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The Impact of US Family Firms on IPO Underpricing and Short-Term Performance

Author: Aimée van Veen
Student number: 575636av
Thesis supervisor: F. Core
Second reader: Y. Gangaram-Panday
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ABSTRACT

In this thesis, I studied the impact of family firms on Initial Public Offering (IPO) underpricing and the short-term performance of IPOs in the United States (US). Using Ordinary Least Squares (OLS) analysis, I analyzed a dataset comprising 699 US IPOs from 2001 to 2023. The results indicate that family firm status does not have a statistically significant impact on IPO underpricing or short-term performance. However, the study identified a significant negative effect of deal size on IPO underpricing, suggesting that larger IPO deals tend to experience lower levels of underpricing. This finding highlights the importance of deal size in the pricing of IPOs. While family firm status may influence IPO underpricing and short-term performance, this study did not find a lasting positive or negative effect.

Keywords: *IPO, Underpricing, Family firm, Short-term performance*

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CHAPTER 1 Introduction

In 2014, JD.com, China's largest online direct sales company owned by family Liu, launched its Initial Public Offering (IPO) on the NASDAQ stock exchange, with the goal to raise capital to expand its logistics network, invest in technology, and enhance its overall infrastructure to compete more effectively with rivals such as Alibaba. JD.com, also known as China's Amazon, their IPO was oversubscribed 15 times, and raised significantly more capital than anticipated. Industry experts believe that Richard Liu's strategic move to go public was particularly shrewd, as it allowed JD.com to precede its larger competitor, Alibaba, by four months before Alibaba's highly anticipated IPO. (Hoverd, 2021). Leitterstorf & Rau (2014) reported that family firms have higher IPO underpricing than non-family firms. IPO underpricing refers to the phenomenon where the IPO price of a company's stock is set lower than its real market value after the stock begins trading on the exchange. In recent decades, IPOs have emerged as a popular avenue for businesses seeking transformation and capital infusion in return for ownership shares. Research conducted by EY indicates that 2021 will be remembered as one of the most successful years for the global IPO market. Over the past year, IPOs have raised over $453 billion. Paul Go, Global IPO Leader at EY, highlights that '2021 witnessed the highest level of activity in the IPO market in the past two decades.' He attributes this success to 'initial optimism fueled by recovering economies, widespread Covid-19 vaccination campaigns, and sustained liquidity resulting from government stimulus programs' (Banken.nl, 2022). IPOs often signify opportunities that extend beyond simply raising capital. Hence, the reasons why family firms decide to take their companies public are numerous and intricate.

Leitterstorf & Rau (2014) studied two research questions. Firstly, they investigated the extent to which families are willing to invest to preserve their socioemotional wealth (SEW). Secondly, they explored how SEW helps clarify the unresolved phenomenon of IPO underpricing. IPO underpricing allows analyzing the trade-off between economic utility and non-economic utility of family firms. Despite numerous studies that have explored the differences between family and non-family firms with regards to SEW, the precise trade-off between economic utility and non-economic utility has remained unclear. Leitterstorf & Rau conducted their study on the relationship between family firms and IPO underpricing using data from the Frankfurt Stock Exchange, focusing on a sample of German IPOs that included both family and non-family firms. They employed a hierarchical regression analysis with IPO underpricing as the dependent variable and family firm status as the variable of interest, treated as a dummy variable. The results revealed that family firms, on average, had 10 percentage points higher underpricing compared to non-family firms. The authors concluded that family firms are willing to sacrifice some economic gains to safeguard their SEW. Additionally, other research suggests that loss-averse family firms tend to undervalue their shares more than non-family firms to minimize potential losses of SEW, as demonstrated by the behavioral agency model. Conversely, according to

the endowment effect in prospect theory, family owners may perceive firm value by including SEW and demand a higher IPO price to relinquish it, aiming to maximize their financial wealth (FW), as indicated by Kotlar et al. (2018). Conceiving IPO pricing as a two-stage gamble,the authors propose that the initial losses of SEW resulting from the decision to go public heightened the tendency of family owners to underprice IPO shares, aiming to potentially counterbalance these losses or achieve a "break-even" point. Furthermore, Chahine & Goergen (2013) demonstrate that the performance of IPOs is negatively correlated with family ties between top management and board members.

In this study, I aim to replicate the experiment conducted by Leitterstorf & Rau (2014) in the United States (US) to demonstrate the robustness of their previous results in a different context. A notable difference between Germany and the US, is the size and the liquidity of the global market. The US market is larger and more liquid compared to Germany's, which could affect the valuation, underpricing, and long-term performance of family-owned IPOs (Barnes, 2024). Next to that, US IPOs generally feature larger issue sizes and involve younger, high-growth firms compared to German IPOs, which tend to involve larger companies. Consequently, the average issue size in our research is likely to be bigger, while the firm age and firm size is likely to be smaller. Additionally Ritter (2003) reports that European IPOs, especially in Germany, have lower gross spreads compared to American IPOs. The gross spread is the difference between the price at which shares are issued by the company (the issuance price) and the price at which the underwriters (the banks facilitating the IPO) sell these shares to the public. This means that the costs associated with going public are lower in Europe than in the US. These variations in firm age, firm size, gross spread and issue size may lead to different outcomes, considering evidence suggesting a relationship between issue size and IPO underpricing (Ranjan & Madhusoodanan, 2004). Given that US family firms contribute similarly to the US GDP (40%) as German family firms do to the German GDP (43%), it is essential to investigate whether the relationship between family firms and IPO underpricing holds true in the US (Family Enterprise USA, 2021, Family Capital, n.d.). Moreover, our research will be more recent, encompassing the COVID-19 pandemic, unlike the study by Leitterstorf & Rau, which examined data up to 2011. Therefore, my research question is “How is IPO underpricing related to family firms in the United States between 2001 and 2023, and what is the effect of family firms on the short-term performance?” To the best of my knowledge, this problem has not been addressed before in the literature.

