggests that signals with high levels of observability will be more effective in communicating information since the signals are more salient or stronger (e.g., Lampel & Shamsie, 2000; Lee, 2001; Park & Mezas, 2005; Ramaswami, Dreher, Bretz, & Wiethoff, 2010). The signaler may prioritize, emphasize, deemphasize, or otherwise strategically manage information in efforts to influence outcomes (Payne et al., 2013). Further, other factors may distort, obscure, or create noise surrounding the signal, which may influence the observability and effectiveness of a signal. For example, family firms can send signals through press releases, but the media outlets reporting this information may distort the message being communicated (e.g., Carter, 2006). Furthermore, the observability of a signal may be influenced by the reputation of the signaler such that a firm with a good reputation may increase the overall observability of their signals (e.g., Connelly et al., 2011).

Both cost and observability are core components of the signals sent throughout the IPO process (Certo, 2003; Connelly et al., 2011). For firms looking to undertake an IPO, the owners and top managers of the private company must adhere to the standard IPO process (Ellis, Michaely, & O'Hara, 1999). The standard IPO process involves three specific phases (Ellis et al., 1999). First, the IPO firm undergoes the registration phase and enlists an investment banker to assist in preparing the registration statements, prospectuses, and other legal documents for the firm. This phase is a crucial step in the IPO process as choosing a quality investment banker often has major performance implications for the IPO price and overall success (Fernando, Gatchev, & Spindt, 2005). Second, the IPO firm enters the marketing stage of the process once the registration phase is completed. To generate interest regarding the offering, firms and investment banks send their IPO prospectus to potential investors and promote the offering through a

series of presentations or “road shows” (Blankespoor, Hendricks, & Miller, 2017; Ellis et al., 1999). Based on the information gathered throughout this process (i.e. investor interests; potential orders), the investment banker then decides on the number of shares to be sold and the offer price; for U.S. IPOs, these decisions are generally made in an effort to maximize the amount of capital raised (Benveniste & Spindt, 1989; Daily et al., 2005; Krigman & Jeffus, 2016).

Throughout the IPO process, important information is signaled to investors about firm characteristics (Daily et al., 2005; Nelson, 2003; Sanders & Boivie, 2004). Much of this information (e.g., strategies, financial data, risk factors, corporate governance, and ownership) is provided to potential investors through the IPO prospectuses (Daily et al., 2003). Indeed, research has demonstrated that the specific language contained in the prospectuses serves as strong signals to investors and influences their valuations of the offering (Filatotchev & Bishop, 2002; Gao, Yu, & Cannella, 2016; Michaely & Shaw, 1994; Reuer, Tong, & Wu, 2012). So, while facts and details of specific governance structures, such as with family ownership and participation in management, are essential to IPO investors (Certo, 2003; Deumes, 2008), there is evidence that suggests that investors perceive signals, including emphasis or levels of observability, in the language used in the prospectus (e.g., Payne et al., 2013). Given this, we explore if more observable signals of family involvement demonstrated in the IPO prospectus impact the success of firms undertaking an IPO.

2.1. Family involvement signals and IPO underpricing

The value given to family involvement in a firm differs according to the perspective (Micelotta & Raynard, 2011; Sciascia & Mazzola, 2008; Zellweger, Eddleston, & Kellermanns, 2010). While there is general agreement that family involvement can influence processes, decisions, behaviors and outcomes (Le Breton-Miller, Miller, & Lester, 2011), prior research suggests that there are both positive and negative implications (Jaskiewicz, González, Menéndez, & Schiereck, 2005; Orth & Green, 2009). As such, external stakeholders may receive the same signal regarding the level of family involvement, but respond differently based on their own perceptions of the firm and their own interests (Poza, Alfred, & Maheshwari, 1997; Zellweger, Nason, Nordqvist, & Brush, 2013). For IPO firms, investors likely consider the level of family involvement when making decisions on whether or not to invest in the firm and how much to invest. While prior research suggests that family involvement is generally well received by many stakeholder groups (e.g., Craig et al., 2008; Zellweger et al., 2010), a growing body of research demonstrates it may be perceived negatively in some situations (Barontini & Caprio, 2006; Jaskiewicz et al., 2005; Sciascia & Mazzola, 2008). Generally, such studies suggest that family firms' tendency towards promoting noneconomic outcomes may be construed negatively from market audiences concerned primarily with the financial performance of the firm.

Consistent with this literature, we expect that higher levels of perceived family involvement will adversely influence IPO performance given that investors are largely concerned with financial gains, often over the short term (Arthurs et al., 2008; Sahlman, 1990). Specifically, we suggest that stronger signals of family involvement sent by IPO firms will not align with the expectations of many IPO investors. Whereas IPO investors are more prone to seek out firms that are more aggressive (Eisenmann, 2006), risk-taking (Carpenter, Pollock, & Leary, 2003), and motivated to drive firm growth quickly (Eisenmann, 2006; Florin, Lubatkin, & Schulze, 2003), family businesses are commonly perceived to be more conservative in their risk-taking strategies (Naldi et al., 2007), less aggressive in competitive markets (Casson, 1999; Schulze et al., 2001), and more long-term oriented (Chandler, Zachary, Brigham, & Payne, 2016; Lumpkin & Brigham, 2011). As such, these firms may be viewed as less attractive to many investors who will opt to invest in other opportunities, resulting in poor performance (i.e., greater underpricing). Formally, we state:

Hypotheses 1. There is a positive relationship between the family involvement signals in the prospectus and IPO underpricing.

2.2. The moderating effect of industry

As noted above, prior research provides evidence that family involvement within a firm is perceived differently and varies in value by different audiences (Jaskiewicz et al., 2005; Micelotta & Raynard, 2011; Sciascia & Mazzola, 2008; Zellweger et al., 2010). This notion highlights the importance of the context or situation in which the signal is sent as it can be expected to play an important role in how the signal is received. For investors of IPOs, their perceptions of signals and subsequent investment decisions are likely to vary by the nature of firm being considered. In some cases, investors may recognize that higher levels of family influence may be a positive boon to firm performance. However, in other cases, family influence may be judged as largely unbeneficial, as we generally posit in Hypothesis 1.

