THE EFFECTS OF UNDERWRITERS ON THE FLOTATION COSTS OF SEOs AND THE LIKELIHOOD OF INVESTOR PARTICIPATION IN EQUITY OFFERINGS

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Abstract

Underwriting is a key factor in equity offerings and many scholars have sought to shed light on the role that underwriters play in the investment banking industry. My thesis extends existing studies by investigating how underwriters affect the flotation costs of SEOs and the likelihood of investor participation in equity offerings.

With the repeal of the US Glass-Steagall Act in 1999, the barrier between commercial banking and investment banking was broken down and commercial banks could also participate in securities underwriting. Given that flotation costs reflect the market perception of a share issue, it is crucial to understand the perceptions that commercial bank co-managers convey to the market.

Theoretically, there are two conflicting views on this. The first is that commercial bank underwriters can obtain more private information through their banking arm than can investment bank underwriters or the market participants, and they can use this private information to better certify the quality of SEOs. As a result, a lower flotation cost should be detected. By contrast, though the second view is also based on the assumption that commercial bank underwriters probably have more private information, it suggests that the flotation cost will be higher if the market suspects the commercial bank underwriters may misuse this information. Most previous studies did not consider that the effects of commercial bank underwriters on SEO floatation costs may vary in the different situation. In other words,

current studies cannot conclude that commercial bank co-managers will always lower SEO flotation costs, in any circumstance. The first empirical chapter of my thesis will fill this gap.

My study utilizes quantitative data collection and analysis following mainstream research in this field. The SEO samples are obtained from the SDC database embedded in Thomson One. The accounting information for all samples comes from the Compustat database. To measure volatility and stock return, the CRSP database is used. To implement my study, I also manually collected data on two variables: announcement date and commercial/investment bank classification. Announcement dates are taken from the EDGAR database of the SEC, while commercial/investment bank classifications are taken from the Merger & Acquisition database of Thomson One, Section 20 Subsidiaries list, Section 4(k)(4)(E) Securities Subsidiaries list, Wikipedia and banks' official websites. Given that my study involves a detailed investigation of the influence of commercial banks on SEO flotation costs, I further divide commercial bank underwriters according to their previous behavior as well as current motivation, as reflected in the issuers' leverage ratios. Considering the increasing popularity of overnight SEO deals (where an offer happens less than two days after the announcement date) after 2007, I also include an overnight dummy as a control variable. My basic objective in this part of the thesis is to find an operational measure that will identify commercial bank underwriters that act opportunistically (in their self-interest) in the market.

The empirical results support my hypothesis that the market perception of SEOs underwritten by a commercial bank varies in different circumstances. Commercial bank co-managers can increase SEO flotation costs if their behaviour and motivation convey the impression of opportunism to the market.

My second empirical chapter (Chapter 5) focuses on the effects of underwriter–investor relationships on investor participation in equity offerings. It is widely accepted that investment banking is a relationship-based rather than transaction-based business. Several studies have shed light on the benefits of a good underwriter–investor relationship for investors or issuers. Nevertheless, due to technical difficulties, few studies have investigated how the underwriter-investor relationship affects investor participation. Studies in this field suffer either from having narrow samples or from lacking good measures of relationships. The research reported in my second empirical chapter fills the gap by employing a sample that includes all IPOs and SEOs during 1990–2011 and using the underwriter–investor measure proposed by Huang and Zhang (2011).

Given the wide acceptance that investment banking is a relationship-based business, I hypothesize that underwriter–investor relationships will increase the likelihood of investor participation in equity offerings and this function should be separated from the market function. My hypothesis differs from that of Huang and Zhang (2011), who consider underwriter–investor relationships to be a component of the market function of underwriters and investigate the effects of the underwriter–investor relationship in a sample of traditional book-built SEOs.

Underwriter–investor relationships are identified by the number or the proportion of the deals undertaken by a particular underwriter–investor pair during a given time window. Whether an investor participated in a deal is determined by the change in the investor's shareholding in the issuer before and immediately after the deal. The research sample comprised 'eligible investors' which is defined as investors that participated in at least 0.5% of all offerings during the year of the current deal and participated in at least 10 offerings during the 5 years prior to the current deal.

The results suggest that: firstly, underwriter–investor networks increase the likelihood of investor participation and such influence is separate from the market function of underwriters; secondly, the underwriter–investor networks are effective not only in pure IPOs and pure SEOs but also interactively; and finally, the relationships built by lead managers are effective, as are those built by co-managers.

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Chapter 1: Introduction

1.1. Research Questions

Efficient and cheap access to funds remains a key topic in corporate finance. The common ways for a company to raise capital include taking loans from a commercial bank, issuing corporate bonds in the debt markets and issuing shares in the stock markets. The normal methods for a firm to raise capital in the stock market are via an initial public offering (IPO) or a seasoned equity offering (SEO). An IPO is the first public offering of shares of a company; all subsequent offerings are called SEOs.

According to Bortolotti et al. (2008), SEOs have become much more popular in capital markets during the last two decades. Those authors reported that the total number of global SEO issues in 1991 was 1,099, at a total volume of $91,904 million (in the equivalent of 2004 US dollars), and that in 2004 the number of issues had risen to 3,223, at a total volume of $320,714 million. Due to the increasing popularity of SEOs, they have become the subject of scholarly interest.

Among academic studies, the topic that draws the most attention is SEO underpricing. Several theoretical pricing models and empirical pricing models have been proposed. There are many explanations for SEO underpricing, including information asymmetry, uncertainty about firm value, price pressure, short-selling and manipulative trading, price clustering and investment banking power, and NASDAQ-listed firms.

With the repeal of the US Glass-Steagall Act in 1999, the barrier between commercial banking and investment banking was broken down and commercial banks could also participate in securities underwriting. Many studies have since focused on the effects of this on offer underpricing by investigating the differences between investment banks and commercial banks in underwriting. Commercial banks generally have better access to company information and so commercial bank underwriters may reduce SEO underpricing if they play a certification role (Booth and Smith, 1986). However, if commercial banks use their private information to shift risk from themselves to the market, the underpricing would be expected to increase (Puri, 1999). Empirical studies mainly support commercial banks' certification role.

Besides underpricing, relationships among institutional investors and underwriters in the equity primary market have long interested financial economists. Some studies point out that an underwriter's network of regular investors benefits issuers by maximizing the proceeds of an issue (Sherman and Titman, 2002; Benveniste and Spindt, 1989; Benveniste and Wilhelm, 1990). Based on this idea, Sherman (2000) attributed the growing popularity of book building in IPO underwriting to the formation of regular institutional investor clienteles of underwriters. Loughran and Ritter (2002) note that underwriters favored regular buy-side investors by allocating highly underpriced IPOs to them. This phenomenon is supported by Reuter (2006). Binay et al. (2007) find that regular investors benefit more than casual investors in IPOs through greater participation in underpriced issues. They also suggest that the underwriter–investor relationship is more important in the distribution of IPOs with strong demand, the IPOs of less liquid firms and deals by less reputable underwriters. Huang et al. (2008) confirm investment banks' network function and show that their networking abilities can attract more investors.

Despite the importance of underwriter–investor relationships, little empirical evidence has been provided on the willingness of regular investors to participate in equity issues with their familiar underwriters. Deeper study of this question could help us to better understand the increasing popularity of accelerated SEO offerings, as well as mergers and acquisitions in investment banking.

This Ph.D. study on the effects of underwriters on flotation costs of SEOs and likelihood of investor participation endeavours to contribute to the literature by addressing the following research questions:

1. Do commercial bank co-managers always reduce the flotation costs of SEOs? That is, do they always work to the benefit of the issuers by reducing the floatation costs? Whether or not commercial bank co-managers will increase floatation costs in some specific conditions. Here, floatation costs in my research include announcement return, underwriting spread, and discount.
2. Do underwriter–investor networks built in previous equity offerings increase the likelihood of institutional investors' participation in a new deal?

1.2. Research Motivation and Proposed Contribution

The Glass-Steagall Act of 1933 separated the roles of commercial and investment banking. For the next 45 years, commercial banks and their subsidiaries were not allowed to underwrite corporate debt or equity securities. The restrictions were relaxed beginning in 1988 for debt securities and in 1990 for equities. On November 14, 1999, the Glass-Steagall Act was finally repealed. As a result of the less restrictive regulatory environment, 30 commercial banks entered equity underwriting during 1990–1999, through the establishment of a Section 20 subsidiary. Thereafter, banks, which prior to December 1996 underwrote less than 1% of the equity issue volume per year, underwrote upwards of 20% of issue volume annually (Chaplinsky and Erwin, 2009). Meanwhile, after the repeal of the Glass-Steagall Act in 1999, commercial banks acted as co-managers in about 49% of transactions (Jeon and Ligon, 2011). Banks started the 1990s with virtually no share of equity underwriting, then substantially increased their prominence as equity underwriters over this decade.

Despite the growing number of commercial banks becoming co-managers[1] in equity underwriting, little effort has been put into the investigation of the relationship between commercial banks' underwriting and flotation costs. Moreover, the studies that have been done have not come to the same conclusion. Narayanan et al. (2004) use a sample of SEO syndicates from 1994 to 1997 and find that lending banks are more likely to co-manage an issue if the lead manager has a high reputation and is non-lending. Moreover, with such a syndicate arrangement, issuers benefit from low underwriting fees, although they do not receive better pricing on their offerings. Suzuki (2010)

[1] The composition of the underwriter syndicate is discussed in section 2.6.

finds that banks holding loans from issuers have a negative effect on price discount and no effect on underwriting fees. This finding implies the certification role of commercial banks' co-managers. Jeon and Ligon (2011) study the role that co-managers play in reducing flotation costs of SEOs. They investigate how different characteristics of an underwriter syndicate affect flotation costs, such as the number of co-managers, the reputation of lead managers and the involvement of commercial banks. They find that the presence of commercial banks as co-managers can reduce underpricing as well as underwriting spread, and improve announcement return. In other words, having commercial banks as co-managers can reduce flotation costs.

However, Puri (1999) suggests that the holding of equity or debt by commercial banks may hinder their certification role. Hebb and MacKinnon (2004) find the presence of commercial banks in underwriter syndicates results in increased uncertainty in IPO valuation. They suggest that the market perceives the possibility of a conflict of interest when commercial banks underwrite equity issues. Song (2004) finds that commercial banks are more likely to serve as co-managers when issuers have lower stock ratings and, thus, rely more on bank loans. This indicates that if commercial banks act as co-managers, they do not improve the certification ability of the syndicate. The overall findings of Chaplinsky and Erwin (2009) suggest that it has been difficult for banks to achieve economies of scale in underwriting, as evidenced by loss of market share.

Previous studies did not consider that the effects of commercial bank underwriters on SEO floatation costs may vary in the different situation. However, this assumption may not apply in practice; indeed, their effects should depend on the nature of the situation. My study aims to fill this gap. The broad motivation behind my research is to understand how commercial bank co-managers affect the cost of SEO flotation in practice. My results refine prior findings by pointing out that the market perception of SEOs underwritten by commercial banks varies in different circumstances. In fact, commercial bank co-managers can actually increase SEO flotation costs if their behavior and motivation convey an impression to the market that they are operating opportunistically.

Investment banking is a relationship-based rather transaction-based business (Huang et al., 2008). Therefore, many scholars put their effort into studying the function of underwriters' networks in equity offerings. James (1992) claims that investment banks build relationships with securities issuers through repeat dealing. Huang et al. (2008) suggest that investment banks develop relationships with investors through repeat dealings in securities offerings, brokerage services, and analyst research coverage. The resulting investor networks benefit investment banks by lowering the costs of searching for potential investors, winning trust from investors, and inducing investors to produce and truthfully reveal information (Benveniste and Spindt, 1989; Benveniste and Wilhelm, 1990; Sherman and Titman, 2002). In accordance with those studies, Sherman (2000) attributes the growing popularity of book building in IPO underwriting to the formation, on the part of underwriters, of a client base of regular institutional investors. Loughran and Ritter (2002) and

Reuter (2006) find that in the late 1990s underwriters normally benefited their regular buy-side clients by the allocation of highly underpriced issues. Binay et al. (2007) find that regular investors benefit more than casual investors in IPOs through greater participation in underpriced issues. They also suggest that the underwriter–investor relationship is more important in the distribution of IPOs with strong demand, in the IPOs of less liquid firms and in deals by less reputable underwriters. Huang et al. (2008) confirm investment banks' network function and show that their networking abilities can attract more investors. Huang and Zhang (2011) employ the idea of underwriter–investor networks to support the marketing role of underwriters in SEO offerings. Their results confirm that a network of underwriters can help to attract investors to participate in share offerings ('book-building deals') and lower the SEO discount (the margin between the lower price of the new shares and the current trading price of existing shares).

Although many studies focus on the functions and the benefits of underwriter–investor relationships in equity offerings for underwriters, little attention has been paid to the exact effect of the underwriter–investor network on potential investors' decision to participate. To the best of my knowledge, Binay et al. (2007), Huang et al. (2008) and Huang and Zhang (2011) are the only studies which investigate investors' participation decisions in deals where they have a pre-existing relationship with the underwriter relationship. Even so, these studies are all far from comprehensive.

Binay et al. (2007) base their measure of 'relationship' on the difference between the probability of institutional participation conditional on past participation in the same lead underwriters' IPOs and the unconditional probability of institutional participation. This measure is expressed as a percentage and actually captures the difference in the participation ratio for the two groups, namely 'previously participated' investors and unconditional investors. However, there are several limitations to their study. One is that it examines only the network of lead managers of a current deal. Though lead managers are likely to be more important, co-managers are also useful in marketing and allocating the offerings (Huang and Zhang, 2011; Jeon and Ligon, 2011) and so their contribution should be included. The second limitation is that the measure of relationship reflects only a difference between two groups, and cannot capture the decision to participate made by each eligible investor. Thirdly, Binay et al. (2007) present only descriptive statistics and do not run a regression that could rule out the influence of other factors.

Huang et al. (2008) also study the effects of the underwriter–investor relationship on the participation decisions of investors. The main limitation of their work is that the sample relates only to private investment in public equity. Considering the different mechanisms underlying public offerings and private investment in public equity, their study cannot, therefore, provide strong evidence on the effects of the underwriter–investor network on investors' participation decisions in public offerings.

Huang and Zhang (2011) show the effects of the underwriter–investor network in traditional book-built SEOs as evidence of the market effort of underwriters.

They assign each eligible investor (defined as investors that participate in at least 0.5% of all SEOs during the year of the current SEO and that participated in at least 10 SEOs during the 5 years prior to the current SEO) to each deal and investigate the effects of network on the participation decision. Their results show that a previously established relationship, whether that is with the lead managers or the co-managers of the current deal, makes investors favor the current deal. However, Huang and Zhang (2011) limit their sample to traditional book-built SEOs. Consequently, whether an underwriter–investor relationship affects investors' decisions to participate in public offerings remains an open question.

This thesis fills a gap in the literature by providing a comprehensive and robust investigation on whether the underwriter–investor network affects investors' decisions to participate in equity offerings. The results reported could provide hints regarding why accelerated SEOs are proving so popular, as well as on the motivation for successful investment banks to acquire distressed banks after a period of financial crisis, as recently experienced.

1.3. Thesis Structure

The thesis is structured as follows: chapter 2 gives a brief introduction to the essential elements of SEO transactions. This discussion provides background information which is the basis for the sample selection and hypothesis. Chapter 3 discusses studies related to equity offerings. This chapter focuses on the literature on SEO underpricing and the role of underwriters in equity markets.

Chapter 4 investigates the effects of commercial bank co-managers on SEO flotation costs, with a focus on SEO underpricing (discount). Chapter 5 provides evidence for the hypothesis that the underwriter–investor network affects the decisions of investors on whether or not to participate in a particular share issue. Chapter 6 presents the conclusions.

Chapter 2: Introduction to Equity Offerings

2.1. IPOs

In the initial development of most companies, funds are raised by selling equity to a small number of investors. Usually, it is not easy for these investors to resell the equity, since the companies are not listed. Because of this lack of liquidity, the companies offer greater compensation (in the form of the discount, or underpricing) to investors when raising equity capital at this stage. Later, when the companies have developed to a certain level, they may need additional capital and consider raising it via the listed equity market. Thus, the companies think about ‘going public’ and selling equity to a large number of investors. This process is called an Initial Public Offering (IPO). In contrast with the shares of unlisted companies, listed companies’ shares can be traded on a much more liquid market. Consequently, listed companies pay less compensation to their investors than they paid before going public. However, an IPO requires companies to pay fees to the firms involved in the auditing and legal processes required for an IPO, as well as to the firm underwriting the IPO, which is usually an investment bank

2.2. SEOs

Any issuance of shares by a company after its IPO is termed a Seasoned Equity Offering (SEO). A more precise definition of an SEO is that it is a registered offering of a block of a security (normally a large block, as a proportion of existing shares) that has been previously issued to the public.

Generally, there are two main functions of an SEO. One is to raise fresh equity for companies. In this case, the shares are offered in the primary market and the proceeds of the sale go to the issuing company. Such offerings are known as primary distribution. Another function of an SEO is to provide a way for existing shareholders to reduce their positions in a company. Such offerings are called secondary distribution. In practice, large investors are more likely to implement secondary distribution. The reason is that only the secondary market is able to absorb such large volumes of shares. Meanwhile, the proceeds of secondary distribution go to those shareholders rather than to the issuing company. One SEO could contain both primary and secondary distributions. As primary distribution is more related to financial activities, most academic studies of SEOs constrain their samples to include at least some primary distributions.

2.3. Differences between IPOs and SEOs

The market for SEOs is larger than that for IPOs. According to Bortolotti et al. (2008), the global dollar volumes of SEOs were nearly twice the global dollar volumes of IPOs in 2004 and 2005. In 2006, though IPO volume ($256.4 billion) was closer to SEO volume ($317.2 billion), it still represented only around 80% of SEO issuance.

Although IPOs and SEOs share nearly the same offering processes, there are several important differences between the two. One major difference is the degree of information asymmetry. Generally, IPOs have more severe information asymmetry than SEOs because, by definition, an IPO involves firms which have issued no public shares previously. For such firms, limited information is available publicly. In contrast, SEOs are conducted by listed companies, which are legally required to release certain types and amounts of information; moreover, the market prices of the shares of SEO issuers are already available to the public. The theory of market efficiency supposes that market prices reflect all information relating to the companies and, to the extent that the theory applies, SEO pricing is based on market closing prices prior to issues. Conversely, before an IPO there is no market price available to the public and investors bear greater information asymmetry risk.

Another difference is in flotation methods (also called underwriting method in some studies, since most SEOs are underwritten by investment banks). In the US, ‘firm commitment’ is the main flotation method used for IPOs. According to the ‘All US Public New Issues’ records in SDC Platinum, the issues underwritten by the firm commitment method made up 98% of all US IPOs during the period 1980–2010. For SEOs, although firm commitment is also the main underwriting method (Booth and Smith, 1986), issues underwritten by other flotation methods represent a substantial portion of all offerings. For instance, from 1980 to 2010, the ‘All US Public New Issues’ record in SDC Platinum shows that around 82% of all US SEOs were underwritten by the firm commitment method and the remaining offerings were underwritten via other flotation methods[2].

[2] Shelf registration has become dominated nowadays. Before shelf registration’s dominance, the market was dominated by firm commitment for a very long time and firm commitment still occupies a comparable portion of the market.

2.4. Flotation Methods

2.4.1. Firm Commitment Method

The progress of a firm commitment offering is roughly as follows. Firstly, the issuer needs to find investment banks to act as lead underwriters and to assemble other investment banks to form a syndicate in order to share risk and facilitate share distribution[3]. The syndicate buys the issue from the issuer and guarantees sales of a certain number of shares to investors at a specified price. Secondly, after the syndicate is established, the lead underwriter undertakes 'due diligence' (that is, checks the financial status of the issuer), registers the issue (in the US, this is with the Securities and Exchange Commission, SEC) and presents a preliminary prospectus to key potential investors (also known as a 'road show'). The issuer is not permitted to sell any shares before approval from the SEC after the registration. Therefore, at this stage, the syndicate can only determine a possible price range of the issue. Thirdly, after the issue has been approved by the SEC, the issuer meets with the underwriter syndicate and fixes the final offer price (the 'pricing meeting'). The offer normally starts the following day. The guarantee period of the underwriter syndicate starts from the pricing meeting, because the guarantee requires a specific offer price. The guarantee period expires at the end of the offer period. A successful offer is usually sold out within a couple of days, and so the guarantee period of the firm commitment method is typically short.

2.4.2. Other Flotation Methods

Best efforts: The best efforts method does not require investment banks to

[3] See further in section 2.6.

guarantee to sell a certain number of securities. Instead, they promise only to sell as much of the issue as possible to the public and to act as agents. Under this flotation method, the investment banks bear less risk than with firm commitment issues. Therefore, in best efforts issues, the investment banks charge lower underwriting fees. According to previous studies in equity offerings, the best efforts method is much more frequently used in IPOs than in SEOs. This is probably because IPOs are riskier than SEOs due to the problem of information asymmetry; for example, IPO stocks have no public market price prior to the issue, no stock analysts following the company, limited information available to the public and a high concentration of ownership, often with managers as the major holders of equity. Therefore, if investment banks believe the risk related to an IPO is too high, they use the best efforts method instead of the firm commitment method in order to reduce their risk.

Rights: Rights offers can be both underwritten and no-underwritten. If issuers choose the no-underwritten method to issue rights offers, the issuers bear all the risk associated with issues. These offers, in contrast to public offers, permit only existing shareholders to purchase a pro rata portion of the issues at a fixed price. A rights offer is normally open for a fixed period (often one month) from the start of the issue. During this period, the existing shareholders are granted the right to accept or decline the offer. The shareholders can subscribe, sell the rights on the secondary market or do nothing. In other words, a rights offer could be treated as an option or a warrant for the shareholders. The offer price is often set at a discount from the market price of the issue date. The price will hold until the offer has been subscribed or withdrawn. It is possible for the offer price to exceed the market price during this period; to offset this risk, the rights offer price is normally more discounted than that in a firm commitment offer. Typically, the rights subscription price is 15–20% below the current market price of the stock.

The underwritten rights offer is often called a standby rights offer. The underwriters charge a fixed ‘standby’ fee and ‘take-up’ fee in a standby rights offer because they bear the price risk, as they do in a firm commitment issue. Though not very common in the US market, rights offers are usually fully subscribed (Eckbo and Masulis, 1992). In a standby rights offer, underwriters typically take around 15% of the issue (Singh, 1997). Rights issues are generally used by closed-end investment companies[4], while European SEOs are normally sold by rights.

Accelerated underwriting: accelerated underwriting is discussed by Bortolotti et al. (2008). Different from traditional firm commitment underwriting, accelerated underwriting executes the transactions much more quickly – it is normally finished in three days. Accelerated offerings can be further divided into three categories, namely accelerated book-built offerings, block trades and bought deals.

The process of accelerated book-built offerings (ABO) is similar to traditional firm commitment underwriting in terms of book-building, shares allocation

[4] Also called `closed-end fund’, which normally only raise money by IPOs and no SEOs thereafter.

and responsibilities of underwriters. The main difference is in the execution speed because ABO firms are typically well known and have good share liquidity.