I will study this research question using the Ordinary Least Squares (OLS) regression model with IPO underpricing as the dependent variable. A total sample of 699 IPOs will be gathered from Orbis M&A, providing necessary data on IPO date and ownership. The Orbis M&A database encompasses global data on mergers and acquisitions, IPOs, and venture capital activities. To collect data about the prices during the IPO process, LSEG Workspace is utilized. LSEG Workspace is a comprehensive financial data and analytics platform, offering real-time market data, news, and research tools for financial professionals. IPO underpricing is calculated by subtracting the offer price from the first-day closing

price, and then dividing that by the offer price. The variable of interest will be the family firm status, treated as a dummy variable, where family firms will be assigned a value of 1 and non-family firms a value of 0. A firm will be classified as a family firm when 25 percent of the decision-making rights are owned by the person who established or acquired the firm (share capital) or their families or descendants mandated by their share capital (European Commission, 2009). Short-term performance will be derived from the stock price observed after a period of 180 days post-IPO. To evaluate short-term performance, the Market Adjusted Buy and Hold Return (MABHR) method will be employed. Additionally, control variables such as issue size, firm size, firm age, and economic cycle status will be incorporated into the analysis.

I anticipate that IPOs from family firms will exhibit greater underpricing compared to IPOs from non-family firms. Previous research has shown that smaller issue sizes can lead to higher IPO underpricing, and studies from Germany indicate that IPOs from family firms tend to experience higher levels of underpricing than those from non-family firms. However, given that issue sizes in the US are generally larger, I expect that the underpricing in US family firms will be significant but potentially less pronounced than in Germany. Our regression analysis should reflect this pattern, with statistically significant results demonstrating that IPOs from family firms are indeed more underpriced, though the degree of underpricing may be smaller due to the larger issue sizes. Focusing specifically on the US market, I anticipate that this study will provide valuable insights into the IPO pricing dynamics of both family and non-family firms within the US context. Additionally, this research will significantly contribute to the existing literature by exploring how this relationship manifests in a major IPO market like the US. Despite this, I expect that the correlation between IPO underpricing and family firm status will not fully explain the observed variance, leaving a substantial portion of the uniqueness inherent to each firm unexplained.

In this study, both analyses indicated that family firm status had a positive but not significant effect on IPO underpricing and short-term performance. Consequently, the study cannot draw definitive conclusions about the relationship between family firms and IPO underpricing or short-term performance in the United States. However, it does reveal significant effects of firm size and deal size on IPO underpricing, as well as the substantial impact of IPOs occurring during a recession on short-term performance. Combined with findings from previous studies, this study concludes that deal size negatively affects IPO underpricing, suggesting that larger deals experience lower underpricing.

The remainder of this thesis is structured as follows: Chapter 2 reviews relevant literature and previous studies on the topics. Chapter 3 describes the dataset and the data collection process. Chapter 4 outlines the methodology used for the analyses. Chapter 5 presents and discusses the study's findings. Chapter 6 concludes the study and discusses its implications. Additional supportive materials are provided in the Appendix.

CHAPTER 2 Theoretical Framework

2.1 IPO Underpricing

An IPO is the process by which a privately-held company offers its shares to the public for the first time. This transition enables the company to raise capital from public investors, turning it into a publicly-traded entity listed on a stock exchange. An IPO allows a company to raise capital from public investors, enhancing its exposure, prestige, and borrowing terms. However, IPOs are costly, and the ongoing expenses of maintaining a public company can be significant. The main motivation behind going public is to raise equity capital for the company and establish a public market where founders and shareholders can eventually liquidate some of their assets. Other factors, such as increased publicity, are typically of lesser significance for most firms (Ritter & Welsch, 2002).

IPO underpricing refers to the percentage difference between the price at which shares are initially sold to investors (the offer price) and the subsequent trading price in the market. In well-developed capital markets, where there are no restrictions on daily price fluctuations, the full extent of underpricing becomes clear quite quickly, typically by the end of the first trading day. As a result, most studies measure initial underpricing using the first-day closing price. Using prices from later dates, such as the end of the first week, generally shows little variation from this initial measure (Ljungqvist, 2007).

Ibbotson's (1975) study is foundational as it systematically documented the existence of IPO underpricing, paving the way for subsequent theoretical and empirical research on the topic. The author examined the initial and aftermarket performance of newly issued common stocks from the 1960s, confirming that the average initial performance was positive, with an average initial return of 11.4%. This finding indicated that new issues were typically underpriced. The study generally supported the concept of aftermarket efficiency, where prices quickly adjusted to reflect available information. While the study provided valuable insights into the underpricing phenomenon, it did not completely explain the underlying reasons for it. This research laid the groundwork for understanding IPO underpricing and inspired further studies to explore various hypotheses and models to explain the observed patterns.

Following on Ibbotson's study, Baron published a study in 1982, revealing the role of asymmetric information in the IPO process. He suggested that underpricing occurs due to information asymmetry between issuers and underwriters. Underwriters possess better information about the market, which they use to set a lower offer price to mitigate risks. Rock's (1986) winner's curse model followed with the best-known asymmetric information model so far (Ljungqvist, 2007). The model posits that certain investors have a better understanding of the true value of shares than the general investor base, the

issuing company, or the underwriting bank. These informed investors only bid for IPOs they perceive as attractively priced, while uninformed investors bid more indiscriminately. This dynamic creates a 'winner's curse' on the uninformed investors.

Rock's winner's curse model explains IPO underpricing as a necessary condition to ensure market participation by uninformed investors. It highlights the impact of asymmetric information, where the presence of informed investors leads to selective participation. To balance the risks faced by uninformed investors, the issuing firm and its underwriters deliberately underprice the shares. This underpricing is crucial to ensure that uninformed investors, on average, are willing to invest despite the risk of receiving unfavorable allocations in overpriced offerings. By doing so, the market maintains a healthy level of participation from all investor types, ensuring the success of the IPO. Lowry, Office & Schwert (2010) also found that the difficulty underwriters face in valuing IPOs is exacerbated by high levels of information asymmetry. When there is greater uncertainty about a company's value, underpricing tends to be higher to compensate investors for the additional risk.

In addition to asymmetric information, other factors have been examined for their impact on IPO underpricing. Switzer, Meslmani, & Zhai (2022) find support for a significant size effect for short investment horizons in the US: smaller firms have greater IPO underpricing, suggesting that this may be due to greater uncertainty in the valuation of smaller firms. Whereas they did not find a differential size effect on the performance of firms beyond a six-month horizon from the IPOs in the US, consistent with a seasoning effect that reduces the information asymmetries across firms. Ranjan & Madhusoodanan (2004) also finds evidence for the size effect. They conclude that small size issues are more likely to be under-priced than larger issues.