To further investigate if some contexts may be more or less influenced by IPO investor perceptions of family involvement, we examine differences in firms that reside in high-tech industries. High-tech industries often are considered “the embodiment of risk” because they are very competitive, have short product life cycles, and often attract many new entrants (Carpenter et al., 2003: 803). Previous research has found that high-tech firms have different founding strategies (Feesser & Willard, 1990), human resource management policies (Pao-Long & Wei-Ling, 2002), and internal investment strategies (Himmelberg & Petersen, 1994) to accommodate the dynamic nature of the industry. Further, research has found that the dynamic nature of high-tech industries influences the decisions of IPO investors, since it takes a unique risk-taking specialist to invest in firms with such inherently high risk (Carpenter & Petersen, 2002; Carpenter et al., 2003).

Due to high levels of risk and complexity, IPO firms in high-tech industries are extremely difficult to evaluate and have a higher probability of financial failure (Carpenter & Petersen, 2002). Previous research suggests that investors looking to fund these firms expect companies to be highly competitive and willing to take substantial risks to sustain and maintain future growth (Carpenter et al., 2003; Lechner & Dowling, 2003). As a result, IPO investors may assume that a family firm in the high-tech industry lacks the necessary motivations and capabilities to be highly successful in such an environment (Carpenter & Petersen, 2002; Carpenter et al., 2003; Feesser & Willard, 1990). Given this, the relationship between family involvement signals and IPO underpricing, which can be most basically explained by the misalignment of family goals and investor goals, would be exacerbated among high-tech firms. In other words, a high-tech firm signaling higher levels of family involvement would likely suffer from biases on the part of investors because the perceptions of family businesses are misaligned with the expectations of successful high-tech firms (e.g., Carpenter et al., 2003; Zahra, 2005). Consequently, signals of family involvement sent by firms in the high-tech industry will likely deter the confidence of IPO investors above and beyond firms in other industries. We formally state Hypothesis 2 below and provide a visually model of both hypothesized relationships in Fig. 1.

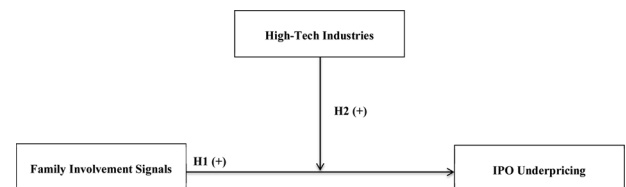


Fig. 1. Conceptual Model of Family Involvement Signals, High-tech industries, and IPO Underpricing.

Hypothesis 2. The family involvement signals to IPO underpricing relationship is positively moderated by whether or not the firm is operating in a high-tech industry, such that the relationship is strengthened for high-tech IPO firms.

3. Methodology

3.1. Sample

To test our hypotheses, we constructed a sample of firms seeking their initial public equity offers on the NASDAQ and NYSE between the years of 2009 and 2012. Following recent studies using IPO firms (e.g., Bell, Moore, & Filatotchev, 2012; Payne et al., 2013), we constructed our sample using domestic IPOs on U.S. stock exchanges between 2009 and 2012 using the SEC's Edgar and Thomson Financial Security Data Corporation (SDC Platinum) databases. We excluded stock listings that were the result of mergers, acquisitions, or spin-offs, as well as rights offerings, units, and warrants (Carpenter et al., 2003; Gulati & Higgins, 2003; Moore, Bell, & Filatotchev, 2010; Moore, Bell, Filatotchev, & Rasheed, 2012). Our final sample size is 155 U.S. IPO firms.

3.2. Dependent variable

IPO underpricing represents the degree to which wealth is retained by shareholders prior to the new issue and measured as the percentage price change between the offer price set by the underwriting bank and the price at the end of the first trading day (Moore et al., 2010). Data were obtained through the prospectus and Thompson's *SDC Platinum* database. Positive values for IPO underpricing represent unretained wealth (i.e., "money left on the table") by pre-IPO shareholders (Certo, Covin et al., 2001, 2001b: 643), while negative values represent wealth received by pre-IPO owners (Bell, Moore, & Al-Shammari, 2008). Consequently, *negative* regression coefficients are interpreted as being associated with *reduced* underpricing and *increased* IPO performance. On the other hand, *positive* regression coefficients are interpreted as being associated *decreased* IPO performance, since the effect is associated with *increased* underpricing.

3.3. Independent variable

Our focal independent variable, *family involvement signals*, was measured using content analysis of language within IPO prospectuses gathered from the SEC's Edgar database using the Diction 7 software package. Content analysis is an ideal measurement tool as it is uniquely able to access the perceptions and beliefs of the author(s) of a text (D'Aveni & MacMillan, 1990; Short & Palmer, 2008), while minimizing individual response bias and intrusiveness (Bartholomew & Smith, 2006; McKenny, Short, & Payne, 2013). Hence, research has relied upon content analysis to explore salient topics in management using IPO prospectuses (e.g., Gao, Darroch, Mather, & MacGregor, 2008; Hanley & Hoberg, 2010; Payne et al., 2013). By examining the content contained within the prospectuses, we can determine the extent that these firms projected relevant signals to investors (Bell et al., 2012; Moore et al., 2010; Payne et al., 2013). More specifically, we developed and validated a content analysis dictionary to quantitatively measure the use of words reflecting the family nature of the firm. Table 1 presents the word list for the *family involvement signals* dictionary.

To create the family involvement signal word list, we followed the methodology proposed by Short, Broberg, Coglisier, and Brigham, (2010). First, we used a deductive process to develop our word lists independent of our sample of IPO prospectus documents (Potter & Levine-Donnerstein, 1999). Specifically, we utilized *The Synonym Finder* (Rodale, 1978), which is a common resource used in other content analysis studies (e.g. Payne, Brigham, Broberg, Moss, & Short, 2011; Short et al., 2010), to compile a comprehensive list of all words related

Table 1

Content Analysis Words for Family Involvement Signals.

aunt	aunts	bloodline	brother	brother-in-law	brothers	brothers-in-law	cousin	cousins
descendant	descendants	elder	elders	extended-family	family	familyness	father	father-
in-law	fathers	fathers-in-law	forefather	forefathers	generation	generations		
grandfather	grandfathers	grandma	grandmas	grandmother	grandmothers	grandpa		
grandparent	grandparents	grandpas	great-grandfather	great-grandfathers	great-			
grandmother	great-grandmothers	great-grandparent	great-grandparents	heir	heirs	in-		
law	in-laws	kids	kin	kins	kinsfolk	kinspeople	kinsperson	kinswoman
legacies	legacy	lineage	lineages	matriarch	mother	mother-in-law	nephew	nephews
next-of-kin	niece	nieces	offspring	offsprings	parentage	paterfamilias	paternal	patriarch
patriarchal	primogenitor	progenitors	progeny	relative	relatives	sib	sibling	siblings
sister	sister-in-	law	step-dad	step-dads	step-daughter	step-daughters	step-families	step-family
step-	mom	step-parent	step-parents	step-son	step-sons	stepdad	stepdads	stepdaughter
stepdaughters	stepfamilies	stepfamily	stepmom	stepmoms	stepparents	stepson		
stepsons	uncle	uncles						

