universität wien

MASTERARBEIT | MASTER'S THESIS

Titel | Title

Underwriter Reputation and IPO Underpricing

verfasst von | submitted by

Jacqueline Hofinger BSc (WU)

angestrebter akademischer Grad | in partial fulfilment of the requirements for the degree of

Master of Science (MSc)

Wien | Vienna, 2026

Studienkennzahl lt. Studienblatt | Degree programme code as it appears on the student record sheet:	UA 066 974
Studienrichtung lt. Studienblatt | Degree programme as it appears on the student record sheet:	Masterstudium Banking and Finance
Betreut von | Supervisor:	Univ.-Prof. Mag. Günter Strobl PhD

Acknowledgment

I am especially grateful to my supervisor, Univ.-Prof. Mag. Günter Strobl, PhD, for his guidance, valuable feedback, and commitment to teaching, which greatly contributed to the completion of this thesis.

I would like to express my sincere appreciation to the professors and staff of the University of Vienna for creating a supportive academic environment throughout my studies.

Finally, I would like to thank my family and friends for their continuous encouragement and support.

Abstract (English)

Prior literature provides contradictory findings on the relationship between Underwriter reputation and IPO underpricing. While some studies emphasize the traditional certification role of reputable underwriters and document lower underpricing, more recent work highlights a rewarding mechanism in which reputable underwriters may use higher underpricing. This thesis investigates potential explanations for these conflicting findings by asking how underwriter reputation is associated with IPO underpricing across the full sample period and during boom periods.

Given the increasing dominance of institutional investors over time, a positive overall association was expected, reflecting a stronger rewarding effect in recent markets. To examine this relationship more closely, the analysis incorporates several reputation proxies and aggregated indices that allow the underlying mechanisms of reputation to be studied more precisely.

The empirical analysis is based on a sample of 1,553 IPOs between 2000 and 2024 and focuses on statistical associations rather than causal identification. The results show that the Composite Reputation Index is not statistically significant across specifications, suggesting that certification and rewarding effects partially offset each other in aggregation. When analyzed separately, however, the rewarding index is more consistently positive, whereas the certification effect remains weaker and less robust. Consequently, the study finds no support for the hypothesis that overall underwriter reputation is positively associated with IPO underpricing or that such an effect strengthens during boom periods. Instead, the results find support for the hypothesis that rewarding behavior represents a more stable effect, although it is not strong enough to dominate certification in aggregated measures.

Abstract (German)

Die bisherige Literatur liefert uneinheitliche Ergebnisse zum Zusammenhang zwischen Underwriter Reputation und IPO Underpricing. Während einige Studien vor allem die Zertifizierungsfunktion renommierter Underwriter betonen und geringeres Underpricing dokumentieren, argumentieren andere Arbeiten über einen Belohnungsmechanismus, bei dem angesehene Underwriter bewusst höheres Underpricing einsetzen, um Investoren loyal zu halten. Ziel dieser Arbeit ist es daher zu untersuchen, wie Underwriter Reputation mit IPO Underpricing über den gesamten Beobachtungszeitraum sowie während Boom-Perioden zusammenhängt und ob unterschiedliche Reputationseffekte die widersprüchlichen Ergebnisse der Literatur erklären können.

Vor dem Hintergrund der zunehmenden Bedeutung institutioneller Investoren wurde ein insgesamt positiver Zusammenhang erwartet, der auf einen stärkeren Belohnungseffekt hindeutet. Um die zugrunde liegenden Reputationseffekte differenzierter zu analysieren, verwendet diese Arbeit mehrere aggregierte Messungen von Reputation: einen aggregierten und gleichgewichteten Gesamtindex sowie zwei getrennte Zertifizierungs- und Belohnungsindizes, um auch eine getrennte Betrachtung der Effekte zu ermöglichen.

Die empirische Analyse basiert auf einer Stichprobe von 1.553 IPOs im Zeitraum von 2000 bis 2024 und konzentriert sich auf statistische Zusammenhänge statt auf kausale Identifikation. Die Ergebnisse zeigen, dass der aggregierte Gesamtindex über verschiedene Spezifikationen hinweg keine statistische Signifikanz aufweist, was darauf hindeutet, dass sich Zertifizierungs- und Belohnungseffekte in aggregierter Form teilweise gegenseitig aufheben. Bei separater Betrachtung liefert jedoch insbesondere der Belohnungseffekt konsistentere Ergebnisse, während der Zertifizierungseffekt schwächer und weniger robust bleibt. Insgesamt finden sich somit keine Belege dafür, dass der aggregierte Gesamtindex positiv mit IPO Underpricing zusammenhängt oder sich dieser Zusammenhang während Boom-Perioden verstärkt. Stattdessen deuten die Resultate darauf hin, dass der Belohnungseffekt konsistenter mit Underpricing assoziiert ist als der Zertifizierungseffekt. Dadurch wird die Existenz eines stärkeren separaten Effekts unterstützt, jedoch nicht die Annahme, dass der Belohnungseffekt in aggregierter Form einen positiven Gesamteffekt erzeugt.

Table of Contents

List of Tables

1. Introduction

Initial Public Offerings (IPOs) are central events in capital markets. By going public, companies not only raise external equity but also shape their reputation and network. IPOs are therefore not merely financing events but also reveal information and influence the reputation of the parties involved. In this sense, IPOs reflect strategic interaction between issuers, investors and underwriters.

A well-documented feature of IPOs is that the offer price is often lower than the first-day closing price, which is commonly referred to as IPO underpricing. Rock (1986) explains underpricing as compensation to attract uninformed investors under conditions of adverse selection. In contrast, bookbuilding models emphasize informational rents granted for investors to incentivize truthful revelation of demand information (Benveniste and Spindt, 1989; Hanley, 1993). In both frameworks, underpricing arises as an outcome from informational frictions, but the underlying mechanisms differ.

Within this context, underwriter reputation has emerged as a central explanatory variable. By acting as the intermediary between issuers and investors, underwriters play a central role in this process and perform two roles in IPOs:

(1) a certification role, which reduces issuer-quality uncertainty, and
(2) a rewarding (bookbuilding) role, which manages investor information and allocation incentives.

This thesis examines how these roles are related to IPO underpricing in contemporary markets by analyzing underwriter reputation both in aggregated form and when decomposed into its underlying components. In particular, it investigates whether, in the period of 2000–2024, underwriter reputation is positively associated with IPO underpricing and whether this relationship is stronger during IPO boom periods. When these components are analyzed separately, the study further examines whether the rewarding component exhibits a stronger positive association with IPO underpricing than certification.

Traditionally, reputation has been interpreted as a certification mechanism, implying a negative association between reputation and underpricing (Carter and Manaster, 1990). However, bookbuilding models may emphasize allocation discretion and repeated interactions between underwriters and institutional investors (Benveniste and Spindt, 1989). In this framework, underpricing can serve as an informational rent that facilitates truthful demand revelation and ongoing investor participation. Moreover, Loughran and Ritter (2004) provide evidence consistent with agency considerations in the

IPO process, suggesting that underpricing outcomes may reflect factors beyond pure certification effects.

As IPO markets have become increasingly dominated by institutional investors, the relative importance of relationship-based mechanisms may have increased. In such an environment, the effect of underwriter reputation on underpricing may no longer be purely certifying but conditional on market conditions and investor structure. In this thesis, such relationship-based effects are referred to as the rewarding role of underwriters.

The empirical analysis is based on a comprehensive sample of U.S. IPOs between 2000 and 2024. Underwriter reputation is proxied using both traditional prestige-based measures (e.g., Carter–Manaster rankings and market share) and behavior-based measures capturing past underpricing and greenshoe activity. These proxies are analyzed in aggregated index forms within a cross-sectional regression framework.

The main findings can be summarized as follows. The Composite Reputation Index does not exhibit a significant overall association with IPO underpricing, and no stronger effect is observed during IPO boom periods. However, when reputation is decomposed into certification and rewarding components, the Rewarding Index shows a stronger and statistically significant association with IPO underpricing, particularly in the boom subsample. These results suggest that while certification effects remain present, rewarding mechanisms appear to be more influential in the modern market. All results are interpreted as conditional associations rather than causal effects.

The remainder of the thesis is structured as follows. Chapter 1.1 outlines the topic and research questions. Chapter 2 reviews the literature on IPO underpricing and underwriter reputation. Chapter 3 develops the economic framework and hypotheses. Chapter 4 describes the data and methodology. Chapter 5 presents empirical results, and Chapter 6 discusses robustness and identification limitations.

1.1. Topic and Research Questions

Underwriter reputation may reflect two economic mechanisms: a certification effect captured by prestige-based proxies and a rewarding effect reflected in behavior-based proxies. The central objective is to examine which of these effects appears to be more prominent in contemporary IPO markets.

To operationalize this distinction, both components are aggregated into a Composite Reputation Index and additionally analyzed separately through Certification and Rewarding Indices.

The empirical analysis investigates how underwriter reputation is associated with IPO underpricing during the period 2000–2024 and whether this association changes during boom markets. Given the increasing importance of institutional investors, the rewarding effect is expected to outweigh certification in aggregation, implying a positive overall relationship between reputation. In addition, the composite index is decomposed into certification and rewarding indices, allowing the analysis to examine whether certification-related or rewarding-related components are more strongly associated with IPO underpricing.

Overall, this thesis addresses two main research questions:
What is the association between the CRI and IPO underpricing (2000–2024), and does it differ in boom vs. non-boom periods?
When decomposed, which component (certification vs rewarding) is more strongly associated with underpricing?

2. Literature review

This chapter reviews the main mechanisms proposed to explain IPO underpricing and relates them to underwriter reputation. It then discusses how reputation has been operationalized in literature, highlights key measurement and identification challenges, and summarizes how institutional investors and IPO cycles can shift the relative importance of certification versus rewarding mechanisms. Finally, it reviews the role of the overallotment option (greenshoe) and aftermarket stabilization.

2.1. Mechanisms behind IPO Underpricing

IPO underpricing, where the first-day closing price exceeds the offer price, is a robust empirical regularity documented across time and markets (Rock, 1986; Loughran & Ritter, 2004). The literature explains underpricing through several mechanisms that imply different roles for intermediaries and different predictions for how underwriter reputation relates to initial returns.

2.1.1 Winner's curse / participation

Rock (1986) formalizes underpricing as an equilibrium response to information asymmetry among investors. In his "winner's curse" model, informed investors concentrate their demand on the most attractive offerings, while uninformed investors are more likely to receive larger allocations in less attractive issues. To sustain participation by uninformed investors, issuers and underwriters must offer IPO shares at a discount, so that expected aftermarket returns compensate for adverse selection (Rock, 1986). Under this view, underpricing primarily reflects compensation for the adverse selection problem faced by uninformed investors and is tied to the degree of ex ante uncertainty and information asymmetry.

2.1.2 Bookbuilding/information revelation and allocations

A complementary mechanism emphasizes that underpricing can be used strategically to elicit information during the bookbuilding process. In the canonical bookbuilding framework, investors may possess valuable demand information, and underwriters can use discretionary allocations – together with leaving some rents via underpricing – to incentivize investors to reveal their information and to participate in information production (Benveniste & Spindt, 1989). In this setting, underpricing is not only a consequence of uncertainty; it can also be an instrument that supports information acquisition and truthful communication during marketing.

Empirically, Hanley (1993) documents the "partial adjustment phenomenon": IPOs with positive price revisions tend to exhibit higher first-day returns. This pattern suggests that favorable demand information revealed during bookbuilding is not fully incorporated into the final offer price, leaving

information rents to investors. Underpricing can therefore be interpreted as part of the incentive mechanism that supports truthful demand revelation in the bookbuilding process.

2.1.3 Agency/conflict perspectives (why issuers tolerate underpricing)

Beyond participation and information-revelation mechanisms, the literature also stresses that issuers may tolerate substantial underpricing because the costs and benefits of underpricing need not be borne symmetrically across decision makers. Loughran and Ritter (2004) argue that underpricing can be understood in part through agency and behavioral considerations, including situations where "leaving money on the table" is not fully internalized by issuers relative to perceived benefits from a successful offering.

Consistent with a shift in incentives and market structure, Loughran and Ritter (2004) show that the relationship between underwriter prestige and underpricing appears to change over time. While earlier periods are more consistent with a certification logic in which reputable underwriters are associated with lower underpricing, the 1990s, especially 1999-2000, show the opposite pattern, where the most prestigious underwriters are linked to higher underpricing (Loughran & Ritter, 2004). This time variation motivates examining whether, in more recent markets, underpricing is better explained by certification or by rewarding/information-rent mechanisms.

2.2. Underwriter Reputation: two roles

The literature attributes at least two economic roles to underwriter reputation. First, reputation can operate as a certification mechanism that mitigates information asymmetry about issuer quality. Second, reputation can reflect an underwriter's ability to manage bookbuilding and allocations, including sustaining relationships with informed investors, which can increase the role of rewarding and information rents.

2.2.1 Certification role → prediction of underpricing

Carter and Manaster (1990) argue that reputable underwriters can serve as certifiers: High-reputation intermediaries convey information about ex ante uncertainty (or dispersion) of the issuer, thereby reducing the compensation required by uninformed investors and lowering the level of discount (Carter & Manaster, 1990). Under a certification view, higher underwriter reputation should be associated with lower underpricing, all else equal.

This role motivates "prestige-based" reputation measures, most prominently the Carter–Manaster tombstone rank (Carter & Manaster, 1990) and market-share-style measures capturing underwriting prominence and deal flow (Megginson & Weiss, 1991).

2.2.2 Rewarding/allocations role → prediction of underpricing

A second perspective emphasizes the underwriter's role in producing information and allocating shares during bookbuilding. When allocations are discretionary, underwriters can reward investors who provide valuable demand information by allocating shares in underpriced deals, creating a link between underwriter "quality" and the magnitude of initial returns (Benveniste & Spindt, 1989). In this view, underwriter reputation may reflect an intermediary's ability to extract information and manage relationships with informed investors, implying that higher reputation can be associated with higher underpricing, particularly in periods of strong demand.

Loughran and Ritter (2004) provide time-series evidence consistent with this interpretation by documenting periods in which prestige is positively associated with underpricing (Loughran & Ritter, 2004). Relatedly, Hoberg (2007) documents persistence in underpricing across underwriters and proposes an "underwriter premium" (based on abnormal initial returns averaged over a rolling window) as a measure capturing systematic differences in underpricing patterns across intermediaries. Hoberg (2007) interprets persistence as consistent with underwriter-specific information advantages and investor relationships, and reports links to more informative analyst activity and stronger institutional investor participation (Hoberg, 2007).

2.2.3 Measurement and identification challenges

Empirically distinguishing certification from rewarding is challenging because reputation proxies can be endogenous and may bundle multiple channels.

First, prestige-based measures such as tombstone rank or market share may reflect not only certification capacity but also issuer selection, industry specialization, or access to high-demand deals. Second, behavior-based proxies such as past underpricing (e.g., Hoberg's underwriter premium) may capture persistent underwriting "style," but can also arise mechanically if certain underwriters systematically attract issuers with characteristics that generate higher initial returns (e.g., stronger growth narratives, higher expected demand, or greater analyst coverage). In that case, persistence may partly reflect matching and selection rather than underwriter behavior alone.

Third, proxy meanings can vary over time with changes in market structure and investor composition, making it important to interpret coefficients in a given sample period (e.g., post-2000) rather than assuming stability from earlier decades (Loughran & Ritter, 2004).

Against this backdrop, a common strategy is to use multiple proxies and interpret them through an explicit mechanism map (certification versus rewarding), while acknowledging that aggregation can mask opposing effects if the components load on different channels. This motivates constructing separate indices for certification-based and rewarding-based mechanisms, in addition to any composite index, and testing them separately.