In bought deals (BDs) and block trades (BTs), the price is fixed by auction. BTs and BDs involve little information production. Issuers sell shares to the investment banks with highest bid. These investment banks then resell the shares to institutional investors. Thus, both BTs and BDs are closed very rapidly.

According to Bortolotti et al. (2008), the main advantage of accelerated underwriting is that it reduces flotation costs, which include SEO announcement return and underwriting fees. In recent years, accelerated underwriting has occupied a considerable portion of the equity offerings market. Armitage (2010) finds that many rights issues have been declined by existing shareholders in the UK, while these shareholders as well as new investors are more interested in block trades. In the US, SEOs executed through accelerated underwriting account for over half the value of SEO offerings. The number of ABOs increased dramatically from 1997 (nearly zero) to 2004 (around a third of the total SEOs).

Shelf registration: In 1983, Rule 415 was introduced by the US Securities and Exchange Commission. This rule allows one single registration file to be used to issue multiple tranches of securities. However, not all companies can implement this flotation method. According to Rule 415, there are four requirements for a shelf registration issue: 1) the issue is of common stock (with or without voting rights) having a market value of at least $75 million; 2) the issuer has had no default on debt, preferred stock or rental payments for 3 years; 3) all SEC disclosure requirements have been met for the last 3 years; 4) the firm's debt is investment grade.

Issuers who use shelf-registration to register securities can hire underwriters from a list. The registered securities may be offered on an immediate, continuous or delayed basis over the next two years. Shelf-registration can increase the flexibility and the speed of issues by allowing firms to execute issues when market conditions become favorable.

The SEC created a new category of issuers called 'well known seasoned issuers' (WKSIs). If a company meets one of two conditions required by the SEC, it will grant WKSI status. The registration statements of WKSIs are automatically effective on filing, without SEC review. Shelf-registration nowadays has become an important part of the SEO market in the US. According to Autore (2011), there were 317 shelf offerings from 2004 to 2006, totalling $51 billion, compared with only 146 traditional offerings, totaling $18 billion.

Private placement: In a private placement, the shares of the issuing firms are transferred from current shareholders to a single investor or a small number of investors. Private placements are non-public and are regulated by Rule 144 and Rule 144a in the US. Institutions such as banks, insurance companies and pension funds are typical investors in private placements.

2.5. Flotation Costs

Flotation costs are made up of direct costs and the indirect costs of selling a security through a public offering.

The direct costs refer to underwriter compensation, registration and listing fees, legal, accounting and printing expenses, and so on. Underwriter compensation has several components, such as: an over-allotment option (typically this is a one-month warrant to purchase an additional 15% of shares at the same price as the offering itself); long-term warrants, exercisable at the offer price; extra reimbursement of underwriter expenses by the issuer; and underwriter's gross spread (the difference between the public offering price and the underwriter purchase price). The underwriter's gross spread is typically the largest component of underwriter compensation.

The indirect costs of the flotation relate to the discount, the announcement return, the possible cost of issue delay or withdrawal, as well as management time and energy devoted to the offering process. Among them, the discount (defined as the difference between the prior trading day's closing price and its closing market price immediately following the public offering) is generally the largest of the indirect costs. Announcement return, defined as the abnormal return during the filing date of an issue, and expected costs of issue delay and withdrawal are generally measured by probability. Management time and energy devoted to the offering process is another significant indirect cost but it is hard to measure and quantify and has rarely been studied.

To summarize, flotation costs can be separated into direct and indirect costs. Direct costs can be further divided:

1. Fees to underwriters (including warrants and over-allotment options);

2. Fees to accountants and law firms;

3. Listing fees, registration fees, printing, advertising as well as road show expenses and the cost of management time.

Indirect flotation costs include:

1. Issue discount (underpricing), which can potentially be captured by underwriters through their power to allocate the issue to preferred customers and affiliates;

2. Announcement effect, which represents the market reaction to the announcement of the offering and is negative on average

3. Costs of delays or withdrawal of an offering.

2.6. Underwriter Syndicate

In an equity offering, underwriters normally perform as agents and execute the issue for the issuing firm (the client). Among all flotation methods, the firm commitment method requires underwriters to play a crucial role. To summarize, underwriters typically do the following work in a firm commitment issue: 1) they provide procedural and financial advice to issuers; 2) they promise to buy the entire issue from the issuer; 3) they resell the shares to investors. Underwriters often form a syndicate to buy and distribute the shares so that the risk associated with the issue is shared with other members. Besides sharing risk, the underwriter syndicate can also broaden distribution, encourage research support and support market making following the offering.

The syndicate will normally comprise a group of banks. The members are likely to take on different roles and responsibilities and be accordingly rewarded in terms of management fees, underwriting fees and selling concessions.

Book managers: Book managers, sometimes called lead managers or lead underwriters, are the underwriters that form and coordinate syndicates and receive the management fees. In equity offerings, the book managers typically record the activities of the syndicate and underwrite the largest portion of the securities. The important role of book managers has been recognized by many studies on equity offerings. Loughran and Ritter (2004) measure the reputation of the underwriters by using the ranking of lead managers in IPOs. Studies of SEOs implement a similar ranking method. Some studies have pointed out that SEOs are less underpriced if they employ lead managers with high reputations. Mola and Loughran (2004) used the ranking of analyst teams of lead managers to represent the analysis capacity of the underwriters.

Co-managers: Co-managers, also known as co-lead managers or co-lead underwriters, do not have the responsibility of recording the activities of the underwriter syndicate and so receive no management fees. Co-managers share underwriting risks and underwriting fees with the book managers, but generally underwrite a smaller portion of the shares than book managers. Jeon and Ligon (2011) find that most syndicates (86%) in SEOs of industrial firms from 1997 to 2007 consisted of more than one co-manager. The average number of co-managers was 2.44 per deal during this period. Corwin and Schultz (2005) find that more co-managers provide greater analyst coverage for issuers after IPOs. This finding is supported by Chen and Ritter (2000). Having more co-managers also results in more market markers after IPOs (Corwin and Schultz, 2005). Corwin and Schultz (2005) also point out that though issuers thereby benefit from having more co-managers in the syndicate, the syndicate size is limited by the offer size, competition for future underwriting business and higher underwriting spread.

Other Syndicate Members: There may be some banks in the syndicate that are responsible only for the distribution of the shares. These banks are normally called ‘other syndicate members’. Other syndicate members are also allocated selling concessions. Reallowance fees are paid to other members of the syndicate (sometimes called secondary sellers). Lead underwriters, co-managers and other syndicate members typically commit to producing analyst coverage together for the shares in a period after the offering. The purpose of analyst coverage is to draw the attention of investors to the securities and increase a stock’s liquidity.

2.7. Types of Underwritten Securities

There are many types of securities in equity transactions: issuing firms may have different equity structures and their specific corporate charter may require different types of shares. Some are rarely studied in the literature, presumably due to their unique characteristics.

Common Shares (Class A and Class B): Common shares (class A and class B) are the most common types of securities in equity offerings. Common shares, also known as ordinary shares, are standard voting shares: they grant holders the right to vote on matters of corporate policy and the composition of the board of directors. The main differences between common shares and class A or class B shares concern the underlying voting rights. Class A shares normally have enhanced voting rights, while class B shares have limited voting rights.

ADRs: American Depositary Receipts (ADRs) are a way for foreign firms to raise capital in the US market. An ADR can be treated as a certificate which represents ownership of shares of a foreign company and allows those shares to be traded in the United States. Under the ADR arrangement, the shares of the foreign company are deposited in a US bank. Then, the US depository bank issues ADRs based on the deposited shares. Meanwhile, the depository bank then converts dividends and other payments into US dollars to ADR holders in the US (Diro Ejara and Ghosh, 2004).

Given the differences in operational environments and the offering process across countries, many studies of equity offerings (especially of the underpricing of equity offerings) exclude non-US companies in their samples. Chen et al. (2009) study how investment banks determine the gross spread in

ADR SEOs from 1980 to 2004 and find that it can be explained in a similar way (offer characteristics) to that of common US SEOs.

Unit: A unit is a product which includes two or more classes of securities. Investment trusts issue units and normally offer redeemable units to investors for a specific period. One unit represents one share of a fixed and unmanaged portfolio which typically consists of shares and bonds. It is designed to provide capital appreciation and dividend income and is generally invested in by three types of companies: investment trusts, mutual funds and closed-end funds. Units are often excluded from the sample selection in academic equity underpricing studies due to their complex features.

REITs: real estate investment trusts. REITs are closed-end investment companies that invest in commercial real estate. In equity studies, the term REITs refers to the shares issued by real estate investment trusts. REITs are more liquid than direct investment in real estate because these shares are traded on a stock market. The trusts often hold various types of real estate and so the risks within the real estate industry are diversified. Thus, REITs provide investors with easy access to real estate and diversification within real estate. REITs can be further categorized into mortgage REITs and equity REITs, according to the type of investment. Mortgage REITs primarily invest in mortgages and are similar to bond investments. Equity REITs mainly invest in commercial or residential properties, using leverage, and are similar to investments in leveraged equity real estate. Studies of equity often exclude REITs from their samples as REITs are a closed-end investments.

2.8. The Regulation of Equity Offerings in the US market

Equity offerings are regulated by two major laws in the US. The first is the Securities Act of 1933, which requires issuers to sell the entire issue at a single price to all investors. Additionally, issuers need to meet filing rules and extensive disclosure requirements prior to the offering date. Prospective issuers have to file an S-1 statement with SEC prior to the offering. Then, the SEC will send the issuer a letter of comment asking for additional disclosures and request amendments to the registration statement within approximately 30 days. After that, the issuers will send responses. This process of letter exchange may be repeated several times before the SEC declares the registration finally effective. The issuers can proceed with the offerings as soon as the filing statements have been approved. However, exemptions may be made to the registration requirements of the Securities Act for small issues, private placements, mergers and reorganizations. Nevertheless, after such exemption, privately placed securities cannot be resold for a year without being publicly registered with the SEC.

The second major act is the Securities Exchange Act of 1934. This requires issuers of publicly held securities to make periodic disclosures through public filings of annual 10-K statements, quarterly 10-Q statements and occasional 8-K statements if material changes occur.

In recent years, there have been trends towards more rapid disclosure of changes in company conditions, less delay in securities issuance and an easing of restrictions on private placements and foreign security issuance and the use of US accounting standards under 'generally accepted accounting principles' (GAAP)[5] . However, not all new legislation has sought to ease the regulatory environment. In 2002, the Sarbanes-Oxley Act was implemented, requiring major changes in the committee structure of boards of directors, auditor independence and certification of company financial disclosures.

Rule 415, governing shelf registration, which was adopted by the SEC in 1982, allowed public companies to sell securities more rapidly. The securities of issuers under shelf registration could be sold from time to time in a two-year period. The offer terms at each sale are based on current market conditions and other factors. Rule 415 makes it unnecessary for issuers to file new registration statements at each sale date, and thus reduces delays for issuers. However, not all companies are eligible to use this flotation method. Shelf registration is normally available to large companies of good repute that have a market value of at least $75 million, and no records of defaults on any debt, preferred stock or rental payments for the previous 3 years. Eligible issuers have to meet all SEC disclosure requirements in the last 3 years and to have been granted investment grade for their debt.

On December 1st, 2005, a new rule, which created a new category of issuers called 'well known seasoned issuers' (WKSIs), became effective. WKSIs are publicly listed firms that are eligible to issue shelf offerings automatically.

[5] Also called 'generally accepted accounting standards'.

When issuers meet one of the two requirements[6] of the SEC, they may become WKSIs. A WKSI can have oral or written communication with investors before, during and after the offering process. WKSIs are given automatic shelf registration status and are permitted to register unspecified amounts of different types of securities on Form S-3 or F-3, without allocating between primary and secondary offerings. Due to automatic shelf registration status, these registration statements are effective on filing without SEC approval. Issuers can add further classes of securities and eligible majority-owned subsidiary securities after the registration statement is effective if they make a 'post-effective amendment' to the offerings' registration statements. WKSIs are permitted to omit the plan of distribution, the name of any selling security holders, the description of securities to be offered, and the allocation between primary and secondary shares. However, these changes should be incorporated in prospectus supplements and post-effective date amendments to the shelf registration statements.

Besides WKSIs, the SEC has made several other changes to the regulations in recent years. One of the major changes is that the SEC increased disclosure requirements in registration statements and 10-K statements in terms of risk factors. Another change is that Rule 415 will no longer limit the amount of securities registered on a shelf registration statement. Initially, the SEC mandates an issuer to provide a registration with a fixed amount intended to be offered. The shelf registration statement is valid for two years from the

[6] The two requirements are (1) have outstanding a minimum of $700 million of common equity market capitalization world-wide that is held by non-affiliates, or (2) if they are only registering non-convertible securities other than common equity, that during the past three years they have issued non-convertible securities other than common equity in registered primary offerings with an aggregate value of $1 billion.

effective date. However, the SEC has allowed shelf registration statements to remain effective for many years in practice. The new rules also permit issuers to conduct primary offerings immediately after the effectiveness of a shelf registration statement. Shelf issuers may also sell equity at varying prices rather than a conventional fixed price offer without limitations on volume and without needing to identify potential underwriters.

Besides securities regulations, there are some other laws and rules impacting the security offering process. Before 1999, the Glass-Steagall Act prohibited commercial banks and their subsidiaries from affiliating with securities firms or underwriting corporate securities. In 1999, this act was repealed and replaced by the Gramm-Leach-Bliley Financial Modernization Act. The repeal of the Glass-Steagall Act had a direct effect on securities underwriting, by increasing competition for corporate underwriting assignments through granting entry to commercial banks.

The Sarbanes-Oxley Act of 2002 encourages the establishment of more independent boards and requires outside directors take on major governance roles within the board of directors. This act has enhanced shareholder voting rights and increased the credibility of firm disclosure by providing greater auditor independence and requiring the chief executive officer (CEO) and chief finance officer (CFO) to personally certify the company’s annual financial statements.

Chapter 3: Literature Review

In this chapter, I will introduce the most common research topics related to equity offerings and discuss the reason for firms to conduct equity offerings and equity flotation costs. This chapter looks at all the possible determinants of SEO underpricing, paving the way for hypothesis development in the first empirical chapter (Chapter 4). This chapter also aims to shed light on whether underwriters influence institutional investors' decisions to participate in an equity offering, and if so how. This discussion facilitates the establishment of the hypothesis of the second empirical chapter (Chapter 5).

3.1. Overview of Studies on Equity Offerings

As noted in Chapter 2, equity offerings can be categorized into two groups, IPOs and SEOs. In practice, there are several topics common to both IPO and SEO studies: the determinants of offer underpricing, market timing and gross spread. Due to its particular characteristics, an SEO has unique features, relating to underwriting methods, market price and more information being available to the public. Thus, studie have looked at SEO announcement effects, the determinants for flotation costs, the reasons for choosing different underwriting methods, and the reasons for the difference in prominent underwriting methods among regions. The aim of this chapter is to introduce the important studies of equity offerings.

Flotation costs are an important portion of gross proceeds in equity offerings. As discussed in Chapter 2, these costs can be further divided into direct and indirect costs. Direct flotation costs include the fees paid to underwriters, registration and listing fees, legal fees, accounting fees and printing expenses. Underwriting fees represent the major portion of direct flotation costs. The studies on direct flotation costs are summarized in Section 3.3. Indirect flotation costs include underpricing, announcement effects and the probability of issue withdrawal; studies of these are discussed in Section 3.4. For IPO studies, indirect flotation costs do not include announcement effects, because the shares were (by definition) not publicly tradable before the IPO. First, though, in Section 3.2 I discuss the reasons why firms launch an SEO. The studies on the impact of underwriters on securities offerings are discussed in Section 3.5. Last but not the least, I discuss the studies on the effects of underwriter-investor network in the literature.

3.2. Reasons for Conducting Equity Offerings

Within the literature, there are three main explanatory frameworks for equity offerings, namely pecking-order theory, tax and leverage cost trade-off models, and market timing theory. There are also some other explanations, for example relating to the corporate lifecycle stage and near-term cash need. This section briefly considers these explanations. Table 1 shows a brief summary of these explanatory frameworks.

3.2.1. Pecking-Order Theory and Empirical Results

The pecking-order theory (Myers and Majluf, 1984)suggests that companies effectively rank their means of accessing capital. Companies prefer internal finance first (‘retention’), then safe securities (e.g. debt) and lastly riskier routes, such as equity. In short, when a company is facing investment opportunities, it will first use retention. If retention cannot meet the funding requirement, straight debt will be issued. Then, if the company still needs funding, it will issue convertible bonds (straight debt with a conversion feature). Equity is normally the last resort if extra capital required. Therefore, the motivation for a company to conduct an SEO is that all other measures have not been able to generate the cash flows required for investment.

Table 1 Reasons Why Companies Conduct Equity Offerings

Theory	Reason to Conduct Equity offerings	Studies
Pecking-order theory	The reason for a company to conduct an equity offering is that all other measures cannot generate the cash flows required for investment	Myers and Majluf (1984), Shyam-Sunder and Myers (1999), Leary and Roberts (2010)
Tax and leverage cost trade-off models	The reason for a company to issue equity is a change in either equity or debt, or even the debt target ratio itself. In order to keep to its target debt ratio, the company has to make equity offerings	Modigliani and Merton (1958), Fama and French (2002), Flannery and Rangan (2006), Chang and Dasgupta (2009)
Market timing	Managers try to sell highly priced shares when stock market conditions permit	Taggart (1977), Loughran and Ritter (1995), Loughran and Ritter (1997), Baker and Wurgler (2002), DeAngelo et al. (2010)
Corporate lifecycle stage	Young companies with high market-to-book ratios and low operating cash flows tend to sell equity to fund investment, while mature companies prefer to fund investment internally	Carlson et al. (2006), DeAngelo et al. (2010)
Near-term cash need	Issuers have to conduct equity offerings in order to avoid running out of cash in the near term	DeAngelo et al. (2010)

A basic pecking-order model is tested by Shyam-Sunder and Myers (1999). They estimate (using OLS regression) a firm's net/gross debt issued on its financing deficit for a small sample of 157 firms that survived from 1971 to 1989. They confirm the greater time-series explanatory power of the basic pecking-order model compared with a static trade-off model and draw the conclusion that the basic pecking-order model is an excellent first-order predictor of financing behaviour.

By contrast, Frank and Goyal (2003) selected a sample of US publicly traded firms, regardless of survival, from the period 1971–1998. The pecking-order theory turns out to be a poor predictor of firms' financing behaviour for their sample after implementing the same regression as that in Shyam-Sunder and Myers (1999). They confirm that the large firms show some aspects of pecking-order behaviour. However, the evidence is not robust if conventional leverage factors are included in the regression or the sample period is restricted to the 1990s. Furthermore, Frank and Goyal (2003) find a decline of over time in support for the pecking-order theory and propose two reasons for this: one is that more small firms have been listed publicly over time and small firms often do not follow the pecking-order theory; the other reason is that equity has become more important and, thus, the support of pecking-order theory declines even for larger firms.

The conclusion of Shyam-Sunder and Myers (1999) is also questioned by Fama and French (2005), who study a sample of companies that frequently issue large blocks of shares via SEOs. Their empirical results provide little evidence for the central predictions of pecking-order theory about how often and under what circumstance firms issue and repurchase equity. Due to the contradictions of the trade-off model's central predictions documented in their previous work (Fama and French, 2002), they suggest a combination of the two models to explain financing decisions.

Leary and Roberts (2010) select a sample of 34,470 firm-year observations over the period 1980–2005 drawn from Compustat to test the pecking-order theory. They find that fewer than 20% of firms follow the pecking-order predictions concerning debt and equity issuance decisions under the strict interpretation of pecking order that limits the variation in firms' saving and debt policies. This result remains the same even after relaxing the limits on firms' debt variation and allowing debt capacity to vary in a manner consistent with that of firms rated as investment grade in the same industry. However, if the debt capacities of the firms are allowed to vary with a variable often attributed to trade-off theory, the predictive ability of the pecking-order theory is increased and over 80% of the observed debt and equity issuance decisions are classified accurately. Leary and Roberts (2010) claim that this finding is consistent with Fama and French (2005) and both the pecking-order and the trade-off model cover elements that can explain financing decisions.

3.2.2. Trade-Off Theory and Empirical Results

Modigliani and Merton (1958) propose the trade-off theory of capital structure. Trade-off is described in many finance textbooks as a common practice adopted by companies. This theory supposes that the debt-equity decision can be viewed as a trade-off between interest tax shields and the costs of financial distress. In contrast with the pecking-order theory, which suggests that firms take on as much debt as possible, trade-off theory argues that companies should have a target debt ratio which balances the benefits brought by interest tax shields and the costs of financial distress or bankruptcy. Therefore, the trade-off theory suggests that the reason for a company to issue equity offerings is a change in either equity or debt, or even the debt target ratio itself. As a result, the company should implement equity offerings to maintain the target debt ratio.

Both the pecking-order model and the trade-off model are tested by Fama and French (2002). In summary, they claim the two models share many predictions about dividends and leverage. However, the two models also give contradictory views on some other issues. Both models predict: 1) a negative relationship between investment and book leverage; 2) a positive relationship between firm size and leverage dividend payout; 3) A negative marginal relationship between leverage and the target dividend payout ratio.

The trade-off model predicts a negative relationship between leverage and profitability. However, Fama and French (2002) find a positive relationship from their empirical tests. They also produce evidence for the leverage target reverting to the mean and this rate of mean reversion (7-17%) is low (Fama and French, 2002).

By contrast, Flannery and Rangan (2006) find firms move relatively quickly towards their target debt ratio, claiming a rate of mean reversion of more than 30% per year. The inconsistency of the adjustment speed between Flannery and Rangan (2006) and Fama and French (2002) suggests some testable assumptions about the adjustment speed and the dynamic properties of target leverage (Flannery and Rangan, 2006). Table 2 shows the effects of exclusion of partial adjustment and firm fixed effects on the adjustment speed summarised by Flannery and Rangan (2006).

Table 2 Effects of Exclusion of Partial Adjustment and Firm Fixed Effects on the Adjustment Speed

Assumptions	Example of Studies	Effect	Conclusions from Flannery and Rangan (2006)
A firm's observed capital ratio is also its desired (target) ratio; when the market debt ratio (MDR) is the dependent variable, the coefficient on lagged MDR is zero	Fama and French (2002)	When the lagged MDR is added, it has a very highly significant coefficient; thus, ignoring lagged MDR would lead to an incorrect model specification	Partial adjustment toward a target capital ratio exists
Firm fixed effects can be excluded	Fama and French (2002), Baker and Wurgler (2002), Huang and Ritter (2009)	Firm-specific unobserved effects substantially influence estimated adjustment speeds, apparently because they substantially sharpen estimates of the target debt ratio	Exclusion of firm fixed effects is unwarranted
Target measurement noise can be included	Flannery and Rangan (2006)	Adding target measurement noise will bias the estimated coefficient on MDR toward unity. A noise volatility of 20% to 25% roughly halves the estimated adjustment speed from 34.5% to about 17%	The effect of noisy targets on the estimated adjustment speed is substantial

Chang and Dasgupta (2009) claim that target adjustment behaviour, direct rebalancing behaviour and significant firm-specific variables are observable in leverage regressions even in samples through simulations in which no target behaviour is assumed. As a result they doubt the effectiveness of existing tests of target behaviour based on leverage ratio changes. Additionally, they suggest that we need to look at financing behaviour (debt versus equity choices) to determine the useful tests in identifying target behaviour. Table 3 illustrates conclusions drawn from test results on simulation samples under three types of tests.