to the word "family". Note that the inclusion of synonyms based on involvement, ownership, or management was deemed unnecessary since we are using a specified business document and such words can apply to many aspects of the firm that are unrelated to family involvement. Second, we validated the chosen words. Following Short and colleagues' (2010) suggestions, three authors independently examined the created word list to determine the appropriateness of including each synonym. Each author then coded if each word should be included or excluded from the family involvement signals word list. Only words that were agreed upon by the two raters were included in the content analysis dictionary. Third, we augmented our deductively-developed word list with an inductively-derived list using DICTION. Specifically, we compiled a list of words repeated two or more times in all IPO prospectuses from the years within our sample (Payne et al., 2011). Lastly, we finished the validation of our word list by independently reviewing each of the generated words and include any additional words agreed upon by the three authors. Our final list of synonyms includes 111 deductively- and inductively-derived words.

Once the word list was complete, we content analyzed the prospectus of each IPO firm within our sample. DICTION produced a summated score for each firm within our sample. These scores represent the number of times words contained in our *family involvement signals* dictionary appeared in a firm's IPO prospectus. After the scores were determined for each firm, the total words count scores were divided by the total number of words in the IPO prospectus. Creating such a score is commonly used in content analysis as it can control for the differences in length of the narrative and more appropriately gauge how strongly family involvement is emphasized throughout the prospectus (e.g., Brigham, Lumpkin, Payne, & Zachary, 2014; Payne et al., 2013). This score was then converted to a percentage score, which is reflected in our descriptive statistics and analyses.

3.4. Moderating variable

Following prior research (e.g., Bell et al., 2012; Certo, Covin et al., 2001, 2001b; Moore et al., 2012), we measured firms operating in high-tech industries, which includes the following SIC codes: biotech and pharmaceuticals (SIC 28), computer hardware (SIC 35), semiconductors and printed circuits (SIC 36), telecommunications (SIC 48), and computer software (SIC 73). *High-tech firms* were coded as "1", while all other firms were coded as "0".

3.5. Control variables

We included several additional variables in our model to control for other factors that might influence IPO underpricing and potentially confound the results; these were gathered from the IPO prospectuses as well as the *SDC Platinum* and *WRDS* databases. First, *firm age*, measured as time between founding and IPO, was included as a control variable

(Arthurs et al., 2008; Bell et al., 2008; 2012; Daily et al., 2003). Second, we controlled for firm size using the focal firm's *total assets* at to IPO (e.g., Arthurs et al., 2008; McLeod et al., 2018). Third, we controlled for the impact that venture capital ownership may have on an IPO market valuation by including the percentage of *VC ownership* prior to IPO (Chahine & Saade, 2011; Moore et al., 2012; Payne et al., 2013), as well dilution of VC ownership using *change in VC ownership* before and after IPO (Arthurs et al., 2008). Fourth, we controlled for corporate governance factors that have been demonstrated to impact IPO underpricing by included the percentage of *inside ownership* and *founder CEOs* at IPO (Bell et al., 2008; Filatotchev & Bishop, 2002; Moore et al., 2012). Fifth, we also controlled for the effect that prestigious underwriters may have on IPO underpricing by including *Carter and Manaster's* (1990) index of *underwriter prestige*.

As a final control, we followed previous research (e.g., Arthurs et al., 2008; Bell et al., 2012; McLeod et al., 2018) to include the number of *risk factors* reported in the IPO prospectus. These *risk factors* are details about the company or its environment that may affect both performance expectations and realized performance; examples include manufacturing capacity limitations, rapid technological change, intense competition, need for additional capital, and uncertainty regarding patents and proprietary rights (Certo, Covin et al., 2001, 2001b). Firms are legally required by the U.S. Security and Exchange Commission (SEC) to disclose a list of their *risk factors* in the IPO prospectus in a common format and categorization scheme to inform investors of *ex ante* uncertainty associated with the IPO (Bell et al., 2012).

3.6. Analytical method

We found in our sample of IPOs that the underpricing variable positively skewed, fitting a log-normal distribution. As a result, a generalized linear model (GLM), utilizing a log link function and Gaussian distribution was deemed appropriate. Utilizing a GLM transforms the mean of the distribution rather than transforming the dependent variable and, as a result, aids model specification, parameter estimation, and interpretation of effects (Ballinger, 2004; Gardner, Mulvey, & Shaw, 1995; McCullagh & Nelder, 1989). However, our analytical method also needed to account for heteroscedastic standard errors arising from correlations among IPO firms within the same industry. Consequently, we employed an extension of GLM called a generalized linear mixed model (GLMM). GLMM has the ability to incorporate both random effects associated with industry classifications (using 4-digit SIC codes) and the non-normally distributed underpricing dependent variable (Zachary, Moore, & Ballinger, 2019).

Table 2
Descriptive Statistics and Pairwise Correlations.

Variables	Average	S.D.	1	2	3	4	5	6	7	8	9	10
1 Firm Age	15.71	19.86										
2 Total Assets	\$1.04B	\$2.87B	0.072									
3 Risk Factors	46.48	9.67	−0.209*	0.040								
4 Inside Ownership	18.47%	21.28%	0.111	−0.022	−0.139							
5 VC Ownership	57.48%	32.42%	0.126	−0.072	0.031	−0.188*						
6 Founder CEO	39.35%	49.01%	0.257*	−0.060	0.246*	−0.072	−0.200*					
7 Change in VC Ownership	13.55%	11.41%	0.017	−0.087	−0.068	−0.126	0.776	−0.213*				
8 Underwriter Prestige	8.49	1.09	−0.010	−0.119	0.068	−0.093	0.332***	0.001	−0.037			
9 Family Firm Signals	4.47%	0.37%	−0.025	−0.155	−0.026	−0.004	0.124	0.079	0.052	0.102		
10 High-Tech Industries	0.542	0.500	−0.207*	−0.265*	0.214*	−0.106	0.130	0.237*	−0.079	0.104	0.165*	
11 Underpricing	15.81%	22.35%	−0.108	−0.096	0.000	0.125	−0.052	0.009	−0.222*	0.088	0.073	0.098

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

n = 155.

Table 3
Generalized Linear Mixed Model Results¹.