Ritter & Welsch (2002) did not find any exceptions to the rule that IPOs of operating firms on average ,over all countries, are underpriced. However, IPOs of non-operating entities, like closed-end funds, typically do not experience underpricing. Nielsson & Wójcik (2016) their research shows that underpricing varies systematically with corporate location, with rural firms experiencing significantly less underpricing than urban firms. This is particularly true for firms far from financial expertise centers. The lower underpricing for rural firms is attributed to the predominance of local investors who invest heavily in local firms and are incentivized to acquire information about them. The study of Van Heerden & Alagidede (2012) on IPO underpricing in the Johannesburg Stock Exchange (JSE) provides insights into the sectoral impact on IPO underpricing. Specifically, the financial sector showed the highest level of underpricing compared to other sectors such as mining and "other" sectors. This significant underpricing in the financial sector was particularly notable in 2007. The study highlights that different industry sectors experience varying levels of IPO underpricing, influenced by sector-specific factors and market conditions.

Lowry, Office & Schwert (2010) conclude that there is substantial volatility in IPO initial returns, and this volatility varies significantly over time. This variability in initial returns is especially pronounced for certain types of firms and during hot market periods. A "hot market" refers to a period characterized by heightened investor enthusiasm and demand for IPOs. Ljungqvist, Nanda & Singh (2006) show evidence that during hot markets, the demand from these investors increases, leading to higher IPO underpricing. Ritter (1984) also found evidence for higher initial returns for IPOs during hot market periods.

2.2 Family Firms

Family firms are characterized by several distinct traits that set them apart from other business models. These include the active participation of family members in daily operations, substantial family ownership, and a long-term focus aimed at preserving the business for future generations. Family values and culture play significant roles in shaping business practices and strategies. Effective succession planning is essential to ensure smooth transitions of leadership and ownership across generations. Additionally, family firms emphasize strong relationships with employees and customers, fostering a sense of loyalty and trust. Family members often wear multiple hats, balancing their roles as relatives and business professionals, which creates a unique organizational dynamic. This multifaceted nature contributes to the resilience and adaptability of family firms, enabling them to effectively navigate various challenges and seize opportunities. As a result, family firms remain a vital and enduring presence in the global business landscape (Birdthistle & Hales, 2023).

Stavrou, Kassinis, and Filotheou (2007) explored the relationship between downsizing and family ownership status among Fortune 500 firms. They found that family firms downsize less than non-family firms, irrespective of performance, because their relationship with employees is based on normative commitments rather than financial performance alone. This study raises important questions about the motivations behind downsizing and the drivers of stakeholder management practices in large multinationals.

Anderson and Reeb (2003) investigated the relation between founding-family ownership and firm performance. They found that family ownership is both prevalent and substantial; families are present in one-third of the S&P 500 and account for 18 percent of outstanding equity. Contrary to their conjecture, they found that family firms perform better than non-family firms.

The study by Zellweger, Eddleston, and Kellermanns (2010) highlights that family firms are not homogeneous; their effectiveness and ability to create familiness vary significantly. The study shows that family firms' innovative capacity is significantly influenced by their unique family involvement,

long-term vision, and resource allocation strategies, which collectively enhance their performance and growth potential. Familiness can positively impact firm performance, but it also has potential drawbacks, such as conflicts arising from overlapping family and business roles.

Naldi et al. (2007) drew on a sample of Swedish SMEs and found that risk-taking is a distinct dimension of entrepreneurial orientation in family firms and that it is positively associated with proactiveness and innovation. They also found that, while family firms do engage in entrepreneurial activities, they take risks to a lesser extent than non-family firms. Moreover, the authors found that risk-taking in family firms is negatively related to performance, which is crucial for understanding entrepreneurial orientation in family firms.

2.3 Relationship between IPO Underpricing and Family Firms

The study of Leitterstorf & Rau (2014) finds that, on average, family firms have 10 percentage points more IPO underpricing than non-family firms. This higher underpricing is a deliberate strategy to protect their socioemotional wealth (SEW). The findings support the Behavioral Agency Model, which suggests that family firms' strategic decisions are influenced by loss aversion concerning their SEW. They prioritize avoiding losses over obtaining gains, leading to higher underpricing.

Kotlar et al. (2018) uses the behavioral agency model to explain that loss-averse family firms are inclined to discount their shares more than non-family firms to minimize losses of SEW. They conclude that family firms are likely to underprice their IPOs more than non-family firms as a strategic decision to balance financial and socioemotional considerations. The authors propose a two-stage gamble model. Initially, family firms experience SEW losses when deciding to go public. To potentially offset these losses and "break even," they underprice IPO shares more significantly. This model explains the dynamic decision-making process of family firms during the IPO. This underpricing acts as a mechanism to preserve SEW and attract investors, ultimately aligning with the family's long-term objectives and risk preferences.

Setia-Atmaja & Chandera (2021) show in their study that IPO underpricing is 28% higher for family firms compared to non-family firms. This study suggests that investors perceive family firms as riskier and demand higher underpricing to compensate for this perceived risk. Next to that, investors predict more significant agency conflicts between controlling and non-controlling shareholders in family firms than between shareholders and management in non-family firms. This perception drives higher underpricing in family-firm IPOs.

Daugherty & Jithendranathan (2012) study whether there are significant differences in underpricing between family-controlled businesses (FCBs) and non-family-controlled businesses (NFCBs) at their

initial public offering (IPO). They find that FCBs experience less underpricing on the first trading day compared to NFCBs and that the management of FCBs holds a larger share in the company both before and after the IPO, contributing to less underpricing. They also find that family firms are on average older at the time of the IPO than non-family firms.

Based on the above described studies, it can be inferred that family firms exhibit distinct behaviors and outcomes compared to non-family firms during their IPOs. Family firms may deliberately choose higher IPO underpricing as a strategic decision to protect and enhance their SEW. By underpricing their IPOs, family firms can generate higher demand and investor interest, leading to a positive reception in the market. This strategy might help preserve the family's control over the business, maintain their reputation, and ensure the long-term sustainability of their socioemotional values. Thus, I expect that:

Hypothesis 1: Family firms experience higher IPO underpricing compared to non-family firms

2.4 Relationship between Short-term Performance and Family Firms

The study of Ritter (1991) provides robust evidence that IPOs tend to underperform in the long run compared to similar firms, with patterns suggesting that investor overoptimism and market fads play a significant role in this underperformance. However, studies conducted on short-term performance are minimal. Therefore, this study will investigate the effect of family firms on the short-term performance of IPOs.