Table 3 Conclusions Based on Simulation Samples

Test	Representative Studies	Results on Simulation samples	Conclusion
Adjustment speeds	Fama and French (2002), Flannery and Rangan (2006)	A move from random financing to vigorous target behaviour generates only a 10% change in the estimated speed of adjustment	The estimated speeds of adjustment are likely to provide a very imprecise picture of the extent of rebalancing going on in the data
Direct evidence of rebalancing behaviour	Leary and Roberts (2010), Alti (2006),	Mechanical effects can arise when firms do not follow target behaviour	Tests of rebalancing behaviour do not have the power to reject mechanical effects associated with non-target behaviour
Significant effects of firm-specific variables in leverage regressions	Frank and Goyal (2003)	Even for simulation samples, several firm-specific variables are statistically significant in leverage regressions	It is difficult to conclude the observed relationship between a particular firm-specific variable and the leverage ratio in the actual sample

De Jong et al. (2011) focus on financing decisions for which the trade-off theory and the pecking-order theory have different predictions. Their sample comes from the Compustat and CRSP database for the period 1985–2005. They find that, for over-leveraged firms, more than three-quarters of the observations reflect a further increase in leverage further through issuing debt. This result agrees with the pecking-order theory, which assumes that debt is favoured over equity. For under-leveraged firms, De Jong et al. (2011) find that firms prefer to repurchase equity first, and then debt. Thus, the static trade-off theory is a better predictor for repurchase decisions.

3.2.3. Market Timing and Empirical Results

Since both the pecking-order theory and the trade-off model are problematic (Fama and French, 2002; Leary and Roberts, 2010), some other explanations have been developed for the reasons of conducting equity offerings. Among them, the market timing hypothesis may be the most popular. The underlying thinking of the market timing hypothesis is that managers try to sell highly priced shares when stock market conditions permit.

The relevant studies can be categorized into four groups according to their findings (Baker and Wurgler, 2002). The first group shows that firms tend to issue equity rather than debt when market value is high and tend to repurchase equity when market value is low. For the second group, analysis of long-run post-issue stock returns suggests that issuers use, on average, successful market timing strategies. Thirdly, firms prefer to issue equity when investors are over-optimistic about earning prospects after analysing the profitability forecasts and realisations around equity issues. Finally, anonymous surveys show that managers admit to using market timing strategies.

3.2.3.1. Market-to-Book Ratio and Stock Return

Baker and Wurgler (2002) utilize a historical market-to-book ratio to capture firms’ past attempts at market timing. After controlling for current investment opportunities in the form of current market-to-book ratio, the historical market-to-book ratio can be interpreted as a proxy for mispricing. They find a significantly negative relationship between leverage and the historical market-to-book ratio, a finding in line with the market timing hypothesis.

In the trade-off framework, the market-to-book ratio is often used as a measure of growth opportunities (Fama and French, 2002). A high market-to-book ratio can be viewed as a sign of high growth options. Therefore, controlling for firms' growth opportunities is necessary and important when interpreting market-to-book ratio as an indicator of mispricing.

Hertzel and Li (2010) implement a methodology proposed by Rhodes–Kropf et al. (2005) that decomposes the pre-issue market-to-book (MTB) ratio into misevaluation and growth option components. They find issuing firms have greater mispricing and greater growth options compared with the overall market. This finding is interpreted as evidence that both firm-level overvaluation and financing needs affect managerial decisions to issue equity.

Besides market-to-book ratio, pre-issue return is also a proxy used by studies to capture attempts at market timing. Lyandres et al. (2008) confirm that firms with large stock price increases are more likely to issue equity and repurchase debt than firms with stock price declines. Graham and Harvey (2001) conduct a survey suggesting the recent stock price performance is one of the most important factors affecting the decision to issue equity.

Additionally, Altı and Sulaeman (2012) study timing behaviour by investigating equity issues that follow periods of high stock returns. They find that only when institutional investor demand is strong do stock price increases have a significant impact on the likelihood of equity issuance. When institutional investor demand is weak, there is little evidence in support of timing behaviour.

3.2.3.2. Long-Run Post-Issue Underperformance

Market timing can also be detected by examining the long-run stock returns of issuers. Loughran and Ritter (1995) find that firms issuing either IPOs or SEOs during 1970–90 have low long-run return over the five years after the issue. However, the low long-run return cannot be fully explained. Loughran and Ritter (1995) suggest a new explanation: that firms tend to take advantage of transitory windows of opportunity by issuing equity when they are overvalued. Loughran and Ritter (1997) also document the declines in profit margin and return for issuers, relative to non-issuers, within four years of offering, in their sample of SEOs from 1979 to 1989.

However, some studies propose alternative explanations for the long-run underperformance based on return benchmark misspecification. Brav et al. (2000) find that IPO returns are similar to non-issuing firm returns in event time performance tests after matching on firm size and book-to-market ratios. Although SEO returns show some underperformance relative to various characteristic-based benchmarks, time series factor models show that SEO returns covary with non-issuing firm returns. Additionally, Brav et al. (2000) suggest that model misspecification could be an important consideration in long-run performance tests.

Eckbo et al. (2000) find that issuer stocks are on average less risky than stocks of matched firms due to changes in unexpected inflation and default risk and stock liquidity caused by equity issues. Therefore, issuer stocks require lower expected returns than those of firms matched on size and book-to-market ratio. As a result, they argue that the abnormal performance is caused by the failure of the matched firm technique of Loughran and Ritter (1995). Carlson et al. (2006) also support Eckbo et al. (2000) by showing that standard matching procedures fail to fully capture the dynamics of risk and expected return by developing a real option theory of observed returns throughout the SEO episode. They argue that expected returns of issuer stocks decrease because growth options are converted into lower-risk assets.

As discussed in the previous section, Hertzel and Li (2010) divide market-to-book ratios into three components. They find that SEO firms with high misevaluation have significant negative abnormal returns. The conclusion still holds even after controlling for the investment factor proposed by Lyandres et al. (2008). Moreover, no relationship between post-issue abnormal returns and the pre-issue growth option component of MTB (market to book ratio) is found. Their results provide evidence for the real investment explanations of low post-issue stock returns.

Altı and Sulaeman (2012) implement two approaches, event-time and calendar-time, to detect SEO long-run return performance. The event-time approach is mainly used in descriptive analysis. The calendar-time approach shows significantly negative alphas of long-run returns. Additionally, Altı and Sulaeman (2012) claim that institutional demand for issuers' stocks has insignificant effects on the long-run post-issue underperformance of the issuing companies.

3.2.3.3. Other Empirical Studies Related to Market Timing

Mahajan and Tartaroglu (2008) test the equity market timing hypothesis in major industrialized G-7 countries. They find that the historical market-to-book ratio is inversely related to leverage in most industrialized countries. Additionally, they confirm that firms in G-7 countries (except Japan) rebalance their capital structure after equity issuance. Meanwhile, a negative relationship between current market-to-book ratio with book leverage for US and Canadian firms is documented when the historical market-to-book ratio is included in the regressions. This result is consistent with the trade-off framework.

In contrast, Hovakimian and Hutton (2010) find evidence that is inconsistent with the market timing hypothesis. Their research supports the market feedback hypothesis proposed by Jegadeesh et al. (1993). This hypothesis suggests that high post-issue performance conveys the market's belief that the marginal return to the firm's projects is high, encouraging managers to raise additional capital to increase the firm's investment. Additionally, they document some support for the effects of institutional investors in the market feedback mechanism.

Jenter et al. (2011) employ a sample of put option sales on company stocks by large US firms to examine the market timing hypothesis. The put option sale setting can overcome two problems that many previous studies examining equity issues have suffered from: the first is the difficulty in interpreting equity issues and repurchases; the second is associated with measuring abnormal returns over long periods of time. Jenter et al. (2011) claim their method can address both. When stocks are undervalued, managers tend to sell puts on their stocks. They document a 5% abnormal stock return in the 100 days following put option issues. Additionally, much of the abnormal return follows the first earnings release date after the sale. This result suggests that managers can identify the mispricing of equity and use securities issues to time the market.

3.2.4. Other Explanations for Equity Offerings

Besides the above explanations, DeAngelo et al. (2010) propose two explanations for conducting SEOs, namely corporate lifecycle and near-term cash need. The lifecycle theory hypothesis suggests that young companies with high market-to-book ratios and low operating cash flows tend to sell equity to fund investment intermediately. As these growth-stage issuers represent a large proportion of all issuers, the pre-SEO share price increases reflect an increase in the value of growth option.

DeAngelo et al. (2010) find that both the market-timing theory and the corporate lifecycle theory have statistically significant support from empirical data on the decision to conduct an SEO. However, they argue that neither theory adequately explains SEO decisions because the majority of issuers are not growth firms and the vast majority of firms with good market-timing opportunities fail to issue stock. DeAngelo et al. (2010) therefore claim that a near-term cash need is the primary motive for conducting an SEO, as 62.6% of issuers would have run out of cash in the year after the SEO without the proceeds.

3.3. Studies on Direct Flotation Costs

As indicated in Section 2.5, the underwriter's gross spread is the main direct cost of an SEO. This section first focuses on two theories proposed to determine underwriting spread, namely economy of scale and U-shape underwriting spread. Then, the 7% solution and net proceeds maximization theory are discussed. Finally, this section considers the effects of liquidity and information asymmetry on underwriting spread.

3.3.1. Economy of Scale and U-Shaped Underwriting Spread

Smith (1977) examined mean underwriter fees and the other expenses of IPOs and SEOs across issue size categories and three major underwriting methods, namely firm commitment, best efforts and rights offers. In the research, Smith (1977) claims two findings. First, issue size is negatively related to underwriter fees as a percentage of gross proceeds. This could be explained by bigger economies of scale leading to more efficiency in relation to fixed costs. Secondly, underwriting spread could be affected by different underwriting methods. Smith (1977) documents that firm commitment offers have the highest mean underwriting spread, while rights offers have the lowest mean underwriting spread for issues of comparable size.

Studies of underwriting spread in SEOs are mainly restricted to the firm commitment method, as that is dominant. Lee et al. (1996) investigate the direct flotation costs (including underwriting spread and other expenses) of IPOs, SEOs and convertible and straight corporate debt issues from 1990 to 1994. They find direct costs of SEOs show economies of scale, which is consistent with the findings of Smith (1977). Additionally, they find direct costs average 7.1% for SEOs.

However, more capital raised does not always mean the reduction of underwriting spreads. Altinkilic and Hansen (2000) find that fixed costs are no more than 10% of total fees on average when they investigate the underwriting spread on 1325 SEOs from 1990 to 1997 in the US market. Further, their research finds that issuers face U-shaped spreads: the spread initially declines as the fixed cost is distributed over the proceeds, but then increases after the capital raised exceeds a certain amount, due to diseconomies of scale and the increase in variable costs. Such a U-shaped relationship is confirmed by Hansen (2001), Drucker and Puri (2005) and Kim et al. (2010).

The explanation of economy of scale is supported by recent empirical evidence. Lee and Masulis (2009) find that the log of net proceeds is negatively related to gross spreads in their regression tests after researching a sample of 963 SEOs over the period 1990–2002. Jeon and Ligon (2011) use gross proceeds as a control variable and confirm the negative effect of gross proceeds on underwriting spread.

3.3.2. The 7% Solution and Net Proceeds Maximization Theory

Chen and Ritter (2000) find that more than 90% of the IPOs (the proceeds of these IPOs are from $20 million to 80 million) from 1995 to 1998 had a spread of 7%. This clustering of spreads is called the 7% solution. However, only 26% of the IPOs from 1985 to 1987 had a 7% spread. Chen and Ritter (2000) attribute this phenomenon to investment bankers tending to use non-price competition, such as analyst coverage and price support instead of low underwriting spread in order to attract deals. However, Hansen (2001) claims there is no evidence that investment bankers collude to profit from the 7% solution and argues that the 7% gross spread is in fact an efficient contract, as a 7% spread is normally profitable.

According to Garner and Marshall (2010), more than one-third of IPOs did not charge 7% spreads in a sample of 2265 firm commitment IPOs between 1993 and 2004. Furthermore, Garner and Marshall (2010) find that those IPOs where underwriters charge less than 7% are normally underwritten by middle-tier underwriters. They consider this phenomenon as evidence of a trade-off between IPO compensation and future SEOs business.

Chen et al. (2009) investigate the clustering of spreads at the 7% level for an American Depositary Receipt (ADR) sample from 1980 to 2004 and confirm its existence for ADR IPOs but not SEOs. They therefore claim that US underwriters set gross spreads differently for IPOs and SEOs.

Yeoman (2001) develops the net proceeds maximization theory, which is different from the 7% solution. The net proceeds maximization theory sets out to explain how spread and offering price are determined in all underwritten offerings, including IPOs and SEOs. In short, Yeoman (2001) suggests that a potential trade-off or substitution relationship exists between underwriting spread and equity underpricing. To build the study, Yeoman (2001) generates both optimal spread and offering price for equity issues by equilibrium constraints initially. Thereafter, Yeoman (2001)tests the optimal spreads obtained from the first step with a sample of 1143 SEOs from 1988 to 1993 and presents evidence for the net proceeds maximization theory.

However, Garner and Marshall (2010) find no evidence support the net proceeds maximization theory. They suggest there is no significant relationship between IPO underpricing and underwriting spread. Additionally, Kim et al. (2010) test three possible relationships between SEO underwriting spread and underpricing: insignificant relationship, substitution relationship and complementary relationship. Kim et al. (2010) find potential `joint determination' of underwriting spreads and initial returns. Their sample comprises 4875 IPOs and 4348 SEOs from 1980 to 2000. By implementing a 3SLS approach, their study confirms the existence of a complementary relationship. In other words, underwriting spreads are positively and significantly related with underpricing for both IPOs and SEOs.

3.3.3. Liquidity, Asymmetric Information and Underwriting Spread

Butler et al. (2005) suggest that stock market liquidity is an important determinant of the costs of raising external capital. A liquid market will facilitate market-making. Investment banks generally play the market-making role in placing an equity offering, and they will be expected to charge a lower underwriting spread if the market is more liquid.

To test this, Butler et al. (2005) employ a sample of 2387 SEOs from 1993 to 2000 and find that total investment banks' fees (gross spread) are indeed substantially lower for firms with more liquid stocks. Butler et al. (2005) incorporate SEO gross spreads and a set of liquidity variables into a regression. To control for the effects of other factors, their study also uses several factors suggested in the previous literature as control variables. These include lead manager reputation, return volatility, share price, firm size, principal amount and several dummy variables. Their study not only confirms that stock market liquidity can reduce gross spread but also suggests that the effect of liquidity is stronger for large equity issues. In other words, the marginal cost of illiquidity is higher for a large issue.

Lee and Masulis (2009) also support the role of asymmetric information in determining underwriting spreads. However, they note that common measures of information asymmetry lack strong theoretical support. These include stock return volatility (e.g. Altinkilic and Hansen, 2003; Corwin, 2003; Drucker and Puri, 2005), analysts' earnings forecast dispersion, debt ratings and bid–ask spread (Corwin, 2003). As a result, Lee and Masulis (2009) build their own, alternative measure of information asymmetry, which employs accounting information quality as the proxy. The underlying theory is that accounting statements are the primary source of information about corporate performance available to outside investors; therefore, if the accounting quality deteriorates, the investors' uncertainty about the firm should rise and demand for its equity should fall, leading to more underwriting efforts and a higher underwriting spread.

In their study, Lee and Masulis (2009) employ two models to measure accounting quality, namely the MDD and the FDD models. MDD and FDD are the two extensions of DD model (built by Dechow and Dichev (2002)) which measure a firm's information asymmetry by its accounting information quality. The reason for Lee and Masulis (2009) to use the extensions of DD model is that they consider accounting information as more direct approach to assessing the information available to outside investors than the other more commonly used proxies. The basic idea of their method is to represent the accrual quality by the standard deviation of a firm's cross-sectional regression residuals across the period. Larger standard deviations of residuals mean a greater portion of current accruals left unexplained by the models; in other words, accrual quality is lower. After using accrual quality to measure information asymmetry, the regression results confirm the significantly positive relation between information asymmetry and gross spreads.

Besides accounting quality, Jeon and Ligon (2011) propose a new factor which may also be related to information asymmetry. The new factor is the reputation of co-managers in the syndicate. They extend the research on the effect of co-managers on flotation costs from IPOs (Corwin and Schultz, 2005) to SEOs.

Their hypothesis is that the prestige of the underwriting bank will be related to the credibility of the certification of an issue (a highly prestigious bank will enhance the quality), which may reduce information asymmetry and therefore lower SEO flotation costs. Jeon and Ligon (2011) employ 2071 completed and 183 withdrawn SEOs from 1997 through to 2007. Besides the effects of the reputation of co-managers on underwriting spread, they investigate the effects of commercial bank co-managers (versus investment bank co-managers) as well as the number of co-managers on underwriting spread. Their results suggest the inclusion of commercial bank co-managers significantly reduces underwriting spread. Moreover, the relationship between underwriting spread and the number of co-managers is quadratic. The number of co-managers has a positive relationship with underwriting spread initially and a negative relationship thereafter, when the number of co-managers is large.

3.4. Studies on Indirect Flotation Costs

This section will provide an overview of indirect flotation costs in equity offerings. Unlike direct flotation costs, indirect flotation costs represent the implicit compensations paid by an issuer to underwriters. Indirect flotation costs typically include announcement effects, underpricing, offer withdrawal and delays. The first two are the most commonly discussed, probably because only a small fraction of all proposed issues are withdrawn or delayed. Furthermore, as there is no market price for shares before IPOs, announcement effects apply only to SEOs. Therefore, this section first summarizes the studies on the announcement effects of SEOs, then studies on the underpricing of equity offerings are investigated and finally a brief introduction is given to the literature on the withdrawal or delay of share offerings.

3.4.1. Announcement Effects

Masulis and Korwar (1986) find a negative stock price change after the announcement of an SEO in a sample from 1963 to 1980. Their sample includes 972 primary stock offerings, 242 combined primary and secondary stock offerings, and 182 dual debt and equity offerings. They confirm statistically that the information conveyed by the offerings of industrial firms is much greater than for public utilities. To implement a regression analysis, they employ several explanatory variables, including percentage change in outstanding shares, changes in financial leverage, stock return volatility and a dummy variable indicating management share sales. The analysis provides evidence that stock price changes are proportional to changes in management's proportion of shareholdings in the firm. This result is consistent with the agency model proposed by Jensen and Meckling (1976). Furthermore, consistent with Masulis (1983), Masulis and Korwar (1986) also suggest that returns during the announcement period are positively related to leverage change.

Many empirical studies have followed Masulis and Korwar (1986) and provide evidence of the significantly negative market reaction to SEOs. Hansen and Crutchley (1990) find that the abnormal return during the announcement period, defined as from one day prior to the announcement to the announcement date, is on average -3.65% in their sample. Korajczyk et al. (1991) research the abnormal returns on SEOs in more detail. They find average abnormal returns of -2.26% and -0.43% on the day preceding and the day of the announcement respectively. Denis (1991) finds that the announcement period abnormal returns are -4.33% for shelf offerings and -3.62% for non-shelf offerings. He defines the announcement period as the two days from the day prior to the announcement date to the announcement date. Bayless and Chaplinsky (1996) use the same definition and find an average abnormal return of -2.5% over the sample period from 1974 to 1990.

Chaplinsky and Ramchand (2000) use a different definition of the announcement period, as the day prior to the announcement date to the day after the announcement date, represented as day -1 to day +1, where day 0 is the announcement date. Using this definition, they compare the price reaction to the announcements of SEOs for both US issues and global issues and report that the cumulative abnormal returns (CARs) for US offers and global offers are -2.4% and -2.2% respectively.

Altinkilic and Hansen (2003) use a sample of 1703 SEOs from 1990 to 1997 to investigate reactions to the announced offer price. They find an announcement period abnormal return of -2.23%. After implementation of a cross-section estimation of the announcement period abnormal returns, Altinkilic and Hansen (2003) confirm the existence of a statistically significant negative relationship between the expected discounting and the announcement reaction, which suggests that investors account for expected discounting when they learn of the SEO.

3.4.2. Explanations of Announcement Effects

This section will first discuss the three main hypotheses explaining announcement effects: the price-pressure hypothesis, the wealth redistribution hypothesis and the information release hypothesis (Kalay and Shimrat, 1987). Some models based on the information release hypothesis will be discussed thereafter.

3.4.2.1. Three Hypotheses Related to Announcement Effects

The price-pressure hypothesis is proposed by Myron (1972), who claims that the demand curve of the shares offered is downward sloping. When SEOs are announced, investors will expect more shares to be poured into the market and the price of the security will therefore decrease. However, the evidence for this hypothesis is mixed (e.g. Masulis and Korwar, 1986; Asquith and Mullins, 1986).

The underlying theory of the wealth redistribution hypothesis is that there is an offset relationship between the market value of outstanding bonds and outstanding equity. Due to the increase in the equity, the leverage ratio of the firm decreases, which means the risk debt is also lowered. As a result, the market value of debt is raised, and as a corollary the market value of equity decreases because the value lost by shareholders are granted to bondholders. Masulis and Korwar (1986) find empirical evidence for the wealth redistribution hypothesis and suggest a negative relation between the abnormal return on the announcement day and the leverage change caused by the issuance. However, after taking the relative size of the issue into consideration, the negative relationship no longer exists (Masulis and Korwar, 1986; Asquith and Mullins, 1986).

The basic idea of the information release hypothesis is that the market assumes that firms possess superior information compared with outside investors. Therefore, equity offerings can be treated as a signal of negative information released by the issuers (Brealey et al., 1977; Myers and Majluf, 1984; Merton and Rock, 1985).

Kalay and Shimrat (1987) investigate the three above hypotheses, to see which has the most explanatory power. Their empirical results suggest that bond prices are negatively related to the announcement of equity offerings. As a result, they conclude that the information release hypothesis is the prevailing factor affecting share prices. However, they also suggest that the other two hypotheses are still worth consideration.

3.4.2.2. Adverse Selection, Agency Issues and Information Asymmetry

Models based on the information release hypothesis are also called adverse selection models. The underlying assumptions are that, first, managers aim to maximize the wealth of shareholders; and second, that capital markets are efficient. Myers and Majluf (1984) predict that managers prefer to issue equity when the current stock price is higher than its intrinsic value. Therefore, rational investors will interpret the decision to offer further equity as a signal that shares are overvalued and the share price will therefore decrease.

An alternative framework for adverse selection relates to agency issues. This framework is based on the idea that managers are motivated to pursue their own private benefits. Thus, the money raised by firms may be used for such agency spending, and the market will react negatively in this situation. Jung et al. (1996) find that firms without valuable investment opportunities have more negative announcement returns than firms with better investment opportunities. To identify the investment opportunities, Habib and Ljungqvist (2001) use book–market ratios as the proxy. They interpret their results as strongly supporting the agency model.