	Model 1	Model 2	Model 3
Control Variables			
Firm Age	−0.023	0.991	0.986
Total Assets	−0.001	1.000	1.000
Risk Factors	0.295**	1.005	0.998
Inside Ownership	0.004*	1.000*	1.000*
VC Ownership	0.241**	1.011**	1.023**
Founder CEO	−0.595	0.859	0.690
Change in VC Ownership	−0.871**	0.914***	0.874***
Underwriter Prestige	0.022	0.024	0.028
Direct Effects			
Family Involvement Signals		1.901***	2.909*
High-tech Industries			1.123*
Interaction Effect			
FIS x High-Tech Industries			0.867**
Fit Statistics			
Wald Chi-squared	104.45***	1219.77***	1231.11*
−2LL	−667.12	−672.01	−682.10
Change in −2LL		−4.89*	−10.09*

¹ Parameter estimates are unstandardized using maximum likelihood.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

4. Results

Table 2 provides means, standard deviations and correlations for the variables used in our analysis; none of the variables indicated multicollinearity between the independent variables. Table 3 reports the results of our GLMM. Model 1 in Table 3 contains only the control variables utilized in the analysis, indicating risk factors ($\beta = 0.297$, $p < 0.01$), VC ownership ($\beta = 0.241$, $p < 0.01$), and change in VC ownership ($\beta = -0.871$, $p < 0.01$) were significant predictors of IPO underpricing. Model 2 reports the independent effect of family involvement signals on IPO underpricing. These results show that family involvement signals ($\beta = 1.901$, $p < 0.001$) is significantly related to IPO underpricing, indicating family involvement signals are negatively associated with IPO performance. In GLMMs, model fit is assessed using log likelihood ratios (deviances) between competing models as additional parameters are introduced. More specifically, the generally accepted approach to assess model fit in GLMMs is to compute the significance of change in log likelihood ratios between successive models based upon a chi-squared distribution (Bliese & Ployhart, 2002; Snijders & Bosker, 1994). Therefore, since Model 2 significantly improves on fit compared to Model 1 ($\Delta-2LL = -4.89$, $p < 0.05$) and there is a significant relationship, we find support for Hypothesis 1.

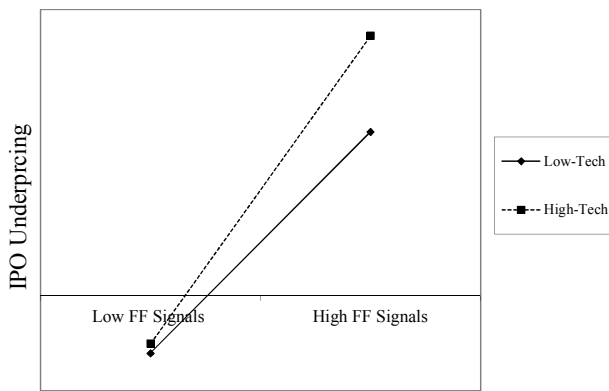


Fig. 2. Interaction Graph of Family Involvement Signals and High-tech industries.

In Model 3 of Table 3, we examine the moderating effect of high-tech industry on the relationship between family involvement signals and IPO underpricing. The results of Model 3 indicate high-tech industry is a significant, positive moderator ($\beta = 0.867$, $p < 0.01$) of family involvement signals to IPO underpricing relationship and significantly improve model fit compared to Model 1 ($\Delta 2LL = -10.09$, $p < 0.05$). Fig. 2 presents these results graphically, indicating a steeper slope for IPOs in high-tech industries ($m = 4.04$, $p \sim 0.00$) versus low-tech ($m = 2.90$, $p \sim 0.00$). Therefore, these statistical analyses provide empirical support for Hypothesis 2, indicating the negative relationship between family involvement signals and IPO underpricing is stronger in high-tech industries.

5. Discussion

Drawing on signaling theory and research on IPOs, we hypothesized—and found empirical support—that communicating the family's involvement in the IPO prospectus may serve as a salient signal to investors, hindering performance in terms of underpricing. Generally, we argue that stronger signals of family involvement will communicate characteristics about the firm that are inconsistent with many IPO investors, who commonly seek firms that will maximize their economic gain by realizing quick, short-term returns (Arthurs et al., 2008; Sahlman, 1990). We also followed this same logic to suggest that the relationship between family involvement signals and investor underpricing is stronger for IPO firms in high-tech industries due to the unique demands of these typically more risky and complex contexts. Our study, therefore, makes several contributions to the strategic management, entrepreneurship, and family business literatures.

5.1. Contributions

Our study first contributes to the literature by demonstrating that family-based language used in the IPO prospectus serves as a negative signal to investors by communicating the family's involvement with the business. While past research has explored the relationship between family and IPO underpricing (e.g., Leitterstorf & Rau, 2014), it has not considered if and to what extent family involvement signals contribute to IPO investment behaviors and outcomes. Rather, research examining family firms and IPO underpricing have argued that family firms—categorically comparing them to non-family firms—make trade-off decisions between gaining socio-emotional wealth (SEW) and financial wealth when setting the stock price at IPO (Kotlar, Signori, De Massis, & Vismara, 2018). These studies, generally drawing upon either behavioral agency theory (Wiseman & Gomez-Mejia, 1998) or prospect theory (Kahneman & Tversky, 1973), argue that IPO underpricing represents a valuation decision by the owners of a firm, which essentially ignores the investors response on the first day of trading. In other

words, while establishing the stock price of the IPO firm is an important component of the equation, there remains a good degree of uncertainty regarding how investors will respond once the stock is available on the open market. Using signaling theory, our study provides an alternative theoretical explanation, and associated empirical evidence, for the family involvement to IPO underpricing relationship. As such, we add to our understanding of how family involvement might be communicated and assessed by investors and to what extent these signals matter to performance.

This main finding also contributes to research in strategic management and entrepreneurship by highlighting the importance of not just family versus non-family connotations, but the extent or strength to which this governance designation is signaled. The literature has examined many governance factors that shape IPO performance, such as the structures of the board of directors (Certo, 2003), founder management (Certo, Covin et al., 2001, 2001b), and top management team legitimacy (Cohen & Dean, 2005). However, past research has largely overlooked how potential IPO investors may view organizations with varying levels of family involvement within the ownership and management of the firm. By examining family-based rhetoric in the IPO prospectus as a variable signal that emphasizes the family's involvement in the ownership and management in the firm, we add another important factor—that is both prevalent in and important to the success of the IPO—to the list (e.g., Hjorth & Steyaert, 2004; Lounsbury & Glynn, 2001; Martens, Jennings, & Jennings, 2007). This, of course, comes with the recognition that strategic decisions made regarding the information being signaled to stakeholders involves a level of trade-offs since space and opportunity to communicate various characteristics is restricted (Payne et al., 2013). Therefore, given choices among various signals, managers must carefully consider their comparative costs and benefits, as well as the signal receiver.