2.2.4 Institutional investors and IPO cycles

The relative importance of certification versus rewarding depends on who supplies capital and information in IPO markets. In Rock (1986)'s framework, investor heterogeneity drives the adverse-selection problem and therefore the need for discounts. In bookbuilding frameworks, informed investors, often institutional investors, become central because they can produce and reveal demand information and can be rewarded through allocations (Benveniste & Spindt, 1989; Hanley, 1993).

Over time, institutional investors have become increasingly dominant in equity markets (Drobetz et al., 2025). This compositional shift suggests that mechanisms tied to discretionary allocations and investor relationships may have gained importance relative to pure certification. Moreover, institutional participation varies over the issuance cycle. Helwege and Liang (2004) show that institutional holdings are higher in "hot" IPO markets, defined via an IPO-volume-based moving average with hot periods in the top quartile of issuance activity, consistent with stronger investor demand during issuance booms (Helwege & Liang, 2004). These patterns imply that rewarding and information-rent mechanisms may be particularly salient during boom periods, when demand is strong and allocation discretion is more valuable.

2.2.5 Greenshoe (overallotment) and aftermarket stabilization

The overallotment option (greenshoe) is closely tied to both allocation management during the offering and stabilization in early aftermarket trading. Hanley (1993) uses overallotment activity as an indicator of adjustments in effective share supply during the IPO process, with higher usage consistent with demand-related allocation and quantity adjustments (Hanley, 1993). Subsequent work emphasizes that overallotment positions also shape aftermarket trading dynamics.

Aggarwal (2000) shows that IPO price support often occurs through the management of underwriters' overallotment (short) positions rather than solely through visible stabilizing bids. Underwriters may initially sell more shares than the base offering and then decide whether to cover the short position in the market or to exercise the greenshoe, depending on aftermarket performance; this mechanism can stabilize early trading (Aggarwal, 2000).

Accordingly, greenshoe-related variables are most naturally interpreted as proxies for aftermarket stabilization and inventory management rather than direct measures of investor "rewarding." In this thesis, past greenshoe execution is used as a behavior-based proxy that may correlate with demand conditions and active aftermarket management. A limitation is that greenshoe execution may reflect not only strong investor demand (oversubscription) but also stabilization motives and deal-specific characteristics; the variable should therefore be interpreted as capturing systematic differences in overallotment usage rather than a clean measure of rewarding behavior.

2.2.6 Syndicate Size

Corwin and Schultz (2005) show that the presence of additional co-managers is associated with greater information production, whereas non-managing syndicate members play a more passive role. Their discussion suggests that certification need not be provided solely by the lead underwriter; participation by additional reputable co-managers can reinforce credibility and expand information aggregation. At the same time, syndicate structure can also be related to bookbuilding dynamics and price revisions. In this thesis, syndicate size is therefore treated primarily as a network-based proxy for collective certification and information production capacity (rather than a pure rewarding proxy), while acknowledging that it may also reflect distribution needs and demand conditions.

3. Economic Framework

This chapter develops the economic framework based on the literature discussed in the previous chapter and derives the hypotheses tested in the empirical analysis.

3.1. Economic Story

The IPO process is shaped by informational asymmetries between issuers, investors, and the intermediary that structures and distributes the offering. Underwriters act as intermediaries who market the issue, collect demand information during bookbuilding, set the offer price, and exercise discretion over allocations. Within this setting, IPO underpricing can be understood as a rational outcome of asymmetric information and incentive problems, and underwriter reputation can affect underpricing through two economically distinct roles.

A useful way to structure the economic intuition is to distinguish between (i) frictions related to issuer quality and valuation uncertainty and (ii) frictions related to investor demand information and strategic reporting. Both can be present at the same time, but their relative importance can vary across market conditions. Underwriter reputation is shaped by, and can be valuable in, addressing both frictions.

Issuer-quality uncertainty (certification)

When uninformed investors face substantial uncertainty about the issuer's value, they may fear paying an overstated price for a low-quality firm and require compensation to trade against better informed investors (Rock, 1986). In such environments, a reputable underwriter can mitigate adverse selection: by associating its name with the offering, a prestigious bank signals that the IPO is characterized by lower ex-ante value uncertainty (Carter & Manaster, 1990). The certification role lowers the discount required to attract uninformed investors to participate, which implies lower expected underpricing for offerings led by more reputable underwriters, all else equal.

Investor information & incentive problem in bookbuilding (rewarding).

In bookbuilt IPOs, informed investors—particularly institutional investors—may possess valuable information about demand and valuation. However, investors may have incentives to shade or withhold favorable information to obtain a lower offer price and larger expected aftermarket gains. This creates an incentive problem during the price discovery process: issuers and underwriters may not fully observe true demand, and the offer price may incorporate positive information only partially (Hanley, 1993). Underwriters can address this problem by using discretionary allocations and leaving some rents through underpricing, thereby rewarding investors who provide valuable demand information and participate in the bookbuilding process (Benveniste & Spindt, 1989).

In this environment, reputation supports the repeated-interaction arrangement underlying bookbuilding: reputable underwriters can more effectively promise future access and valuable allocations, making it credible for institutions to reveal information today. Importantly, information rents may be delivered through current underpricing, future allocations, or a combination of both.

Implications for the reputation–underpricing relationship in 2000-2024.

While certification and rewarding have opposite sign predictions, this thesis expects that in the 2000-2024 period, characterized by bookbuilding and greater institutional participation, the rewarding channel is sufficiently strong that the net association between composite reputation and underpricing is positive, and becomes stronger in boom markets. This expectation is consistent with evidence that the relation between underwriter prestige and underpricing can vary over time and may become positive in periods where allocation discretion and investor incentives are particularly salient (Loughran & Ritter, 2004). Building on this two-role view, the empirical analysis evaluates the overall association using a composite reputation measure and then assesses whether the rewarding component exhibits a stronger relationship with underpricing than the certification component.

Market conditions and the role of hot markets.

Market states can shift the relative importance of these frictions. In hot markets with high volume issuance and strong investor demand, allocations are more likely to be rationed, and demand information becomes particularly valuable for pricing. Under these conditions, the importance of the investor-related incentive problem increases, and the rewarding role of reputable underwriters is expected to be more prominent, implying a stronger positive reputation–underpricing association during boom periods. In cooler markets with weaker demand and less demand, the scope for rewarding through underpricing is reduced. While the rewarding component may still operate, it is expected to be less pronounced than in boom periods, so the positive association between reputation and underpricing should weaken accordingly.

Overall, the economic framework implies that underwriter reputation can influence IPO underpricing through two distinct but potentially coexisting roles, certification and rewarding, and that the balance between these roles varies with market conditions. This motivates testing whether a positive reputation–underpricing relationship is present over 2000-2024, whether it is stronger in boom periods, and whether rewarding-related measures of reputation exhibit a stronger empirical association with underpricing than certification-related measures.

In this thesis, certification-related reputation is operationalized using prestige-based measures (e.g., Carter–Manaster-style prestige and market share), while rewarding-related reputation is operationalized using behavior-based measures (e.g., persistent underpricing and allocation/aftermarket management proxies). This mapping allows the empirical analysis to test whether the positive composite association expected for 2000–2024 is driven primarily by the rewarding channel, and whether this channel strengthens in boom years.

3.2. Hypotheses development

This thesis examines the relationship between underwriter reputation and IPO underpricing in the period from 2000 to 2024. Underwriter reputation can influence IPO underpricing through two different effects: On the one hand, reputation can serve as a certification role by reducing perceived risk and information asymmetry, which is typically associated with lower underpricing. On the other hand, reputation can be interpreted as a relationship-based rewarding mechanism, as highly reputable underwriters use underpricing to encourage truthful demand revelation and to maintain long-term relationships with institutional investors.

This study argues that the rewarding effect is particularly relevant for underwriters with high reputation. Such underwriters have persistent access to institutional investors and are more frequently involved in offerings characterized by strong demand, making rewarding an effective and necessary mechanism. Accordingly, this study examines whether underwriter reputation is associated with IPO Underpricing in the overall sample, whether this association varies across market cycles, and whether the rewarding effect exhibits a stronger relationship with underpricing than the certification effect.

First, the Composite Reputation Index is expected to be positively associated with IPO underpricing, reflecting the possibility that rewarding dominates traditional certification effects, meaning that the net effect captured by the composite index is positive once both components are included. Hypothesis 1 is evaluated based on the coefficient of the composite reputation index; the certification and rewarding subindices are reported separately to diagnose underlying mechanisms even if the composite effect itself is statistically insignificant. Second, Hypothesis 2 examines whether the association between underwriter reputation and IPO underpricing varies across market cycles using interaction specifications. Hot market periods are operationalized using a boom-period dummy based on annual IPO volume, where years above the 75^{th} percentile of the IPO volume distribution are classified as boom periods. This Hypothesis is tested using interaction specifications and boom versus non-boom subsample as complementary analyses. Third, the rewarding and certification indices are analyzed jointly to assess which mechanism exhibits stronger empirical association with IPO underpricing. Empirically, Hypothesis 3 evaluates whether the coefficient on the rewarding index

exceeds the coefficient on the certification index (βRewarding > βCertification), which is tested within joint regression specifications. A Wald test applies to evaluate whether the rewarding component of reputation exhibits a statistically different association with IPO underpricing than the certification component.

The following hypotheses are tested:
Hypothesis 1: Underwriter reputation is expected to be positively related to IPO underpricing in the total period of 2000-2024.

Hypothesis 2: The positive relationship between underwriter reputation and IPO underpricing is more pronounced during hot market periods than during cold/moderate market periods.

Hypothesis 3: The rewarding effect of underwriter reputation is expected to exert a stronger positive association with IPO underpricing than the certification effect.

For the first two hypotheses, the underwriter reputation is measured by the Composite Reputation Index. Certification and rewarding Indices are subindices of the Composite Reputation Index that are included as additional analysis to explore the underlying effects of reputation.
For Hypothesis 3, the certification and rewarding subindices are analyzed jointly within OLS regressions.

4. Data and Methodology

This chapter describes the data and sample construction, followed by the definition of variables. Finally, the empirical estimation strategy is presented.

4.1. Data and Sample construction

This section describes the construction of the IPO sample and the identification of underwriters used in the empirical analysis.

4.1.1 IPO sample construction

This thesis uses S&P Capital IQ as the primary data source for 1,553 IPOs from 2000 to 2024. The data was collected in Excel and analyzed with Python. To construct the sample, IPO-level data is obtained from S&P Capital IQ and filtered with predefined screening criteria. The dataset is limited to traditional initial public offerings by setting transaction type to Initial Public Offering and the offering description to IPOs. This is necessary to ensure comparability and consistency across the sample. In addition, this thesis focuses on companies headquartered in the United States and listed on one of the following exchanges: NASDAQCM, NASDAQGM, NASDAQGS, NYSE and NYSEAM. The U.S. market is chosen as environmental setting to analyze the pricing behavior of underwriters during bookbuilding procedures. From 2000 to 2024, the initial dataset comprises a total of 3,325 IPOs. Table 1 shows a summary of several types of offerings that are excluded to ensure that IPOs have comparable pricing mechanisms. Following Loughran and Ritter (2004), the sample is restricted to operating companies, and the following transactions are excluded from the dataset with predefined filters: Specifically, 984 Special Purpose Acquisition Companies (SPACs) are identified and removed based on their SPAC Status because they have no operating business at IPO. In addition, the dataset was screened via business description and company industry identification to exclude 110 Real Estate Investment Trusts (REITs), 461 banks and investment funds as well as 29 reverse mergers. During the data cleaning process 53 master limited partnerships (MLPs) could be identified via prospectus and removed because their valuation is based on sector-specific or tax-specific forces rather than underwriter reputation. Finally, IPOs with an offering price below $5 per share (penny stocks) eliminating 130 additional observations following common IPO sample screens. The exclusion filters were applied sequentially, and once an observation was removed it was not considered in subsequent categories, ensuring that each IPO is counted only once. After these exclusions, 1,553 traditional IPOs remained.

Table 1 Exclusions

Exclusions	
Total number of IPOs before exclusions	3,325
Number of SPACs	-984
Number of REITs	-110
Number of banks and investment funds	-461
Number of Reverse Mergers	-29
Number of MLPs	-53
Number of penny stocks (Offering Price < 5)	-130
Final Sample	1,553

After applying the initial exclusion criteria and defining the final IPO sample, several additional data cleaning steps were implemented to ensure consistency of the dataset. The procedure follows a set of data cleaning steps covering underwriter identification, underpricing verification, ticker validation and variable construction.

4.1.2 Underwriter Data and Identification

To obtain the underwriters, Book manager and co-manager fields were added via S&P Capital IQ for each IPO. The first-listed book manager (Book Manager 1) is used as a proxy for the lead underwriter. Missing entries of Book Manager 1 (29 cases) were added based on the underwriter's position in prospectus. If the underwriter is positioned on the top left, then he is categorized as book manager 1 or lead book manager of the IPO.

To ensure a robust and consistent measure of underwriter reputation, this study focuses exclusively on the lead book manager (Book Manager 1) for each transaction, following the established approach in the IPO literature. Although IPO syndicates frequently involve multiple joint bookrunners, the lead-left manager typically bears primary responsibility for price discovery, bookbuilding, and the final allocation decision. Since the pricing process is related to IPO underpricing as instrument to certify lower risk or reward investors, reputation proxies are most appropriately linked to the underwriting history of the lead book manager. Focusing on one lead underwriter per IPO does not reduce the number of IPO observations but limits the analysis to a single underwriter-role observation per transaction. This ensures a clean one-to-one mapping between the historical track record of the lead underwriter and the underpricing outcome of the IPO.

To ensure consistent identification of underwriters across IPOs, a brand mapping procedure was applied. Different name notations referring to the same institution (e.g. Inc., Corp., LLC, L.P., Ltd.) were consolidated under a single standardized underwriter name. The number of distinct underwriters

decreases from 118 to 110, reflecting a consolidation of 8 institutions in the regression sample. This standardization ensures that underwriting activity is consistently attributed to the same institution across IPOs and over time, thereby avoiding artificial fragmentation of underwriter histories. All subsequent analyses, including the construction of reputation proxies, index aggregation, and the clustering of standard errors, are based on these standardized underwriter identifiers.

4.1.3 Industry Classification and Time

Two-digit SIC codes are obtained from S&P Capital IQ for each IPO to classify firms by industry.

IPO activity is particularly concentrated in SIC 28 (Chemical and Allied Products) and SIC 73 (Business Service), indicating a strong presence of pharmaceutical, biotechnology, and technology-related firms during the sample period.

Industry fixed effects based on the two-digit SIC classification are included in the regression models (Section 4.3.2). Appendix A reports the distribution of IPOs across the 20 most frequent two-digit SIC codes.

4.1.4 Time Distribution of IPOs

Offering years are obtained for each IPO from S&P Capital IQ. Appendix B reports the annual number of IPOs from 2000 – 2024, showing substantial variation in issuance across years. IPO activity exhibits cyclical patterns with issuance waves during boom periods. Year fixed effects are therefore included in the regression models (see Chapter 4.3.2).

4.2. Variable Definitions

This section describes the construction of the main variables used in empirical analysis. It outlines the definition, data sources, and transformations applied to the dependent variable and the underwriter reputation measures. Additional details on variables are summarized in Appendix C.