Walker and Yost (2008) also find a negative announcement period abnormal return, averaging -2.76%. They define the abnormal return as a two-day cumulative return (over the announcement date and the day after announcement date). Their study mainly investigates how the stated use of proceeds in the prospectus of SEOs affects flotation costs. To gather information on the stated use of proceeds, Walker and Yost (2008) check firms' registration files, which are available from the Securities and Exchange Commission online. They mainly categorize the stated use into three groups, namely investment, debt reduction and general corporate purposes. Walker and Yost (2008) note that most firms increase their level of investment regardless of what they say in the registration files and find that firms giving 'general corporate' reasons for the share issue normally show a significantly negative abnormal return during the announcement period. They conclude that the market reacts more positively towards firms with more specific stated use of proceeds than towards those ones with vaguely stated plans.

Lee and Masulis (2009) study the underlying reasons for announcement effects. Though their work is based on both adverse selection and alternative agency model frameworks, they utilize accrual quality (accounting information quality) as a proxy to measure information asymmetry. They hypothesize that poor accrual quality prevents investors from evaluating the true financial status of the issuing firm and increases information asymmetry between issuers and investors. In this situation, the probability of both adverse selection and moral hazard is higher, which leads to larger negative SEO announcement effects. Their hypothesis is supported by empirical results showing a significant negative coefficient of the accruals quality measures.

Jeon and Ligon (2011) research the relationship between information asymmetry and announcement effects. In contrast with earlier literature, they measure the degree of information asymmetry by the characteristics of co-managers. Based on the idea that co-managers can reduce information asymmetry in SEO transactions, they hypothesize that: 1) the announcement return will increase with the number of co-managers if co-managers can certify the value of the issuing firm; 2) announcement returns will be positively associated with the inclusion of highly reputable co-managers and commercial bank co-managers if such highly reputable co-managers can credibly certify the value of the securities. Their empirical results show that: 1) there is no significant relationship between the number of co-managers and the announcement returns; and 2) the high reputation co-managers can play a certification role, reducing the information asymmetry in SEOs, and thus increasing the announcement return of SEOs.

3.4.3. Empirical Studies on Underpricing of Equity Offerings

Most theoretical studies attribute the underpricing of equity offerings to information asymmetry. However, it is difficult to test the explanations of equity underpricing based on information asymmetry directly. A number of empirical studies have focused SEOs since they became popular in the 1990s. Those on underpricing can be divided into two main groups, those undertaking a long-run analysis of equity underpricing and those looking at the determinants of underpricing.

3.4.3.1. Long-Run Analysis of Equity Underpricing

The long-run average underpricing of both IPOs and SEOs has experienced significant changes. Lowry et al. (2010) find that the monthly mean of IPO initial returns is 12.1% from 1965 to 1980. However, the IPO initial returns rise to 25.8% from 1991 to 2005. Autore (2011) finds that the SEO mean discounting is 0.87% from 1982 to 1987, then increases to 2.16% between 1988 and 1993, and is 3.03% in 1994–1999 and 3.20% in 2000–2004. Many scholars have tried to explain these results.

Long-Run IPO Underpricing

Loughran and Ritter (2004) confirm that IPO average underpricing doubled from 7% during 1980–1989 to nearly 15% during 1990–1998. Thereafter, the mean underpricing of IPOs dropped from 65% during 1999–2000 to 12% during 2001–2003. Their study also examines the three hypotheses for the long-run change in underpricing: the changing risk composition hypothesis (Ritter, 1984), the realignment of incentives hypothesis (Ljungqvist and Wilhelm, 2003) and the changing issuer objective function hypothesis (Loughran and Ritter, 2004).

The changing issuer objective function hypothesis suggests that, given constant levels of managerial ownership and other characteristics, issuers may become more willing to accept underpricing. According to Ljungqvist and Wilhelm (2003), there are two reasons why this might be. The first is that issuers may be willing to accept excessive underpricing if the underwriters can provide satisfactory analyst coverage. The second reason is the co-opting of decision-makers through side payments. This refers to the behaviour whereby underwriters allocate ‘hot’ IPOs (those likely to prove highly profitable) to venture capitalists and the executives of issuing firms. This is known as spinning and began in the 1990s, becoming commonplace by the end of the decade.

According to the empirical results of Loughran and Ritter (2004), the risk composition hypothesis could partially explain the changes in IPO underpricing, but there is little evidence supporting the realignment of incentives hypothesis. Loughran and Ritter (2004) confirm that analyst coverage and side-payments to CEOs and venture capitalists were significantly related to underpricing during the internet bubble.

Lowry et al. (2010) implement a study on the relationship between IPO initial return and IPO initial return volatility. Their underlying theory is that IPO initial return volatility could reflect the difficulty of pricing IPOs. Testing empirically, they find that the IPO initial return volatility fluctuates greatly over time. They claim a strong positive correlation between the mean and the volatility of initial returns over time. In order to explain the fluctuation of the IPO initial return volatility, Lowry et al. (2010) test it against type of issuer as well as variation in market-wide conditions. Theoretically, young, small and technology firms are more difficult to price. Therefore, when the proportion of these types of firms is higher, IPO initial return volatility should also be higher, due to the uncertainty. Lowry et al. (2010) estimate the influence of each characteristic on both the level and the uncertainty of firm-level initial returns by implementation of maximum likelihood estimation (MLE). The empirical results suggest that both the mean and the variability of initial returns are relatively high for those types of issuer that are especially difficult to value.

Lowry et al. (2010) also use ARMA models to account for residual autocorrelation and EGARCH models to account for heteroskedasticity, so that they are able to examine whether there are likely to be additional time-series factors. After adding the time-series terms, the coefficients of firm characteristics are unchanged. Thus, Lowry et al. (2010) confirm that firms with greater uncertainty tend to produce greater initial returns.

Lowry et al. (2010) also suggest that other factors, such as market-wide conditions, have an important effect on IPO pricing according to the significance of the time-series parameters. They use both the NASDAQ time-series return volatility and the NASDAQ cross-section return volatility to capture monthly initial returns. They find little evidence for a positive relationship between average initial returns and the NASDAQ cross-sectional return volatility, and no evidence to support any significant relationship between the NASDAQ cross-sectional return volatility and initial return volatility. However, they do find a significant relationship between NASDAQ time-series return volatility and the level and volatility of IPO initial returns.

Long-Run SEO Underpricing

Mola and Loughran (2004) examine three hypotheses to explain the long-run change in SEO underpricing, namely the changing issuer composition hypothesis, the short-selling hypothesis and the leaving a good taste hypothesis. Their results suggest that none of these can fully explain the increasing SEO discount. Therefore, they propose their own hypothesis, which they call the increased investment banking power hypothesis.

The changing issuer composition hypothesis suggests that as most SEOs are now increasingly through NASDAQ, NASDAQ issues overall will increasingly reflect the characteristics of the SEO market. This hypothesis is consistent with the assumptions made by Altinkilic and Hansen (2003), who employ 'NASDAQ-listed firms' as a variable. Since NASDAQ issues often involve greater uncertainty than NYSE/Amex SEOs, having more issues done on NASDAQ should mean greater average SEO discounts. However, counter to expectation, NYSE/Amex SEO discounts also show a statistically significant increase during the sample period from 1986 to 1999. In other words, the changing issuer composition hypothesis has its limitations in explaining the increase in average SEO discount. Mola and Loughran (2004) also find little evidence to support the short-selling hypothesis. They find that issuers with no SEO during the previous year reported larger SEO discounts than firms with an SEO in that year. Thus, they claim some evidence for the leaving a good taste hypothesis, which assumes large discounts are given because firms want to come back later for additional funding.

In addition, Mola and Loughran (2004) find evidence to support their own increased investment banking power hypothesis, which suggests that banks use analyst coverage to extract extra benefit from issuers for themselves. Therefore, they examine analyst coverage and the characteristics that determine the SEO market share of underwriters and find evidence of market concentration in the SEO underwriting industry. They conclude that the changing composition and investment banker power hypotheses can explain the long-run change of SEO underpricing.

Kim and Shin (2004) attribute the increase in SEO underpricing to the implementation of Rule 10b-21 by the US Securities and Exchange Commission (SEC) on August 25, 1988. This rule imposes the restraints to the covering of short sales using shares from Seasoned Equity Offerings. The purpose of the rule is to minimize manipulative short selling prior to SEOs. However, Corwin (2003) and Kim and Shin (2004) find that abnormal negative returns still increased after the implementation of Rule 10b-21. The underlying idea of the short-selling hypothesis is that Rule 10b-21 actually restricts informational short sales and reduces the information of prices, thereby increasing underpricing. Kim and Shin (2004), by introducing a dummy variable, show that the implementation of Rule 10b-21 has positive effects on SEO underpricing. After checking all the hypotheses they could find, Kim and Shin (2004) suggest the implementation of Rule 10b-21 is linked to the increase of in SEO underpricing.

Autore (2011) argues that the theoretical models supporting the hypothesis that Rule 10b-21 increases SEO discounting, on three grounds: first, shares are not always allocated to manipulative investors; second, underwriters can still use information collected in the book-building process to price the offer, even though the information is limited by Rule 10b-21; and third, Rule 10b-21 affects informed short sellers who have favourable information more than short sellers who have negative information.

Autore (2011) then builds his own methodology to test the hypothesis that Rule 10b-21 increases SEO discounting. The test is based on a sample of shelf-registered offers. Shelf-registered offers were initially excluded from the effect of Rule 10b-21, until September 2004. The results suggest that the discounting of shelf offers slightly decreases after the regulation took effect. To exclude the effects of market-wide differences on empirical results, Autore (2011) employs a difference-in-difference methodology. The study analyses the impact of the adoption of Rule 10b-21 in 1988 by using shelf offers as a control group, since shelf offers were exempt from that rule at that time. The study shows that the rule seems to increase discounting in shelf offers by approximately the same amount that it increases discounting in traditional offers. Therefore, the study provides evidence that the pre-issue short-sale constraints do not increase SEO discounting. Autore (2011) attributes the increasing of SEO discounting to the increasing popularity of overnight shelf offers.

3.4.3.2. Determinants of SEO Underpricing

Two studies comprehensively analyse the determinants of SEO underpricing. Altinkilic and Hansen (2003) suggest the discounting can be divided into expected and surprise components. They include six variables identified with the expected components in earlier empirical models of underpricing in seasoned offers. These variables are the amount of the offering, the relative size, stock return volatility, stock price, NASDAQ listing and lead bank reputation. The paper also includes offer-day returns as the surprise components. All of these components are statistically significant. Besides these, they also include the inverse Mills' ratio and other possible variables, such as industry-specific dummy variables and dummy variables for each calendar year. The inverse Mills' ratio is significant and none of the industry and offer-year dummy variable effects are statistically significant.

Corwin (2003) also implements multivariable models to examine the determinants of underpricing for SEOs. The determinants selected include uncertainty and asymmetric information, price pressure, pre-offer price moves and manipulative trading, transaction cost savings and underwriter pricing practices. The empirical results confirm the significantly positive relationship between SEO underpricing and the level of uncertainty about firm value. The results also suggest a significantly positive relationship between underpricing and relative size. The effect is pronounced when there is relatively inelastic demand for the shares. However, little evidence is found for a reliable relationship between SEO underpricing and proxies for asymmetric information.

Corwin (2003) uses market-adjusted returns prior to the offer to examine the manipulative trading hypothesis. The bid–ask spread is utilized to measure transaction cost savings. Corwin (2003) finds little evidence to support a relationship between bid–ask spread and underpricing. Corwin adds conventional underwriter pricing practices into the analysis, in contrast to Altinkilic and Hansen (2003). Strong evidence is found for SEO prices, rounded to even-dollar amounts or $0.25 increments. This study also confirms that the offer price is likely to be set at the closing bid quote for NASDAQ offers and at the closing transaction price for NYSE offers.

Following these two studies of the determinants of SEO underpricing, other studies proposed new factors. These include a new proxy for information asymmetry (Chemmanur and Yan, 2009), the roles of institutional investors (Chemmanur et al., 2009) and the role of underwriting syndicates (Jeon and Ligon, 2011; Huang and Zhang, 2011). Chemmanur and Yan (2009) implement a new method to deal with information asymmetry in equity offerings. They first assume that a firm faces asymmetric information in both the product and the financial markets. If a firm needs external financing to fund its growth opportunities, the product market advertising is visible to the financial markets as well. In this situation, the firm will naturally consider a combination of product market advertising, equity underpricing and underfinancing to convey the product quality and the intrinsic value to customers and investors. Therefore, product market advertising and equity underpricing can be treated as substitutes for each other when a firm issues new equity. This hypothesis is tested by Chemmanur and Yan (2009) with a sample of 1517 equity offerings[7] from 1990 to 2000. They find supportive evidence for their hypothesis in the context of firms making IPOs and SEOs. In addition, they study information asymmetry and the roles of institutions.

Chemmanur et al. (2009) suggest two possible roles for institutions with private information about SEOs: manipulative trading and information production. For the information production role, they assume that institutions produce information about issuers and request allocations in SEOs about which they obtain favourable private information. From a large sample of transaction-level institutional data, they find support for an information production role for institutions instead of a manipulative trading role. They also find that more pre-offer institutional net buying and larger institutional allocations normally result in a smaller SEO discount. This suggests that institutions seek to increase their allocations when they have more favourable information about the long-term prospects of the issuers and, thus, SEO underpricing is reduced. It is worth mentioning that the conclusion of Chemmanur et al. (2009) does not have direct implications for the increase in

[7] Including 884 IPOs and 633 SEOs.

SEO underpricing during the past two decades.

Jeon and Ligon (2011) investigate the role of co-managers in underwriting syndicates. The study raises three hypotheses for the effects of co-managers on SEO flotation costs. One hypothesis is that the number of co-managers in the syndicate is negatively associated with SEO underpricing. The second is that highly reputable co-managers will reduce SEO underpricing. The third is that commercial banks serving as co-managers reduce SEO underpricing compared with investment banks serving as co-managers. All of these hypotheses are based on the certification roles of underwriters.

Jeon and Ligon (2011) use the OLS, 2SLS and treatment effects regression to test their hypotheses. They show that adding a co-manager significantly reduces underpricing by 0.2% in the OLS. However, after controlling for the endogenous choice of the number of co-managers by using 2SLS, they find no evidence to support a relationship between number of co-managers and SEO underpricing. The empirical results from both OLS and treatment effect regressions confirm that the involvement of highly reputable co-managers significantly decreases SEO underpricing. The underpricing is decreased by 1.0% and 1.9% estimated by OLS and treatment effect regressions respectively. SEO underpricing is decreased by about 0.5% when commercial banks are included as co-managers in the syndicate. The above results suggest that the number of co-managers does not significantly affect SEO underpricing after controlling for endogeneity of syndicate structure, while having highly reputable co-managers and commercial bank co-managers has significant effects on the decrease in SEO underpricing.

According to previous literature, underwriters may also play a marketing role in underwriting. Huang and Zhang (2011) hypothesize that the marketing efforts can influence the demand for SEO shares in the primary market and, thus, lower the offer price discount. They use the number of managing underwriters (lead managers and co-managers) in an SEO syndicate as a proxy of marketing efforts made by underwriters. Huang and Zhang (2011) find that the natural logarithm of the number of managers is negatively related to the SEO discount. They also confirm that the benefits of additional managers are greater for larger relative offer size and higher stock return volatility. All these results support the marketing hypothesis. They then examine the effects of investor networks on SEO discount. This variable is defined as the number of 'relationship investors' each underwriter had before the current deal. A relationship investor is defined as one that participated in at least in 10 SEOs in the 5 years prior to the current SEO, with at least one underwriter in the syndicate (a lead or co-managing underwriter). Participation is determined by that investor having increased its holding of the stock after the SEO. Through empirical tests, Huang and Zhang (2011) find that the number of managing underwriters for an SEO is negatively related to the offer price discount, especially when the relative offer size is large and the stock return volatility is high. Larger investor networks of comanaging underwriters also lower offer price discounts. The results can be considered strong support for the marketing role of investment banks in book-built SEOs.

3.4.3.3. Explanations for SEO Underpricing

Following the discussions above, this section introduces several important explanations of SEO underpricing and discount. To summarize, there are six main explanations from the literature for SEO underpricing: information asymmetry, uncertainty about firm value, price pressure, short-selling and manipulative trading, price clustering and investment banking power, and NASDAQ-listed firms.

3.4.3.3.1. Information Asymmetry

Information asymmetry may be the most popular explanation in equity pricing. Benveniste and Spindt (1989) suggest that many information models used in IPO pricing can be extended to the case of SEOs. However, according to recent empirical studies, information asymmetry seems to be a smaller factor in SEO pricing than in IPO pricing. These studies include a variety of measures of information asymmetry. For example, Corwin (2003) uses firm size and the bid–ask spread to measure the information problem. The results show little evidence of a relationship between information asymmetry and SEO underpricing. Huang and Zhang (2011) implement an alternative method by using the logged pre-issue market capitalization as a control variable for information asymmetry. They find the market capitalization is significantly positively related to the SEO discount.

Altinkilic and Hansen (2003) assess whether information released during the registration period can affect the discount. To measure information asymmetry, Altinkilic and Hansen (2003) utilize three measures. Their results confirm a significantly positive relationship between expected discounting and positive private information released in the registration period. To summarize, though some prior studies suggest information asymmetry significantly influences the pricing of equity offerings, information asymmetry is seemingly not an important consideration in SEO pricing.

3.4.3.3.2. Uncertainty about Firm Value

Stock return volatility is often used to measure uncertainty about firm value or price uncertainty, though some studies consider stock return volatility as a proxy for information asymmetry. For example, Drucker and Puri (2005) and Altinkilic and Hansen (2000) use stock return volatility to measure information asymmetry. Nevertheless, Lee and Masulis (2009) claim that stock return volatility is likely to capture other economic effects besides asymmetric information. They point out that stock return volatility can also be used to measure uncertainty and is influenced by industry-wide and economy-wide shocks.

Corwin (2003) employs stock return volatility as a proxy for price uncertainty. Here, volatility is calculated by the standard deviation of daily stock returns over the 30 trading days ending 11 trading days prior to the issue. The empirical results suggest a significantly positive relationship between the level of uncertainty about firm value and price uncertainty.Altinkilic and Hansen (2003) also find a positive relationship between stock return volatility and the SEO discount. Chemmanur et al. (2009) define volatility as the standard deviation of the issuer's stock return from 126 trading days prior to the offering to 42 trading days prior to the offering. They use volatility as a control variable and find that the volatility is significantly positively related to SEO discount in all regressions. Huang and Zhang (2011) implement the same definition of volatility as Corwin (2003) and confirm that volatility is significantly positively related to SEO discount. As a result, though some papers doubt the effects of stock return volatility, I still include it as a factor in my research.

3.4.3.3.3. Price Pressure

Price pressure is defined as the effects of having more outstanding shares. The effects can be either permanent or temporary. If the demand curve for the shares of the issuing firm is downward sloping, an increase in supply will result in a permanent decrease in stock price. This is called downward-sloping demand, or permanent price pressure (Corwin, 2003). According to some studies, a permanent stock price decrease may not take place on the issue day. In contrast, for temporary price pressure, since an SEO brings a temporary liquidity shock, a discount is required to compensate investors for absorbing the additional shares (Corwin, 2003).

Offer size and relative offer size are the two most commonly used proxies for price pressure. Hansen (2001) points out that the relative amount of IPOs should increase underpricing. Altinkilic and Hansen (2003) define 'relative offer size' as the gross proceeds with regard to the market value of equity, measured one week before the offer day. The results suggest the discount is higher for larger relative size. Bortolotti et al. (2008) use a similar definition of price pressure to Altinkilic and Hansen (2003), and the coefficients of the regressions turn out to be insignificant.

Relative offer size is sometimes also defined as the number of shares offered over the total number of shares outstanding before the offer (Corwin, 2003; Huang and Zhang, 2011). The results reported by both Corwin (2003) and Huang and Zhang (2011) suggest the relative offer size is significantly positively associated with SEO discount. Corwin (2003) also shows a significant price drop in the days prior to the offer, followed by a significant price recovery following the offer. As a result, there is little evidence to support permanent price pressure, while the results of the empirical test strongly support the temporary price pressure hypothesis.

3.4.3.3.4. Short-selling and Manipulative Trading

The short-selling hypothesis is proposed by Hovakimian and Hutton (2010). They find a price pattern which means an average 1.5% price decline accompanied by abnormally high trading volume in a short period (15 minutes) after an announcement from 1981 to 1983. This price drop is followed by a significant recovery of 1.5% after the issue day. Therefore, this phenomenon provides some evidence for the argument that investors depress stock prices through short-selling to affect the offer prices of new equity issues. Additionally, Jenter et al. (2011) claim that such manipulative trading might reduce the informativeness of secondary market prices before the offering and force firms to offer a high discount on new shares.

Corwin (2003) divides the research period into two parts, according to the implementation of Rule 10b-21. This study shows that a large price drop prior to the offer date did not lead to more underpricing before the implementation of Rule 10b-21but that large price movements in either direction did lead to more underpricing after the implementation of Rule 10b-21. Therefore, Corwin (2003) suggests that increased restrictions on short sales result in more uncertainty. This conclusion is supported by Kim and Shin (2004), who record that there is still a significant increase in SEO underpricing between the periods before and after the implementation of Rule 10b-21, and after they exhaust all possible explanations. They conclude that the implementation of Rule 10b-21 reduced the informativeness of market prices and led to more risk and higher SEO underpricing.

3.4.3.3.5. Price Clustering and Investment Banking Power

Some studies suggest that price clustering may affect equity offer pricing. More specifically, the hypothesis is proposed that offer prices are likely to be set at integer values. Bradley et al. (2004) point out that IPOs priced at integer values have in higher first-day returns than those priced in dollar fractions. This is explained by the desire of the underwriters to reduce the costs of negotiation. They argue that clustering at integers is also a way to compensate the underwriter for increased uncertainty.

Corwin (2003) tests the effects of price rounding on SEO underpricing by examining the relationship between underpricing and price level. The empirical test provides strong evidence that offer prices tend to be rounded to whole-dollar amounts or $0.25 increments. Mola and Loughran (2004) confirm the finding that SEOs priced at integer values have a larger average discount than those priced at fractional values. Additionally, the use of integer offer prices in IPOs increased over time from 1986 to 1999 (Mola and Loughran, 2004). IPOs priced at integer values had an average first-day return of 21.4% while those priced at fractions had an average first-day return of 8.9%.

In contrast with earlier studies, Mola and Loughran (2004) consider the clustering of SEO prices as evidence of increased investment banking power. They point out that analyst coverage is an important explanation for increased SEO discounting. Their study also documents evidence of market concentration in the SEO underwriting industry. The underlying idea is that big banks have more influential analysts and have more customers in other areas. Firms prefer to choose familiar analysts who will issue favourable and influential reports. Therefore, big banks have more pricing power in SEOs because they have greater market share. However, Altinkilic and Hansen (2003) find evidence that a highly reputable lead manager reduces the SEO discount.

A number of studies treat price clustering as an important control variable. These include Chemmanur et al. (2009), Jeon and Ligon (2011), Autore (2011) and Huang and Zhang (2011), all of which implement a dummy variable that equals one if an offer is priced at an integer value and zero otherwise. The coefficients of this variable are strongly significant in regressions in all these studies.