Our study also contributes to the literature by demonstrating the importance of contextualizing signals. While we find that family involvement signals in the prospectus are important to performance outcomes, we demonstrate that the effect is contingent upon industry context (i.e., high-tech industries). Our results provide additional evidence that signals are considered and acted upon by receivers based on other important issues that may influence information asymmetries and uncertainty, including contextual factors such as time, industries, and institutions. For instance, Payne et al. (2013) demonstrated the importance of country-level corruption as a moderator of the relationship between signals of organizational virtue and performance in a sample of foreign IPOs listing in the U.S. market. Also, as developed by Plummer et al. (2016), signals may be validated (or invalidated) by other signals, including those from external parties; this makes affiliations with external constituents, which can reinforce positive signals, important to outcomes. Following this line of research, future studies should more explicitly consider how various signals, from both the focal firm and other stakeholders, and contexts interact to influence investor decisions.

Finally, this study contributes methodologically by developing a new, theory-based way of measuring family involvement using business narratives. Using both inductive and deductive techniques (Short et al., 2010), we create and provide a word-list that allows the measurement of family involvement, based on the argument that emphasis in key business documents represents the level of involvement and importance the organization places on family. Then, using computer-aided content analysis to measure signals of family involvement based on the word-list described above. This measurement approach overcomes several limitations associated with self-reporting and provides unobtrusive but direct observation of signals sent by family firms. In creating this unique word-list, our study extends past research and provides a platform for family business scholars to empirically measure the degree to which organizations signal family involvement in the business.

5.2. Limitations

Despite supportive results and several implications for family business research, our study contains some limitations that warrant mentioning. First, our study focuses on the family involvement signal and its influence on external audiences in only one specific context: the IPO. However, other external audiences play an important role in shaping the success of organizations. Prior research has shown that external audiences like shareholders (Marcus & Goodman, 1991), market analysts (Bartov, 1991; Westphal & Graebner, 2010), and non-government organizations (Chenhall, Hall, & Smith, 2010) construct their perceptions of organizations through the signals sent from the top managers of firms. Hence, future research should explore whether these signals of family involvement affect the perception of other external stakeholders or if this is a relationship unique to IPO investors.

Our study is also limited in that it does not capture the information received through the traditional road shows that occur before the IPO offering (Ellis et al., 1999). Although the IPO prospectus generally takes into account the most prominent and important organizational information that is presented throughout the road shows (e.g., Blankespoor et al., 2017), our study follows past research and only examines the information presented throughout the IPO prospectus (e.g., Moore et al., 2012; Payne et al., 2013). Given this limitation, future research should examine the roles of family involvement signals throughout the firm presentations during the road shows. Furthermore, it would worthwhile to see if the congruence between the signals of family involvement presented during the road shows is in alignment with the signals of family involvement sent throughout firms' IPO prospectuses. This area of research is largely unexplored throughout the IPO literature and presents many opportunities for future research.

In addition to our study examining the IPO prospectus as compared to the information throughout the road show, our study is limited in it focuses exclusively on the last prospectus for each IPO firm. Throughout the IPO process, firms develop many IPO prospectuses to disclose the most prominent and urgent information to potential investors (2012, Moore et al., 2010; Payne et al., 2013). However, our study is consistent with prior literature in that it focuses squarely on the information presented in the last prospectus before the IPO offering (e.g., Payne et al., 2013). Future studies should extend our findings and evaluate the consistency of family involvement signals throughout all of the prospectuses created throughout the IPO process and examine their effects on IPO investors.

5.3. Conclusion

In sum, we show that use of family involvement signals deters investor confidence in an IPO firm and leads to greater IPO underpricing due to the misalignment of family goals and investor goals. We also show that this misalignment is more drastic for firms operating in high-tech industries and that the relationship between family involvement signals and investor underpricing is enhanced under these conditions. We hope that our study stimulates future research not only because of its implications for the family business, signaling, and IPO literatures, but also because it presents unique opportunities for extending research through the use of our new measurement of family involvement signals.

References

Arthurs, J. D., Hoskisson, R. E., Busenitz, L. W., & Johnson, R. A. (2008). Managerial agents watching other agents: Multiple agency conflicts regarding underpricing in IPO firms. *The Academy of Management Journal*, 51(2), 277–294.

Ballinger, G. A. (2004). Using generalized estimating equations for longitudinal data analysis. *Organizational Research Methods*, 7(2), 127–150.

Barontini, R., & Caprio, L. (2006). The effect of family control on firm value and performance: Evidence from continental Europe. *European Financial Management*, 12(5),

689–723.

Bartholomew, S., & Smith, A. D. (2006). Improving survey response rates from chief executive officers in small firms: The importance of social networks. *Entrepreneurship Theory and Practice*, 30(1), 83–96.

Bartov, E. (1991). Open-market stock repurchases as signals for earnings and risk changes. *Journal of Accounting and Economics*, 14(3), 275–294.

Beck, S., & Prügl, R. (2018). Family firm reputation and humanization: Consumers and the trust advantage of family firms under different conditions of brand familiarity. *Family Business Review*, 31(4), 460–482.

Bell, R. G., Moore, C. B., & Al-Shammari, H. A. (2008). Country of origin and foreign IPO legitimacy: Understanding the role of geographic scope and insider ownership. *Entrepreneurship Theory and Practice*, 32(1), 185–202.

Bell, R. G., Moore, C. B., & Filatotchev, I. (2012). Strategic and institutional effects on foreign IPO performance: Examining the impact of country of origin, corporate governance, and host country effects. *Journal of Business Venturing*, 27(2), 197–216.

Benveniste, L. M., & Spindt, P. A. (1989). How investment bankers determine the offer price and allocation of new issues. *Journal of Financial Economics*, 24(2), 343–361.

Binz Astrachan, C., & Botero, I. C. (2018). “We are a family firm” an exploration of the motives for communicating the family business brand. *Journal of Family Business Management*, 8(1), 2–21.

Blankespoor, E., Hendricks, B. E., & Miller, G. S. (2017). Perceptions and price: Evidence from CEO presentations at IPO roadshows. *Journal of Accounting Research*, 55(2), 275–327.

Bliese, P. D., & Ployhart, R. E. (2002). Growth modeling using random coefficient models: Model building, testing, and illustrations. *Organizational Research Methods*, 5(4), 362–387.