Previous studies suggest that family firms may engage in greater underpricing in order to protect their SEW (Leitterstorf & Rau, 2014). Research shows that IPO underpricing often leads to initial positive returns followed by long-term underperformance. Given that prices quickly adjust to reflect available information (Ibbotson, 1975). This pattern suggests a negative relationship between initial underpricing and subsequent aftermarket performance. Therefore, I expect that:

Hypothesis 2: The short-term performance of IPOs from family firms will be worse compared to the performance of IPOs from non-family firms

CHAPTER 3 Data

3.1 Sample Description

To study the research question, I have collected data on 699 IPOs in the United States (US). These IPOs occurred between 2001 and 2023.

The primary data is collected from two databases: Orbis M&A and LSEG Workspaces. Orbis M&A is well-known for its extensive and detailed information on mergers and acquisitions, including comprehensive coverage of IPOs with detailed ownership information. LSEG Workspaces, offered by the London Stock Exchange Group (LSEG), is a robust financial data and analytics platform designed to support a wide range of financial professionals, including researchers, analysts, and investors. The platform provides access to a vast array of financial information, tools, and functionalities essential for in-depth market analysis and decision-making.

The sample is based on the above described databases. Where Orbis M&A is used to filter on IPOs in the US and collect data about ownership. LSEG Workspaces is used to provide detailed information on the prices during the IPO process. A ticker symbol assigned to each IPO is used to merge the two datasets. The final dataset contains information about the offer price, first-day closing price, the offer date, family ownership, deal size, firm size and firm age.

To ensure the integrity and reliability of the dataset, I undertook a rigorous data cleaning process. This involved addressing missing information and identifying and removing outliers that could skew the analysis. Records with significant amounts of missing critical data were removed from the dataset. True outliers, which were determined to be errors or anomalies not representative of the overall dataset, were removed.

3.2 Variables

IPO Underpricing

IPO underpricing is the dependent variable in the first hypothesis, representing the percentage difference between the initial offering price and the closing price on the first trading day. It is calculated by subtracting the offer price from the first-day closing price, then dividing the result by the offer price (Leitterstorf & Rau, 2014). The formula for IPO underpricing is:

$$Ret_{i,t} = \left(\frac{P_{i,1} - P_{i,0}}{P_{i,0}}\right) * 100\%$$

where $Ret_{i,t}$ is the initial day return of IPO *i* at time *t*, $P_{i,1}$ is the first-day closing price of IPO *i* and $P_{i,0}$ represents the offer price of IPO *i.*

Short-term Performance

The second hypothesis conducts a regression analysis where short-term performance serves as the dependent variable. This performance metric is derived from the stock price observed after a period of 180 days post-IPO. To evaluate short-term performance, we employ the Market Adjusted Buy and Hold Return (MABHR) method. Unlike traditional return calculations, MABHR adjusts for the concurrent return of the market index over the same time frame. Given the prevalence of NASDAQ-listed IPOs in our sample, we utilize NASDAQ as the market index, with data sourced from Yahoo Finance. You can find the distribution of the IPOs across the stock exchanges in Appendix A. The formula for MABHR is:

$$MABHR_{i,t} = \Sigma[ln(\frac{P_{i,t+180}}{P_{i,t}}) - ln(\frac{I_{m,t+180}}{I_{m,t}})]$$

Where $MABHR_i$ is the Market Adjusted Buy and Hold Return for IPO *i* at time *t* , $P_{i,t+180}$ is the stock price after 180 days and $P_{i,t}$ is the offer price, $I_{m,t+180}$is the market index value after *t* + 180 days and $I_{m,t}$ is the market index value at the offer date.

Family Firm Status

Family firm status is the independent variable, treated as a dummy variable. In both of the hypotheses family firm status is the variable of interest. When a firm is classified as a family firm, it is assigned a value of 1, whereas a non-family firm is assigned a value of 0. A family firm is defined based on the European Commission (2009) criteria, which specifies that listed companies meet the definition of a family enterprise if the person who established or acquired the firm, their families, or descendants possess 25 percent or more of the decision-making rights mandated by their share capital. This data had been gathered from Orbis M&A.

3.3 Control Variables

Firm size

Firm size is included as a control variable and is proxied by the natural logarithm of market capitalization after the IPO in millions of dollars. Market Capitalization is commonly used as a proxy for firm size (Dang et al., 2018). The market capitalization data is gathered from LSEG Workspace. I calculated the market capitalization by multiplying the number of shares outstanding after the IPO by the offer price. The market capitalization after the IPO reflects the company's current valuation in the market, which is influenced by the IPO price. This gives an accurate representation of the firm's size and value at the time of the IPO.

Hot issue Market

In financial literature, hot IPO markets are characterized by an unusually high volume of initial public offerings (IPOs), significant underpricing, frequent oversubscription of offerings, and sometimes a concentration in specific industries (Helwege & Liang, 2004). To assess the activity level in the US IPO market, an average number of IPOs per year is estimated for the years of our sample. Orbis M&A is utilized for this data. Based on this average, a dummy variable named Hot Issue Market is created. When the number of IPOs in a given year exceeds the average, the variable is assigned a value of 1; otherwise, it receives a value of 0, indicating whether the IPO market activity for that year is above or below average, respectively.

Deal Size

Deal size is included as a control variable based on established literature demonstrating a significant relationship between deal size and IPO underpricing (Ranjan & Madhusoodanan, 2004). The deal size, provided in millions of dollars, is transformed into its natural logarithm. This transformation helps to normalize the distribution, reduce heteroscedasticity, and mitigate the impact of outliers. The data is sourced from LSEG Workspace.

Recession

The dummy variable Recession has been constructed to capture the occurrence of an IPO during recessions within the United States economy. A recession is typically characterized by a significant decline in economic activity across various sectors, including employment, production, and spending. The "Recession" dummy variable takes on a value of 1 during periods identified as recessions, and 0 otherwise. Specifically, it is coded as 1 during the following time periods: March 2001 – November 2001, December 2007 – June 2009, February 2020 – April 2020 (*Dates of U.S. Recessions as Inferred by GDP-based Recession Indicator*, 2024). Appendix B includes a graph illustrating these periods. These time periods correspond to well-documented recessions in the United States, as identified by various economic indicators such as gross domestic product (GDP), unemployment rates, and consumer spending patterns.