4.2.1 IPO Underpricing

IPO Underpricing, defined as the percentage return from the offer price to the first-day closing price, is one of the most persistent phenomena in capital markets. For this thesis, underpricing is the dependent variable and is calculated as follows:

% Initial Return: $IR = \frac{(P_{mkt} - P_{IPO})}{P_{IPO}}$

where P_{IPO} is the offer price at which shares are sold to investors and P_{mkt} is the closing price on the first trading day

The primary data for IPO Underpricing was retrieved from S&P Capital IQ. 25 observations of IPO Underpricing were missing and could be added via prospectus. Prospectuses were obtained from S&P

Capital IQ. The variable is winsorized at the 1st and 99th percentiles to reduce the influence of extreme observations in the heavily right-skewed return distribution.

4.2.2 Underwriter Reputation

The primary data to calculate market share, past syndicate size, past underpricing and past greenshoe execution were retrieved from S&P Capital IQ, while Carter-Manaster ranks were obtained from Jay Ritter's Database (Ritter, 2025)[1].

To capture the different components of underwriter reputation, this thesis distinguishes between two broad categories.

Carter and Manaster Rank

Carter and Manaster (1990) introduce the tombstone-based prestige ranking, which orders underwriters according to their placement in IPO tombstone advertisements and thereby reflects their perceived market status. The measure quickly became a widely used proxy for underwriter reputation because it was transparent and easy to apply (Carter & Manaster, 1990).

One limitation of the ranking is its relatively static nature, as it does not adjust continuously to changes in market conditions.

The Carter-Manaster ranks used in this thesis were obtained from Jay Ritter's Database and matched to each IPO based on the corresponding year. For 40 lead underwriters, no Carter-Manaster rank could be identified, resulting in a reduced sample of 1,513 observations for this proxy.

As a reputation measure, the Carter and Manaster rank primarily captures the credibility and perceived quality of an underwriter within the IPO market.

[1] Jay R. Ritter, IPO Data (including underwriter ranks), accessed November 2025, https://site.warrington.ufl.edu/ritter/ipo-data/. Specific file used: IPO Underwriter Reputation Rankings (1980 – 2024)

Market Share

As a measure of reputation, market share reflects an underwriter's established market presence and the ability to attract issuers over time. A higher market share suggests that an underwriter is repeatedly chosen by issuers and maintains a stable position within the IPO market.

In this study, market share is constructed as the ratio of an underwriter's total IPO proceeds to total market proceeds, as defined in Equation (1):

$$Market\ Share\ = \frac{\sum_{s=t-5}^{t-1} Gross\ Proceeds_{i,s}}{\sum_{s=t-5}^{t-1} Gross\ Proceeds_{s}^{mkt}} \quad (1)$$

where i denotes the lead underwriter and t the year of the IPO for which the variable is calculated. $\sum_{s=t-5}^{t-1} Gross\ Proceeds_{i,s}$ represents total IPO gross proceeds generated by underwriter i in year s and $\sum_{s=t-5}^{t-1} Gross\ Proceeds_{s}^{mkt}$ represents the total IPO gross proceeds of the entire market in year s.

Gross proceeds were obtained from S&P Capital IQ and were cross-checked by multiplying total shares offered by the offering price.

Past Syndicate Size

Corwin and Schultz (2005) show that broader participation in IPO syndicates is associated with greater information production and enhanced certification. Building on this evidence, this study employs past syndicate size as a reputation-related proxy.

Past syndicate size is defined as the average log number of underwriters (Book managers and co-managers) in IPOs in which the lead underwriter participated over a five-year rolling window prior to the offering, as shown in Equation (2):

$$Past\ Syndicate\ Size = \frac{1}{N}\sum_{n=1}^{N} \log\left(Syndicate\ Size_{J,n}\right) \quad (2)$$

where N denotes the number of IPOs handled by the respective lead underwriter J within the five-year rolling window prior to the IPO, and $Syndicate\ Size_{J,n}$ represents the total number of book managers and co-managers in IPO n.

The number of book managers and co-managers is obtained from S&P Capital IQ.

Past Underpricing

Past underpricing reflects systematic differences in pricing outcomes across underwriters. Higher values indicate that the lead underwriter has historically generated higher IPO underpricing relative to the market which may be consistent with a stronger institutional network.

Following Hoberg (2007), the measure is defined as the abnormal average initial return generated by an underwriter over a five-year rolling window, as expressed in Equation (3):

$$UW\ Premium_{J,N} = \frac{1}{N}\sum_{n=1}^{N} IR_{J,n} - IR_n^{mkt} \tag{3}$$

where N denotes the number of IPOs handled by the lead underwriter J within the five-year rolling window prior to the IPO.

$IR_{J,n}$ is the initial return (underpricing) of IPO n underwritten by J, and IR_n^{mkt} is the market-wide average IPO initial return or underpricing in the same calendar month.

IPO Underpricing was obtained from S&P Capital IQ, as explained in chapter 4.2.1. Market-wide monthly averages were calculated based on the same IPO-level data.

Past Greenshoe Execution

In addition to Hoberg's Underwriter Premium, this study introduces a second dynamic proxy called Greenshoe Premium. As a reputation measure, GS Premium might reflect systematic differences in how frequently underwriters operate in high-demand IPO environments. Higher values indicate that the underwriter has historically exercised overallotment options more intensively.

The variable Greenshoe Premium (GS Premium) is defined as the average Greenshoe ratio over the past 5 years in Equation (4):

$$GS\ Premium_{J,N} = \frac{1}{N}\sum_{n=1}^{N} GS\ Ratio_{J,n} \tag{4}$$

where $GS\ Ratio_{J,n}$ is the greenshoe ratio of IPO n, and N is the number of IPOs the underwriter completed in the five-year period prior to each IPO

The Greenshoe ratio (GS Ratio) is the number of exercised Greenshoes divided by total shares offered without greenshoe option. The calculation is expressed in Equation (5):

$$GS\ Ratio_{J,n} = \frac{Number\ of\ exercised\ Greenshoe}{Total\ shares\ issued\ without\ greenshoe} \tag{5}$$

Greenshoe data were obtained from S&P Capital IQ. Since the Greenshoe ratio is naturally bounded by regulatory limits (15%), no winsorization is applied.

Composite Reputation Index

Individual reputation proxies capture specific aspects of underwriter reputation but may also reflect proxy-specific factors such as issuer characteristics or market conditions. To reduce reliance on single proxies, this thesis adopts an index-based approach that aggregates multiple reputation proxies into a single composite measure. Similar composite approaches are commonly used in empirical finance to combine related indicators into a single measure (e.g., Gompers et al., 2003). The objective is to introduce a reputation measure with reduced proxy specific noise and increased commonly used factors.

The baseline Composite Reputation Index (CRI) aggregates all five reputation proxies that capture different components of underwriter reputation. Since these indicators differ in scale (percentages, ranks, or monetary values), all variables are standardized prior to aggregation using z-score normalization, as defined in Equation (6):

$$\boldsymbol{z_i} = \frac{x_i - \bar{x}}{SD} \tag{6}$$

This transformation expresses each variable as deviations from its sample mean in units of standard deviation, ensuring comparability across measures. All standardized variables have a mean of zero and a standard deviation of one. The standardized variables are then equally weighted and averaged to obtain the Composite Reputation Index. A higher index value indicates a reputation above the sample average; a lower CRI indicates a below-average reputation. The higher the index value, the higher the reputation of the underwriter.

Subindices: Certification and Rewarding Index

Given that underwriter reputation may affect IPO underpricing through different components, the Composite Reputation Index is additionally decomposed into two subindices.

The Certification Index groups prestige-based proxies which are primarily related to the certification role of underwriters, reflecting market standing and perceived credibility.

The Rewarding Index groups behavior-based proxies and captures systematic differences in underwriter outcomes related to pricing and overallotment practices.

Both subindices are constructed using the same standardization and equal-weighted aggregation procedure as the baseline Composite Reputation Index, ensuring consistency across measures.

4.2.3 Missing Values

Five Year Rolling Window

All reputation proxies, with exception of Carter-Manaster rank, are constructed using a five-year rolling window prior to the IPO. Market share is calculated based on cumulative gross proceeds over the preceding five-year period, whereas the remaining proxies are computed using IPO volume averages within the same window.

IPOs with no prior activity within the five-year rolling window are excluded. In contrast, market share allows zero values when no prior activity is observed, as it is defined as the ratio of underwriter proceeds to total market proceeds. Carter-Manaster rank has 40 missing observations.

As a result, past underpricing, past greenshoe execution and past syndicate size exhibit approximately 23 % missing observations (354 exclusions), while market share exhibits 18 % missing observations (272 exclusions). Table 2 summarizes the final sample size for each proxy.

Table 2 Sample size per reputation proxy after exclusion

Final Sample Size per Reputation Proxy		
Carter-Manaster Rank	(1,553 – 40)	1,513
Market Share	(1,553 – 272)	1,281
Past Syndicate Size	(1,553 – 354)	1,199
Past Underpricing	(1,553 – 354)	1,199
Past Greenshoe execution	(1,553 – 354)	1,199

Index construction

The Composite Reputation Index has a slightly lower sample size (N=1,536) than the full IPO sample (N=1,553), reflecting missing proxy information for individual reputation proxies in a small number of cases.

The Rewarding Index (N=1,199) has a smaller sample size, as it relies on behavior-based proxies that require prior IPO activity within the five-year rolling window. In contrast, the Certification Index (N=1,536) can be computed for a larger set of IPOs, as it is based on proxies with larger sample sizes like market share or Carter-Manaster rank.

4.2.4 Control Variables

This section describes variables that are included in regressions to isolate the effect of underwriter reputation on IPO underpricing. Standard control variables commonly used in empirical IPO research are included (e.g. Carter and Manaster, 1990; Loughran and Ritter, 2004). Missing values were manually completed using IPO prospectuses.

Company Size

Company size is included as a control variable to account for heterogeneity in issuer characteristics and potential selection effects in the matching between issuers and underwriters. This variable is measured using the natural logarithm of total assets, collected via S&P Capital IQ. A natural logarithm transformation is applied to this variable to account for the positive skewness of the distribution.

Company age

Company age is included as a control variable to capture differences in valuation uncertainty across issuing firms. The Founding Dates needed to calculate this variable and the offering dates are obtained from S&P Capital IQ. Company age at the time of IPO is calculated by subtracting the founding date from the offering date. Since the age variable exhibits positive skewness, a natural logarithm is applied.

Venture Capital

Venture capital backing is included as a control variable to account for differences in firm quality, monitoring, and information availability prior to the IPO. According to the certification hypothesis (Megginson & Weiss, 1991), venture capitalists are actively involved in screening and governance, which can reduce information asymmetry and influence the pricing process. Controlling for VC backing helps separate the effect of underwriter reputation from differences associated with externally monitored firms. This variable is constructed as a binary dummy variable, taking the value of one if the firm is venture-backed and zero otherwise. The data is retrieved from Jay Ritter's Database, which provides comprehensive records on the presence of VC involvement at the time of the offering (Ritter, 2025)[2].

Offering Size

Offer size is included as a control variable to account for heterogeneity in deal specific characteristics and market visibility across IPOs. Offer size is measured using the natural logarithm of gross proceeds,

[2] Jay R. Ritter, IPO Data (including Venture Capital-backed IPOs), accessed November 2025, https://site.warrington.ufl.edu/ritter/ipo-data/. Specific files used: A list of Venture Capital-backed IPOs (including 482 Growth Capital-backed IPOs from 1975-2025.

retrieved from the S&P Capital IQ. To address the positive skewness of the distribution, a natural log transformation is applied, consistent with the treatment of company size and age.

4.3. Estimated Strategies

This section outlines the empirical strategy used to test the hypotheses developed in Chapter 3. The analysis is conducted using ordinary least squares (OLS) regressions.

4.3.1 Baseline Model

Hypothesis 1: Net Reputation Effect – Overall Relationship between Reputation and IPO Underpricing

This specification assesses whether underwriter reputation measured by the Composite Reputation Index is positively associated with IPO underpricing over the full sample period from 2000 to 2024. Certification and rewarding subindices are used in additional analysis.

The baseline regression model for Hypothesis 1 is specified in Equation (7):

$$IPO\ Underpricing_i = \alpha + \beta Reputation_i + \gamma X_i + \delta_j + \lambda_t + \varepsilon_i \quad (7)$$

where

- $IPO\ Underpricing_i$ denotes the initial return of IPO i
- $Reputation_i$ represents the underwriter reputation of the lead book manager of each IPO, measured by the Composite Reputation Index.
- X_i is a vector of firm- and deal-level control variables (explained in chapter 4.2)
- δ_j and λ_t denote industry and year fixed effects
- ε_i is the error term

The coefficient of interest is β, which captures the association between underwriter reputation and IPO underpricing. A statistically significant positive coefficient indicates that higher underwriter reputation is associated with higher underpricing, consistent with a rewarding-based interpretation of reputation.

4.3.2 Market Cycle

Hypothesis 2: Reputation Effects across Market Cycles

To examine whether the effect of underwriter reputation measured by the Composite Reputation Index varies across market cycles, an interaction model is estimated. Subsample regressions are used for additional analysis.

The corresponding interaction model is specified in Equation (8):

$$IPO\ Underpricing_i = \alpha + \beta_1 Reputation_i + \beta_2 Boom_i + \beta_3\ (Reputation_i\ x\ Boom_i) + \gamma X_i + \delta_j + \lambda_t + \varepsilon_i \quad (8)$$

where

- $Boom_i$ is a dummy variable indicating boom market conditions
- $(Reputation_i\ x\ Boom_i)$ is the interaction term measuring the additional effect of underwriter reputation during booms.
- $Reputation_i$ is measured by using the Composite Reputation Index.

The coefficient of interest is β_3, which measures whether the association of underwriter reputation with IPO underpricing differs between boom and non-boom periods. A positive and statistically significant β_3 indicates that the reputation effect is stronger during boom periods.

As a complementary approach, the sample is split into boom and non-boom subsamples, and the baseline regression is estimated separately for each regime. Subsample regressions allow the reputation-underpricing association to be examined within each market regime and indicate whether the association is present within each market cycle.

Boom periods are identified based on annual IPO volume. A year is classified as a boom if the number of IPOs exceeds the 75th percentile of the annual IPO distribution over 2000-2024 (corresponding to 80 IPOs). Under this definition, the years 2000 and 2017 – 2021 are classified as boom periods, resulting in 758 IPOs in boom years and 795 IPOs in non-boom periods (see Appendix D for annual distribution).

4.3.3 Certification vs. Rewarding

Hypothesis 3: Certification versus Rewarding effect

To examine whether different reputation-related components exhibit heterogeneous associations with IPO underpricing, joint regressions are estimated including both the Certification and Rewarding Index, which is expressed in Equation (9):

$$IPO\ Underpricing_i = \alpha + \beta_1 Certification_i + \beta_2 Rewarding_i + \gamma X_i + \delta_j + \lambda_t + \varepsilon_i \qquad (9)$$

where

- $Certification_i$ denotes the certification index of the lead book manager
- $Rewarding_i$ denotes the rewarding index of the lead book manager

The coefficient β_1 captures the association between certification index and IPO underpricing, while β_2 reflects the association between rewarding index and IPO underpricing

To formally test whether the rewarding-related reputation effect is statistically different from certification-related reputation effect, Wald tests of coefficients equality are conducted. The null hypothesis states $\beta_1 = \beta_2$. Rejection of the null hypothesis indicates that the two effects differ statistically. Given the directional hypothesis, particular attention is paid to whether $\beta_2 > \beta_1$.

4.3.4 Fixed Effects and Standard Errors

Fixed Effects

All regressions include industry and year fixed effects to absorb unobserved heterogeneity across industries and common shocks over time. Industry fixed effects are defined using two-digit SIC codes (Section 4.1.3), and year fixed effects are defined using the IPO offering year (Section 4.1.4).