Botero, I. C. (2014). Effects of communicating family ownership and organisational size on an applicant's attraction to a firm: An empirical examination in the USA and China. *Journal of Family Business Strategy*, 5(2), 184–196.

Brigham, K. H., Lumpkin, G. T., Payne, G. T., & Zachary, M. A. (2014). Researching long-term orientation: A validation study and recommendations for future research. *Family Business Review*, 27(1), 72–88.

Carpenter, R. E., & Petersen, B. C. (2002). Capital market imperfections, high-tech investment, and new equity financing. *The Economic Journal*, 112(477), 54–72.

Carpenter, M. A., Pollock, T. G., & Leary, M. M. (2003). Testing a model of reasoned risk-taking: Governance, the experience of principals and agents, and global strategy in high-technology IPO firms. *Strategic Management Journal*, 24(9), 803–820.

Carter, S. M. (2006). The interaction of top management group, stakeholder, and situational factors on certain corporate reputation management activities. *Journal of Management Studies*, 43(5), 1145–1176.

Carter, R., & Manaster, S. (1990). Initial public offerings and underwriter reputation. *The Journal of Finance*, 45(1), 1045–1067.

Casson, M. (1999). The economics of the family firm. *The Scandinavian Economic History Review*, 47(1), 10–23.

Certo, S. T. (2003). Influencing initial public offering investors with prestige: Signaling with board structures. *The Academy of Management Review*, 28(3), 432–446.

Certo, S. T., Holcomb, T. R., & Holmes, R. M., Jr. (2009). IPO research in management and entrepreneurship: Moving the agenda forward. *Journal of Management*, 35(6), 1340–1378.

Certo, S. T., Covin, J. G., Daily, C. M., & Dalton, D. R. (2001). Wealth and the effects of founder management among IPO-stage new ventures. *Strategic Management Journal*, 22(6–7), 641–658.

Certo, S. T., Daily, C. M., & Dalton, D. R. (2001). Signaling firm value through board structure: An investigation of initial public offerings. *Entrepreneurship Theory and Practice*, 26(2), 33–50.

Chahine, S., & Saade, S. (2011). Shareholders' rights and the effect of the origin of venture capital firms on the underpricing of US IPOs. *Corporate Governance an International Review*, 19(6), 601–621.

Chan, K., Wang, J., & Wei, K. J. (2004). Underpricing and long-term performance of IPOs in China. *Journal of Corporate Finance*, 10(3), 409–430.

Chandler, J. A., Zachary, M. A., Brigham, K. H., & Payne, G. T. (2016). In F. Hoy, & F. Kellerman (Eds.). *Long-term orientation: Reviewing the past and identifying future opportunities for family business research*. The Routledge Companion to Family Business.

Chen, S., Chen, X., Cheng, Q., & Shevlin, T. (2010). Are family firms more tax aggressive than non-family firms? *Journal of Financial Economics*, 95(1), 41–61.

Chenhall, R. H., Hall, M., & Smith, D. (2010). The role of management control systems in NGOs. *Chartered Institute of Management Accountants*, 6(6), 1–5.

Chrisman, J. J., & Patel, P. C. (2012). Variations in R&D investments of family and nonfamily firms: Behavioral agency and myopic loss aversion perspectives. *The Academy of Management Journal*, 55(4), 976–997.

Cohen, B. D., & Dean, T. J. (2005). Information asymmetry and investor valuation of IPOs: Top management team legitimacy as a capital market signal. *Strategic Management Journal*, 26(7), 683–690.

Connelly, B. L., Certo, S. T., Ireland, R. D., & Reutzel, C. R. (2011). Signaling theory: A review and assessment. *Journal of Management*, 37(1), 39–67.

Craig, J. B., Dibrell, C., & Davis, P. S. (2008). Leveraging family-based brand identity to enhance firm competitiveness and performance in family businesses. *Journal of Small Business Management*, 46(3), 351–371.

D'Aveni, R. A., & MacMillan, I. C. (1990). Crisis and the content of managerial communications: A study of the focus of attention of top managers in surviving and failing firms. *Administrative Science Quarterly*, 35(4), 634–657.

Daily, C. M., Certo, S. T., & Dalton, D. R. (2005). Investment bankers and IPO pricing: Does prospectus information matter? *Journal of Business Venturing*, 20(1), 93–111.