Firm age

Firm age indicates the duration of the company at the time of its IPO issuance, in years. This variable is calculated by subtracting the founding year of a company from the year of the IPO offering, as provided by LSEG Workspaces.

3.4 Descriptive Statistics

Table 1

Correlation Matrix of Key Variables Hypothesis 1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
IPO Underpricing (1)	1.000						
Family Firm Status (2)	0.018	1.000					
Firm Size (3)	0.113**	-0.038	1.000				
Hot Issue Market (4)	0.058	-0.074*	0.124**	1.000			
Deal Size (5)	0.043	-0.128***	0.839***	0.167***	1.000		
Recession (6)	0.018	-0.046	0.061	0.023	0.065	1.000	
Firm Age (7)	-0.009	0.013	0.062	-0.003	0.050	0.019	1.000

Note: The values in the table represent Pearson correlation coefficients between the variables. *p < .05, **p < .01, ***p<.001. The sample size (N) for the correlations is 699.

Table 2

Correlation Matrix of Key Variables Hypothesis 2

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Shor-term performance (MABHR) (1)	1.000						
Family Firm Status (2)	0.054	1.000					
Deal Size (3)	0.177***	-0.088*	1.000				
Firm Size (4)	0.171***	-0.006	0.835***	1.000			
Recession (5)	0.090*	-0.045	0.068	0.058	1.000		
Firm Age (6)	0.043	-0.012*	0.062	0.066	0.030	1.000	
Hot Issue Market (7)	0.010	-0.080*	0.172***	0.126**	0.017	0.001	1.000

Note: The values in the table represent Pearson correlation coefficients between the variables. *p < .05, **p < .01, ***p<.001. The sample size (N) for the correlations in hypothesis 2 is 627.

Table 3

Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
IPO Underpricing	699	20.06	48.33	-91.18	537.78
Family Firm Status	699	0.14	0.35	0.00	1.00
Firm Size	699	6.25	1.43	1.53	11.15
Hot Issue Market	699	0.68	0.47	0.00	1.00
Deal Size	699	4.93	0.47	0.99	9.89
Recession	699	0.01	0.11	0.00	1.00
Firm Age	699	9.73	11.10	0.00	100.00
Short-term performance	627	0.00	0.52	-3.79	1.69

Note: The number of observations (Obs), mean, standard deviation (std. dev.), minimum (min) and maximum (max) values of the key variables are described in this table. IPO Underpricing is a percentage. Family Firm Status, Hot Issue Market, and Recession are dummy variables. Firm Size and Deal Size are natural logarithms in million dollars. Short-term Performance is also a natural logarithm. Firm Age is a numeric variable.

Table 4

Mean difference Family Firms and Non-Family Firms

	Family Firm	Non-family Firm	Difference
IPO Underpricing	22.18	19.72	-2.46
			(6.45)
Firm Size	6.11	6.27	0.16
			(0.18)
Hot Issue Market	0.60	0.70	0.10
			(0.05)
Deal Size	4.51	5.00	0.49**
			(0.17)
Recession	0.00	0.01	0.01**
			(0.00)
Firm Age	10.08	9.68	-0.40
			(1.17)
Obs	97	602	699

Note: This table shows in the first column the means for Family Firms, in the second column the means for Non-family Firms in our sample and the third column shows the difference in means and shows if this difference is significant, *p < .05, **p < .01, ***p<.001

CHAPTER 4 Method

To analyze the collected data I will make use of the Ordinary Least Squares (OLS) regression. OLS is a method used in regression analysis. It aids in determining the parameters of a linear regression model, shedding light on how changes in one variable, denoted as X, influence another variable, referred to as Y. The model aims to make predictions that closely match reality by minimizing the sum of the squared differences between the observed dependent variable and the predicted values.

4.1 First Hypothesis

To test the first hypothesis "Family firms experience higher IPO underpricing compared to non-family firms", I will first conduct a simple linear regression. With IPO underpricing as the dependent variable and family firm status as the independent variable. The family firm status will be a dummy variable, where family firms will be assigned a value of 1 and non-family firms a value of 0.

$$IPO\ Underpricing_i = \beta_0 + \beta_1\ family\ firm\ status_i + \varepsilon_i$$

Secondly, I will add control variables. The control variables are discussed in chapter 3.3. Adding control variables is important to improve the accuracy of estimated effects of the independent variables on the dependent variable. It can aid in gaining a better understanding of the relationship between the variables and enhancing the accuracy and reliability of the results. The order of the control variables was determined using the correlation matrix provided in Table 1. Specifically, the variable with the highest correlation with the dependent variable was included first, followed by the variable with the next highest correlation, and so on. This approach ensures that the most influential variables are considered first, potentially capturing the largest amount of variance in the dependent variable.

$$IPO\ Underpricing_i = \beta_0 + \beta_1\ family\ firm\ status_i + \beta_2\ Control\ Variables_i + \varepsilon_i$$

4.2 Second Hypothesis

The following linear regression models test the second hypothesis "The short-term performance of IPOs from family firms will be worse compared to the performance of IPOs from non-family firms". The same control variables as in Hypothesis 1 will be added to the simple regression for the second analysis, but they will be ordered differently based on the correlation matrix provided in Table 2.

$$Short - term\ performance_i = \beta_o + \beta_1 family\ firm\ status_i + \varepsilon_i$$

$$Short - term\ performance_i = \beta_o + \beta_1\ family\ firm\ status_i + \beta_2\ Control\ Variables_i + \varepsilon_i$$

4.3 Testing

To ensure the statistical significance, robustness to heteroskedasticity, and absence of serial correlation in the model's error term, I conduct several tests. First, I use the t-test to determine if the variables are statistically significant at a 5% significance level. To assess the goodness of fit of the model, the R-squared value provided by STATA is observed. R-squared measures the proportion of the variance in the dependent variable that is predictable from the independent variables. It ranges from 0 to 1, where 0 indicates that the model does not explain any of the variance in the dependent variable, and 1 indicates that the model explains all the variance.

The White test is employed to detect heteroskedasticity, which occurs when the variance of errors (residuals) in a regression model varies across different levels of the independent variables. This test is crucial because one of the key assumptions of OLS is that the errors exhibit constant variance, known as homoscedasticity. Deviations from this assumption can lead to biased and inefficient parameter estimates. If heteroskedasticity is detected, it is essential to use robust standard errors to correct the estimates of the regression coefficients' standard errors. This ensures that the t-values and p-values are correctly calculated despite the presence of heteroskedasticity.