3.4.3.3.6. NASDAQ-Listed Firms

NASDAQ-listed firms are different from NYSE-listed firms in many respects. For example, NYSE-listed firms are often larger and their shares are traded more actively. Corwin (2003) notes that NYSE issues normally represent a smaller fraction of the firm's existing shares than do NASDAQ issues. The statistics of Corwin's sample show that the offered shares of an NYSE issuer represent an average 16% of pre-issue shares outstanding, while the offered shares of NASDAQ-listed companies occupy an average 26.8% of pre-issue shares outstanding. Altinkilic and Hansen (2003) also incorporate a NASDAQ dummy in their empirical model and confirm that the expected SEO discount is larger for NASDAQ firms. Mola and Loughran (2004) also confirm that NASDAQ-listed issues are associated with greater discounts. However, some recent studies report insignificant influences of the NASDAQ dummy on SEO discount or underpricing. These studies include Jeon and Ligon (2011), Autore (2011), and Huang and Zhang (2011).

3.5. Structure and Function of the Underwriter Syndicate

This section provides an overview of studies on underwriter syndicates. It introduces the structure as well as the function of underwriting syndicate first. Then, studies of the effects of different features of underwriting syndicates on SEO underpricing will be discussed. The different features include the reputation of the underwriters, the number of underwriters and the involvement of commercial bank co-managers.

3.5.1. The Structure of the Underwriting Syndicate

An underwriter syndicate typically includes several categories of underwriter, namely lead underwriter (book manager), co-manager(s) and selling groups (selling syndicate).

The lead underwriter[8] determines who is to form the syndicate and manages the overall process of the offering. The management fees are paid to the lead managers because they typically record the activity of the syndicate. In a syndicate, lead manager(s) also underwrite the largest portion of the securities. Many studies recognize the important role of book managers. For example, Loughran and Ritter (2004) use the ranking[9] of lead managers in IPOs to represent the reputation of the underwriter syndicate. Mola and Loughran (2004) use the ranking of the analyst team of the lead managers to measure the analysis capacity of the underwriters.

Similar to lead managers, co-managers also bear underwriting risks and receive underwriting fees. However, they do not receive management fees because they do not record the activities of the underwriter syndicate. Though lead managers are likely to be more important, additional managing underwriters are useful in the distribution of offerings (Huang and Zhang, 2011). According to Jeon and Ligon (2011), the importance of co-managers is increasing and most of the syndicates in SEOs consisted of more than one

[8] In fact there is often more than just one `lead' underwriter.
[9] Jay Ritter's updated Carter-Manaster underwriter ranking.

co-manager from 1997 to 2007; the average number was 2.44 per deal.

In a syndicate, the banks that are responsible only for the distribution of shares are said to belong to the selling group or syndicate. Reallowance fees[10] are paid to these banks. Members of the selling group, which can number in the hundreds for some issues, sign a selected dealer agreement that stipulates the terms of the relationship, including the commission (called the selling concession), the date of termination (typically 30 days), and whether the selling groups must buy unsold shares. Additionally, the analyst coverage for the shares after the offering is normally implemented by lead underwriters, co-managers and selling syndicate.

3.5.2. The Functions of the Underwriting Syndicate

In the literature, the functions of underwriters are usually categorized in four groups, namely information production, certification, analyst coverage and marketing.

Information production theory denotes that having more underwriters help better convey the information to book managers. Corwin and Schultz (2005) suggest underwriters convey information of market interest in an IPO to book managers both directly and indirectly, through conversations with issuers, called ‘whisperings in the issuer’s ear’. In addition, the issuer will convey the information to the book managers through negotiations with them.

[10] In securities underwriting, reallowance fee is the fee that the underwriting group pays to a securities firm that is not part of the syndicate, but that still sells shares in the offering.

Certification reduces information asymmetry and adverse selection (Huang and Zhang, 2011). According to information production theory, underwriters can reduce indirect costs for issuing firms. According to Jeon and Ligon (2011), more co-managers, the better reputation of those co-managers and the involvement of commercial bank co-managers can all improve the certification function of the underwriter syndicate.

Syndicate members also provide analyst coverage. Corwin and Schultz (2005) find that each additional co-manager adds 0.8 analyst issuing reports in three months after an IPO. They also find that if an underwriter has a top-ranked analyst in the issuer’s industry, the likelihood of that underwriter being included in the syndicate significantly increases. Aggarwal et al. (2002) suggest that analyst coverage on an IPO can shift up the demand curve for the stock and, thus, is positively related to its 6-month return between the offer date and the lockup expiration date. James and Karceski (2006) show that stock prices increase more for newly listed US firms when underwriters provide a strong buy recommendation and when the target price is high. Degeorge et al. (2007), however, question the value of such analyst ‘hype’ for a sample of French IPOs.

The underwriters’ marketing efforts can shift up and flatten the demand curve of an SEO (Gao and Ritter, 2010)according to Gao and Ritter (2010), who argue that underwriters exert few or no marketing efforts in accelerated book-built and bought deals but do play an important marketing role in book-built (also called fully marketed) SEOs. Consistent with their argument, they show that firms with inelastic demand curves tend to choose fully marketed SEOs. Huang and Zhang (2011) focus on the marketing efforts of underwriters in the primary market of book-built SEOs. They report that the underwriters' marketing efforts can lower the offer price discount by shifting up and flattening the demand curve of an SEO.

3.5.3. The Effects on Flotation Costs of the Different Features of Underwriter Syndicates

This section reviews previous studies on the relationships between the underwriter syndicate and flotation costs. Three features have been focused on: the effects of the reputation of the underwriter (possibly the most commonly studied feature), the number of co-managers and the involvement of commercial bank co-managers. A brief summary of the effects of these features is presented next.

3.5.3.1. The Reputation of the Underwriters

Many scholars find that underwriter reputation can reduce the indirect costs of issuance (Carter and Manaster (1990); Megginson and Weiss (1991); Habib and Ljungqvist (2001); Chen and Mohan (2002).

After controlling for endogeneity in issuer–underwriter matching in the investigation of bond underwriting services, Fang (2005) finds that more reputable banks offer the bond issuers with higher bond price and charge higher fees, but issuers' net proceeds are still higher compared with less reputable banks. Such relations are pronounced in the junk-bond category.

Fang (2005) interprets this phenomenon as reflecting bank underwriters' reputation. He also suggests that economic rents are earned on reputation, which provides an incentive for underwriters to maintain their reputation. Chuluun and Khorana (2007) study the structural features of underwriting syndicates (including 'prestige') and their impact on completion speed, offer discount, and post-issue performance of SEOs. They find prestigious syndicates are associated with a lower discount, which is consistent with the certification hypothesis.

Chen and Mohan (2002) investigate the relationship between underwriter reputation, underwriter spread and underpricing. They contend that underwriter spread may represent an explicit pricing of risk for an IPO issue and they find that it is significantly correlated with underpricing, which represents an implicit pricing of risk. Their results roughly suggest that deeper underpricing often is accompanied by higher underwriter spread. However, after analysing their results in detail, they find for the medium-reputation underwriters, underwriter spread impacts initial underpricing negatively, suggesting a substitution relationship. For the low- and high-reputation underwriters, initial underpricing affects underwriter spread positively, indicating a complementary relationship. Jeon and Ligon (2011) examine the effect of including co-managers in the underwriting syndicate on expected flotation cost. They find that highly reputable underwriters serving as co-managers play a certification role, reducing indirect costs.

Thus, although highly reputable underwriters are shown in the literature to reduce indirect costs significantly, their effect on underwriter spread, which is considered a direct cost, is ambiguous. Chemmanur and Fulghieri (1994) and Puri (1999) argue that more reputable underwriters charge higher fees to cover the costs incurred in providing superior certification and monitoring services. On the other hand, Livingston and Miller (2000) find a negative relationship between underwriter reputation and underwriting spreads. Jeon and Ligon (2011) support Livingston and Miller (2000)'s finding by studying the relation between underwriter spread and reputation, and find a negative relationship. They attribute this finding to prestigious underwriters having bargaining power in persuading syndicate members to accept lower fees in order to increase market share.

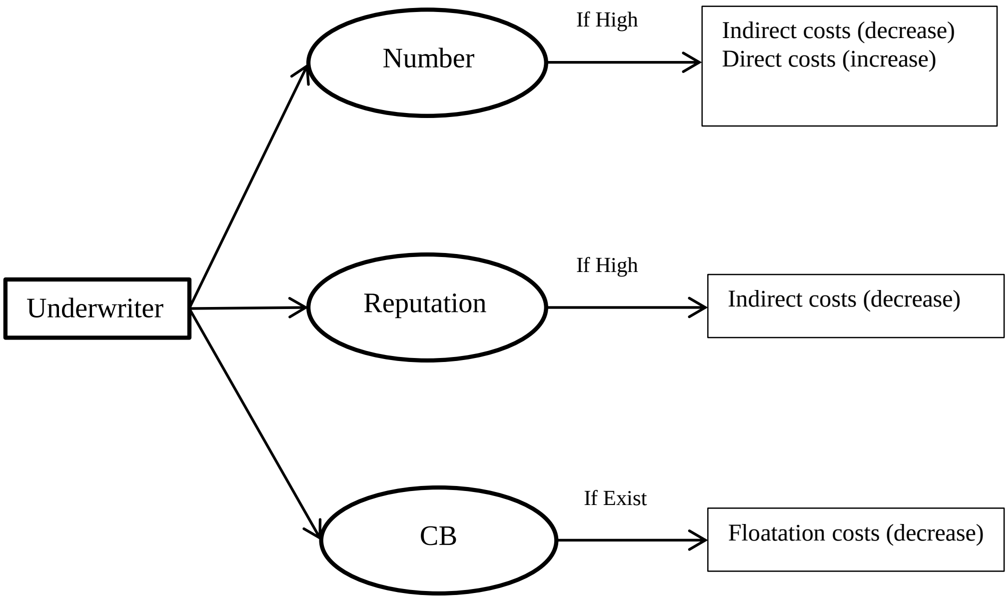

Figure 1 A Summary of the Effects of Different Characteristics of Underwriters on Floatation Costs

3.5.3.2. The Number of Co-managers

Corwin and Schultz (2005) find that having more co-managers can reduce the indirect costs of issuance, as they can serve to lower information asymmetry and act as certification agents. Jeon and Ligon (2011) find the more co-managers, the lower the indirect cost. However, the increase of the number of co-managers can result in a higher underwriting spread, because underwriting spreads are shared with all the syndicate members participating in the syndicate.

3.5.3.3. The Involvement of Commercial Bank Underwriters

As discussed in Section 1.2, for a long time in the USA, only investment banks could participate in underwriter syndicates. This situation changed after the repeal of Glass-Steagall Act, allowing commercial banks to participate as co-managers where an IPO or SEO was led by an investment bank (sometimes termed a hybrid syndicates). Commercial banks serving as co-managers could conceivably use their proprietary information to enhance the quality of certification of issues and, as a result, reduce indirect flotation costs (Song, 2004). Narayanan et al. (2004) also find commercial banks ask for lower underwriting spreads.

However, there is also an opposite view, that commercial banks with proprietary information about an issuer, derived from a lending relationship, might face conflicts of interest in underwriting that relate to misrepresenting the value of issues in order to use the proceeds to repay bank loans. Puri (1999) suggests that the equity- or debt-holding commercial banks may hinder banks' certification role. Hebb and MacKinnon (2004) find the presence of commercial banks in underwriter syndicates results in increased uncertainty of IPO valuation. They suggest that the market perceives the possibility of a conflict of interest when commercial banks underwrite equity issues. Song (2004) also find that commercial banks are more likely to serve as co-managers when issuers have lower stock rankings and, thus, rely more on bank loans. This result indicates that the inclusion of commercial banks as co-managers does not improve the certification ability of the syndicate.

Chaplinsky and Erwin (2009) find little evidence that commercial banks advance their position in equity underwriting beyond the share obtained through acquisition of investment banks with an existing share of equity underwriting. They attribute this phenomenon to lack of experience and the high cost of scope expansion. In other words, commercial banks up to that time are still not quite professional in equity underwriting and suffer from weaker certification ability compared with investment banks.

Though the effect on indirect costs of having commercial banks act as co-managers is ambiguous, they do seem to have an effect on direct costs, because commercial banks may benefit from informational economies of scope through their business relationships (e.g. lending) with issuers (Drucker and Puri, 2005). As they have more information and bear lower risk of uncertainty, commercial banks should ask for less underwriting spread as compensation. This theory receives support from Jeon and Ligon (2011), who find the presence of commercial banks can lower underwriting spread.

3.6. Effects of the Underwriter–Investor Network

Investment banking is a relationship-based rather than transaction-based business (Huang et al., 2008). The effects of the nature of the relationships between underwriters and investors have long interested financial economists. It is widely accepted that an underwriter's network of regular investors benefits issuers by maximizing the proceeds of an issue (Sherman and Titman, 2002; Benveniste and Spindt, 1989; Benveniste and Wilhelm, 1990). Sherman (2000) points out that the reason for the growing popularity of book building in IPO underwriting is the formation of regular institutional investor clienteles. Loughran and Ritter (2002) suggest that underwriters typically benefit their regular buy-side investors by allocating highly underpriced IPOs to them. Reuter (2006) supports this . Binay et al. (2007) find that regular investors benefit more than casual investors in IPOs through greater participation in underpriced issues. They also suggest that the underwriter–investor relationship is more important in the distribution of IPOs with strong demand, IPOs of less liquid firms, and deals with less reputable underwriters.

Huang et al. (2008) confirm investment banks' network function and show that the networking abilities of investment banks can attract more investors by examining a sample of Private Investments in Public Equity (PIPEs). Huang and Zhang (2011) use a sample of traditional book-built SEOs and find that the investor networks established by managing underwriters increase the likelihood of investor participation and benefit issuers in the form of lower discounts on their offers.

3.7. Conclusion of Literature Review

This chapter reviews the literature on equity offerings regarding reasons for conducting equity offerings, studies on direct flotation costs, studies on indirect flotation costs, structure and function of underwriter syndicate as well as effects of the underwriter-investor networks.

To summarize, there are three most popular reasons for conducting equity offerings, that is, pecking order theory, trade-off theory as well as market timing theory. However, recent empirical literature does not come to an agreed conclusion. Nevertheless, both pecking order and trade-off theory are problematic. As a result, market timing theory seems to be the most popular explanation for conducting equity offerings. Moreover, DeAngelo et al. (2010) propose another two explanations for conduct SEOs, that is, corporate lifecycle and near-term cash need.

This chapter also reviews the floatation costs of equity offerings. Floatation costs could be further divided into direct flotation costs and indirect flotation costs. Direct flotation costs mainly refer to underwriting spread, while indirect floatation costs mainly include announcement return and discount. The review of previous studies in the determinants of floatation costs provides evidence for including possible variables to implementing my research on the floatation costs in Chapter 4.

Previous studies on structure and function of the underwriter syndicate are also reviewed to facilitate the further discussions on choosing necessary variables in my research model. Meanwhile, the illustration of previous theories on how commercial bank underwriters may affect floatation costs paves the way to build the hypothesis for my own study in Chapter 4. Based on the findings of previous literature, I expect to confirm commercial bank co-managers have more proprietary information from another angle and find evidence for the idea that how market considers commercial bank co-managers' use of such proprietary information is the key factor affecting floatation costs.

The literature on the effects of underwriter-investor network mainly supports that underwriter-investor network is a very important factor in equity offerings. Former underwriter-investor relationship could benefit issuers by maximizing the issue proceeds and benefit investors through greater participation in underpriced issues. Based on the discussions of previous studies, I raised the research hypothesis in Chapter 5. Meanwhile, the chosen of variables in previous literature provides evidence for my variables selection. Previous literature implies the possibility that underwriter-investor network may facilitate investors to participate in new issues. My research is expected to provide evidence for this implication.

Chapter 4: Commercial Bank Co-managers and the Flotation Costs of SEOs

4.1. Introduction

The flotation cost is an inevitable and considerable cost for firms which want to issue equity. It mainly consists of three components: underwriting spread, underpricing and announcement return. Due to its importance for issuers who want to maximize the expected net proceeds of security offerings, flotation cost is of great research interest. The determinants of flotation cost normally investigated are the characteristics of issuing firms and underwriters. The work reported in this chapter is a deep investigation of the effects of the characteristics of underwriters on flotation costs.

Among the characteristics of underwriters, the number participating within a syndicate and their reputation are the two most often considered and scholars have come to a seemingly agreed conclusion. However, this is not so when considering the role of commercial banks in underwriting. There're two opposite theories regarding the effect of involving commercial banks in the underwriting syndicate. One theory indicates that having commercial banks act as co-managers will significantly enhance the whole syndicate's certification role and reduce flotation costs (Jeon and Ligon, 2011). On the other hand, as commercial banks may have private information about a firm through loans or a clearing function, banks can misrepresent the value of a firm's securities on the basis that the proceeds can be used to repay its own claims (Puri, 1999; Song, 2004). This can obviously constitute a conflict of interest.

For this reason, the Glass-Steagall Act of 1933 separated the roles of commercial and investment banking. For more than 50 years thereafter, commercial banks and their subsidiaries were not allowed to underwrite corporate debt or equity securities. The restrictions were then relaxed, beginning in 1988 for debt securities and in 1990 for equities. On November 14, 1999, the Glass-Steagall Act was finally repealed. As a result of the less restrictive regulatory environment, 30 commercial banks entered equity underwriting during 1990–1999, through the establishment of a Section 20 subsidiary[11]. Prior to December 1996, banks underwrote less than 1% of equity issue volume but thereafter underwrote upwards of 20% of issue volume annually (Chaplinsky and Erwin, 2009). Commercial banks now act as co-managers in about 49% of transactions (Jeon and Ligon, 2011). Banks thus substantially increased their prominence as equity underwriters.

Despite the growth in popularity of commercial banks becoming co-managers in equity underwriting, not much work has been done to investigate the relationship between underwriting by commercial banks and flotation costs. Moreover, those studies that have been done have not come to the same conclusion. Narayanan et al. (2004) use a sample of SEO syndicates from 1994 to 1997 and find that lending banks are more likely to co-manage an issue if the lead manager has a high reputation and is not another lending bank. Moreover, with such a syndicate arrangement, issuers benefit from low underwriting fees, although they do not receive better pricing on their

[11] Section 20 subsidiary allows commercial banks to participate the underwriting and dealing of securities.

offerings. Suzuki (2010) finds that banks holding loans from issuers have a negative effect on price discount and no effect on underwriting fees. This finding implies the certification role of commercial banks co-managers. Jeon and Ligon (2011) comprehensively study the role co-managers play in reducing the flotation costs of SEOs. They investigate how different characteristics of the underwriter syndicate, such as the number of co-managers, the reputation of lead managers and the involvement of commercial banks, affects flotation costs. They find that the involvement of commercial banks as co-managers can reduce underpricing as well as underwriting spread and improve announcement return. In other words, having commercial banks act as co-managers can reduce flotation costs.

In contrast to the findings of Jeon and Ligon (2011), Puri (1999) suggests that equity- or debt-holding commercial banks may hinder banks' certification role. Hebb and MacKinnon (2004) find the presence of commercial banks in underwriter syndicates results in increased uncertainty of IPO valuation. They suggest that the market perceives the possibility of a conflict of interest when commercial banks underwrite equity issues. Song (2004) finds that commercial banks are more likely to serve as co-managers when issuers have lower stock rankings and, thus, rely more on bank loans. This indicates that having commercial banks act as co-managers does not improve the certification ability of the syndicate. The overall findings of Chaplinsky and Erwin (2009) suggest it has been difficult for banks to achieve economies of scope in underwriting, as evidenced by loss of market share.

Previous studies did not consider that the effects of commercial bank underwriters on SEO floatation costs may vary in the different situation. However, the effects are likely to be more complicated and to depend on the specifics of each situation. My study will fill this gap. The broad motivation behind my research is to understand how commercial bank co-managers affect SEO flotation costs in practice. My results refine prior findings by indicating that the market perception of SEOs underwritten by commercial banks is depends upon the circumstances. In particular, commercial bank co-managers can in some circumstances increase the SEO flotation cost if their behaviour and motivation convey the impression to the market that they are acting opportunistically.

4.2. Hypothesis

The potential benefits of cross-usage of banking information have been examined extensively in the academic literature. When underwriting a new security, underwriters are required to perform due diligence. Because of its previous relationship with the issuer, a commercial bank may already have much of this information. Commercial banks, therefore, can actually certify firm value if they use their private information properly. This argument is consistent with that of Booth and Smith (1986), who show that the certification effect is greater for underwriters with inside information (e.g., previous banking information).

However, contrary to the certification hypothesis, it is also possible for banks to use their private information shift bankruptcy risk from themselves to the market, as hypothesized by Puri (1999). This hypothesis is called conflict of interest. Kroszner and Rajan (1994) describe how a commercial bank may have an incentive to use its private information if it underwrites public securities for troubled firms, and asks the firms to use the proceeds to retire its loans made to the firms previously. If the market perceives such an incentive, it will discount the value of securities underwritten by commercial banks to a greater degree than those underwritten by investment banks.

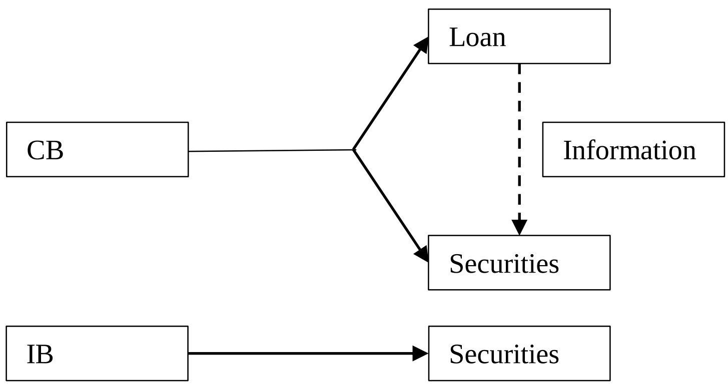

Figure 2 Differences between CB and IB when Underwriting

Figure 2 illustrates the differences between CB and IB when underwriting. Compared with IB underwriters who could only underwrite securities, CB underwriters could issue loans as well as underwrite securities. According to this fact, CB underwriters may have more proprietary information than IB underwriters. Naturally, there are two possibilities for CB underwriters to use such proprietary information, one is properly used and the other one is misused.

When studying the effect of commercial banks' involvement in underwriter syndicates on flotation costs, market perception is the key factor. In other words, if the market suspects that commercial banks will use their private information to mitigate information asymmetry, commercial bank involvement in an underwriter syndicate will reduce flotation costs and play a certification role. Alternatively, if the market suspects commercial banks will use their private information to benefit themselves, their certification ability will be weaken and flotation costs will be increased.

To the best of my knowledge, no previous study has used a specific measure that seeks to identify whether a commercial bank underwriter conveys to the market an impression of acting in self-interest. In other words, previous studies did not consider that the effects of commercial bank underwriters on SEO floatation costs may vary in the different situation. Therefore, though most recent empirical tests support commercial bank underwriters' certification role, they cannot reject the existence of a conflict of interest, which may be perceived by the market in certain circumstance. As a result, the main step for further study of the effect of commercial bank co-managers is to establish a measure to identify a circumstance where commercial bank co-managers have a motivation to act in their own self-interest and, more particularly, are seen by the market to have such a motivation.