- Daily, C. M., Certo, S. T., Dalton, D. R., & Roengpitya, R. (2003). IPO underpricing: A meta-analysis and research synthesis. *Entrepreneurship Theory and Practice*, 27(3), 271–295.
- Deng, F. J., Huang, L. Y., Carraher, S., & Duan, J. (2009). International expansion of family firms: An integrative framework using Taiwanese manufacturers. *Academy of Entrepreneurship Journal*, 15(1–2), 25.
- Deumes, R. (2008). Corporate risk reporting: A content analysis of narrative risk disclosures in prospectuses. *The Journal of Business Communication* (1973), 45(2), 120–157.
- Eisenmann, T. R. (2006). Internet companies' growth strategies: Determinants of investment intensity and long-term performance. *Strategic Management Journal*, 27(12), 1183–1204.
- Ellis, K., Michaely, R., & O'Hara, M. (1999). A guide to the initial public offering process. *K. Ellis, R. Michaely and M. O'Hara.*
- Feesser, H. R., & Willard, G. E. (1990). Founding strategy and performance: A comparison of high and low growth high tech firms. *Strategic Management Journal*, 11(2), 87–98.
- Fernando, C. S., Gatchev, V. A., & Spindt, P. A. (2005). Wanna dance? How firms and underwriters choose each other. *The Journal of Finance*, 60(5), 2437–2469.
- Filatovchev, I., & Bishop, K. (2002). Board composition, share ownership, and 'underpricing' of UK IPO firms. *Strategic Management Journal*, 23(10), 941–955.
- Fischer, H. M., & Pollock, T. G. (2004). Effects of social capital and power on surviving transformational change: The case of initial public offerings. *The Academy of Management Journal*, 47(4), 463–481.
- Florin, J., Lubatkin, M., & Schulze, W. (2003). A social capital model of high-growth ventures. *The Academy of Management Journal*, 46(3), 374–384.
- Fombrun, C., & Shanley, M. (1990). What's in a name? Reputation building and corporate strategy. *The Academy of Management Journal*, 33(2), 233–258.
- Gao, H., Darroch, J., Mather, D., & MacGregor, A. (2008). Signaling corporate strategy in IPO communication: A study of biotechnology IPOs on the NASDAQ. *The Journal of Business Communication* (1973), 45(1), 3–30.
- Gao, H., Yu, T., & Cannella, A. A., Jr. (2016). The use of public language in strategy: A multidisciplinary review and research agenda. *Journal of Management*, 42(1), 21–54.
- Gardner, W., Mulvey, E. P., & Shaw, E. C. (1995). Regression analyses of counts and rates: Poisson, overdispersed Poisson, and negative binomial models. *Psychological Bulletin*, 118(3), 392–404.
- Gulati, R., & Higgins, M. C. (2003). Which ties matter when? The contingent effects of interorganizational partnerships on IPO success. *Strategic Management Journal*, 24(2), 127–144.
- Hanley, K. W., & Hoberg, G. (2010). The information content of IPO prospectuses. *The Review of Financial Studies*, 23(7), 2821–2864.
- Himmelberg, C. P., & Petersen, B. C. (1994). R & D and internal finance: A panel study of small firms in high-tech industries. *The Review of Economics and Statistics*, 76(1), 38–51.
- Hjorth, D., & Steyaert, C. (2004). *Narrative and discursive approaches in entrepreneurship: A second movements in entrepreneurship book.*
- Jaskiewicz, P., González, V. M., Menéndez, S., & Schiereck, D. (2005). Long-run IPO performance analysis of German and Spanish family-owned businesses. *Family Business Review*, 18(3), 179–202.
- Kahlert, C., Botero, I. C., & Prügl, R. (2017). Revealing the family: Effects of being perceived as a family firm in the recruiting market in Germany. *Journal of Family Business Management*, 7(1), 21–43.
- Kahneman, D., & Tversky, A. (1973). On the psychology of prediction. *Psychological Review*, 80(4), 202–237.
- Kotlar, J., Signori, A., De Massis, A., & Vismara, S. (2018). Financial wealth, socio-emotional wealth, and IPO underpricing in family firms: A two-stage gamble model. *The Academy of Management Journal*, 61(3), 1073–1099.
- Krigman, L., & Jeffus, W. (2016). IPO pricing as a function of your investment banks' past mistakes: The case of Facebook. *Journal of Corporate Finance*, 38, 335–344.
- Lampel, J., & Shamsie, J. (2000). Critical push: Strategies for creating momentum in the motion picture industry. *Journal of Management*, 26(2), 233–257.
- Le Breton-Miller, I., Miller, D., & Lester, R. H. (2011). Stewardship or agency? A social embeddedness reconciliation of conduct and performance in public family businesses. *Organization Science*, 22(3), 704–721.
- Lechner, C., & Dowling, M. (2003). Firm networks: External relationships as sources for the growth and competitiveness of entrepreneurial firms. *Entrepreneurship and Regional Development*, 15(1), 1–26.
- Lee, P. M. (2001). What's in a name. com?: The effects of 'com' name changes on stock prices and trading activity. *Strategic Management Journal*, 22(8), 793–804.
- Leitterstorf, M. P., & Rau, S. B. (2014). Socioemotional wealth and IPO underpricing of family firms. *Strategic Management Journal*, 35(5), 751–760.
- Lester, R. H., Certo, S. T., Dalton, C. M., Dalton, D. R., & Cannella, A. A. (2006). Initial public offering investor valuations: An examination of top management team prestige and environmental uncertainty. *Journal of Small Business Management*, 44(1), 1–26.
- Lounsbury, M., & Glynn, M. A. (2001). Cultural entrepreneurship: Stories, legitimacy, and the acquisition of resources. *Strategic Management Journal*, 22(6–7), 545–564.
- Lumpkin, G. T., & Brigham, K. H. (2011). Long-term orientation and intertemporal choice in family firms. *Entrepreneurship Theory and Practice*, 35(6), 1149–1169.
- Marcus, A. A., & Goodman, R. S. (1991). Victims and shareholders: The dilemmas of presenting corporate policy during a crisis. *The Academy of Management Journal*, 34(2), 281–305.
- Martens, M. L., Jennings, J. E., & Jennings, P. D. (2007). Do the stories they tell get them the money they need? The role of entrepreneurial narratives in resource acquisition. *The Academy of Management Journal*, 50(5), 1107–1132.
- McCullagh, P., & Nelder, J. A. (1989). *Generalized linear models, no.37 in monograph on statistics and applied probability.*
- McKenny, A. F., Short, J. C., & Payne, G. T. (2013). Using computer-aided text analysis to elevate constructs: An illustration using psychological capital. *Organizational Research Methods*, 16(1), 152–184.
- McKenny, A. M., Short, J. C., Zachary, M. A., & Payne, G. T. (2012). Assessing espoused goals in private family firms using content analysis. *Family Business Review*, 25(3), 298–317.
- McLeod, M. S., Moore, C. B., Payne, G. T., Sexton, J., & Evert, R. E. (2018). Organizational virtue and stakeholder interdependence: An empirical examination of financial intermediaries and IPO firms. *Journal of Business Ethics*, 149(4), 785–798.
- Micelotta, E. R., & Raynard, M. (2011). Concealing or revealing the family? Corporate brand identity strategies in family firms. *Family Business Review*, 24(3), 197–216.
- Michaely, R., & Shaw, W. H. (1994). The pricing of initial public offerings: Tests of adverse-selection and signaling theories. *The Review of Financial Studies*, 7(2), 279–319.
- Moore, C. B., Bell, R. G., & Filatovchev, I. (2010). Institutions and foreign IPO firms: The effects of "Home" and "Host" country institutions on performance. *Entrepreneurship Theory and Practice*, 34(3), 469–490.
- Moore, C. B., Bell, R. G., Filatovchev, I., & Rasheed, A. A. (2012). Foreign IPO capital market choice: Understanding the institutional fit of corporate governance. *Strategic Management Journal*, 33(8), 914–937.
- Moss, T. W., Neubaum, D. O., & Meyskens, M. (2015). The effect of virtuous and entrepreneurial orientations on microfinance lending and repayment: A signaling theory perspective. *Entrepreneurship Theory and Practice*, 39(1), 27–52.
- Naldi, L., Nordqvist, M., Sjöberg, K., & Wiklund, J. (2007). Entrepreneurial orientation, risk taking, and performance in family firms. *Family Business Review*, 20(1), 33–47.
- Nelson, T. (2003). The persistence of founder influence: Management, ownership, and performance effects at initial public offering. *Strategic Management Journal*, 24(8), 707–724.
- Orth, U. R., & Green, M. T. (2009). Consumer loyalty to family versus non-family business: The roles of store image, trust and satisfaction. *Journal of Retailing and Consumer Services*, 16(4), 248–259.
- Pao-Long, C., & Wei-Ling, C. (2002). The effect of human resource management practices on firm performance: Empirical evidence from high-tech firms in Taiwan. *International Journal of Management*, 19(4), 622–631.
- Park, N. K., & Mezas, J. M. (2005). Before and after the technology sector crash: The effect of environmental munificence on stock market response to alliances of e-commerce firms. *Strategic Management Journal*, 26(11), 987–1007.
- Payne, G. T., Brigham, K. H., Broberg, J. C., Moss, T. W., & Short, J. C. (2011). Organizational virtue orientation and family firms. *Business Ethics Quarterly*, 21(2), 257–285.
- Payne, G. T., Moore, C. B., Bell, R. G., & Zachary, M. A. (2013). Signaling organizational virtue: An examination of virtue rhetoric, country-level corruption, and performance of foreign IPOs from emerging and developed economies. *Strategic Entrepreneurship Journal*, 7(3), 230–251.
- Plummer, L. A., Allison, T. H., & Connelly, B. L. (2016). Better together? Signaling interactions in new venture pursuit of initial external capital. *The Academy of Management Journal*, 59(5), 1585–1604.
- Potter, W. J., & Levine-Donnerstein, D. (1999). Rethinking validity and reliability in content analysis. *Journal of Applied Communication Research*, 27(1), 258–284.
- Poza, E. J., Alfred, T., & Maheshwari, A. (1997). Stakeholder perceptions of culture and management practices in family and family firms-A preliminary report. *Family Business Review*, 10(2), 135–155.
- Ramaswami, A., Dreher, G. F., Bretz, R., & Wiethoff, C. (2010). Gender, mentoring, and career success: The importance of organizational context. *Personnel Psychology*, 63(2), 385–405.
- Reuer, J. J., Tong, T. W., & Wu, C. W. (2012). A signaling theory of acquisition premiums: Evidence from IPO targets. *The Academy of Management Journal*, 55(3), 667–683.
- Rodale, J. I. (Ed.). (1978). *The synonym finder*. Rodale.
- Sahlman, W. A. (1990). The structure and governance of venture-capital organizations. *Journal of Financial Economics*, 27(2), 473–521.
- Sanders, W. M., & Boivie, S. (2004). Sorting things out: Valuation of new firms in uncertain markets. *Strategic Management Journal*, 25(2), 167–186.
- Schulze, W. S., Lubatkin, M. H., Dino, R. N., & Buchholtz, A. K. (2001). Agency relationships in family firms: Theory and evidence. *Organization Science*, 12(2), 99–116.
- Sciascia, S., & Mazzola, P. (2008). Family involvement in ownership and management: Exploring nonlinear effects on performance. *Family Business Review*, 21(4), 331–345.
- Shepherd, D. A. (2009). Grief recovery from the loss of a family business: A multi-and meso-level theory. *Journal of Business Venturing*, 24(1), 81–97.
- Short, J. C., & Palmer, T. B. (2008). The application of DICTION to content analysis research in strategic management. *Organizational Research Methods*, 11(4), 727–752.
- Short, J. C., Payne, G. T., Brigham, K. H., Lumpkin, G. T., & Broberg, J. C. (2009). Family firms and entrepreneurial orientation in publicly traded firms: A comparative analysis of the S&P 500. *Family Business Review*, 22(1), 9–24.
- Short, J. C., Broberg, J. C., Coglisier, C. C., & Brigham, K. H. (2010). Construct validation using computer-aided text analysis (CATA) an illustration using entrepreneurial orientation. *Organizational Research Methods*, 13(2), 320–347.
- Smith, E. A., & Bird, R. (2005). Costly signaling and cooperative behavior. *Moral sentiments and material interests: The Foundations of Cooperation in Economic Life*, 6, 115–148.
- Snijders, T. A., & Bosker, R. J. (1994). Modeled variance in two-level models. *Sociological Methods & Research*, 22(3), 342–363.
- Spence, M. (1973). Job market signaling. *The Quarterly Journal of Economics*, 87(3),