Lastly, I employ the Variance Inflation Factor (VIF) test to check for multicollinearity. Multicollinearity occurs when two or more predictor variables in a regression model are highly correlated, meaning they contain similar information about the variance in the dependent variable. High multicollinearity can inflate the variance of the coefficient estimates and make the model unstable and difficult to interpret. A VIF value less than 1 is unusual and may indicate an issue with the data. Values between 1 and 5 suggest an acceptable level of multicollinearity, indicating that the variables within this range generally have little to no multicollinearity problems. When the VIF values are between 5 and 10, it indicates moderate multicollinearity. While it is possible to work with these values, it may be beneficial to further investigate the involved variables. A VIF value of 10 or higher is considered a strong indication of multicollinearity. In such cases, it is often advisable to take measures to reduce multicollinearity, such as removing one of the involved variables

CHAPTER 5 Results & Discussion

5.1 Hypothesis 1

Table 5

OLS-regressions hypothesis 1

	IPO Underpricing					
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Family Firm Status	2.461	3.065	3.511	1.130	1.204	1.237
	(5.291)	(5.265)	(5.276)	(5.332)	(5.340)	(5.344)
Firm Size		3.860**	3.671**	8.842***	8.828***	8.860***
		(1.277)	(1.286)	(2.356)	(2.358)	(2.361)
Hot Issue Market			4.776	5.866	5.852	5.836
			(3.950)	(3.956)	(3.959)	(3.961)
Deal Size				-6.739**	-6.755**	-6.754**
				(3.578)	(2.580)	(2.582)
Recession					5.682	5.787
					(8.403)	(16.131)
Firm Age						-0.067
						(0.164)
Constant	19.721***	-4.473	-6.620*	-6.080	-5.989	-5.533
	(1.971)	(8.239)	(8.426)	(8.393)	(8.403)	(8.481)
R-squared	0.000	0.013	0.011	0.025	0.025	0.025
Obs	699	699	699	699	699	699

Note: The values in the table represent coefficients for the OLS regressions. *p < .05, **p < .01, ***p<.001.

White's test concludes that there is no significant evidence of heteroskedasticity in the first regression model. The residuals appear to have a constant variance, which is a desirable property for the validity of the regression results.

The Variance Inflation Factor (VIF) test was conducted to assess multicollinearity among the independent variables. All the variables have VIF values indicating low multicollinearity, with a mean VIF of 1.84. Appendix C provides the VIF values for each variable. This indicates that there is no significant multicollinearity present in the model, suggesting that the estimates of the regression coefficients are stable and reliable.

Significance based on the t-test will be shown with stars: * corresponds to a 5% significance level, ** corresponds to a 1% significance level, and *** corresponds to a 0.1% significance level.

The R-squared value is provided in the table. The R-squared 0.00 and 0.025, overall, these low R-squared values suggest that the models have limited utility in predicting the dependent variable based on the independent variables included.

Table 5 presents the results of multiple OLS regression models, each with different sets of independent variables. The focus is on the effect of various factors on IPO Underpricing.

Family Firm Status shows a positive coefficient on IPO Underpricing in all the regressions and becomes more positive when adding control variables Firm Size and Hot Issue Market, but becomes less positive when adding the control variable Deal Size. This means that, on average, family firms have an IPO underpricing that is 1.130 to 3.065 percentage points higher than non-family firms, but this difference is not statistically significant. Therefore I cannot conclude a significant positive effect on IPO underpricing.

Firm Size, proxied by the natural logarithm of market capitalization, shows a significant effect in all models. The coefficients are positive and highly significant in models (2) to (6). This indicates that larger firms tend to have higher IPO underpricing.

Deal Size, expressed as the natural logarithm of the deal size in millions of dollars, shows a significant negative effect on IPO underpricing in models (4), (5), and (6). This means that for each one-unit increase in the natural logarithm of deal size, IPO underpricing decreases significantly. The coefficients range from -6.739 to -6.755, indicating a robust negative relationship between deal size and IPO underpricing.

The coefficient for Hot Issue Market shows a positive value but is not statistically significant. Recession has a positive coefficient in models (5) and (6) but is not statistically significant. This suggests that IPOs occurring during recessions tend to have higher underpricing, but this effect is not statistically significant. The coefficient for Firm Age is -0.067 but is not statistically significant. This means that for each one-year increase in firm age, IPO underpricing decreases by 0.067 percentage points, but this effect is not statistically significant.

5.2 Discussion Hypothesis 1

The hypothesis that family firms experience higher IPO underpricing compared to non-family firms was not supported by our regression analysis. Although the coefficients for Family Firm Status were positive across all models, indicating a potential trend for higher underpricing in family firms, following the results of previous studies, these coefficients were not statistically significant. This suggests that, within our sample and the variables considered, being a family firm does not have a discernible impact on IPO underpricing.

Furthermore, the low R-squared values suggest that the models have limited explanatory power, highlighting the need for further research to identify other factors that may influence IPO underpricing. The lack of significant impact from Family Firm Status on IPO underpricing suggests that other factors, perhaps internal firm characteristics, market sentiment, industry trends, underwriter reputation, and macroeconomic indicators, may play a more pivotal role in determining IPO underpricing.

Overall, Firm Size and Deal Size are the variables that show a significant relationship with IPO underpricing. Larger firms tend to have higher underpricing, while larger deal sizes tend to have lower underpricing.

The positive coefficient on Firm Size indicates that as the size of the firm increases, the degree of IPO underpricing also increases. This is somewhat counterintuitive as larger firms are often perceived as more stable and less risky, which typically would lead to less underpricing. However, the significant positive relationship in your results suggests otherwise. One possible explanation is that larger firms attract more attention and demand from investors, leading to higher initial returns or underpricing. The excitement and perceived value associated with larger firms could drive up the initial trading prices, resulting in higher underpricing. Another possible explanation is that underwriters may intentionally set lower offer prices for larger firms to ensure the success of the IPO by creating a positive market debut, which can be especially important for high-profile deals. This strategy can result in higher underpricing.

The significant negative impact of deal size suggests that larger IPOs are perceived as less risky or more stable by investors, leading to lower underpricing. Larger deals might be associated with more established or financially stable firms, reducing the need for significant underpricing to attract investors. This finding is consistent with existing literature that often finds a negative relationship between deal size and IPO underpricing. Larger IPOs tend to have more information available and greater scrutiny, leading to more accurate pricing and less underpricing.