I implement two criteria to identify such a circumstance. The first concerns whether the commercial bank co-managers are likely to be opportunists in any current deal. To implement this criterion, I assume that commercial bank co-managers have more incentive to help issuers use SEO proceeds to pay back loans and reduce issuers' bankruptcy risk when issuers' leverage is higher than a threshold. The rational for this is that high-leverage issuers have a high risk of bankruptcy. Thus, to avoid the issuer's bankruptcy and default on loans, commercial bank may act as opportunists. However, determining what that threshold should be is not an easy judgement to make: how high a leverage is really 'high'? Therefore, I set the threshold at the industry average.

The second criterion concerns market perceptions of commercial bank co-managers' previous underwritten deals. Previous deals and previous behaviour should be observable to the market (i.e. potential investors) and evidence of opportunistic behaviour will be noted. The reason for this criterion is that flotation costs are actually based on the reactions and perceptions of the market. If a commercial bank co-manager's previous acts give the market any basis for suspicion, the flotation costs of the current underwritten SEO should be increased. To implement this criterion, the leverage of the issuer is used. If its leverage is higher than the industry average before issuance and reduced thereafter, then the commercial bank co-managers in that firm's SEO are labelled 'previous opportunists'.

To summarize, SEOs with 'suspicious' commercial bank co-managers and highly leveraged issuers should experience higher flotation cost than others. Based on these specific circumstances (commercial bank co-managers are opportunists in previous deals and they may play the same role in current underwriting), I build my hypothesis as follows:

SEOs with commercial bank co-managers who acted as opportunists in the

previous deal may play the same role in the current underwritten deal and the higher flotation costs will therefore be higher.

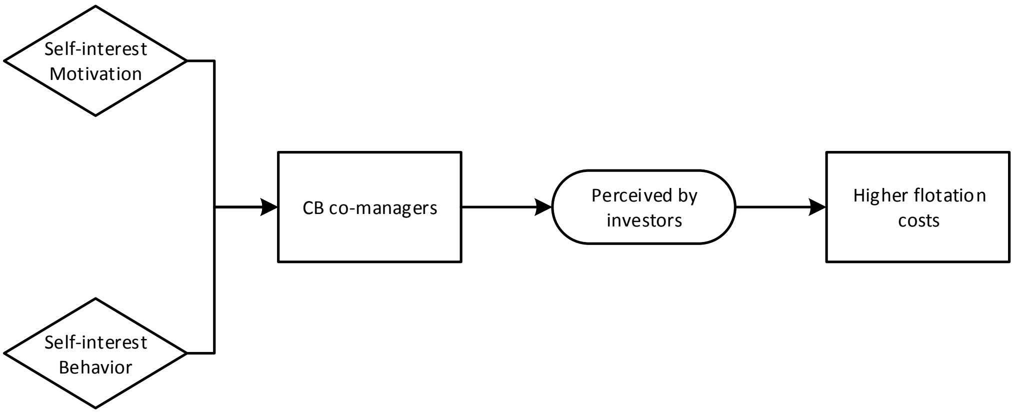

Figure 3 Key Explanation for Hypothesis

4.3. Empirical Setup

4.3.1. Data and Sample Selection

The sample selection criteria mainly follow the work of Jeon and Ligon (2011). I select SEO deals from the Thomson One database. The sample period is from 1995 to 2011. The number of SEOs in the initial sample is 4590. During the sample period, I collect only ordinary common share offerings (i.e. Center for Research in Security Prices (CRSP) share codes 10 and 11) and exclude the following offers:

(1) issues by non-US firms, REITs, and limited partnerships (CRSP share code 40 or greater),

(2) issues by firms not listed on NYSE, AMEX, or NASDAQ,

(3) issues with offer prices less than $3 or greater than $400,

(4) issues by financial (one-digit SIC code 6) and utility (one digit SIC code 4)

firms,

(5) issues where price and financial data are not available in CRSP and COMPUSTAT,

(6) units (CRSP share code 70 or greater), ADRs (the first digit of CRSP share code 3), and rights offerings, and

(7) pure secondary offers.

There are 2444 SEOs in the sample after the above criteria are applied. Then, I supplement the SDC database with financial data from COMPUSTAT and stock price data from CRSP. Following Huang and Zhang (2011), I collect analyst recommendations from the Institutional Brokers' Estimate System (I/B/E/S).

Following Corwin and Schultz (2005), I assign to each underwriter in the syndicate one of the following three designations: book manager, co-manager, or syndicate member. I measure the reputation of each underwriter by using Jay Ritter's updated Carter and Manaster (1990) underwriter ranking, available on Jay Ritter's website at the University of Florida (http://bear.cba.ufl.edu/ritter).

To implement my research, there are also two specific sets of data which require hand collection. The first is the 'real' filing date of each shelf SEO. Actually, the Thomson One database records the filing date of each deal and many previous studies treated this filing date as the announcement date (or identify the announcement date mainly based on this filing date). However, due to the increasing popularity of shelf offers and the shelf offer's key characteristic (one registration can be used for several tranches), the filing date cannot be naturally converted to the announcement date. I consider the date when the file for the specific offer was submitted to the SEC as the announcement date for each offer. Therefore, I collect such data from the SEC's EDGAR database manually by searching issuers' files close to offer date (normally in 3 months) and adjust the announcement date of each shelf offer (tranche) as the earliest filing date for the particular offer (tranche).

The second set of data requiring manual collection is the category of underwriters (commercial bank or investment bank). According to Drucker and Puri (2005), I identify each underwriter as an 'investment bank' or 'commercial bank' based on the status of parent/holding company of the underwriter at the time of the issue. Due to the many mergers and acquisitions in the financial sector, I use the mergers and acquisitions database from Thomson One to help in this classification. For example, Nations Bank acquired Montgomery Securities on 10/1/1997. Montgomery Securities is classified as an investment bank prior to 10/1/1997, but after 10/1/1997 I classify it as a commercial bank. I mainly use the Section 20 Subsidiaries' list as well as the Section 4(k)(4)(E) Securities Subsidiaries' list to identify underwriters' categories (commercial bank/investment bank). Moreover, I also use Wikipedia, the underwriters' official website and Bloomberg Bussinessweek to aid my classification.

Besides manually collected data, I further match SEO deals with the

Compustat database for accounting information, following Kim and Park (2005). According to Kim and Park (2005), the accounting information used in research should be the latest available. Considering the time interval between the end of each fiscal quarter/year and the release of financial statements, issuers' accounting information should be adjusted for different circumstances. Following Kim and Park (2005), I also set the time window between the end of a fiscal quarter and a financial statement filed to be 60 days and the interval between the end of the fiscal year (fourth fiscal quarter data included) and a financial statement filed to be 120 days. Therefore, if an offer occurs in the third or fourth fiscal quarter, accounting data of the last fiscal quarter should be used if the offer is issued more than 60 days after the end of last fiscal quarter and the data of the fiscal quarter before the last one should be used if the interval is shorter than 60 days. If a deal is offered in the issuer's first fiscal quarter, the data of the third fiscal quarter of the last fiscal year should be used, as 120 days should be allowed for the data of the fourth fiscal quarter of the last fiscal year. The most complicated situation is when an SEO occurs in an issuer's second fiscal quarter. In this condition, if an offer occurs less than 30 days before the end of last fiscal quarter, the accounting data of the last third quarter should be merged for the current deal. If an offer occurs more than 60 days from the end of the last fiscal quarter, the data of the first fiscal quarter should be used if it is available. If a deal happens more than 30 days but less than 60 days from the end of last fiscal quarter, the last fourth quarter's data should be merged. The following table is a simple explanation of the adjustment method.

Quarter	Current date	Latest Date of Information Available
1	Whole quarter	3rd quarter of last year
2	First 30 days	3rd quarter of last year
	31-60 days	4th quarter of last year
	61 days and later	1st quarter of this year
3	First 60 days	1st quarter of this year
	61 days and later	2nd quarter of this year
4	First 60 days	2nd quarter of this year
	61 days and later	3rd quarter of this year

4.3.2. Description of the Variables Used

This section reports the definitions of the variables that are necessary in my research. I divide them to four subgroups: flotation cost, syndicate characteristic variables, issuer characteristic variables and issue characteristic variables. Flotation cost comprises announcement returns, discount and underwriting spread. Syndicate characteristic variables include the number of co-managers, book runners' reputation and so on. Issuer characteristic variables mainly capture the accounting information of issuers, while issue characteristic variables regard the background and classification of deals. I summarize all these variables in Appendix 1.

4.3.2.1. Flotation Cost

Announcement returns are the cumulative abnormal returns over the three-day window [-1, 1] or over the five-day window [-2, 2] around the announcement of the SEO, where returns are calculated using the market model with the

CRSP value-weighted index as the market. The estimation period for parameters is from 200 days to 40 days prior to the announcement date.

Discount is defined as the return from the offer price to the pre-offer day's closing price (Corwin, 2003), i.e. ln (pre-offer day close/offer price). This definition is similar to that of discounting in Altinkilic and Hansen (2003).

Underwriting spread is the underwriter gross spread, expressed as a percentage of offer size, which is the sum of the management fee, underwriting fee, and selling concessions, obtained from Thomson One.

4.3.2.2. Syndicate Characteristic Variables

Lead rank is the lead underwriter's reputation based on its adjusted Carter and Manaster (1990) reputation rank, obtained from Jay Ritter's web page at the University of Florida. I will average the reputation ranks for multiple lead underwriters.

Multi-book equals one if an offer is underwritten by more than one lead underwriter and zero otherwise.

CB-Lead is a dummy variable that takes a value of one if the offer has a commercial bank as a lead underwriter and is zero otherwise.

CB-COM is a dummy variable that equals one if a syndicate includes at least one commercial bank as a co-manager. I collect and identify this set of data manually, as discussed in Section 4.3.1.

CMCB-Susp is a dummy variable that equals one if a syndicate includes at least one commercial bank co-manager that behaved as an 'opportunist' in its last deal in the previous two years. A commercial bank co-manager is treated as a potential 'opportunist' if the leverage of the issuer is higher than the industry average before issuance and lower thereafter.

CMCB-HL is a dummy variable that equals one if a syndicate includes at least one commercial bank and the leverage of the issuer is higher than the industry average before issuance.

CMCB-Susp&HL is a dummy variable that equals one if both CMCB-Susp and CMCB-HL equals one. This variable takes a value of one if a highly leveraged firm issues an SEO that has at least one commercial bank co-manager is classified as a potential 'opportunist' in its last deal.

4.3.2.3. Issuer Characteristics Variables

Lnassets, defined as the natural logarithm of total assets, is a measure of firm size and of information asymmetry and firm transparency.

Volatility is the stock return standard deviation from 60 trading days through to 11 trading days prior to the announcement date.

Market to book is defined as the sum of total assets and market value of equity minus book value of equity divided by total assets.

Leverage is defined as the ratio of total debt to total assets.

4.3.2.4. Issue Characteristics Variables

Lnproceeds is the natural logarithm of the number of shares issued multiplied by offer price. It measures issue size and controls for economies of scale in security issuance.

Pure Primary is a dummy variable equal to one if the issue is a pure primary offering, and zero otherwise.

NASDAQ is a dummy variable that equals one if an offer is issued by a NASDAQ-listed firm.

Integer is a dummy variable that equals one if an offer is priced at an integer value and is zero otherwise.

SOX is a dummy variable that equals one if the offer date is after the effective date of the Sarbanes-Oxely Act (SOX) (7/30/2002). Since that regulation's inception, firm transparency may be improved and information asymmetries between investors and issuers may be reduced because the market has access to more reliable public information.

ACTMAR is a dummy variable that takes a value of one if a quarter has more than 75% of the number of SEOs completed in each quarter. The quantity of offering is a measure of supply relative to demand.

LnAnalyst is the natural logarithm of the number of analyst recommendations, obtained from Institutional Brokers' Estimation System (I/B/E/S).

Shelf is a dummy variable that equals one if an offer is shelf-registered. The data are from the Thomson One database.

Accelerate is a dummy variable that equals one if an SEO is an accelerated offer. The data are available in the Thomson One database. According to recent studies, accelerated SEOs have different flotation costs from traditional ones. Thus, it is necessary to include this as a control variable in my study.

Overnight is a dummy variable that equals one if an offer occurs within two days of its announcement date. This definition is from Autore (2011), who finds such 'overnight' deals are much more popular from 2008. I manually collect this set of data, as discussed in Section 4.3.1.

4.3.3. Baseline Model

I use a common OLS model to implement my regression:

$$Y = \sum_{i=1}^{n} \beta_i X_i + \beta_{n+1} Z \qquad \textbf{(Model 4.1)}$$

Here, Z denotes variables relating commercial bank co-managers (*CB-COM*, *CMCB-Susp*, *CMCB-HL* and *CMCB-Susp&HL*) while X_i are the other variables. β_i are coefficients and Y is the dependent variable (announcement return, discount or gross spread).

4.4. Statistical Analysis

4.4.1. Descriptive Statistics

Table 4 presents illustrative descriptive statistics for SEO samples from 1995 to 2011. The definition of each variable is given in Appendix 2. The total number of SEO samples is 2443. The highest annual number occurs in 1996, followed by 1995 and 1997. The average announcement return over three-day window (CAR[-1,1]) is 2.1%. The mean and median values of the discount are 3.72% and 3.36% respectively. The mean and median values of the gross spread are both nearly 5.05%, which is consistent with numerous previous studies.

The mean of number of managers (NO. of Mgr) is 3.94, with a relatively steady increasing trend. The highest number of managers occurs in 2008. The statistical characteristics of the number of managers are in coincident with each year's averaged proceeds (Proc. Avg), of which the mean and median values are 165.47 and 143.43 respectively. The averaged proceeds in each year also show a roughly increasing trend, with highest in 2008.

Among all deals, the proportion of deals with highly leveraged issuers (HL Ratio) fluctuates around an average of 38.47%. The proportion of deals underwritten by commercial banks (CB) for highly leverage issuers (HL&CB

Ratio) is slightly higher than in the whole sample, averaging 39.77%, while the proportion of deals underwritten purely by investment banks (IB) for highly leveraged issuers (HL&IB Ratio) is lower, averaging 36.59%. This result implies that highly leveraged issuers prefer the help of commercial banks to that of investment banks when they have to turn to the equity market for funding.

The variable CBCM Ratio represents the percentage of deals underwritten by CB co-managers in whole deals each year. After the repeal of Glass-Steagall Act at the end of 1999, CB-underwritten SEO deals occupy more than 40% of the total, while the figure was only around 20% before the repeal. This suggests the popularity of CB co-managers in SEO underwriting. The increased importance of CBs in underwriter syndicates is also supported by the CB Ratio (the proportion of CB-underwritten SEOs to the whole sample), CB Proc. Ratio (the ratio of proceeds of CB-underwritten SEOs to the whole sample's total proceeds) and CMCB Proc. Ratio (the ratio of proceeds of CB-underwritten SEOs to the whole sample's total proceeds).

Table 5 presents a summary of SEO flotation costs by offering technique: non-shelf, shelf but non-accelerated, accelerated but non-overnight, and overnight. Overnight offerings have the highest discount, at 7.1%, while the discount with the other techniques is around 3%. Non-shelf offerings cost issuers the highest underwriting spread. For the shelf offers, a quicker technique demands a lower underwriting spread. Non-shelf offerings show the lowest announcement return, while overnight offerings have the lowest announcement return among the shelf offerings.

Considering the large differences in flotation costs between overnight and non-overnight offers, it is necessary to use 'overnight' as a control variable to implement a multivariate regression.

In Table 6, different statistics presented for three subgroups, that is, opportunistic CB, opportunistic IB and the rest of the sample. 'Opportunistic CB' denotes the part of the sample with CB co-managers who have opportunist motivation and behaviour (as explained in Section 4.2). 'Opportunistic IB' similarly denotes the part of the sample with IB co-managers who have opportunist motivation and behaviour. The third subgroup is the rest of the sample. From Table6, it is clear that the second and third subgroups have similar characteristics for most variables, while the selection criteria are generally the same for the first two subgroups.

Table 7 presents the results of a univariate analysis of SEO flotation costs (discount, underwriting spread and announcement return), by independent variables. There are three subgroups categorized by three components of flotation costs. For each subgroup, the whole sample is further divided into four parts by quartiles. To form the quartiles, each independent variable is sorted from low to high. Then I set the threshold value by the value at lowest, 1/4, 1/2, 3/4 and highest of the whole. Quartiles increase according to the quartile number and the value in each part should be more than previous threshold and less or equal to next threshold. The definitions of all non-dummy variables are given in Section 4.3.2 as well as in Appendix 1.Most of the results are in line with prior studies. For example, LnAnalyst, LnProceeds, RelativeSize and MarketCap seem to decrease flotation costs while Volatility seems to increase costs.

Table 8 presents a univariate analysis of SEO flotation cost by dummy variables. The variables, such as, Overnight, Accelerated, Shelf, Integer, Nasdaq, Pure Primary, could increase discount dramatically, while CB Co-manager and HQ_co-manager decrease discount considerably. The results coincide with previous literature. However, Overnight, Accelerated and Shelf decrease underwriting spread and increase announcement return, in other words, decrease the floatation costs in terms of underwriting spread and announcement return. The reason may be that overnight/accelerated/shelf offers are closed much faster than normal ones, and thus, require less service from underwriters and leave less time for the market to react.

The statistics in this section indicate that the characteristics of underwriting syndicate are an important factor in the determination of the floatation costs of SEOs. Meanwhile, the results also suggest that offering techniques would affect floatation costs dramatically and need to be considered in multivariate analysis. However, descriptive statistics as well as univariate analysis do not rule out the impact of other variables. Therefore, to get more detailed and convinced evidence, regression analysis is necessary.

Table 4 Descriptive Statistics

The sample includes 2443 completed SEOs from 1995 through to 2011 as reported in Thomson One database. Definitions of variables are given in Appendix 2.

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total	
																		Mean	Median
NO. of Deals	236	263	227	133	180	196	125	111	126	146	103	101	102	55	154	94	91	2443	
ANN RET	-0.019	-0.017	-0.028	-0.026	-0.023	-0.015	-0.034	-0.019	-0.023	-0.024	-0.021	-0.025	-0.009	-0.044	-0.010	-0.006	-0.010	-0.021	-0.021
Discount	0.031	0.039	0.032	0.024	0.025	0.030	0.040	0.034	0.036	0.032	0.035	0.033	0.029	0.038	0.065	0.054	0.056	0.037	0.034
Gross Spread	0.053	0.054	0.054	0.052	0.051	0.051	0.050	0.050	0.050	0.048	0.051	0.050	0.049	0.046	0.046	0.051	0.050	0.050	0.050
NO. of Mgr	2.614	2.791	3.035	3.353	3.739	3.980	3.320	3.703	3.794	3.904	3.786	3.802	4.598	7.073	4.591	4.106	4.802	3.941	3.794
NO. of Lead	1.004	1.004	1.000	1.015	1.050	1.066	1.192	1.234	1.302	1.390	1.398	1.396	1.657	1.745	1.721	1.681	1.813	1.333	1.302
NO. of COM	1.610	1.787	2.035	2.338	2.689	2.913	2.128	2.468	2.492	2.514	2.388	2.406	2.941	5.327	2.870	2.426	2.989	2.607	2.468
HL Ratio	0.331	0.316	0.366	0.436	0.350	0.281	0.392	0.432	0.468	0.404	0.398	0.337	0.373	0.455	0.545	0.372	0.286	0.385	0.373
HL&CB Ratio	0.345	0.398	0.373	0.419	0.336	0.242	0.375	0.453	0.495	0.448	0.390	0.361	0.351	0.475	0.619	0.375	0.306	0.398	0.375
HL&IB Ratio	0.326	0.278	0.363	0.458	0.385	0.457	0.448	0.360	0.400	0.293	0.423	0.276	0.440	0.400	0.306	0.368	0.241	0.366	0.368
DR&CB Ratio	0.455	0.542	0.478	0.527	0.531	0.491	0.615	0.663	0.560	0.524	0.597	0.500	0.532	0.325	0.610	0.464	0.387	0.518	0.527
DR&IB Ratio	0.558	0.561	0.488	0.508	0.481	0.629	0.690	0.640	0.457	0.610	0.500	0.552	0.520	0.467	0.528	0.474	0.586	0.544	0.528
CB Ratio	0.233	0.316	0.295	0.556	0.711	0.821	0.768	0.775	0.722	0.719	0.748	0.713	0.755	0.727	0.766	0.596	0.681	0.641	0.719
CMCB Ratio	0.139	0.213	0.189	0.398	0.528	0.724	0.616	0.640	0.516	0.486	0.447	0.455	0.480	0.509	0.539	0.319	0.374	0.445	0.480
Proc. Sum	19216.3	22929.6	18290.4	15304.2	30883.5	53211.8	17929.6	13759.0	16241.5	23195.6	12252.6	14479.9	18980.3	27077.6	29121.4	14290.6	15348.4	21324.2	18290.4
Proc. Avg	81.4	87.2	80.6	115.1	171.6	271.5	143.4	124.0	128.9	158.9	119.0	143.4	186.1	492.3	189.1	152.0	168.7	165.5	143.4
CB Proc. Ratio	0.108	0.169	0.103	0.209	0.247	0.466	0.466	0.514	0.467	0.462	0.416	0.392	0.391	0.483	0.636	0.475	0.431	0.378	0.431
CMCB Proc. Ratio	0.047	0.110	0.070	0.141	0.174	0.340	0.301	0.330	0.263	0.281	0.220	0.191	0.225	0.285	0.298	0.166	0.206	0.215	0.220

Table 5 SEO Flotation Cost by Issuing Technique

In this table, samples have been divided into four subgroups according to issuing technique. Panel A shows the statistics for non-shelf offers (traditional offers), which obey the traditional procedure of SEO issuing. Panel B lists the statistics for shelf but non-accelerated offers. Shelf offers are the offers that implement shelf registration, which allows one registration for several tranches of share release. Accelerated offers are the offers that happen less than two days before the launch date. Accelerated offers must be shelf offers. Panel C reports the statistics for accelerated but non-overnight offers. Overnight offers are a type of accelerated offer but are even quicker. Normally, overnight offers give no advance notice to the market. For overnight offers, files are submitted on the offer date or even later. Panel D presents flotation costs for overnight offers.