- 355–374.
- Stewart, A., & Hitt, M. A. (2012). Why can't a family business be more like a nonfamily business? Modes of professionalization in family firms. *Family Business Review*, 25(1), 58–86.
- Stuart, T. E., Hoang, H., & Hybels, R. C. (1999). Interorganizational endorsements and the performance of entrepreneurial ventures. *Administrative Science Quarterly*, 44(2), 315–349.
- Tagiuri, R., & Davis, J. (1996). Bivalent attributes of the family firm. *Family Business Review*, 9(2), 199–208.
- Welbourne, T. M., Neck, H., & Dale Meyer, G. (2012). The entrepreneurial growth ceiling: Using people and innovation to mitigate risk and break through the growth ceiling in initial public offerings. *Management Decision*, 50(5), 778–796.
- Westphal, J. D., & Graebner, M. E. (2010). A matter of appearances: How corporate leaders manage the impressions of financial analysts about the conduct of their boards. *The Academy of Management Journal*, 53(1), 15–44.
- Wiseman, R. M., & Gomez-Mejia, L. R. (1998). A behavioral agency model of managerial risk taking. *The Academy of Management Review*, 23(1), 133–153.
- Yeung, H. W. C., & Soh, T. M. (2000). Corporate governance and the global reach of Chinese family firms in Singapore. *Seoul Journal of Economics*, 13(3), 301–334.
- Zachary, M. A., Moore, C. B., & Ballinger, G. A. (2019). Anything but normal: The challenges, solutions, and practical considerations of analyzing non-normal multi-level data. In J. M. LeBreton, & S. E. Humphrey (Eds.). *The handbook for multilevel theory, measurement, and analysis*. Washington, D. C: American Psychological Association.
- Zahra, S. A. (2005). Entrepreneurial risk taking in family firms. *Family Business Review*, 18(1), 23–40.
- Zahra, S. A. (2012). Organizational learning and entrepreneurship in family firms: Exploring the moderating effect of ownership and cohesion. *Small Business Economics*, 38(1), 51–65.
- Zellweger, T. M., Eddleston, K. A., & Kellermanns, F. W. (2010). Exploring the concept of familiness: Introducing family firm identity. *Journal of Family Business Strategy*, 1(1), 54–63.
- Zellweger, T. M., Nason, R. S., Nordqvist, M., & Brush, C. G. (2013). Why do family firms strive for nonfinancial goals? An organizational identity perspective. *Entrepreneurship Theory and Practice*, 37(2), 229–248.