The other variables, including Family Firm Status, Hot Issue Market, Recession, and Firm Age, do not show statistically significant effects in these models.

5.3 Hypothesis 2

Table 6

OLS-regressions hypothesis 2

	Short-term performance (MABHR)					
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Family Firm Status	0.083	0.107	0.101	0.106	0.106	0.105
	(0.067)	(0.067)	(0.068)	(0.068)	(0.068)	(0.068)
Deal Size		0.074***	0.053	0.051	0.051	0.052
		(0.021)	(0.036)	(0.036)	(0.036)	(0.036)
Firm Size			0.023	0.023	0.022	0.022
			(0.030)	(0.030)	(0.030)	(0.029)
Recession				0.377**	0.373**	0.373**
				(0.143)	(0.141)	(0.142)
Firm Age					0.001	0.001
					(0.001)	(0.001)
Hot Issue Market						-0.017
						(0.045)
Constant	-0.011	-0.385**	-0.423***	-0.418***	-0.426***	-0.419***
	(0.022)	(0.112)	(0.115)	(0.115)	(0.113)	(0.118)
R-squared	0.003	0.036	0.038	0.044	0.045	0.045
Obs	627	627	627	627	627	627

Note: The values in the table represent coefficients for the OLS regressions. *p < .05, **p < .01, ***p<.001.

There is significant evidence of heteroskedasticity in the second regression model after performing the White test. The White test indicates that heteroskedasticity is present, which violates one of the assumptions of OLS. Therefore, I used robust standard errors to mitigate its effects. This approach adjusts the standard errors of the coefficient estimates, providing more reliable statistical inferences.

The Variance Inflation Factor (VIF) test was conducted to assess multicollinearity among the independent variables. All the variables have VIF values indicating low multicollinearity, with a mean VIF of 1.81. Appendix D provides the VIF values for each variable. This indicates that there is no significant multicollinearity present in the model, suggesting that the estimates of the regression coefficients are stable and reliable.

Significance based on the t-test will be shown with stars: * corresponds to a 5% significance level, ** corresponds to a 1% significance level, and *** corresponds to a 0.1% significance level.

The low R-squared values indicate that the independent variables included in these models explain only a small fraction (up to 4.5%) of the variance in short-term performance (MABHR). This suggests that other factors not included in the model may be influencing short-term performance.

Table 6 presents the results of multiple OLS regression models, each with different sets of independent variables. The focus is on the effect of various factors on short-term performance.

Looking at the Family Firm Status coefficient, it suggests that family firms have a slightly higher short-term performance compared to non-family firms, ranging from 0.083 to 0.107 across different models, but this effect is not statistically significant.

Recession shows a significant positive effect on short-term performance. The positive and significant coefficients indicate that IPOs during a recession tend to have higher short-term performance by about 0.373 to 0.377 units, holding other variables constant. A coefficient of 0.373 for Recession suggests that MABHR is, on average, 0.373 higher for IPOs during recession periods than for those during non-recession periods. Since MABHR is the natural logarithm of the excess return, we can exponentiate the coefficient to interpret it in percentage terms: $e^{0.373} - 1 = 0.452$.
This means that short-term performance is approximately 45.2% higher for IPOs during recession periods.

Looking at the variable Deal Size, initially, larger deal sizes appear to positively impact short-term performance, but this effect diminishes when additional variables are added. Firm Age has a very small positive but not significant effect on short-term performance. Hot Issue Market conditions show a negative value but do not significantly impact short-term performance. Firm Size does not have a significant effect on short-term performance.

5.4 Discussion Hypothesis 2

The analysis of short-term performance (MABHR) revealed that the hypothesis predicting worse performance for family firms compared to non-family firms was not supported. Even though the hypothesis expected worse performance for family firms, the estimated coefficients are positive. The coefficients for Family Firm Status were consistently positive, suggesting that family firms might have slightly better short-term performance, but these results were not statistically significant. Thus, I cannot conclusively state that family firm status affects short-term performance.

The findings suggest that while family firms may exhibit certain traits and strategic behaviors that differ from non-family firms, these do not translate into measurable differences in short-term IPO performance. The low R-squared values suggest that there are other important factors influencing short-term performance that are not captured by the model. The sample size of 627 observations, while substantial, may not be large enough to capture the full range of variability in short-term performance. Additionally, the sample is specific to a certain context (US IPOs from 2001 - 2023), which may limit the generalizability of the findings. Longitudinal studies examining the long-term performance of family versus non-family firms post-IPO could offer a more nuanced understanding of how family ownership affects firm performance over time.

The significant positive effect of the Recession variable on short-term performance indicates that market conditions play a critical role, overshadowing firm-specific characteristics such as family ownership. The significant positive impact of Recession suggests that IPOs during recession periods may offer better short-term performance. This could be due to several reasons. Investors might perceive IPOs during recessions as opportunities to buy into companies at lower valuations, expecting higher returns as the economy recovers. Or companies that decide to go public during recessions might be more resilient or have stronger fundamentals, leading to better performance. Another reason could be that the competition for investor funds is reduced during recessions. That might lead to more favorable reception for IPOs.

The other variables, including Family Firm Status, Hot Issue Market, Firm Size, and Firm Age, do not show statistically significant effects in these models.

CHAPTER 6 Conclusion

In this study, I examined the effect of family firm status on IPO underpricing and short-term performance. Previous studies have shown that family firms tend to experience higher underpricing than non-family firms. However, this relationship has not been thoroughly investigated in the United States. Given the unique and active nature of the US IPO market, it is particularly useful to study this phenomenon. Additionally, research on the short-term performance of IPOs from family firms is minimal. Therefore, the central question addressed in this dissertation was: "How is IPO underpricing related to family firms in the United States between 2001 and 2023, and what is the effect of family firms on the short-term performance?"

To answer this research question, 699 US IPOs were studied, including 97 IPOs from US family firms. The analysis focused on the effect of family firm status on IPO underpricing and the short-term performance of the IPO. Both analyses concluded that family firm status had a positive but not significant effect on IPO underpricing and short-term performance in this sample. The first analysis revealed a positive significant effect of firm size on IPO underpricing and a negative significant effect of deal size on IPO underpricing. The second analysis indicated that IPOs occurring during a recession had a positive significant effect on short-term performance.