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Mean
Panel A Flotation cost of non-shelf offers																		
NO. of Deals	161	227	202	95	118	130	79	56	57	45	27	34	30	12	12	9	15	1309
Discount	0.031	0.039	0.033	0.023	0.025	0.033	0.035	0.026	0.035	0.028	0.031	0.028	0.035	0.037	0.064	0.028	0.032	0.032
Underwriting spread	0.054	0.055	0.054	0.054	0.053	0.053	0.054	0.054	0.055	0.055	0.054	0.054	0.052	0.054	0.043	0.051	0.049	0.054
Announcement return	-0.019	-0.019	-0.031	-0.038	-0.034	-0.025	-0.037	-0.030	-0.035	-0.057	-0.024	-0.037	-0.019	-0.059	-0.080	-0.046	-0.024	-0.029
Panel B Flotation cost of shelf but non-accelerated offers																		
NO. of Deals	3	4	6	12	22	24	16	24	42	64	54	37	48	14	38	31	25	464
Discount	0.008	0.013	0.011	0.018	0.016	0.026	0.033	0.029	0.028	0.029	0.040	0.026	0.024	0.024	0.038	0.039	0.029	0.029
Underwriting spread	0.039	0.045	0.044	0.041	0.046	0.046	0.046	0.051	0.053	0.049	0.055	0.055	0.051	0.048	0.048	0.051	0.050	0.050
Announcement return	-0.010	-0.015	-0.026	-0.003	0.000	0.007	-0.022	-0.028	-0.019	-0.007	-0.017	-0.024	-0.010	0.000	0.009	0.011	0.002	-0.008
Panel C Flotation cost of accelerated but non-overnight offers																		
NO. of Deals							1	3	3	6	1	4	4	7	34	13	6	82
Discount							0.019	0.007	0.022	0.009	0.004	0.024	0.028	0.013	0.035	0.022	0.028	0.026
Underwriting spread							0.050	0.047	0.044	0.037	0.040	0.050	0.033	0.043	0.046	0.049	0.042	0.045
Announcement return							-0.129	-0.005	-0.018	0.008	-0.017	0.007	-0.017	-0.046	0.007	-0.002	-0.023	-0.005
Panel D Flotation cost of overnight offers																		
NO. of Deals		1	2	4	6	2	22	19	22	24	16	22	10	18	62	36	37	303
Discount		0.029	0.010	0.054	0.052	0.012	0.065	0.063	0.049	0.052	0.036	0.059	0.040	0.061	0.100	0.083	0.094	0.071
Underwriting spread		0.067	0.044	0.041	0.035	0.027	0.044	0.039	0.030	0.034	0.030	0.036	0.035	0.039	0.046	0.052	0.053	0.042
Announcement return		-0.036	-0.015	0.037	-0.033	0.079	-0.036	0.010	-0.003	-0.024	-0.036	-0.021	0.014	-0.076	-0.020	-0.012	-0.013	-0.018

Table 6 Summary of Variables for Different Subgroups of Bank Underwriters

Table 6 presents the results for three subgroups which are categorized by underwriters' previous behaviour as well as current motivation. Opportunistic CB denotes the subgroup of with CB co-managers whose behaviour and motivation suggest they may be potential opportunists. The details are presented in the Hypothesis section (4.3). The definition of Opportunistic IB is similar to that of Opportunistic CB but focuses on IB co-managers. The definitions of all the variables are explained in Appendix 1.

Variables	Opportunistic CB	Opportunistic IB	Rest of the sample
NO. of Deals	161	81	1520
Discount	0.031	0.039	0.038
Underwriting spread	0.045	0.052	0.051
Announcement return	-0.014	-0.022	-0.024
Market capital	21.261	20.171	20.224
Relative Size	0.178	0.206	0.193
Lead Rank	8.756	7.482	7.549
HQ_comanager ratio	0.795	0.519	0.482
Multi-book ratio	0.559	0.173	0.209
CB lead Ratio	0.671	0.407	0.435
LnAsset	7.319	5.667	5.243
Volatility	0.557	0.546	0.655
Market-to-Book	0.771	0.809	0.462
Leverage	0.752	0.772	0.445
LnProceeds	5.394	4.468	4.422
Pure Primary	0.789	0.642	0.649
Nasdaq Ratio	0.280	0.642	0.747
Integer Ratio	0.335	0.444	0.401
ACTMKT Ratio	0.366	0.395	0.303
LnAnalyst	2.208	1.657	1.738
Shelf Ratio	0.758	0.420	0.451
Accelerated Ratio	0.267	0.123	0.218
Overnight Ratio	0.099	0.086	0.184

Table 7 Univariate Analysis of SEO Flotation Costs by Independent Variables

Table 7 presents a univariate analysis of SEO flotation costs by independent variables. There are three subgroups categorized by three components of flotation costs. For each subgroup, the whole sample is further divided into four parts by quartiles. Each part lists the average values of SEO flotation costs. Quartiles increase according to the quartile number. In other words, quartile 4 presents the data with highest values of the independent variable, while quartile 1 means the lowest. The definitions of all non-dummy variables are given in Section 4.3.2 as well as in Appendix 1.

Flotation costs	Discount				Underwriting Spread				Announcement Return			
Quartiles	1	2	3	4	1	2	3	4	1	2	3	4
LnAnalyst	0.049	0.034	0.030	0.031	0.058	0.053	0.049	0.043	-0.025	-0.025	-0.022	-0.017
NO. of Obs	595	589	475	499	595	589	475	499	595	589	475	499
LnProceeds	0.060	0.037	0.029	0.022	0.059	0.053	0.050	0.042	-0.027	-0.026	-0.018	-0.019
NO. of Obs	540	539	540	539	540	539	540	539	540	539	540	539
Leverage	0.039	0.037	0.034	0.037	0.055	0.053	0.048	0.048	-0.025	-0.024	-0.020	-0.020
NO. of Obs	540	539	540	539	540	539	540	539	540	539	540	539
MB Ratio	0.039	0.036	0.034	0.038	0.055	0.053	0.048	0.049	-0.027	-0.021	-0.021	-0.021
NO. of Obs	539	539	539	541	539	539	539	541	539	539	539	541
Volatility	0.023	0.035	0.043	0.046	0.046	0.052	0.053	0.053	-0.010	-0.024	-0.028	-0.028
NO. of Obs	540	539	540	539	540	539	540	539	540	539	540	539
LnAsset	0.052	0.037	0.031	0.027	0.059	0.054	0.050	0.041	-0.026	-0.029	-0.022	-0.013
NO. of Obs	540	539	540	539	540	539	540	539	540	539	540	539
Co-manager NO.	0.053	0.032	0.028	0.026	0.051	0.054	0.051	0.047	-0.022	-0.022	-0.029	-0.017
NO. of Obs	692	619	448	399	692	619	448	399	692	619	448	399
RelativeSize	0.034	0.033	0.036	0.044	0.044	0.051	0.054	0.056	-0.017	-0.024	-0.021	-0.028
NO. of Obs	540	539	540	539	540	539	540	539	540	539	540	539
MarketCap	0.055	0.039	0.030	0.023	0.060	0.054	0.050	0.041	-0.031	-0.022	-0.019	-0.019
NO. of Obs	540	539	540	539	540	539	540	539	540	539	540	539

Table 8 Univariate Analysis of SEO Flotation Costs by Dummy Variables

Table 8 shows a univariate analysis of SEO flotation costs by dummy variables. There ar three subgroups in this analysis according to three components of flotation costs. The definitions of all these dummy variables are in Section 4.3.2. The columns labelled `yes' list the average values of the component of flotation costs when the dummy variable equals one, while the columns labelled `no' list the average values of the component of flotation costs when the dummy variable equals to zero

Variables	Discount		Underwriting Spread		Announcement Return	
	YES	NO	YES	NO	YES	NO
Overnight	0.071	0.031	0.042	0.053	-0.018	-0.023
NO of Obs	303	1855	303	1855	303	1855
Accelerated	0.062	0.031	0.043	0.053	-0.016	-0.024
NO of Obs	385	1773	385	1773	385	1773
Shelf	0.044	0.032	0.047	0.054	-0.012	-0.029
NO of Obs	849	1309	849	1309	849	1309
ACTMAR	0.036	0.038	0.052	0.050	-0.019	-0.025
NO of Obs	905	1253	905	1253	905	1253
Integer	0.043	0.033	0.052	0.050	-0.026	-0.020
NO of Obs	860	1298	860	1298	860	1298
Nasdaq	0.040	0.029	0.053	0.045	-0.026	-0.014
NO of Obs	1546	612	1546	612	1546	612
Pure Primary	0.042	0.028	0.050	0.052	-0.018	-0.031
NO of Obs	1353	805	1353	805	1353	805
CB Co-manager	0.028	0.043	0.050	0.052	-0.024	-0.022
NO of Obs	901	1257	901	1257	901	1257
CB Lead	0.035	0.038	0.049	0.052	-0.021	-0.023
NO of Obs	851	1307	851	1307	851	1307
Multi-bookrunner	0.033	0.038	0.048	0.052	-0.016	-0.024
NO of Obs	422	1736	422	1736	422	1736
HQ_co-manager	0.026	0.048	0.050	0.052	-0.022	-0.023
NO of Obs	1108	1050	1108	1050	1108	1050

4.4.2. Regression Analysis

4.4.2.1. Announcement Return

In this section, I investigate the effect of co-managers on announcement returns. I hypothesize that SEOs with commercial bank co-managers who acted as opportunists in their last deal and may play the same role in current underwriting would generate a lower announcement return. The underlying reason is that any suspicion that commercial bank co-managers suspicion will act out of self-interest represents unfavourable information for the market, and thus harms underwriters' certification ability and decreases announcement returns.

I conduct an OLS regression to examine the role of commercial bank co-managers in SEO announcement returns. Table 9 reports the results of multiple regressions of SEO announcement returns. Generally, I apply four regressions for each of two subgroups. The first five columns show the results of the first subgroup, which implements normal regressions without the 'accelerate' and 'overnight' dummy variables. This regression method is also suggested by Jeon and Ligon (2011). The last five columns illustrate the results of the second subgroup, which implements regressions with the 'accelerate', 'overnight' and 'year' dummy variables. The rationale for adding the two dummy variables is the boom in the number of accelerated and overnight SEOs after 2000 (especially after 2007) according to Autore (2011).

Within each subgroup, first column, labelled 'Before 2008', illustrates the results of the regression investigating the effect of CB (commercial bank) co-managers globally from 1997 to 2007, while second column, labelled 'Whole', reports the results of the same regression as the first column, except the date is expanded from 1997 to2011. The third column in each subgroup, labelled 'Susp CMCB', reveals the results of the regression investigating how CB co-managers with suspicious behaviour (the issuer's leverage is high before issuance and lowered thereafter) in their last deals affect the announcement return of recent deals. The HL CMCB subgroup represents how the announcement returns of the current SEO deals with highly leveraged issuers are affected by the involvement of CB co-managers. Each subgroup's last column shows the results of the regression investigating how the involvement of CB co-managers suspected of self-interest behaviour before and with a conflict of interest currently affects the announcement returns of SEOs.

Table 9 also shows the F-test results for second subgroup ‘Regression with All Dummy Variable Added’. The purpose of F-test is to show whether it is appropriate to add the dummy variables named ‘Accelerated’, ‘Overnight’ and ‘Year Dummy’. However, F-test shows no significant result. Therefore, the analysis of the effects of co-managers on announcement return will only focus on the first subgroup whose models are recommended by previous literature.

The meaning of each regression variable has been explained in Section 4.3.2 and is given for reference in Appendix 2. The coefficient of CB-COM is negative in the first column, though insignificant. This result is similar to that obtained by Jeon and Ligon (2011) when using the OLS method. When the sample period is expanded from 1997 to 2011, the coefficient is similar to that in the first column and insignificant too. The coefficient of CMCB_Susp&HL in the last column is negative, with a bigger absolute value compared with the first column. However, the result is also insignificant. The results in the second subgroup are similar to those of the first one.

For the other estimations reported in Table 9, several control variables are significantly correlated with announcement returns. NASDAQ-listed firms, which may have higher informational asymmetries between issuers and investors, tend to have more negative announcement returns. On the other hand, shelf-registered issues tend to have less negative announcement returns, perhaps because, by SEC Rule 415, the option is only available to large publicly listed firms that have fewer asymmetric information problems. Announcement returns are also higher for pure primary offerings. Since pure primary offerings usually do not involve management sales of stock, the market would react less negatively than to mixed offerings. Meanwhile, higher market to book ratio significantly reduce announcement return. Overall, the results in Table 9 are consistent with adverse selection hypothesis of Myers and Majluf (1984).

To summarize, I find no significant evidence to suggest that syndicate structure (specifically, the inclusion of commercial banks as underwriters) affects announcement return.

Table 9 Analysis of Announcement Returns

This table presents the results of multiple regressions that test the effect of different co-manager structures on SEO announcement returns, defined as the cumulative abnormal returns over a three-day window [-1,1], using the market model with the CRSP value-weighted index as the market. The first five columns report the results of regressions similar to previous literature while the last five columns report the results of regressions with all dummy variables implied by recent literature. Definitions of variables are provided in section 4.3.2 as well as Appendix 2.

Dependent variable	Original Regression					Regression With All Dummy Variables Added				
	Before 2008	Whole	Susp CMCB	HL CMCB	Susp&HL CMCB	Before 2008	Whole	Susp CMCB	HL CMCB	Susp&HL CMCB
Lead Rank	0.001	0.002	0.003	0.002	0.002	0.001	0.003	0.003	0.003	0.003
	(0.30)	(0.56)	(0.60)	(0.55)	(0.54)	(0.27)	(0.68)	(0.73)	(0.67)	(0.66)
Multi-Book	0.002	0.004	0.004	0.005	0.005	0.001	0.002	0.002	0.002	0.002
	(0.29)	(0.84)	(0.81)	(0.91)	(0.88)	(0.18)	(0.37)	(0.33)	(0.42)	(0.41)
Lnasset	-0.002	-0.004[c]	-0.004[c]	-0.004[c]	-0.004[c]	-0.002	-0.003	-0.003	-0.003	-0.003
	(-0.91)	(-1.92)	(-1.92)	(-1.80)	(-1.90)	(-0.62)	(-1.35)	(-1.37)	(-1.26)	(-1.32)
Volatility	-0.005	-0.005	-0.005	-0.005	-0.005	-0.010	-0.008	-0.008	-0.007	-0.007
	(-0.93)	(-0.91)	(-0.91)	(-0.91)	(-0.90)	(-1.56)	(-1.33)	(-1.34)	(-1.31)	(-1.32)
Leverage	0.057[b]	0.062[b]	0.062[b]	0.067[a]	0.063[b]	0.057[b]	0.056[b]	0.055[b]	0.060[b]	0.057[b]
	(1.98)	(2.54)	(2.53)	(2.70)	(2.56)	(1.99)	(2.26)	(2.25)	(2.41)	(2.29)
Lnproceeds	0.004	0.003	0.003	0.003	0.003	0.002	0.001	0.001	0.001	0.001
	(1.22)	(1.12)	(1.05)	(1.09)	(1.13)	(0.53)	(0.38)	(0.34)	(0.36)	(0.38)
Pure Primary	0.012[b]	0.009[c]	0.009[c]	0.009[c]	0.009[c]	0.010[b]	0.008[c]	0.008[c]	0.008	0.008
	(2.50)	(1.91)	(1.91)	(1.89)	(1.90)	(2.13)	(1.65)	(1.65)	(1.64)	(1.64)
NASDAQ	-0.011[c]	-0.010[c]	-0.009[c]	-0.010[c]	-0.010[c]	-0.012[b]	-0.010[c]	-0.010[c]	-0.011[c]	-0.010[c]
	(-1.92)	(-1.76)	(-1.68)	(-1.86)	(-1.79)	(-2.06)	(-1.84)	(-1.76)	(-1.93)	(-1.87)
MBRatio	-0.065[b]	-0.065[a]	-0.064[a]	-0.065[a]	-0.065[a]	-0.066[b]	-0.059[a]	-0.059[a]	-0.060[a]	-0.059[a]
	(-2.49)	(-2.86)	(-2.85)	(-2.88)	(-2.86)	(-2.48)	(-2.60)	(-2.59)	(-2.62)	(-2.60)
Shelf	0.018[a]	0.023[a]	0.023[a]	0.023[a]	0.023[a]	0.017[a]	0.022[a]	0.022[a]	0.022[a]	0.022[a]
	(3.35)	(4.59)	(4.54)	(4.57)	(4.60)	(2.91)	(4.05)	(3.98)	(4.05)	(4.07)
SOX	-0.002	-0.004	-0.005	-0.004	-0.004	-0.007	-0.007	-0.008	-0.007	-0.007
	(-0.46)	(-0.89)	(-1.00)	(-0.91)	(-0.85)	(-0.35)	(-0.33)	(-0.37)	(-0.34)	(-0.32)
ACTMAR	0.011[b]	0.009[b]	0.008[b]	0.009[b]	0.009[b]	0.014[b]	0.011[c]	0.011[c]	0.011[c]	0.011[c]
	(2.33)	(2.11)	(2.03)	(2.17)	(2.14)	(2.38)	(1.87)	(1.84)	(1.90)	(1.89)
Lnanalyst	0.002	0.004	0.004	0.004	0.004	0.003	0.005	0.005	0.005	0.005
	(0.84)	(1.33)	(1.34)	(1.30)	(1.32)	(0.95)	(1.62)	(1.62)	(1.59)	(1.62)
CB-Lead	-0.002	-0.001	-0.001	-0.001	-0.002	-0.003	-0.002	-0.002	-0.002	-0.003
	(-0.58)	(-0.37)	(-0.35)	(-0.35)	(-0.38)	(-0.77)	(-0.60)	(-0.59)	(-0.58)	(-0.61)
CB-COM	-0.001	-0.003	-0.004	0.000	-0.002	-0.002	-0.004	-0.006	-0.001	-0.003
	(-0.28)	(-0.62)	(-0.95)	(0.08)	(-0.46)	(-0.39)	(-0.90)	(-1.23)	(-0.28)	(-0.75)
CMCB-Susp			0.005					0.006		
			(0.88)					(0.97)		
CMCB-HL				-0.008					-0.007	
				(-1.30)					(-1.13)	
CMCB-Susp&HL					-0.004					-0.004
					(-0.52)					(-0.49)
I.Accelerate						-0.002	0.004	0.004	0.004	0.004
						(-0.11)	(0.41)	(0.41)	(0.42)	(0.43)
I.Overnight						0.004	-0.009	-0.009	-0.009	-0.009
						(0.25)	(-0.88)	(-0.86)	(-0.90)	(-0.90)
Intercept	-0.029	-0.022	-0.022	-0.022	-0.022	-0.022	-0.017	-0.016	-0.017	-0.017
	(-0.75)	(-0.56)	(-0.55)	(-0.57)	(-0.56)	(-0.58)	(-0.42)	(-0.41)	(-0.43)	(-0.42)
Ind Dummy	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Year Dummy	Excluded	Excluded	Excluded	Excluded	Excluded	Included	Included	Included	Included	Included
No. of Obs	1373	1718	1718	1718	1718	1373	1718	1718	1718	1718
Adjusted R^2	0.022	0.033	0.033	0.033	0.033	0.022	0.033	0.033	0.033	0.033
F test						0.93	1.00	1.01	0.98	1.00

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

4.4.2.2. Discount

In this section, I examine the effect of co-managers on the SEO discount. According to the previous literature, if the primary source of the SEO discount is information asymmetry between issuers and investors, suspicion that underwriters may act out of self-interest should increase the discount. Therefore, I hypothesize that if commercial bank co-managers may reasonably be suspected of acting out of self-interest are involved in an SEO as underwriters, that should increase information frictions between market participants, and thus result in a greater discount.

Table 10 also shows the F-test results for second subgroup 'Regression with All Dummy Variable Added'. F-test shows significant results, which suggest it is appropriate to add dummy variables named 'Accelerate', 'Overnight' and 'Year Dummy'. Meanwhile, Adjusted R^2 is reported in Table 10. Adjusted R^2 is a measure of the explanatory ability of a model. It is clear that Adjusted R^2 values of all columns in for the regression with all dummy variables are bigger than those in the 'original regression', which implies the effectiveness of adding the year, accelerated SEO and overnight SEO dummy variables to implement the regression.

Table 10 reports the results of the relevant multiple regressions. The columns are similar to those in Table 9. The coefficient of CB-COM is negative and significant at the 1% level. In other words, the involvement of commercial bank co-managers can significantly reduce the SEO discount. This conclusion is still holds when the sample period is expanded from 1997 to 2011, and after adding in the three dummy variables (year, accelerate and overnight) to the regression. This result is also supported by Jeon and Ligon (2011).

In contrast, the third column of second subgroup shows that the involvement of commercial bank co-managers can raise discount if the last deal implies a conflict of interest. However, this result is not statistically significant. Similarly, the fourth column of second subgroup shows a positive insignificant relationship between discount and commercial bank co-managers if the issuer's leverage is higher than the industry average before the issue. The fifth column of the second subgroup reports a positive relationship between discount and commercial bank co-managers, which is significant at the 5% level if the commercial bank co-managers show a conflict of interest in their last deal and if there is an indication of self-interest in the current deal. To summarize, commercial bank co-managers may increase SEO discount if the co-managers have revealed their conflict of interest in previous deals and have the motivation of self-interest in current deal.

4.4.2.3. Underwriting Spread

Announcement return and discount are normally treated as indirect flotation costs, while underwriting spread is considered a direct flotation cost. Underwriting spread is the compensation paid to underwriters as a percentage of gross proceeds. Underwriting spreads are higher when stock return volatility is greater, firm size is smaller, and less reputable banks are involved in the underwriting. In short, greater uncertainty and information asymmetry are associated with higher underwriting spread. Moreover, underwriting spreads are also greater for issues that need more underwriting services. Thus, I hypothesize that a commercial bank co-manager will ask for more underwriting spread if it has revealed its conflict of interest in its last deal and has some motivation to act out of self-interest.

Table 11 reports results of the relevant multiple regressions and in all respects is similar to Table 9 and Table 10. All F-test results in the second subgroup are significant, denoting the safety to add the dummy variables called 'Accelerated', 'Overnight' as well as 'Year Dummy'. All adjusted R^2 values in the second subgroup are bigger than those in the first subgroup, which indicates that the explanatory power of the model is better after the three dummy variables are added in. In contrast to Jeon and Ligon (2011), the coefficient of CB-COM is positive and statistically significant at the 1% level, implying commercial bank co-managers increase the gross spread. Given that the coefficients of all the other variables have signs expected from the previous literature while volatility in Jeon and Ligon (2011)'s study is negative, my result may be more convincing. Moreover, though Narayanan et al. (2004) also report a negative relationship between gross spread and the involvement of commercial bank co-managers, they exclude the variables Lnasset and Lnproceeds. In an unreported test, I duplicate their method and get a negative coefficient, though the adjusted R^2 is reduced to around 0.4. Therefore, I think Lnasset and Lnproceeds are necessary in tests of underwriting spread and my result may be more rational.

Table 10 Analysis of Discount

This table presents the results of multiple regressions that test the effect of different co-manager structures on SEO discount, defined as the return from the offer price to the pre-offer close price. The labels as well as their meanings are the same as in Table 9. The estimated model is OLS model and definitions of variables are provided in section 4.3.2 as well as Appendix 2.