Consequently, the coefficient on underwriter reputation is identified from within-industry, within-year variation in IPO underpricing.

Standard Errors

Standard errors are clustered at the underwriter level to account for potential correlation of residuals across IPOs managed by the same underwriter. Since multiple IPOs are frequently handled by the same lead underwriter, independence of observations cannot be assumed.

The full sample includes 110 underwriter clusters (78 in boom periods and 80 in non-boom periods). Because cluster sizes are uneven, a degree of freedom adjustment is applied when estimating clustered standard errors. Detailed distributional statistics are reported in Appendix E.

The distribution of IPOs across underwriters is uneven: While many underwriters appear only once or a few times in the sample, a small number of large intermediaries account for a large share of IPOs.

5. Results

This chapter presents empirical results based on the methods and data outlined in Chapter 4. The findings are reported in line with the estimation strategies developed earlier and are discussed with respect to the hypotheses of the study. Consistent with the methodological framework, the results are interpreted as conditional associations rather than causal effects.

Firstly, descriptive analysis is conducted for all variables included in the regression models. Secondly, potential multicollinearity is assessed using pairwise correlations and variance inflation factors. Thirdly, the empirical results are presented, starting with single proxy regressions followed by the composite reputation index and its subindices. Finally, the findings are discussed and linked to the underlying hypotheses.

5.1. Variable Descriptive Analysis

This section includes an analysis and interpretation of the variables used in this thesis. Table 3 presents the overall descriptive statistics of the dependent variable (IPO underpricing), the constructed indices as main independent variables and the individual reputation proxies used to build these indices.

Continuous variables and ratio measures are expressed as decimal values between zero and 1, while count variables, company age, gross proceeds and total assets are transformed using the natural logarithm. The log transformation accounts for the skewed distribution of these variables and captures diminishing marginal effects. Venture capital backing is included as a categorized variable. The reputation indices are standardized and aggregated measures, with the equal-weighted (EW) index serving as the baseline specification.

The average IPO underpricing in the sample amounts to 0.22 with a median of 0.12. The distribution exhibits substantial dispersion, as reflected by a standard deviation of 0.36, a minimum of -0.29, and a maximum of 1.96. IPO underpricing is bounded below at -1, as losses cannot exceed 100 % while it is not bounded above. Values above 1 indicate returns exceeding 100% relative to the offer price when the first-day closing price more than doubles, whereas negative values indicate offerings trading below the offer price. The difference between the mean and median indicates positive skewness, suggesting that a relatively small number of highly underpriced offerings drive the average upward. Overall, the magnitude of underpricing observed in the sample is broadly comparable to typical levels reported in the IPO literature. The presence of both negative and highly positive initial returns reflects the well-documented heterogeneity in IPO pricing outcomes. Additional descriptive evidence on the distribution of first-day returns is presented in Appendix F. Approximately 25.8% of IPOs in the sample

exhibit negative initial returns, while the majority of offerings generate positive first-day performance. Most observations fall within the 0.1 – 0.6 return range (42.2%), and a smaller fraction of IPOs (10.4%) experience particularly high initial returns above 0.6. This distribution reflects the typical positive skewness observed in IPO markets.

With respect to the individual reputation proxies, the Carter-Manaster rank has a mean of 8.18 and ranges from 2 to 9, indicating that most IPOs in the sample are led by relatively highly ranked underwriters, while still exhibiting meaningful cross-sectional variation in prestige.

Market share displays substantial dispersion, ranging from 0 to 0.36 indicating heterogeneity in underwriting activity across lead underwriters.

Table 3 presents descriptive statistics for the reputation proxies and the constructed reputation indices. Past syndicate size, past underpricing, and past greenshoe execution are each available for 1,199 observations, reflecting their dependence on historical IPO activity within their rolling window.

Past underpricing shows a relatively wide range (-0.57 to 1.66), reflecting variation in prior pricing outcomes across underwriters.

In contrast, past greenshoe execution exhibits a narrower distribution, with values between 0 and 0.15 and a mean of 0.11, indicating more stable overallotment behavior. The observed upper bound is consistent with regulatory constraints on overallotment options in firm commitment offerings (FINRA 5110 (g)(9)[3]).

Past syndicate size, measured in logarithmic form, displays moderate dispersion, suggesting variation in underwriter team size and deal complexity.

As the indices are standardized, their means are close to zero by construction. The equal-weighted composite index shows moderate dispersion (SD=0.76). The PCA-based index is reported as a robustness measure and exhibits a larger standard deviation (SD=1.27), reflecting the different weighting scheme, as PCA places stronger weight on the common variation across proxies.

Sample size differs across indices because the PCA-based indices can only be computed for IPOs with complete data on all underlying proxies within the rolling window. Observations with missing proxy inputs are therefore excluded from PCA construction, whereas the equally weighted indices can be computed when some proxy information is unavailable, resulting in larger samples.

The control variables in Table 3 highlight the heterogeneous nature of issuing firms in the sample. Company age exhibits substantial variation, with a mean log age of 2.41, indicating the presence of

[3] Financial Industry Regulatory Authority (FINRA) Rule 5110 (g) (9), part of the Corporate Finance Rule governing underwriter terms and arrangements, generally limits overallotment options in IPOs to approximately 15 % of the shares offered.

both young and old firms. Measures of gross proceeds as offering size and total assets as firm size display wide dispersion, reflecting differences across IPOs. Venture capital backing is observed in approximately 54 % of the sample, suggesting a prominent role of venture capitalists in the IPO market during the observation period.

Table 3 Descriptive Analysis of Variables

	N	Mean	Median	Min	Max	SD
IPO Underpricing	1,553	0.22	0.12	-0.29	1.96	0.36
Composite Reputation Index (EW)	1,536	-0.03	0.17	-3.53	1.42	0.76
Rewarding Index (EW)	1,199	0	0.11	-4.68	5.4	0.82
Certification Index (EW)	1,536	0	0.14	-3.53	1.38	0.88
Composite Reputation Index (PCA)	1,183	0	0.32	-6.92	1.99	1.27
Rewarding Index (PCA)	1,199	0	0.16	-6.61	7.64	1.15
Certification Index (PCA)	1,257	0	0.18	-3.79	1.9	1.26
Carter-Manaster Rank	1,513	8.18	9	2	9	1.47
Market Share	1,281	0.12	0.09	0	0.36	0.11
Past Syndicate Size (log)	1,199	1.94	2.01	0.69	2.67	0.3
Past Underpricing	1,199	0.008	0.01	-0.57	1.66	0.11
Past Greenshoe Execution	1,199	0.11	0.11	0	0.15	0.03
Company Age (log)	1,553	2.41	2.3	0	5.46	0.93
Gross Proceeds (log)	1,553	18.71	18.64	15.06	23.5	1.1
Total Assets (log)	1,553	18.72	18.63	9.62	25.64	1.98
Venture Capital Backing (dummy)	1,553	0.54	1	0	1	0.5

5.2. Multicollinearity

Multicollinearity arises when explanatory variables are strongly correlated, making it difficult to disentangle their individual associations in a regression framework. High multicollinearity can inflate standard errors and reduce the precision of coefficient estimates, even if the model is otherwise correctly specified.

Because several underwriter reputation proxies capture related aspects of prestige and rewarding, multicollinearity is assessed using pairwise correlations and variance inflation factors (VIFs).

5.2.1 Pairwise correlations

Pairwise correlations among the reputation proxies are examined. This analysis is used to assess the degree of co-movement across proxies and to evaluate whether they capture related aspects of a common underlying concept, while not being so highly correlated as to indicate redundancy. The correlation matrix provides initial diagnostics for potential multicollinearity concerns prior to index construction and regression analysis.

Appendix G reports pairwise correlations for IPO underpricing, reputation proxies, and the control variables. As expected, the prestige-based proxies (Carter-Manaster rank, market share and past syndicate size) are positively correlated with each other. In particular, Carter-Manaster rank correlates strongly with past syndicate size (ρ=0,76) and market share (ρ=0,53), while market share and past syndicate size are also moderately correlated (ρ = 0.48). These patterns are consistent with the proxies capturing overlapping prestige-related effects.

In contrast, the behavior-based proxies (past underpricing and past greenshoe execution) exhibit weaker correlations with prestige-based proxies and with each other. For example, past underpricing is only weakly related to Carter-Manaster rank (ρ = 0.13), market share (ρ = 0.08), and is essentially uncorrelated with past syndicate size (ρ = 0). Such weak unconditional correlations are not unusual given that IPO underpricing is influenced by multiple interacting issuer- and market-level factors.

Regarding controls, gross proceeds and total assets are strongly correlated (ρ = 0.73), indicating that both capture related aspects of issuer and deal scale. Gross proceeds is also moderately correlated with the prestige proxies (e.g. ρ = 0.60 with Carter-Manaster rank; ρ = 0.52 with past syndicate size), which is economically intuitive because larger offerings are more likely to be managed by more prominent underwriters. Venture-capital backing is negatively correlated with firm size measures (e.g. ρ = -0.29 with total assets) and with age (ρ = -0.27), consistent with VC-backed issuers being younger and smaller on average.

Appendix H reports pairwise correlations between the composite reputation index, it's rewarding and certification subindices, and the control variables. As expected, the composite reputation index is strongly positively correlated with the certification index (ρ = 0.91) and moderately correlated with rewarding index (ρ = 0,67), reflecting the construction of the overall reputation measure.

Correlations between the indices and IPO underpricing are relatively modest: the composite index and rewarding index both correlate ρ = 0,12 with underpricing, while the certification index correlates ρ = 0,09.

Overall, these descriptive correlations motivate formal multicollinearity assessment within the regression framework using VIFs.

5.2.2 Variance Inflation Factors (VIFs)

To complement the pairwise correlation analysis, multicollinearity is assessed using variance inflation factors (VIFs), which quantify how strongly each regressor is explained by the remaining regressors in the model. High VIF values indicate that a variable contains overlapping information with other ones, which may inflate standard errors and reduce estimation precision. As a rule of thumb, VIF values above 5 are often considered problematic.

Table 4 reports the VIFs for the specifications including the individual reputation proxies and the control variables. All VIFs are below 5, the highest value is observed for Carter-Manaster rank (VIF = 3.21).

Table 4 VIF for reputation proxies and controls

Variable	VIF
Carter-Manaster Rank	3.212848
Past Syndicate Size (log)	2.644908
Gross Proceeds (log)	2.581098
Total Assets (log)	2.410723
Market Share	1.508025
Venture Capital Backing (dummy)	1.322397
Past Greenshoe Execution	1.280784
Company Age (log)	1.174651
Past Underpricing (%)	1.151076

Tables 5 and 6 report VIFs for the baseline specifications using the composite reputation index and the two subindices. VIFs remain well below 5 across all specifications, indicating that multicollinearity is not a concern in regression design.

Table 5 VIF with composite reputation index and controls

Variable	VIF
Composite Reputation Index (EW)	1.477213084
Company Age (log)	1.169573693
Gross Proceeds (log)	2.543408422
Total Assets (log)	2.485751782
Venture Capital Backing (dummy)	1.222406747

Table 6 VIF with rewarding and certification subindex

Variable	VIF
Gross Proceeds (log)	2.571494981
Total Assets (log)	2.341992767
Certification Index (EW)	1.640236468
Venture Capital Backing (dummy)	1.285740918
Company Age (log)	1.167692608
Rewarding Index (EW)	1.066457767

To sum up, although some moderate pairwise correlations are observed among some reputation proxies and size related controls, the VIF results consistently indicate that multicollinearity does not pose a concern in any specification. Accordingly, the analysis proceeds with the multivariate regression results.

5.3. Regressions

This section presents empirical regression results examining the relationship between underwriter reputation and IPO underpricing. The analysis proceeds in three steps. First, single proxy regressions are estimated to illustrate the limitations of relying on individual reputation measures. Second, the composite reputation index is introduced as the baseline specification. Finally, the analysis is extended by separating the index into rewarding and certification subindices.

Importantly, all specifications include firm- and deal-level controls, as well as industry and year fixed effects, with standard errors clustered at the underwriter level.

5.3.1 Individual Reputation Proxy Regressions

These individual proxy regressions serve as diagnostics of how individual reputation measures behave when considered in isolation. This step ensures to assess whether single proxies show stable and consistent results or whether their relationship with underpricing is noisy. The findings from these regressions motivate the focus on an aggregated index in the main empirical analysis.

Table 7 reports OLS regressions examining the association between individual underwriter reputation proxies and IPO underpricing over the full sample period from 2000 to 2024.

These single proxy regressions serve as a preliminary step prior to the construction of composite reputation indices, allowing each proxy to be evaluated individually in terms of direction, statistical significance, and stability across specifications.

Table 7 OLS Regressions of each Reputation Proxy on IPO Underpricing

	Dependent Variable: IPO Underpricing				
	(1)	(2)	(3)	(4)	(5)
	Carter-Manaster Rank	Market Share	Past Syndicate Size (log)	Past Underpricing	Past Greenshoe Execution
Carter-Manaster Rank	-0.008				
	(0.011)				
Market Share		-0.047			
		(0.1032)			
Past Syndicate Size (log)			-0.095**		
			(0.048)		
Past Underpricing				0.451***	
				(0.164)	
Past Greenshoe Execution					0.001
					(0.004)
Company Age (log)	-0.018	-0.020	-0.017	-0.016	-0.015
	(0.012)	(0.011)	(0.011)	(0.011)	(0.011)
Gross Proceeds (log)	0.093***	0.072***	0.086***	0.069***	0.073***
	(0.013)	(0.014)	(0.014)	(0.012)	(0.012)
Total Assets (log)	-0.035***	-0.029***	-0.025***	-0.029***	-0.027***
	(0.005)	(0.007)	(0.007)	(0.006)	(0.007)
Venture Capital Backing	0.087***	0.073***	0.097***	0.076***	0.087***
	(0.020)	(0.022)	(0.022)	(0.021)	(0.020)
Intercept	-0.681	-0.746	-0.956	-0.723	-0.850
	(0.279)	(0.242)	(0.248)	(0.204)	(0.230)
Year Fixed Effects	YES	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES	YES
Clustered SE	Underwriter	Underwriter	Underwriter	Underwriter	Underwriter
Observations	1513	1281	1199	1199	1199
*R*2	0.224	0.183	0.202	0.217	0.198
Adjusted R^2	0.175	0.125	0.142	0.158	0.137

Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Compared to the pairwise correlation analysis, the regression results reveal differences in both coefficient magnitude and direction once issuer characteristics, deal-level controls and fixed effects are taken into account.

In general, the individual reputation proxies do not provide consistent associations with IPO Underpricing, neither in terms of coefficient signs nor in significance.
Past Underpricing exhibits a positive and statistically significant coefficient (0.451). This result is consistent with rewarding-related effects, whereby underwriters with a history of higher underpricing leave more money on the table. However, this proxy may also capture persistence in pricing behavior or deal-specific strategies rather than pure reputation.
In addition, past syndicate size shows a statistically significant negative association with IPO underpricing (-0.095). This result is consistent with a certification-related interpretation, in which larger syndicates reduce ex ante uncertainty.
The remaining reputation proxies are statistically insignificant, but their coefficient signs remain economically intuitive. The coefficients of traditional prestige-based reputation proxies (Carter-Manaster rank, market share and past syndicate size) are negative, consistent with a certification role of reputable underwriters that reduces ex ante uncertainty. In contrast, behavior-based proxies (past underpricing and past greenshoe execution) display positive coefficient signs, consistent with a rewarding behavior.

Overall, the mixed and partly unstable results suggest that individual reputation proxies are noisy. As discussed in Chapters 6.1 and 7.4, each proxy suffers from specific limitations when used in isolation These findings motivate the construction of composite indices that combine these variables to reduce proxy-specific measurement error and better capture the underlying reputation component.