Therefore, this study cannot draw a definitive conclusion on the relationship between family firms and IPO underpricing or short-term performance in the United States. However, it does demonstrate significant effects of firm size and deal size on IPO underpricing, as well as the significant impact of IPOs occurring during a recession on short-term performance. Combined with findings from previous studies, this study concludes that deal size has a negative effect on IPO underpricing, suggesting that larger deals experience lower underpricing.

6.1 Implications for Investors

The findings of this study have important implications for investors considering investments in IPOs. Larger IPO deals are associated with lower underpricing. Investors may find more predictable pricing and potentially less volatility in larger deals, making these investments more attractive. Next to that, IPOs that occur during recessions show significant positive effects on short-term performance. This counterintuitive finding suggests that investors might find favorable opportunities during economic downturns, as these IPOs can outperform in the short term.

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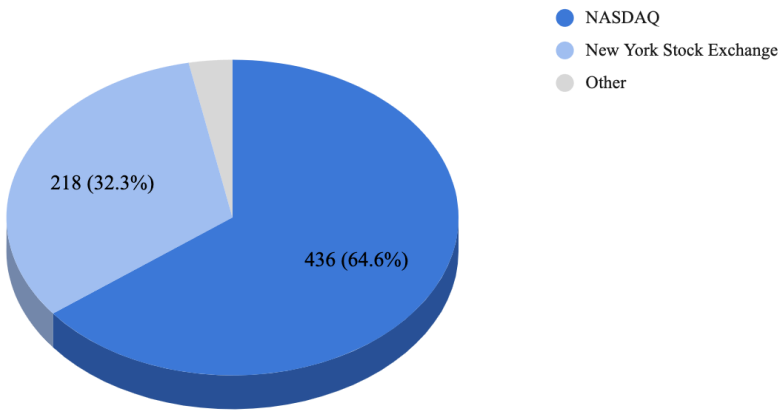
APPENDIX A: Distribution of Stock Exchange Listings

This figure shows the distribution of the IPOs in our sample across different stock exchanges. Specifically, it illustrates the proportion of IPOs listed on NASDAQ, the New York Stock Exchange, and other exchanges. The chart reveals that 64.6% of the IPOs in our sample were listed on NASDAQ, 32.3% on the New York Stock Exchange, and the remaining on other exchanges.

Figure 1

Distribution of Stock Exchange Listings

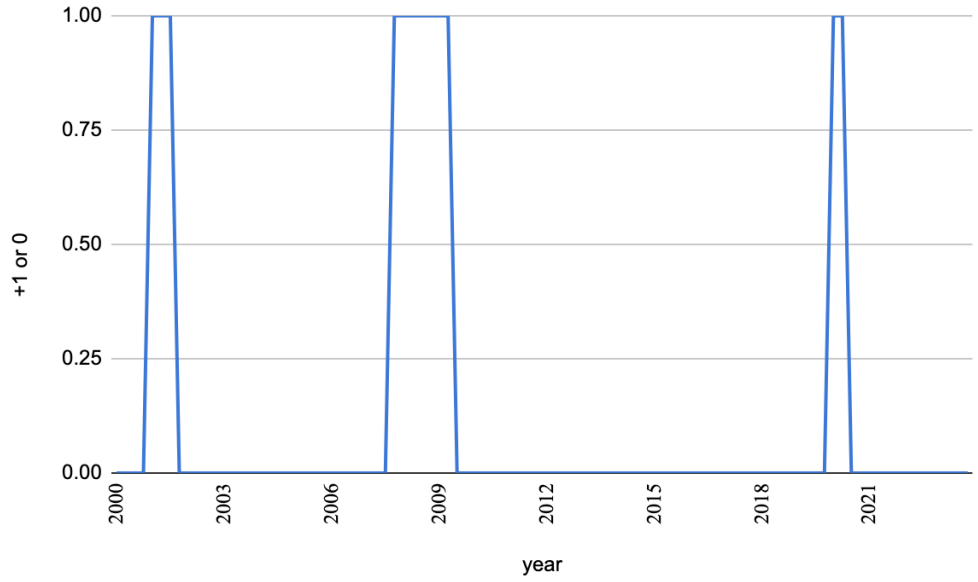


APPENDIX B: Distribution of the Recession Dummy Variable

This figure shows the distribution of the dummy variable 'Recession' over time. The dummy variable takes a value of 1 during the months when the US economy was in a recession, as indicated by the vertical spikes in the graph. Specifically, the graph highlights the periods when the US was officially in a recession, reflecting the times when the dummy variable is set to 1. During all other periods, the dummy variable takes a value of 0. This visualization helps to understand the temporal occurrence of recessions within the sample period.

Figure 2

Distribution of the Recession Dummy Variable



APPENDIX C: Variance Inflation Factor (VIF) for Hypothesis 1

This table presents the Variance Inflation Factor (VIF) values for the variables included in the regression analysis for testing Hypothesis 1. The VIF values help identify the presence of multicollinearity among the independent variables. Multicollinearity can cause issues such as inflated standard errors and unreliable coefficient estimates.

The mean VIF for the variables in this model is 1.84, which is well below the commonly accepted threshold of 10. This indicates that multicollinearity is not a significant issue in this analysis, and the estimates for the regression coefficients should be reliable.

Table 7

Variance Inflation Factor (VIF) hypothesis 1

Variable	VIF
Deal Size	3.53
Firm Size	3.44
Family Firm status	1.04
Hot Issue Market	1.03
Recession	1.01
Firm Age	1.00
Mean VIF	1.84

APPENDIX D Variance Inflation Factor (VIF) for Hypothesis 2

This table presents the Variance Inflation Factor (VIF) values for the variables included in the regression analysis for testing Hypothesis 2. The VIF values help identify the presence of multicollinearity among the independent variables. Multicollinearity can cause issues such as inflated standard errors and unreliable coefficient estimates.

The mean VIF for the variables in this model is 1.81, which is well below the commonly accepted threshold of 10. This indicates that multicollinearity is not a significant issue in this analysis, and the estimates for the regression coefficients should be reliable.

Table 8

Variance Inflation Factor (VIF) hypothesis 2

Variable	VIF
Deal Size	3.42
Firm Size	3.36
Hot Issue Market	1.04
Family Firm status	1.03
Recession	1.01
Firm Age	1.01
Mean VIF	1.81