Since the regression results of each individual reputation proxy on IPO underpricing do not show consistency, the following analysis moves from single measures toward composite reputation indices. By aggregating information across these variables, these indices aim to reduce proxy-specific noise and provide a more comprehensive measure of underwriter reputation. The next section therefore examines relationships between the composite reputation index and IPO underpricing as the baseline regression framework and categorized reputation indices as robustness.

5.3.2 Reputation Index Regressions (Equally Weighted)

Table 8 reports the baseline regressions examining the association between underwriter reputation and IPO underpricing using the equally weighted (EW) indices. The Composite Index aggregates all reputation proxies and serves as the main specification, while the Certification and Rewarding Indices are included as additional specifications. The Certification Index captures prestige-based proxies, whereas the Rewarding Index reflects behavior-based proxies.

Table 8 OLS Regressions of Equally Weighted Reputation Indices on IPO Underpricing

	Dependent Variable: IPO Underpricing		
	(1) Composite	(2) Certification	(3) Rewarding
Composite Index (EW)	0.011		
	(0.016)		
Certification Index (EW)		-0.020	
		(0.017)	
Rewarding Index (EW)			0.037**
			(0.017)
Company Age (log)	-0.018	-0.019	-0.015
	(0.012)	(0.012)	(0.011)
Gross Proceeds (log)	0.082***	0.096***	0.069***
	(0.013)	(0.014)	(0.012)
Total Assets (log)	-0.036***	-0.034***	-0.028***
	(0.005)	(0.005)	(0.006)
Venture Capital Backing	0.076***	0.086***	0.080***
	(0.021)	(0.021)	(0.020)
Intercept	-0.499*	-0.787***	-0.737***
	(0.280)	(0.305)	(0.213)
Year Fixed Effects	YES	YES	YES
Industry Fixed Effects	YES	YES	YES
Clustered SE	Underwriter	Underwriter	Underwriter
Observations	1536	1536	1199
$R2$	0.224	0.224	0.206
Adjusted R^2	0.175	0.176	0.146

Standard errors in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

The equally weighted Composite Reputation Index shows no statistically significant association with IPO underpricing indicating a slightly positive coefficient (0.011). When considered separately, the Rewarding Index is positive and statistically significant at the 5% level (0.037), whereas the Certification Index is insignificant and has negative coefficient (-0.020). Economically, an increase of one standard deviation in the Rewarding Index is associated with an increase of approximately 3.7 percentage points in IPO underpricing, suggesting a meaningful rewarding related association.

Overall, the insignificant composite estimate suggests that certification- and rewarding-related mechanisms may partially offset each other when aggregated. Thus, the baseline result shows no evidence of a positive association between the Composite Reputation Index and IPO underpricing. When considered separately, only the rewarding index as reputation measure remains statistically significant, while the certification index shows the expected negative sign but lacks significance. The results of additional specifications should be interpreted as complementary analysis.

.

Table 9 presents the interaction models examining whether the association between underwriter reputation and IPO underpricing varies across market cycles. Building on Table 8, this analysis tests whether the relationship differs between boom and non-boom periods. The equally weighted Composite Reputation Index serves as main explanatory variable, while the Rewarding and Certification Indices are included as additional specifications.

Table 9 Interaction Terms: Reputation Index x Boom

Dependent Variable: IPO Underpricing			
	(1)	(2)	(3)
	Composite × Boom	Certification × Boom	Rewarding × Boom
Composite Index (EW)	0.016		
	(0.017)		
Composite Index (EW) × Boom	-0.011		
	(0.029)		
Certification Index (EW)		-0.012	
		(0.018)	
Certification Index (EW) × Boom		-0.015	
		(0.019)	
Rewarding Index (EW)			0.031
			(0.028)
Rewarding Index (EW) × Boom			0.014
			(0.033)
Boom Dummy	0.303***	0.300***	0.022
	(0.086)	(0.086)	(0.020)
Company Age (log)	-0.018	-0.018	-0.016
	(0.012)	(0.012)	(0.011)
Gross Proceeds (log)	0.082***	0.096***	0.068***
	(0.013)	(0.014)	(0.012)
Total Assets (log)	-0.036***	-0.035***	-0.028***
	(0.005)	(0.005)	(0.006)
Venture Capital Backing	0.077***	0.087***	0.080***
	(0.020)	(0.021)	(0.020)
Intercept	-0.810***	-1.091***	-0.7407***
	(0.233)	(0.258)	(0.2094)
Year Fixed Effects	YES	YES	YES
Industry Fixed Effects	YES	YES	YES
Clustered SE	Underwriter	Underwriter	Underwriter
Observations	1536	1536	1199
*R*2	0.224	0.225	0.206
Adjusted R^2	0.175	0.176	0.145

Standard errors in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Across all specifications, the interaction terms remain statistically insignificant, indicating that the association between underwriter reputation and IPO underpricing does not differ meaningfully between boom and non-boom periods. The Composite Reputation Index serves as main model, while the certification and rewarding indices are included as additional specifications. The interaction coefficients are small and statistically insignificant across models, suggesting no differential association during boom markets.

The boom dummy is positive and statistically significant in the composite and certification specifications (0.303 and 0.300), but smaller and statistically insignificant in the rewarding specification (0.022). This comparison should be interpreted with caution because the rewarding specification is estimated on a smaller subsample (N=1,199 vs. 1,536) due to data availability for the rewarding proxies. Hence, differences in the boom coefficient may reflect changes in sample composition and statistical power rather than a genuine change in boom effects.

Overall, while IPO underpricing appears higher during boom periods on average, there is no statistical evidence that reputation-related associations become stronger during boom periods.

Table 10 reports subsample regressions examining the association between underwriter reputation and IPO underpricing separately for boom and non-boom periods. The Composite Reputation Index serves as the main aggregated measure of reputation, while the Certification and Rewarding Indices are included as additional specifications to illustrate the individual reputation components within each market state. Unlike the interaction models in Table 9, which formally test whether the association differs across market cycles, the subsample regressions provide a descriptive comparison by estimating the relationship separately within boom and non-boom environments. These results are presented as complementary analysis and should therefore be interpreted cautiously, as they do not constitute a formal test of a stronger or weaker effect across market cycles rather illustrate whether reputation-related associations are present within each subsample.

Table 10 Subsample Regressions

Dependent variable: IPO Underpricing						
	Composite Index (EW)		Certification Index (EW)		Rewarding Index (EW)	
	Boom	Non-Boom	Boom	Non-Boom	Boom	Non-Boom
Composite Index (EW)	-0.009	0.031				
	(0.031)	(0.017)				
Certification Index (EW)			-0.046*	0.005		
			(0.025)	(0.018)		
Rewarding Index (EW)					0.045***	0.036
					(0.015)	(0.030)
Company Age (log)	-0.033	-0.008	-0.033	-0.009	-0.016	-0.011
	(0.027)	(0.007)	(0.028)	(0.007)	(0.019)	(0.008)
Gross Proceeds (log)	0.116***	0.044***	0.137***	0.053***	0.087***	0.054***
	(0.023)	(0.016)	(0.026)	(0.016)	(0.019)	(0.014)
Total Assets (log)	-0.052***	-0.020**	-0.051***	-0.018**	-0.034**	-0.025***
	(0.014)	(0.008)	(0.013)	(0.008)	(0.014)	(0.008)
Venture Capital Backing	0.097***	0.057***	0.108***	0.064***	0.089***	0.063***
	(0.035)	(0.020)	(0.035)	(0.021)	(0.034)	(0.023)
Intercept	-0.677*	-0.450**	-1.079**	-0.652***	-0.635**	-0.555**
	(0.400)	(0.219)	(0.248)	(0.233)	(0.259)	(0.233)
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES	YES	YES
Clustered SE	Underwriter	Underwriter	Underwriter	Underwriter	Underwriter	Underwriter
Observations	748	788	748	788	602	597
*R*2	0.218	0.182	0.222	0.177	0.213	0.206
Adjusted R^2	0.157	0.087	0.161	0.081	0.138	0.091

Standard errors in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

Across both subsamples, the Composite Reputation Index remains statistically insignificant, with coefficients close to zero (Boom: -0.009; Non-Boom: 0.031), indicating no robust aggregated association with IPO underpricing in either market phase. The Certification Index shows a weakly negative and marginally significant at the 10 % level during boom periods (coefficient: -0.046), while remaining close to zero and insignificant during non-boom periods (coefficient: 0.005).
In contrast, the Rewarding Index displays a positive and statistically significant coefficient at the 1 % level within the boom subsample (coefficient: 0.045), while remaining positive but statistically insignificant during non-boom periods (coefficient: 0.036).
Given the absence of significant interaction terms in Table 9, differences in statistical significance across subsamples should be interpreted cautiously and not as evidence of a stronger association during boom periods.

Overall, the subsample results show that the aggregated composite reputation measure remains insignificant across market states, while the rewarding effect shows a positive association with IPO underpricing during boom periods. These findings should be interpreted as complementary to interaction analyses, reflecting how underwriter reputation measures behave within each market environment rather than providing evidence that the association differs between boom and non-boom periods.

Table 11 presents joint regression models and Wald tests that include the Certification Index and the Rewarding Index simultaneously. Estimating both indices within the same specification allows the association of each reputation component with IPO underpricing to be evaluated while controlling for the other. To assess whether the estimated coefficients differ significantly, two-sided Wald tests are conducted. The Wald test evaluates whether the two coefficients are statistically distinguishable from each other within the joint regression framework. In contrast to earlier specifications, the Composite Reputation Index is not included in these models. Instead, the Certification Index and Rewarding Index serve as the primary explanatory variables, allowing a direct comparison of the two reputation components.

The full-sample specification represents the main analysis, while additional estimations for boom and non-boom periods are reported to provide descriptive context following earlier subsample analyses.

Table 11 Joint Regressions and Wald Test with Rewarding Index and Certification Index

Dependent variable: IPO Underpricing			
	(1)	(2)	(3)
	Full	Boom	Non-Boom
Certification Index (EW)	-0.031*	-0.050**	-0.017
	(0.018)	(0.022)	(0.031)
Rewarding Index (EW)	0.040**	0.046***	0.038
	(0.017)	(0.016)	(0.032)
Company Age (log)	-0.016	-0.018	-0.012
	(0.011)	(0.019)	(0.008)
Gross Proceeds (log)	0.082***	0.111***	0.060***
	(0.015)	(0.026)	(0.014)
Total Assets (log)	-0.027***	-0.033**	-0.023***
	(0.007)	(0.014)	(0.008)
Venture Capital Backing	0.091***	0.106***	0.069***
	(0.021)	(0.035)	(0.025)
	-1.001***	-1.032**	0.687***
Intercept	(0.289)	(0.411)	(0.242)
Year Fixed Effects	YES	YES	YES
Industry Fixed Effects	YES	YES	YES
Clustered SE	Underwriter	Underwriter	Underwriter
Observations	1199	602	597
*R*2	0.209	0.220	0.207
Adjusted R^2	0.148	0.144	0.091
Wald χ^2: H0 Rewarding = Certification	6.29**	14.78***	0.89
p-value	(0.012)	(0.0001)	(0.344)

Standard errors in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Across specifications, the Certification Index shows a negative coefficient that is weakly significant at 10% level in the full period (-0.031) and statistically significant at the 5 % level during boom periods (-0.050), while remaining insignificant during non-boom periods. In contrast, the Rewarding Index displays positive coefficients that are statistically significant at 5 % level in the full sample (0.040) and at 1% level during boom periods (0.046), but statistically insignificant during non-boom periods. Estimating both indices jointly reveals both associations more clearly, suggesting that certification and rewarding effects are associated with IPO underpricing in opposite directions.

To formally compare both reputation effects, two-sided Wald tests are conducted. The Wald test examines whether the certification and rewarding coefficients are statistically equal. The results reject equality in the full sample (χ^2= 6.29 and p=0.012) and particularly during boom periods (χ^2= 14.78 and p<0.001), while no difference is detected in non-boom markets. This finding indicates that the rewarding coefficient is more positive than the certification coefficient.

Overall, the joint regressions suggest that underwriter reputation reflects two co-existing reputation effects that are associated with IPO underpricing in different directions. When estimated together, both associations become visible with the rewarding component showing the more positive coefficient, especially during boom periods. These findings complement the earlier analyses and provide a comparison of both reputation measures within one regression framework.

5.4. Discussion

This thesis examines the conditional association between underwriter reputation and IPO underpricing. By constructing an aggregated reputation measure and separating it into a certification component (prestige-based) and a rewarding component (behavior-based), the analysis helps reconcile mixed findings in prior work that relies on single reputation proxies.

Hypotheses are evaluated using the following decision rule: a hypothesis is considered supported if the coefficient of interest is statistically significant and has the expected sign; otherwise, it is classified as not supported.

Evidence from individual proxies. The single-proxy regressions show that results depend strongly on the chosen proxy. Most prestige-based and behavior-based and behavior-based proxies are not statistically significant once controls and fixed effects are included. Past Syndicate size is negatively associated with underpricing, while past underpricing is positively associated with underpricing. Overall, the absence of a consistent pattern across individual proxies highlights the measurement limitation of using any single proxy as a stand-alone representation of underwriter reputation and motives the use of aggregated indices.

To reduce proxy-specific noise and align measurement with theoretical mechanisms, prestige-based proxies are aggregated into a Certification Index, behavior-based proxies into a Rewarding Index and both are combined into an equally weighted Composite Reputation Index.

Hypothesis 1 (net reputation effect). Hypothesis 1 predicts a positive association between the Composite Reputation Index and IPO underpricing, reflecting a rewarding mechanism that dominates certification in the aggregate. The composite index is not statistically significant, indicating no evidence of a net association in aggregated form. Estimating the subindices separately reveals a positive and statistically significant rewarding association and a negative but weaker certification association. Taken together, these patterns are consistent with the two mechanisms operating in opposite direction and partially offsetting each other in the composite measure. Since the Composite Reputation Index is not significantly positive, Hypothesis 1 is not supported.

Hypothesis 2 (market-cycle differences). Hypothesis 2 predicts that the positive reputation-underpricing association is stronger in boom periods. Interaction models do not provide statistical evidence that the association between reputation and underpricing differs between boom and non-boom periods, either for the composite index or for the subindices. Subsample regressions suggest that the rewarding association is more precisely estimated during booms, while certification remains weaker and less precisely estimated across subsamples. However, because the interaction terms are

not statistically significant, the evidence does not support the claim that the reputation effect is systematically stronger in booms. As a result, Hypothesis 2 is not supported.

Hypothesis 3 (rewarding vs. certification). Hypothesis 3 predicts that the rewarding component is stronger than the certification component in current markets. In joint regressions including both subindices, the rewarding coefficient is positive and the certification coefficient is negative, and both become statistically relevant in the full sample and especially in booms. Wald tests reject equality of the two coefficients in the full sample and in boom periods, indicating that the rewarding association is statistically more positive than the certification association. This supports Hypothesis 3.

Overall, the results are consistent with a two-component view of underwriter reputation. In aggregate, certification and rewarding can offset each other, yielding no detectable net association for the composite index. When decomposed, the rewarding component shows the more pronounced positive association with IPO underpricing, while certification is weaker and negative. Future research could examine how these components interact over time and whether investor-demand and allocation-related measures help explain when rewarding versus certification is most relevant.

6. Robustness

Robustness checks are conducted to examine whether the main findings of thesis depend on the specific measurement of underwriter reputation. In this section, first, endogeneity concerns are discussed. Second, different methods of index creation are tested to evaluate whether the empirical results remain stable across different operationalizations of reputation.

6.1. Endogeneity Concerns

This section discusses potential endogeneity concerns in the empirical analysis and outlines the measures taken to mitigate them. The main sources of endogeneity in this thesis arise from non-random matching between issuers and underwriters as well as from measurement error of the reputation proxy. While these issues cannot be fully eliminated, several steps are taken to reduce their impact. Accordingly, the results are interpreted as conditional associations rather than strict causal effects.

Non-Random Matching

A key endogeneity concern is that matching between underwriters and issuers is not random: Reputable underwriters may choose higher-quality issuers, implying that part of the observed underpricing could reflect issuer quality rather than reputation. The observed relationship between underwriter reputation and IPO underpricing might be biased by unobserved company characteristics leading to omitted variable bias. To mitigate this concern, regressions include firm-level and deal-level controls (age, size, VC backing) as well as industry and year fixed effects, as described in Chapter 4.3.
These controls and fixed effects mitigate omitted-variable bias from unobserved time/industry factors, but do not fully solve selection into underwriter. Valid instruments are difficult because underwriter choice is jointly determined with deal characteristics and expected demand

Measurement error in reputation proxies

A second concern relates to measurement error in underwriter reputation. Reputation is an inherently latent construct and cannot be directly observed. Individual reputation proxies therefore capture not only the intended reputation component but also proxy-specific noise arising from issuer characteristics, deal size and prevailing market conditions. When analyzed in isolation, such proxies may provide noisy and potentially biased signals of underwriter reputation.
To mitigate this issue, this thesis constructs a reputation index that aggregates multiple reputation proxies. By combining different measures, idiosyncratic proxy-specific noise is reduced, while the

common reputation component shared across proxies is strengthened. This aggregation improves measurement precision compared to relying on single reputation proxies.
In addition, all reputation proxies are based on a five-year rolling window of underwriter activity prior to each IPO. This ensures that the reputation measure reflects recent and observable underwriting history available at the time of the offering and avoids look-ahead bias.

In summary, two main sources of endogeneity are considered: non-random matching between issuers and underwriters, and measurement error in reputation proxies. These concerns are partially addressed through the inclusion of control variables, fixed effects and aggregated reputation measures based on rolling historical windows.
Further robustness checks, including alternative index constructions and alternative standard error specifications are conducted to assess the stability of the results.
While these steps enhance the reliability of the empirical analysis, the results are interpreted as conditional associations rather than causal relationships between underwriter reputation and IPO underpricing.

6.2. Categorized Reputation Index

While the baseline analysis relies on standardized continuous reputation indices, this section introduces an alternative categorized reputation measure that focuses on extreme levels of reputation. Following Gompers et al. (2003), a categorized additive index is created. The purpose of this approach is to assess whether the relationship between underwriter reputation and IPO underpricing is primarily driven by highly reputable or low-reputation underwriters rather than by marginal differences across the entire reputation distribution. This categorized reputation index is used exclusively as a robustness check.

Categorization of individual Proxies

Instead of using standardized continuous measures, each reputation proxy is transformed into a trichotomous variable. Specifically, observations in the upper tail of the proxy distribution are assigned a value of +1, observations in the lower tail are assigned a value of -1, and observations in the middle of the distribution receive a value of 0. Let $q_L(p)$ and $q_H(p)$ denote the lower and upper percentile cutoffs of proxy p. Percentile thresholds are computed from the pooled distribution of each proxy across the full sample to apply a constant reputation scale over 2000-2024, consistent with the idea that reputation evolves over long horizons. This choice trades off time-invariant comparability against the possibility that proxy distributions shift over time. The reputation index is constructed additively by summing the resulting trichotomous scores across all proxies.

Formally, for IPO i:

- -1 if $p_i \leq q_L(p)$
- 0 if $q_L(p) < p_i < q_H(p)$
- +1 if $p_i \geq q_H(p)$

where $q_H(p)$ and $q_L(p)$ denote the lower and upper percentile thresholds of proxy p_i.

The following two threshold definitions are used:

1. **Broad classification: q_L= 25 % and q_H= 75 %**

   This specification preserves substantial within-sample variation and is intended to capture reputation effects that may already operate at moderate reputation levels rather than only at extreme tails.

2. **Extreme-tail classification: q_L= 5 % and q_H=95 %**

   The second specification applies more restrictive percentile thresholds that isolate only the most extreme realizations of the underlying reputation proxies. This stricter definition is motivated by the highly skewed distribution of IPO activity across IPO underwriters in the sample (see Chapter 4.3.4 and Appendix E). By focusing on the extremes of the distribution, this specification tests whether the baseline results are driven primarily by these extreme reputation segments.

Both threshold definitions are reported to evaluate the sensitivity of results to alternative operationalizations of "high" and "low" reputation. Given the skewness of the underwriter distribution, different cutoff definitions may lead to different patterns across specifications.
Appendix I reports the numerical threshold values for both classification approaches. An indicative pattern is that the stricter specification generates larger separation between high and low-reputation observations, consistent with a more extreme definition of underwriter reputation.

Construction of composite categorized index

Summing the five trichotomous proxy scores yields a Composite Reputation Index. Higher values indicate that the underwriter is classified in the upper tail for a greater number of proxies. This equal-weight aggregation emphasizes tail membership rather than marginal variation in proxy magnitudes.
The 25th/75th cutoffs retain statistical power and capture moderately high vs low reputation. In contrast, the 5th/95th cutoffs focus on extreme realizations of the proxies. Given the concentration of underwriting activity, these extreme groups are disproportionately populated by offerings led by the most reputable underwriters, making this specification well-suited to detect tier-specific effects

In addition to the composite categorized index, separate categorized subindices for certification and rewarding are constructed using the same trichotomous coding procedure and percentile thresholds. The Certification Index aggregates Carter-Manaster rank, market share, and past syndicate size, whereas the Rewarding Index combines past underpricing and past greenshoe execution. Apart from the different number of underlying proxies, the construction follows identical methodological steps, ensuring comparability across specifications.

Appendix J presents descriptive statistics for the categorized Composite Reputation Index constructed under two alternative threshold definitions: the baseline 0.75/0.25 quartile specification (Composite Reputation Index (CAT, 0.75)) and a stricter extreme-tail definition based on the 0.95/0.05 thresholds (Composite Reputation Index (CAT, 0.95)). Because the separation into subindices represents a central element of this thesis, the categorized Certification and Rewarding indices are reported for both threshold specifications as well.

A notable finding is that the categorized Composite Reputation Index does not reach its theoretical maximum value of -5 and 5, indicating that no underwriter is simultaneously classified as highly reputable across all proxies. This pattern holds across both threshold definitions. One possible explanation is that the Rewarding and Certification components partially offset each other when aggregated into a single index, which is consistent with the earlier evidence obtained from the standardized specification.

In contrast to the standardized index, the categorized specification retains the full sample of 1,553 IPOs. In the categorized construction, missing proxy values are conservatively coded as −1. This choice treats missing history-based measures as indicative of limited prior underwriting activity within the rolling window and therefore avoids dropping observations. Results should be interpreted with this conservative coding in mind.

Overall, the stricter extreme-tail classification exhibits lower maximum values and a narrower distribution, while the broader quartile-based classification produces higher index levels and greater dispersion, although the theoretical maximum remains unattained.

The categorized reputation indices are estimated within the same baseline OLS framework used for the standardized index. Specifically, the continuous reputation measure is replaced by the categorized index while maintaining identical control variables, offering year fixed effects, industry fixed effects, and underwriter-clustered standard errors. The analysis mirrors the structure of Chapter 5 by estimating both the composite categorized index and specifications that include the categorized Certification and Rewarding subindices jointly. A one-unit increase in the categorized index corresponds to a one-step shift in tail classification across the underlying proxies (e.g., one proxy moving from 0 to

+1 or from −1 to 0), holding other components constant. A move from the lower tail (−1) to the upper tail (+1) for a single proxy increases the index by two units.

Regression Results

The following tables present OLS regression results based on the categorized reputation indices. Results are shown for both simple regressions using individual indices and joint specifications that include the Rewarding and Certification components simultaneously. Table 12 and 13 report results based on stricter 0.95/05 thresholds, while Tables 14 and 15 present results using broader 0.75/0.25 thresholds. A key pattern emerges across the alternative threshold specifications. When broader thresholds are applied, the Certification Index exhibits a statistically significant negative association with IPO underpricing, whereas the Rewarding Index remains insignificant. In contrast, under stricter extreme-tail classifications, the Rewarding Index becomes statistically significant while the certification effect weakens. The Composite Reputation Index remains insignificant across all categorized specifications, consistent with the findings obtained using the standardized Index.

The results suggest that the empirical relevance of different reputation-related mechanisms depends on how reputation is operationalized. These patterns are consistent with a tiered interpretation: broader cutoffs may pool moderately reputable underwriters with the most reputable, potentially attenuating effects that are concentrated at the top. Under stricter cutoffs, the rewarding component becomes more salient, which is consistent with the view that allocation-based rewarding mechanisms operate more strongly among the most reputable underwriters.

Within the categorized specifications, the results indicate that rewarding-related effects are more concentrated in the extreme upper tail of reputation, whereas certification-related effects appear more broadly present across the upper segment of the reputation distribution. One possible interpretation is that rewarding mechanisms are partially driven by a small group of highly reputable underwriters, while certification effects reflect a wider set of market participants. As a result, studies that effectively compare the extreme upper tail of underwriters may be more likely to detect rewarding-type patterns, whereas designs that group a broader set of reputable underwriters may find stronger certification effects. The persistent insignificance of the composite index is consistent with partial offsetting between certification and rewarding components, suggesting that both mechanisms can coexist in the contemporary IPO market. Under stricter classification thresholds, the regressions align more closely with the rewarding effect observed in the standardized specification, whereas broader classifications reveal a relatively stronger certification effect.

Table 12 OLS Regressions with Categorized Indices (0.95/0.05 Threshold)

Dependent variable: IPO Underpricing			
	(1) Composite	(2) Certification	(3) Rewarding
Composite Index (CAT, 0.95)	0.006		
	(0.012)		
Certification Index (CAT, 0.95)		-0.007	
		(0.015)	
Rewarding Index (CAT, 0.95)			0.038**
			(0.015)
Company Age (log)	-0.015	-0.016	-0.015
	(0.012)	(0.012)	(0.012)
Gross Proceeds (log)	0.083***	0.089***	0.085***
	(0.012)	(0.013)	(0.011)
Total Assets (log)	-0.036***	-0.035***	-0.036***
	(0.005)	(0.005)	(0.005)
Venture Capital Backing	0.075***	0.081***	0.076***
	(0.021)	(0.020)	(0.020)
Constant	-0.551**	-0.682**	-0.590**
	(0.261)	(0.286)	(0.261)
Year Fixed Effects	YES	YES	YES
Industry Fixed Effects	YES	YES	YES
Clustered SE	Underwriter	Underwriter	Underwriter
Observations	1553	1553	1553
*R*2	0.218	0.218	0.220
Adjusted R^2	0.170	0.170	0.172
Residual Std. Error	0.331	0.331	0.330

Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Table 13 Joint Regressions with Categorized Indices and 0.95/0.05 threshold

Dependent variable: IPO Underpricing			
	(1) Full	(2) Boom	(3) Non-Boom
Rewarding Index (CAT, 0.95)	0.039***	0.084***	0.012
	(0.0150)	(0.0220)	(0.0182)
Certification Index (CAT, 0.95)	-0.008	-0.023	0.009
	(0.0148)	(0.0235)	(0.0119)
Company Age (log)	-0.016	-0.030	-0.008
	(0.0121)	(0.0285)	(0.0069)
Gross Proceeds (log)	0.089***	0.128***	0.049***
	(0.0129)	(0.0250)	(0.0162)
Total Assets (log)	-0.035***	-0.054***	-0.018**
	(0.0053)	(0.0132)	(0.0077)
Venture Capital Backing	0.080***	0.095***	0.061***
	(0.0203)	(0.0347)	(0.0202)
Intercept	-0.667**	-0.863*	-0.597***
	(0.2849)	(0.4472)	(0.2199)
Year Fixed Effects	YES	YES	YES
Industry Fixed Effects	YES	YES	YES
Clustered SE	Underwriter	Underwriter	Underwriter
Observations	1553	758	795
R2	0.220	0.217	0.176
Adj. R^2	0.172	0.155	0.080

Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Table 14 OLS Regressions with Categorized Indices and 0.75/0.25 threshold

Dependent Variable: IPO Underpricing			
	(1) Composite Index	(2) Certification Index	(3) Rewarding Index
Rewarding Index (CAT,0.75)			0.012
			(0.008)
Certification Index (CAT,0.75)		-0.012*	
		(0.007)	
Composite Index (CAT,0.75)	-0.005		
	(0.007)		
Company Age (log)	-0.016	-0.017	-0.016
	(0.012)	(0.012)	(0.012)
Gross Proceeds (log)	0.090***	0.096***	0.085***
	(0.013)	(0.013)	(0.011)
Total Assets (log)	-0.035***	-0.034***	-0.035***
	(0.006)	(0.006)	(0.005)
Venture Capital Backing	0.081***	0.084***	0.077***
	(0.021)	(0.021)	(0.020)
Intercept	-0.702**	-0.827***	-0.592**
	(0.294)	(0.285)	(0.256)
Year Fixed Effects	YES	YES	YES
Industry Fixed Effects	YES	YES	YES
Clustered SE	Underwriter	Underwriter	Underwriter
Observations	1553	1553	1553
$R2$	0.218	0.220	0.219
Adjusted R^2	0.170	0.172	0.171

Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Table 15 Joint Regression with Categorized Indices and 0.75/0.25 threshold

Dependent variable: IPO Underpricing			
	(1) Full	(2) Boom	(3) Non-Boom
Rewarding Index (CAT, 0.75)	0.011	0.017	0.002
	(0.0089)	(0.0140)	(0.0075)
Certification Index (CAT, 0.75)	-0.012*	-0.024***	-0.000
	(0.0065)	(0.0088)	(0.0077)
Company Age (log)	-0.017	-0.029	-0.009
	(0.0123)	(0.0295)	(0.0068)
Gross Proceeds (log)	0.095***	0.137***	0.053***
	(0.0128)	(0.0234)	(0.0154)
Total Assets (log)	-0.034***	-0.052***	-0.017**
	(0.0056)	(0.0131)	(0.0083)
Venture Capital Backing	0.083***	0.100***	0.066***
	(0.0208)	(0.0364)	(0.0201)
Intercept	-0.801***	-1.074**	-0.685***
	(0.2865)	(0.4224)	(0.2422)
Year Fixed Effects	YES	YES	YES
Industry Fixed Effects	YES	YES	YES
Clustered SE	Underwriter	Underwriter	Underwriter
Observations	1553	758	795
R2	0.221	0.218	0.175
Adj. R^2	0.173	0.157	0.079

Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

6.3. Principal Component Analysis

This chapter examines whether the empirical results are sensitive to the weighting scheme used in the construction of the reputation indices. A PCA-based index constructs a composite measure by extracting the linear combination of proxy variables that explains the largest share of common variation across observations, rather than assigning equal weights. Importantly, PCA is purely data-driven and does not impose any economic structure on the weights. Consequently, the extracted component captures the dominant pattern in the data, which does not necessarily correspond to a single economic mechanism.

The PCA-based indices are used as robustness checks to verify that the main findings are not driven by equal-weighting assumption. Appendix K reports the explained variance ratios and PCA loadings for each reputation index specification. Tables 16 and 17 in this chapter present the corresponding regression results using PCA-based measures of reputation.

PCA of Composite Reputation Index

For the Composite Reputation Index, the principal component analysis explains approximately 45% of the total variance across the included reputation proxies. This moderate explained variance ratio indicates that the proxies do not align along with a single empirical pattern, suggesting that more underlying mechanisms contribute to the observed variation. The loading pattern shows that prestige-based proxies receive the largest weights, particularly past syndicate size (0.57), Carter–Manaster rank (0.51), and market share (0.50), whereas behavior-based rewarding proxies contribute less strongly, with past greenshoe usage (0.35) and past underpricing (0.19). This distribution implies that the PCA index is primarily driven by certification-related aspects of underwriter reputation.

Given the loading pattern, the PCA composite index is tilted toward certification-related proxies. The insignificant coefficient suggests that, even with data-driven weighting, an aggregated measure does not yield a dominant association with underpricing.

While the equally weighted index yields a slightly positive coefficient, the PCA index shows a small negative coefficient, although both remain statistically insignificant. This difference is consistent with the PCA loadings, which assign relatively higher weights to prestige-based proxies and lower weights to behavior-based proxies. As a result, the PCA index leans more strongly toward certification-related characteristics, yet the absence of statistical significance suggests that neither certification nor rewarding dominates sufficiently in aggregated form. Overall, the lack of significance in both aggregation approaches reinforces the interpretation that certification and rewarding represent two distinct but simultaneously present stories of reputation that may offset each other when combined into a single index.

PCA of Rewarding Index

The principal component analysis of the reward-based proxies explains approximately 66% of the total variation, indicating that both measures share a high common empirical structure. The nearly identical PCA loadings (0.71) indicate that both proxies contribute with a similar magnitude to the common factor. Empirically, the rewarding index remains statistically significant when estimated individually and retains a comparatively stronger coefficient in joint regressions, where certification effects reappear. This pattern suggests that both mechanisms capture related but distinct aspects of underwriter reputation. This result is consistent with equally weighted index construction and suggests that the rewarding component represents a stable behavioral pattern rather than a proxy-specific effect.

PCA for Certification Index

The principal component analysis for the certification-based proxies explains approximately 72% of the total variation, indicating a relatively strong common statistical structure among these variables. This comparatively higher explained variance suggests that the prestige-related measures move more closely together within the sample. The loading structure shows that past syndicate size receives the largest weight in the first component (0.63), followed by market share (0.57) and Carter–Manaster rank (0.53), indicating that all three proxies enter the index with different relative importance.

Empirically, the certification effect measured using the PCA index closely mirrors the results obtained from the equally weighted index. During the full sample period, the certification coefficient remains statistically insignificant, while it becomes significant once both reputation components are included jointly in the regression framework. In this joint specification, however, the magnitude of the certification effect appears weaker than that of the rewarding component, consistent with the findings from the equally weighted construction.

.

Overall, the PCA-based measures display a high degree of consistency with equally weighted indices in terms of statistical significance and economic interpretation. While the PCA specification produces slightly lower coefficients for the rewarding mechanism and marginally higher coefficients for certification, the conclusions remain unchanged. Across specifications, the rewarding component exhibits higher significant coefficient patterns, aligning closely with the interpretation derived from the equally weighted indices.

Table 16 OLS Regressions with Reputation Indices (PCA)

Dependent Variable: IPO Underpricing			
	Composite (PCA)	Rewarding (PCA)	Certification (PCA)
Composite Reputation Index (PCA)	-0.005		
	(0.010)		
Rewarding Index (PCA)		0.026**	
		(0.012)	
Certification Index (PCA)			-0.014
			(0.012)
Company Age (log)	-0.014	-0.015	-0.015
	(0.011)	(0.011)	(0.011)
Gross Proceeds (log)	0.078***	0.069***	0.085***
	(0.014)	(0.012)	(0.015)
Total Assets (log)	-0.026***	-0.028***	-0.026***
	(0.007)	(0.006)	(0.007)
Venture Capital Backing	0.092***	0.080***	0.097***
	(0.021)	(0.020)	(0.022)
Intercept	-0.951***	-0.737***	-1.092***
	(0.269)	(0.213)	(0.306)
Year Fixed Effects	YES	YES	YES
Industry Fixed Effects	YES	YES	YES
Clustered SE	Underwriter	Underwriter	Underwriter
Observations	1184	1199	1184
$R2$	0.199	0.206	0.201
Adjusted R^2	0.138	0.146	0.140

Standard errors in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 17 Joint Regressions with Reputation Indices (PCA)

Dependent Variable: IPO Underpricing			
	Full sample	Boom	Non-Boom
Certification Index (PCA)	-0.018*	-0.029**	-0.010
	(0.010)	(0.013)	(0.020)
Rewarding Index (PCA)	0.028**	0.032***	0.028
	(0.013)	(0.011)	(0.026)
Company Age (log)	-0.015	-0.018	-0.010
	(0.011)	(0.019)	(0.008)
Gross Proceeds (log)	0.083***	0.112***	0.061***
	(0.015)	(0.026)	(0.014)
Total Assets (log)	-0.027***	-0.033**	-0.023***
	(0.007)	(0.014)	(0.008)
Venture Capital Backing	0.090***	0.106***	0.068***
	(0.021)	(0.035)	(0.024)
Constant	-1.023***	-1.039**	-0.713***
	(0.289)	(0.410)	(0.243)
Year Fixed Effects	YES	YES	YES
Industry Fixed Effects	YES	YES	YES
Clustered SE	Underwriter	Underwriter	Underwriter
Observations	1184	602	582
$R2$	0.209	0.220	0.209
Adjusted R^2	0.149	0.144	0.092

Standard errors in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

6.4. Heteroskedastic Errors HC

Since highly reputable underwriters are involved in multiple IPOs, observations are not fully independent across underwriters. To account for potential within-underwriter correlation in the error term, standard errors are clustered at the underwriter level in the main specifications, including a degree-of-freedom adjustment.

However, the sample structure is highly unbalanced: a large share of underwriters appears only once or twice in the data set. Appendix L shows that roughly 50% of all underwriters participate in only one or two IPOs. Given this distribution, an additional robustness test using heteroskedasticity-robust (HC1) standard errors is conducted. While clustered standard errors explicitly allow for correlation of residuals within underwriters, HC errors correct only for heteroskedasticity and therefore provide a useful alternative benchmark.

Comparing both specifications shows no substantial differences across signs or coefficients and only a very slight increase in HC errors.

In the separate OLS regressions, coefficients become marginally smaller and HC standard errors slightly larger, leading the rewarding index to lose one level of statistical significance, as it was already close to the threshold under clustered errors. In the joint regressions, results remain largely unchanged, although the rewarding index receives one fewer significance star, likely because the increase in standard errors moves the estimate just below the previous significance level.

Overall, the similarity of results across clustered and HC standard errors suggests that the findings are robust to alternative assumptions about the error structure. A potential explanation is the distribution of IPOs across underwriters: only a small number of large underwriters account for many observations, while a substantial share of underwriters appears only once or twice. The slightly larger HC standard errors may arise because heteroskedasticity-robust (HC1) errors adjust only for unequal error variance across observations, whereas clustered standard errors additionally account for potential correlation of residuals within the same underwriter.

Table 18 OLS Regressions with Indices based on HC errors

Dependent Variable: IPO Underpricing			
	Composite (HC)	Certification (HC)	Rewarding (HC)
Composite Reputation Index	0.0111		
	(0.0161)		
Certification Index		-0.0197	
		(0.0151)	
Rewarding Index			0.0369**
			(0.0174)
Company Age (log)	-0.0179*	-0.0186*	-0.0150
	(0.0098)	(0.0097)	(0.0094)
Gross Proceeds (log)	0.0820***	0.0956***	0.0686***
	(0.0145)	(0.0152)	(0.0141)
Total Assets (log)	-0.0363***	-0.0344***	-0.0282***
	(0.0080)	(0.0079)	(0.0087)
Venture Capital Backing	0.0762***	0.0863***	0.0803***
	(0.0204)	(0.0212)	(0.0199)
Intercept	-0.4991**	-0.7864***	-0.7374***
	(0.2327)	(0.2616)	(0.1963)
Year Fixed Effects	YES	YES	YES
Industry Fixed Effects	YES	YES	YES
SE	HC1	HC1	HC1
Observations	1536	1536	1199
$R2$	0.224	0.224	0.206
Adjusted R^2	0.175	0.176	0.146

Standard errors in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 19 Joint Regressions of Indices based on HC errors

Dependent Variable: IPO Underpricing			
	Full Sample (HC)	Boom (HC)	Non-Boom (HC)
Certification Index (EW)	-0.031*	-0.050**	-0.017
	(0.018)	(0.025)	(0.031)
Rewarding Index (EW)	0.040**	0.046**	0.038
	(0.017)	(0.019)	(0.031)
Company Age (log)	-0.016*	-0.018	-0.012
	(0.009)	(0.017)	(0.010)
Gross Proceeds (log)	0.082***	0.111***	0.060***
	(0.016)	(0.025)	(0.018)
Total Assets (log)	-0.027***	-0.033**	-0.023**
	(0.009)	(0.013)	(0.009)
Venture Capital Backing	0.091***	0.106***	0.069**
	(0.021)	(0.033)	(0.027)
Intercept	-1.002***	-1.032***	-0.686**
	(0.256)	(0.333)	(0.283)
Year Fixed Effects	YES	YES	YES
Industry Fixed Effects	YES	YES	YES
SE	HC1	HC1	HC1
Observations	1199	602	597
$R2$	0.209	0.220	0.207
Adjusted R^2	0.148	0.144	0.091

Standard errors in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

7. Conclusion

This thesis examines the relationship between underwriter reputation and IPO underpricing, a link that has been widely discussed yet inconsistently documented in the literature. While some studies such as Carter and Manaster (1990) and Rock (1986) emphasize the traditional certification effect of reputable underwriters, more recent research, including Loughran and Ritter (2004), highlights a potentially opposing effect in which underwriters might strategically allocate underpriced shares to favored investors. By applying different methods of measuring underwriter reputation and separating the underlying mechanisms behind reputation, this thesis seeks to provide a possible explanation for these contradictory findings. The central research question therefore asked how underwriter reputation is associated with IPO underpricing across the full sample and during boom markets. During the full period, reputable underwriters generally face stronger demand, which was expected to increase further during booms leading to more selective share allocation.

Measuring reputation is challenging because it cannot be observed directly and must be approximated through proxy variables. Traditional measures such as Carter-Manaster rank and market share capture prestige-based aspects of reputation, whereas rewarding-based measures such as past underpricing may partly reflect rewarding of investors in their past but can also capture persistent underwriter characteristics. This study introduces additional proxies designed to capture network- and demand-related aspects of underwriting activity, including past syndicate size and a newly constructed measure of past greenshoe execution. Using Hoberg's (2007) five-year rolling window, both traditional prestige-based measures and the newly introduced proxies are combined into several reputation indices. By integrating equally weighted standardized indices with categorized and PCA-based robustness specifications, the thesis develops an alternative framework for measuring underwriter reputation that aims to reduce proxy-specific noise while maintaining economic interpretability.

Beyond measurement, this thesis distinguishes between two underlying effects of reputation: a certification effect linked to prestige-based proxies and a rewarding effect linked to behavior-based proxies. When aggregated into a composite reputation index, these mechanisms appear to offset each other, resulting in no statistically significant association with IPO underpricing. However, separating the indices reveals a clearer pattern. Across most specifications, the rewarding index shows more consistent positive coefficients and stronger statistical significance, whereas the certification index exhibits weaker and less stable effects that become more visible in joint regressions. This pattern suggests that both certification and rewarding coexist.

The categorized-index robustness check adds nuance: under the broader 0.75/0.25 cutoffs, certification-related associations are more visible, whereas under the stricter 0.95/0.05 cutoffs,

rewarding-related associations become more pronounced. This suggests heterogeneity across reputation tiers and shows that measurement choices can affect which component is most visible empirically. Reputation therefore appears to reflect both underwriters' prestige and accumulated experience within institutional networks.

Overall, the empirical results indicate that the Composite Reputation Index does not exhibit a significant positive association with IPO underpricing, leading to no empirical support of the first two hypotheses. The expected dominance of rewarding over certification in aggregated form is not observed, suggesting that both effects remain present and partially offset each other. In contrast, the third hypothesis receives empirical support, as the rewarding effect is more consistently positive across specifications. The interdependence between certification and rewarding further highlights that underwriter reputation might reflect two different effects rather than a single unified mechanism. While the results document robust empirical associations across different reputation measures and aggregation methods, they should be interpreted as correlational rather than causal, as the empirical design does not fully address potential endogeneity such as issuer selection or persistent underwriter characteristics.

In conclusion, this thesis argues that the conflicting findings in prior research may stem not only from differences in proxy selection or market cycles, but also from the methods used to construct reputation measures. Reputation appears inherently noisy and shaped by both certification-related prestige and rewarding-related behavior. The results are consistent with rewarding-related associations being economically relevant in the 2000–2024 sample, while certification continues to play a complementary role. Future research could extend this framework by incorporating additional direct measures of investor networks or dynamic models of reputation formation to further clarify how underwriter reputation is associated with IPO underpricing over time.

References

Aggarwal, R. (2000). Stabilization activities by underwriters after initial public offerings. *Journal of Finance, 55(3)*, 1075–1103. https://doi.org/10.1111/0022-1082.00241

Ritter, J. R. (2025). IPO Data. University of Florida https://site.warrington.ufl.edu/ritter/ipo-data/

Benveniste, L. M., & Spindt, P. A. (1989). How investment bankers determine the offer price and allocation of new issues. *Journal of Financial Economics, 24*, 343–361. https://doi.org/10.1016/0304-405X(89)90051-2

Gompers, P. A., Ishii, J. L., & Metrick, A. (2003). Corporate governance and equity prices. Quarterly J*ournal of Economics, 118(1)*, 107–155. https://doi.org/10.1162/00335530360535162

Carter, R., & Manaster, S. (1990). Initial Public Offerings and Underwriter Reputation. *The Journal of Finance*, *45*(4), 1045–1067. https://doi.org/10.1111/j.1540-6261.1990.tb02426.x

Hanley, Kathleen W. (1993). The underpricing of initial public offerings and the partial adjustment phenomenon. *Journal of Financial Economics 34,* 231–250. https://doi.org/10.1016/0304-405X(93)90019-8

Helwege, J., & Liang, N. (2004). Initial public offerings in hot and cold markets. *Journal of Financial and Quantitative Analysis, 39*(3), 541–569. https://doi.org/10.1017/S0022109000004026

Hoberg, G. (2007). The Underwriter Persistence Phenomenon. *The Journal of Finance*, *62*(3), 1169–1206. https://doi.org/10.1111/j.1540-6261.2007.01233.x

Loughran, T., & Ritter, J. (2004). Why Has IPO Underpricing Changed over Time? *Financial Management*, *33*(3), 5–37.

Megginson, W. L., & Weiss, K. A. (1991). Venture Capitalist Certification in Initial Public Offerings. *The Journal of Finance*, *46*(3), 879–903. https://doi.org/10.1111/j.1540-6261.1991.tb03770.x

Rock, K. (1986). Why new issues are underpriced. *Journal of Financial Economics*, *15*(1–2), 187–212. https://doi.org/10.1016/0304-405X(86)90055-3

Drobetz, W., El Ghoul, S., Guedhami, O., & Yu, X. (2025). Beyond ownership: The role of institutional investors in international corporate governance. Corporate Governance: An International Review. https://doi.org/10.1111/corg.12635

Corwin, S. A., & Schultz, P. (2005). The role of IPO underwriting syndicates: Pricing, information production, and underwriter competition. *Journal of Finance*, 60(1), 443–486. https://doi.org/10.1111/j.1540-6261.2005.00735.x

Financial Industry Regulatory Authority (FINRA). (n.d.). Rule 5110(g)(9): Corporate financing rule. https://www.finra.org/rules-guidance/rulebooks/finra-rules/5110

Appendix A Distribution of IPOs by 2-Digit SIC Code

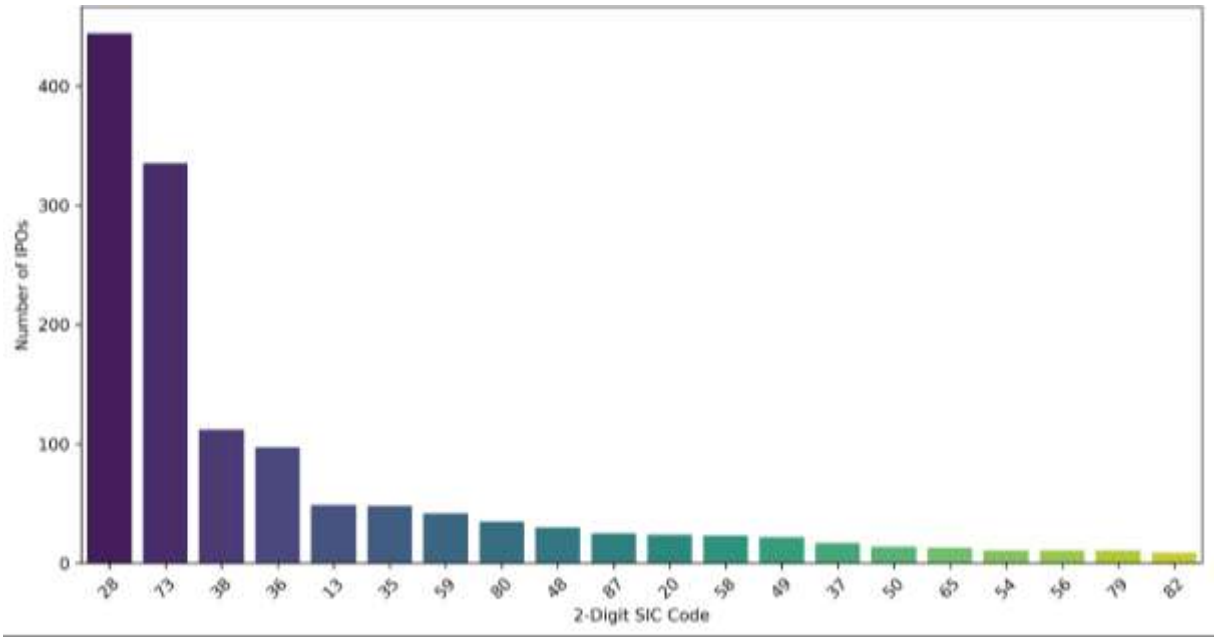

Figure A Distribution of IPOs by 2-Digit SIC Code

Appendix B Distribution of IPO Volume per Year

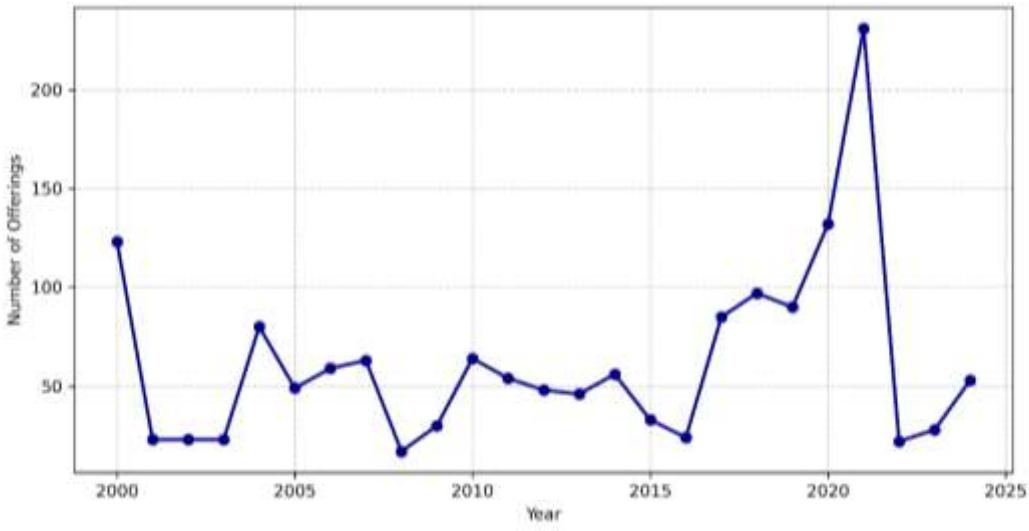

Figure B Distribution of IPO Volume per Year

Appendix C: Description of key variables

Table C Summary of key variables

Variable	Description
IPO Underpricing	IPO Underpricing is calculated as the difference between the first-day closing price and the offering price, divided by the offering price.
Past Syndicate Size (reputation proxy)	Syndicate size is measured as the natural logarithm of the total number of underwriters (book managers and co-managers) averaged across all IPOs underwritten over a 5-year rolling window.
Market Share (reputation proxy)	Market share is calculated as the sum of gross proceeds raised by the underwriter over a five-year period divided by the total gross proceeds of the IPO market during the same period.
Carter-Manaster rank (reputation proxy)	This ranking scale is based on the positioning of underwriters in "tombstone advertisements" in IPO prospectuses. Reputation scores range from 0 (lowest) to 9 (highest).
Past Underpricing (reputation proxy)	Past underpricing is defined as the difference between IPO initial returns and the market-wide average IPO underpricing in the same calendar month, averaged across all IPOs underwritten by the underwriter over a five-year rolling window.
Past Greenshoe executions (reputation proxy)	Past greenshoe execution is measured as the ratio of exercised greenshoe shares to the total number of shares offered without overallotment, averaged across all IPOs underwritten by the bank over a five-year rolling window.
The Composite Reputation Index	The Composite Reputation Index aggregates all reputation proxies using equal weights.
Rewarding Index	The Rewarding Index includes the behavior-based proxies: past underpricing and past greenshoe executions.
Certification Index	The Certification Index includes the prestige-based proxies: Carter–Manaster rank, market share, and past syndicate size.
Total Assets (control variable)	Total assets are used as a measure of company size. Company size is included as a control variable and is measured as the natural logarithm of total assets.
Company Age (control variable)	Company age is included as a control variable and is measured as the natural logarithm of (1 + age). Age is calculated as the difference between the offering date and the founding date.
Venture Capital (control variable)	A VC dummy variable equals one if the firm is venture capital backed and zero otherwise.
Gross Proceeds (control variable)	Gross Proceeds are used as measure for offering size. This variable is measured by the natural logarithm of Gross Proceeds.

Appendix D: Distribution of annual IPO volume from 2000 to 2024

Table D Distribution of annual IPO volume

YEAR	IPO VOLUME
2000	123
2001	23
2002	23
2003	23
2004	80
2005	49
2006	59
2007	63
2008	17
2009	30
2010	64
2011	54
2012	48
2013	46
2014	56
2015	33
2016	24
2017	85
2018	97
2019	90
2020	132
2021	231
2022	22
2023	28
2024	53

Appendix E: Distribution of IPOs across Underwriters

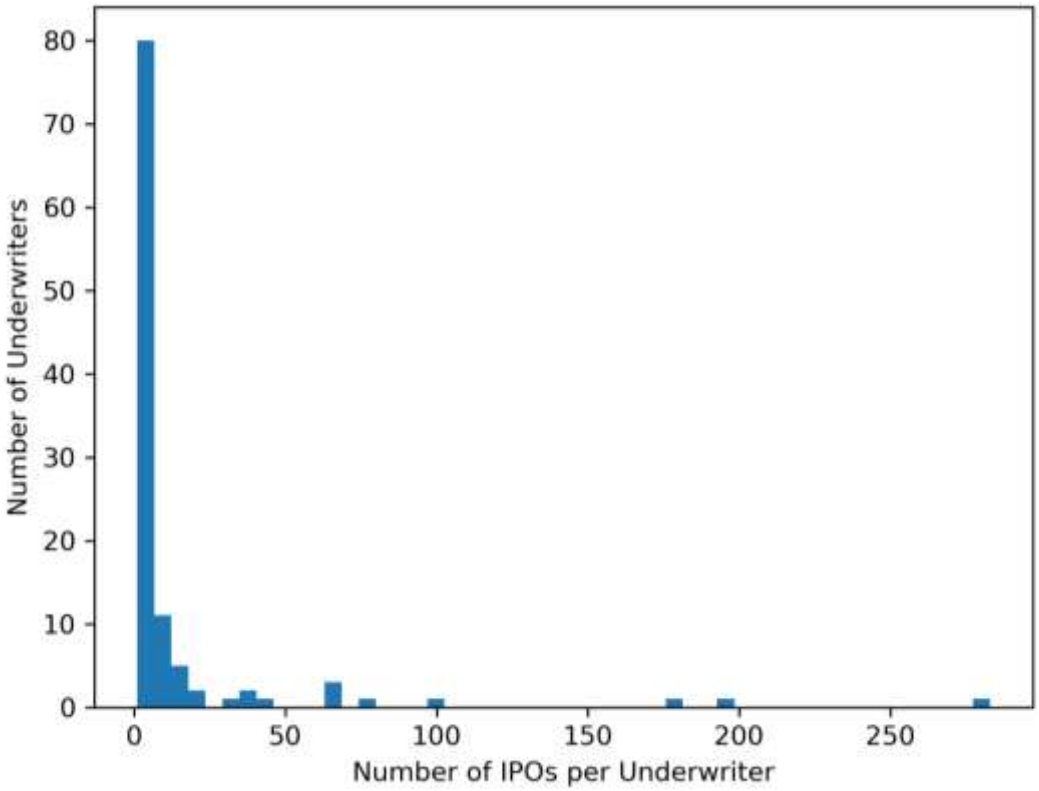

Figure E Distribution of IPOs across Underwriters

Table E Top 10 Underwriters

Underwriter Name	Number of IPOs
Goldman Sachs & Co.	283
Morgan Stanley & Co.	196
J.P. Morgan Securities	181
Credit Suisse Secs	102
Citigroup Global Markets	75
Jefferies	67
Merrill Lynch Pierce Fenner	65
BofA Securities	65
Barclays Capital	45
Cowen & Co.	37

Appendix F: Average First-Day Returns and Number of IPOs

Table F Average First-Day Returns and Number of IPOs

Return Categories	Number of IPOs	Average First-Day Returns	Percentage of Sample
Return ≤ 0	401	-0.0783	25.82
0 < Return ≤ 0.10	336	0.0426	21.64
0.10 < Return ≤ 0.60	655	0.2857	42.18
Return > 0.60	161	1.0399	10.37
Total	1553	0.2173	100

Appendix G: Pearson Correlation Matrix with Single Reputation Proxies and Control Variables

Table G Pearson Correlation Matrix with Single Reputation Proxies

	IPO Underpricing (%)	Carter-Manaster Rank	Market Share (%)	Past Syndicate Size (log)	Past Underpricing (%)	Past Greenshoe Execution (%)	Company Age (log)	Gross Proceeds (log)	Total Assets (log)	Venture Capital Backing
IPO Underpricing (%)	1									
Carter-Manaster Rank	0.08	1								
Market Share (%)	0.11	0.53	1							
Past Syndicate Size (log)	-0.01	0.76	0.48	1						
Past Underpricing (%)	0.15	0.13	0.08	0	1					
Past Greenshoe Execution (%)	0.05	0.36	0.14	0.19	0.33	1				
Company Age (log)	-0.07	0.05	0.02	0.05	0.01	0.02	1			
Gross Proceeds (log)	0.1	0.6	0.47	0.52	0.05	0.21	0.17	1		
Total Assets (log)	-0.08	0.45	0.28	0.42	0.04	0.13	0.33	0.73	1	
Venture Capital Backing	0.15	0.15	0.14	0.03	0.07	0.06	-0.27	-0.12	-0.29	1

Appendix H: Pearson Correlation Matrix with Composite Reputation Index and Subindices

Table H Pearson Correlation Matrix with Composite Reputation Index

	IPO Underpricing (%)	Composite Reputation Index	Rewarding Index	Certification Index	Company Age (log)	Gross Proceeds (log)	Total Assets (log)	Venture Capital Backing
IPO Underpricing (%)	1							
Composite Reputation Index	0.12	1						
Rewarding Index	0.12	0.67	1					
Certification Index	0.09	0.91	0.2	1				
Company Age (log)	-0.07	0.05	0.02	0.05	1			
Gross Proceeds (log)	0.1	0.57	0.16	0.62	0.17	1		
Total Assets (log)	-0.08	0.43	0.11	0.45	0.33	0.73	1	
Venture Capital Backing	0.15	0.13	0.08	0.12	-0.27	-0.12	-0.29	1

Appendix I Classification of Categorized Reputation Indices

Table I Classification of Categorized Reputation Indices

Reputation Proxy	*Broad classification* (q_L= 25%, q_H= 75%)	*Extreme-tail classification* (q_L= 5%, q_H= 95%)
Past Underpricing	q_{L25}= -0.027	q_{L5}=-0.13076
	q_{H75}= 0.050	q_{H95}= 0.10847
Past Greenshoe Execution	q_{L25}=0.106	q_{L5}=0.064
	q_{H75}= 0.123	q_{H95}= 0.150
Carter-Manaster Rank	q_{L25}=8.001	q_{L5}=5.001
	q_{H75}= 9.001	q_{H95}= 9.001
Market Share	q_{L25}=0.014	q_{L5}=0.000
	q_{H75}= 0.189	q_{H95}= 0.334
Past Syndicate Size	q_{L25}=1.867	q_{L5}=1.286
	q_{H75}= 2.123	q_{H95}= 2.254

Appendix J Descriptive Analysis of the Categorized Indices

Table J Descriptive Analysis of the Categorial Indices

	N	Mean	Median	Min	Max	Std
Composite Reputation Index (CAT, 0.75/0.25)	1,553	0.217	1	-5	4	2.0656
Certification Index (CAT, 0.75/0.25)	1,553	0.2176	1	-3	3	1.7863
Rewarding Index (CAT, 0.75/0.25)	1,553	-0.0006	0	-2	2	1.0276
Composite Reputation Index (CAT, 0.95/0.05)	1,553	0.470057952	1	-5	3	1.077193786
Certification Index (CAT 0.95/0.05)	1,553	0.470057952	1	-3	2	0.941202378
Rewarding Index (CAT, 0.95/0.05)	1,553	0	0	-2	2	0.451229706

Appendix K Principal Component Analysis Weights and Explained Variance Ratio

Table K1 PCA Weights of Composite Reputation Index

Composite Reputation Index	
PCA explained variance ratio: 0.4544	
Reputation Proxy	**PCA weights**
Past Syndicate Size	0.57
Carter-Manaster Rank	0.51
Market Share	0.50
Past Greenshoe Execution	0.35
Past Underpricing	0.19

Table K2 PCA Weights of Rewarding Index

Rewarding Index	
PCA explained variance ratio: 0.6639	
Reputation Proxy	**PCA weights**
Past Greenshoe Execution	0.71
Past Underpricing	0.71

Table K3 PCA Weights of Certification Index

Certification Index	
PCA explained variance ratio: 0.7224	
Reputation Proxy	**PCA weights**
Past Syndicate Size	0.63
Carter-Manaster Rank	0.57
Market Share	0.53

Appendix L: Summary statistics of IPOs per Underwriters

Table L Summary statistics of IPOs per Underwriter

IPOs per Underwriter: Summary	
Count	110
Std	14.12
Min	39.16
25%	1.00
50%	2.00
75%	7.00
Max	283