Dependent Variable	Original Regression					Regression with All Dummy Variables Added				
	Before 2008	Whole	Susp CMCB	HL CMCB	Susp&HL CMCB	Before 2008	Whole	Susp CMCB	HL CMCB	Susp&HL CMCB
Lead Rank	-0.003[c]	-0.006[a]	-0.005[b]	-0.006[a]	-0.005[a]	-0.003	-0.003	-0.003	-0.003	-0.003
	(-1.74)	(-2.72)	(-2.55)	(-2.72)	(-2.68)	(-1.59)	(-1.48)	(-1.40)	(-1.47)	(-1.39)
Multi-Book	-0.005[c]	-0.003	-0.003	-0.003	-0.003	-0.003	-0.002	-0.002	-0.002	-0.002
	(-1.92)	(-1.15)	(-1.16)	(-1.18)	(-1.29)	(-1.25)	(-0.69)	(-0.73)	(-0.78)	(-0.94)
Lnasset	-0.001	0.001	0.001	0.001	0.001	-0.003[a]	-0.002	-0.002	-0.002	-0.002
	(-1.27)	(1.16)	(1.11)	(1.11)	(1.08)	(-2.81)	(-1.48)	(-1.49)	(-1.60)	(-1.62)
Volatility	0.013[a]	0.021[a]	0.021[a]	0.021[a]	0.021[a]	0.012[a]	0.016[a]	0.016[a]	0.016[a]	0.016[a]
	(5.09)	(8.53)	(8.44)	(8.53)	(8.52)	(4.43)	(6.44)	(6.42)	(6.40)	(6.43)
Leverage	0.000	0.002	0.002	0.001	0.001	0.002	0.001	0.001	-0.001	-0.000
	(0.02)	(0.26)	(0.26)	(0.17)	(0.17)	(0.21)	(0.11)	(0.11)	(-0.11)	(-0.03)
Lnproceeds	-0.008[a]	-0.010[a]	-0.010[a]	-0.010[a]	-0.010[a]	-0.006[a]	-0.006[a]	-0.006[a]	-0.006[a]	-0.006[a]
	(-6.26)	(-7.52)	(-7.19)	(-7.51)	(-7.58)	(-4.52)	(-4.46)	(-4.32)	(-4.45)	(-4.54)
Pure Primary	0.002	0.003	0.002	0.003	0.003	0.002	0.002	0.002	0.002	0.002
	(0.88)	(1.18)	(1.12)	(1.19)	(1.18)	(0.91)	(1.07)	(1.05)	(1.08)	(1.05)
NASDAQ	-0.004[c]	-0.003	-0.003	-0.003	-0.003	-0.005[c]	-0.004[c]	-0.004[c]	-0.004	-0.004
	(-1.67)	(-1.25)	(-1.25)	(-1.19)	(-1.09)	(-1.91)	(-1.71)	(-1.70)	(-1.58)	(-1.47)
MBRatio	0.010	0.005	0.005	0.005	0.005	0.009	0.005	0.005	0.005	0.005
	(1.54)	(0.74)	(0.74)	(0.72)	(0.72)	(1.38)	(0.82)	(0.82)	(0.78)	(0.79)
Shelf	0.009[a]	0.012[a]	0.012[a]	0.012[a]	0.012[a]	0.004[c]	0.001	0.001	0.001	0.001
	(3.78)	(4.99)	(5.00)	(4.97)	(4.95)	(1.81)	(0.46)	(0.50)	(0.41)	(0.32)
Integer	0.013[a]	0.013[a]	0.013[a]	0.013[a]	0.013[a]	0.013[a]	0.013[a]	0.013[a]	0.013[a]	0.013[a]
	(7.53)	(7.30)	(7.29)	(7.31)	(7.32)	(7.69)	(7.66)	(7.65)	(7.71)	(7.71)
SOX	0.003	0.011[a]	0.011[a]	0.011[a]	0.011[a]	0.009	0.008	0.008	0.008	0.007
	(1.37)	(4.86)	(4.90)	(4.88)	(4.71)	(1.14)	(0.92)	(0.93)	(0.93)	(0.79)
ACTMAR	-0.006[a]	0.002	0.002	0.002	0.001	-0.005[c]	-0.005[b]	-0.005[c]	-0.005[b]	-0.005[b]
	(-2.87)	(0.87)	(1.08)	(0.83)	(0.66)	(-1.92)	(-1.99)	(-1.93)	(-2.04)	(-2.11)
Lnanalyst	-0.003[b]	-0.003[b]	-0.003[b]	-0.003[b]	-0.003[b]	-0.004[a]	-0.005[a]	-0.005[a]	-0.005[a]	-0.005[a]
	(-2.48)	(-2.24)	(-2.28)	(-2.21)	(-2.23)	(-3.31)	(-4.07)	(-4.08)	(-4.01)	(-4.07)
CB-Lead	0.003[c]	0.002	0.002	0.002	0.002	0.003	0.001	0.001	0.001	0.001
	(1.88)	(1.00)	(1.09)	(0.99)	(1.00)	(1.46)	(0.57)	(0.61)	(0.52)	(0.52)
CB-COM	-0.006[a]	-0.008[a]	-0.008[a]	-0.009[a]	-0.009[a]	-0.003[c]	-0.003[c]	-0.003[c]	-0.005[b]	-0.005[b]
	(-3.08)	(-4.21)	(-4.30)	(-3.97)	(-4.53)	(-1.79)	(-1.70)	(-1.76)	(-2.24)	(-2.38)
CMCB-Susp			-0.004[b]					-0.002		
			(-2.34)					(-1.09)		
CMCB-HL				0.002					0.004	
				(0.63)					(1.56)	
CMCB-Susp&HL					0.006[c]					0.010[a]
					(1.82)					(2.97)
I.Accelerate						0.001	-0.010[b]	-0.010[b]	-0.010[b]	-0.011[b]
						(0.12)	(-2.28)	(-2.27)	(-2.27)	(-2.35)
I.Overnight						0.019[b]	0.040[a]	0.040[a]	0.040[a]	0.041[a]
						(2.54)	(8.61)	(8.46)	(8.63)	(8.74)
Intercept	0.060[a]	0.046[b]	0.047[b]	0.046[b]	0.046[b]	0.054[a]	0.056[a]	0.056[a]	0.056[a]	0.056[a]
	(3.46)	(2.35)	(2.39)	(2.35)	(2.36)	(2.77)	(2.61)	(2.63)	(2.62)	(2.64)
Ind Dummy	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Year Dummy	Excluded	Excluded	Excluded	Excluded	Excluded	Included	Included	Included	Included	Included
No. of Obs	1564	1958	1958	1958	1958	1564	1958	1958	1958	1958
Adjusted R^2	0.188	0.197	0.199	0.197	0.198	0.211	0.280	0.280	0.281	0.283
F test						4.80	14.69	14.41	14.83	14.77

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

The coefficient of CMCB-Susp is similar to that for CB-COM and is also significant at the 1% level. This result implies that the behaviour of a commercial bank co-manager in its last deal does not influence its effect as a 'normal' commercial bank co-manager in SEO underwriting. However, the coefficients of CMCB-HL and CMCB-Susp&HL are obviously bigger than that of CB-COM, suggesting commercial banks do charge the issuer more if the issuer's leverage is higher than the industry average.

Table 11 Analysis of Underwriting Spread

This table presents the results of multiple regressions that test the effect of different co-manager structures on SEO underwriting spread, defined as the compensation paid to underwriters as a percentage of gross proceeds. The labels as well as their meanings are the same as those in Table 9. The estimated model is an OLS model and definitions of variables are given in section 4.3.2 as well as in Appendix 2.

Dependent Variable	Original Regression					Regression with All Dummy Variables Added				
	Before 2008	Whole	Susp CMCB	HL CMCB	Susp&HL CMCB	Before 2008	Whole	Susp CMCB	HL CMCB	Susp&HL CMCB
Lead Rank	-0.000	-0.000	-0.000	-0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-0.78)	(-0.02)	(-0.36)	(-0.03)	(0.04)	(-0.88)	(-0.88)	(-1.08)	(-0.88)	(-0.81)
Multi-Book	0.003[a]	0.004[a]	0.004[a]	0.004[a]	0.004[a]	0.002[a]	0.002[a]	0.002[a]	0.002[a]	0.002[a]
	(5.30)	(6.97)	(7.06)	(6.75)	(6.74)	(3.60)	(4.58)	(4.72)	(4.36)	(4.33)
Lnasset	-0.003[a]	-0.003[a]	-0.003[a]	-0.003[a]	-0.003[a]	-0.002[a]	-0.002[a]	-0.002[a]	-0.002[a]	-0.002[a]
	(-10.67)	(-11.76)	(-11.74)	(-12.07)	(-11.89)	(-8.82)	(-10.10)	(-10.11)	(-10.42)	(-10.23)
Volatility	-0.000	0.016[c]	0.019[b]	0.017[b]	0.016[c]	0.018	0.024[a]	0.025[a]	0.023[b]	0.024[a]
	(-0.03)	(1.86)	(2.17)	(1.97)	(1.90)	(1.48)	(2.61)	(2.74)	(2.57)	(2.64)
Leverage	0.003[c]	0.004[b]	0.004[b]	0.003	0.003[b]	0.002	0.004[b]	0.004[b]	0.003[c]	0.003[b]
	(1.87)	(2.19)	(2.21)	(1.57)	(2.03)	(1.47)	(2.30)	(2.32)	(1.70)	(2.14)
Lnproceeds	-0.003[a]	-0.004[a]	-0.004[a]	-0.004[a]	-0.004[a]	-0.004[a]	-0.004[a]	-0.004[a]	-0.004[a]	-0.004[a]
	(-10.05)	(-12.20)	(-12.73)	(-12.18)	(-12.31)	(-13.46)	(-14.45)	(-14.69)	(-14.43)	(-14.52)
Pure Primary	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.68)	(0.75)	(0.87)	(0.82)	(0.74)	(0.64)	(0.86)	(0.92)	(0.89)	(0.83)
NASDAQ	-0.000	-0.000	-0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(-0.11)	(-0.09)	(-0.06)	(0.26)	(0.19)	(0.47)	(0.36)	(0.36)	(0.69)	(0.62)
MBRatio	-0.003[c]	-0.003[b]	-0.003[b]	-0.003[b]	-0.003[b]	-0.002	-0.003[b]	-0.003[b]	-0.003[b]	-0.003[b]
	(-1.89)	(-2.12)	(-2.15)	(-2.23)	(-2.16)	(-1.43)	(-2.10)	(-2.13)	(-2.22)	(-2.14)
Shelf	-0.003[a]	-0.002[a]	-0.002[a]	-0.002[a]	-0.002[a]	0.001	0.000	0.000	0.000	0.000
	(-4.37)	(-4.66)	(-4.73)	(-4.72)	(-4.74)	(1.46)	(0.58)	(0.45)	(0.47)	(0.43)
SOX	-0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-0.22)	(0.12)	(0.06)	(0.19)	(-0.11)	(-0.01)	(-0.03)	(-0.06)	(-0.02)	(-0.16)
ACTMAR	-0.000	0.000	-0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001
	(-0.20)	(0.36)	(-0.06)	(0.16)	(0.02)	(1.45)	(1.54)	(1.41)	(1.40)	(1.42)
Lnanalyst	-0.002[a]	-0.002[a]	-0.002[a]	-0.002[a]	-0.002[a]	-0.001[a]	-0.002[a]	-0.002[a]	-0.001[a]	-0.002[a]
	(-6.76)	(-6.69)	(-6.69)	(-6.58)	(-6.71)	(-5.31)	(-5.66)	(-5.68)	(-5.58)	(-5.68)
CB-Lead	0.000	0.000	0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000
	(0.29)	(0.47)	(0.29)	(0.42)	(0.48)	(0.34)	(-0.09)	(-0.21)	(-0.17)	(-0.12)
CB-COM	0.003[a]	0.004[a]	0.004[a]	0.003[a]	0.004[a]	0.001[a]	0.002[a]	0.002[a]	0.001[a]	0.002[a]
	(7.73)	(9.39)	(9.68)	(6.21)	(8.35)	(3.20)	(5.34)	(5.54)	(2.86)	(4.49)
CMCB-Susp			0.002[a]					0.001[a]		
			(4.62)					(2.84)		
CMCB-HL				0.003[a]					0.002[a]	
				(4.11)					(3.97)	
CMCB-Susp&HL					0.002[a]					0.002[a]
					(3.09)					(2.95)
I.Accelerate						-0.004[a]	-0.002[c]	-0.002[b]	-0.002[c]	-0.002[b]
						(-2.65)	(-1.94)	(-1.96)	(-1.92)	(-2.00)
I.Overnight						-0.011[a]	-0.009[a]	-0.008[a]	-0.009[a]	-0.009[a]
						(-6.15)	(-8.37)	(-8.09)	(-8.35)	(-8.26)
Intercept	0.085[a]	0.085[a]	0.084[a]	0.085[a]	0.085[a]	0.084[a]	0.089[a]	0.089[a]	0.089[a]	0.089[a]
	(20.45)	(20.26)	(20.29)	(20.33)	(20.31)	(22.26)	(19.63)	(19.61)	(19.74)	(19.69)
Industry Dummy	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Year Dummy	Excluded	Excluded	Excluded	Excluded	Excluded	Included	Included	Included	Included	Included
No. of Obs	1513	1876	1876	1876	1876	1513	1876	1876	1876	1876
Adjusted R^2	0.502	0.487	0.493	0.492	0.490	0.606	0.554	0.556	0.558	0.556
F test						33.22	18.04	17.10	17.96	17.04

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

4.5. Conclusion

According to most current empirical studies, it is well accepted that commercial bank co-managers can benefit issuers by lowering flotation costs (e.g. Jeon and Ligon, 2011; Narayanan et al., 2004; Drucker and Puri, 2005). This phenomenon is attributed to the fact that commercial bank underwriters can better certificate an SEO than investment bank underwriters. However, finding benefits to allowing commercial banks to engage in underwriting is not the same thing as finding no conflict of interest. Current empirical studies cannot reject the possibility of such a conflict of interest. My study fills this gap by investigating the effect of commercial bank co-managers on the flotation costs of SEOs in specific conditions where the commercial bank can be perceived by the market to have act out of self-interest. In such circumstances, I find evidence that commercial banks increase the discount and the gross spread rather than reduce them. In other words, commercial bank co-managers do not always benefit SEO issuers by lowering flotation costs. My finding can also be treated as implying that a conflict of interest does exist.

The contribution of this study is twofold. First, the findings empirically support the concern that commercial bank underwriters may have a conflict of interest. Note that the specific circumstance of my study is highly related to the issuer's degree of leverage and bankruptcy risk; this is in line with the concern that a conflict of interest can arise where banks may require a firm that represents a poor–quality loan to issue equity in order to reduce the bank's exposure to default risk. Second, the result helps establish a better understanding regarding the effect of commercial bank co-managers on SEO flotation costs. Previous studies did not consider that the effects of commercial bank underwriters on SEO floatation costs may vary in the different situation, whereas I investigate the effect further by setting more specific tests and find different results from previous studies.

Chapter 5: Underwriter–Investor Relationships and Investors' Participation in Equity Offerings

This chapter reports an empirical study on the effects of the underwriter–investor relationship on the decision of potential investors on whether or not to participate in an SEO. The structure of the chapter is as follows: firstly, the conceptual framework and the hypothesis will be proposed; secondly, sample selection as well as control variable identification will be briefly introduced; thirdly, the descriptive statistics will be shown; then, regressions will be implemented and analysis will be presented; and finally, conclusions will be drawn.

5.1. Conceptual Framework and Hypothesis Building

Huang and Zhang (2011) consider the underwriter–investor relationship to be a component of the marketing efforts of underwriters. They also show that that relationship does have an influence on the participation decision of investors, via a sample of traditional book-built SEOs. However, according to Huang et al. (2008), investment banks develop relationships with investors through repeat business in securities offerings, brokerage services and analyst research. In other words, the underwriter–investor relationship cannot be simply treated as a marketing component, as it would exist even in the absence of marketing activity. Moreover, in reality, there is a firewall between the ECM (Equity Capital Market, normally carrying out marketing activities such as road shows) and the Trading/Sales departments of the bank. Therefore, the underwriter–investor relationship should, in principle at least, be separate from any marketing efforts, though there is an overlap between them.

Given that the underwriter–investor relationship is not only derived from marketing activities but also from the repeat dealings in the process of securities offerings, it is natural to hypothesize that the relationship influences the decision of investors to participate not only in traditional book-built SEOs but also in accelerated SEOs, which have been booming during recent years and for which less marketing is done. Additionally, as many underwriter and investors deal with both IPOs and SEOs, the relationships built during IPOs should also be effective in SEOs, and vice versa.

Another question needing careful consideration is whether the relationships built by co-managers are as effective as those built by lead managers. Binay et al. (2007) focus on the role of underwriter–investor relationships in the IPO process but consider only the relationships built by lead managers through previous IPO deals, on the grounds that lead managers are the most important in the allocation decisions. However, Jeon and Ligon (2011) point out that though lead managers manage the overall process of share offerings, co-managers are also responsible for share allocations, revise offer prices according to information and provide after-market services. Huang and Zhang (2011) also insist on the importance of co-managers in SEOs and suggest that they are useful in attracting different investors and providing after-market services. Therefore, the present study considers not only the relationships built by lead managers but also the relationships built by co-managers.

To summarize, I set up the following hypothesis:

The existence of a previously established underwriter–investor relationship will increase the willingness of potential investors to participate in public equity offerings underwritten by that underwriter; the relationships built by lead managers or co-managers are both effective.

5.2. Sample Selection and Variable Identification

5.2.1. Basic Data for Deals

For the study in this chapter, I identify equity deals in the Thomson One database. The sample includes IPOs and SEOs for US common stocks during the period 1990–2011. Market prices of shares are from the Center for Research in Securities Prices (CRSP). To be consistent with previous literature as well as with the empirical study reported in Chapter 4, I exclude following deals:

(1) issues by non-US firms, REITs and limited partnerships (CRSP share code 40 or greater),

(2) issues by firms not listed on NYSE, AMEX or NASDAQ,

(3) issues with offer prices less than $3 or greater than $400,

(4) issues where price and financial data are not available in CRSP and COMPUSTAT,

(5) units (CRSP share code 70 or greater), ADRs (the first digit of CRSP share code 3) and rights offerings, and

(6) pure secondary offers.

Different from the study reported in Chapter 4, the study reported in this chapter does include deals issued by financial firms (one-digit SIC code 6), which follows Huang and Zhang (2011).

From the Thomson One database I obtain issue-specific data such as the offer date, total proceeds, offer price and the syndicate composition for my common equity sample. The market prices of shares as well as SIC codes are from the CRSP daily files. The accounting information of issuers is taken from Compustat annual files.

Under the 1978 amendment to the Securities and Exchange Act of 1934, all institutional investors are required to file quarterly 13F reports to the SEC highlighting equity positions greater than 10,000 shares or $200,000 in market value as of the last date for each quarter if they manage a portfolio with an investment value equal to or above $100 million. For each equity deal in my sample, I obtain the end-of-quarter shareholdings for each institutional investor from the CDA Spectrum 13F Filing database.

5.2.2. Identification of Variables

To implement this study, the identification of variables needs careful consideration. This section sets out the method used to measure underwriter–investor relationship first and thereafter the other variables are described.

5.2.2.1. Variables Related to the Underwriter–Investor Relationship

Although some theoretical studies focus on the effects of the underwriter–investor relationship on equity offerings, few empirical studies look at this topic. The reason, perhaps, is the difficulty in building a practical method to measure these relationships (Huang et al., 2008; Binay et al., 2007). In the literature, there are two methods, proposed by Binay et al. (2007) and Huang and Zhang (2011).

Binay et al. (2007) build a ‘relationship participation’ measure that indicates the propensity of institutional investors to participate in an IPO conditional on their involvement in past IPOs by the same lead underwriter. The measure of relationship participation for each IPO is the difference between the probability of institutional participation conditional on past participation and the unconditional probability of institutional participation (expressed as a percentage). An investor is defined as participating in an IPO if the number of shares of the stock owned by that investor increases from the quarter immediately prior to the IPO to the quarter immediately after the IPO. They express their measure as follows:

$$R_i = (\frac{{n_i}^R}{N^R} - \frac{n_i}{N}) \times 100$$

Here, the unconditional probability of institutional IPO participation, $\left(\frac{{n_i}^R}{N^R}\right)$, is the number of institutions participating in IPO i, (n_i), divided by all institutions present at the time of the IPO, (N). Institutions that have never participated in an IPO are excluded from the analysis. The probability of institutional participation in IPO i conditional on past relationships $(\frac{{n_i}^R}{N^R})$ is constructed as follows. First, for every IPO and for every institution with a 13F filing at the end of the issuing quarter, they find whether the institution has participated in any of the past 10 IPOs underwritten by the same lead bank within five years of the current IPO. If the lead bank has managed fewer than 10 IPO deals within the past five years, then they use all available past IPO deals. They calculate the conditional probability of participation as the number of institutions participating in the IPO that also have past IPO participation with the same underwriter, $({n_i}^R)$, divided by the number of all institutions present at the time of the IPO that have past IPO participation with the same lead underwriter, (N^R).

On the other hand, Huang and Zhang (2011) propose four variables, namely $LOYAL_{LEAD}$, $LOYAL_{CM}$, $LOYAL_{LEAD_D}$, and $LOYAL_{CM_D}$, to capture the underwriter–investor relationship. $LOYAL_{LEAD}$ is the proportion of SEOs that an 'eligible investor' participated in in the 5 years prior to the current SEO that were underwritten by at least 1 of the current SEO's lead underwriters. The set of eligible investors comprises all investors that participated in at least 0.5% of all SEOs during the year of the current SEO and that participated in at least 10 SEOs during the 5 years prior to the current SEO. This variable captures the influence of the lead underwriter(s) on investor participation. The second relationship variable, $LOYAL_{CM}$, is the proportion of SEOs that the eligible investor participated in in the 5 years prior to the current SEO that were underwritten by at least 1 of the current SEO's co-managers. This variable captures the influence of the co-manager(s) on investor participation.

To examine whether the likelihood of participation increases if an eligible investor has relationships with multiple underwriters of an SEO, Huang and

Zhang (2011) replace the relationship variables measured by the actual proportions with 2 dummy variables, $LOYAL_{LEAD_D}$ and $LOYAL_{CM_D}$. $LOYAL_{LEAD_D}$ equals 1 if the eligible investor is a 'relationship investor' of at least 1 lead manager, and 0 otherwise. Similarly, $LOYAL_{CM_D}$ equals 1 if the eligible investor is a 'relationship investor' of at least 1 co-manager, and 0 otherwise. An investor is viewed as a 'relationship investor' of a bank if that investor participated in at least 10 deals for which the bank was a lead or co-manager in the 5 years prior to the current SEO.

Compared with the measure derived by Huang and Zhang (2011), the measure implemented by Binay et al. (2007) is better at capturing the probability of participation for a given group of investors, but it ignores the influence of underwriter–investor relationships on an individual investor's decision to participate. Given that the purpose of my study is to shed light on the influence of the underwriter(s) on every single investor, my research mainly employs the measure proposed by Huang and Zhang (2011).

My study also proposes a method to reduce the impact of mergers and acquisitions in the investment banking industry. Binay et al. (2007) recognize that these will affect the accuracy of identifying underwriter–investor relationships. However, they choose to ignore this because it is not a big problem in the sample period of their study, since few influential deals occurred. However, my study covers some of the period since the 2008 financial crisis, when several giant companies merged or were acquired. Therefore, I do consider this problem in my research. The details will be set out in Section 5.2.3.

5.2.2.2. Descriptions of Other Variables

The other variables that are employed in my research are as follows:

LnN_{IPO} is the natural logarithm of 1 + the number of IPOs in which the investor participated in the 5 years prior to the current IPO; it is used to control for how active the investor has been in the IPO sample;

LnN_{SEO} is the natural logarithm of 1 + the number of SEOs in which the investor participated in the 5 years prior to the current SEO; it is used to control for how active the investor has been in the SEO sample;

LnN_{Equity} is the natural logarithm of 1 + the number of IPOs and SEOs in which the investor participated in the 5 years prior to the current offering; it is used to control for how active the investor has been in the IPO and SEO sample;

$LnNSEO_{SAMISSUER}$ is the natural logarithm of 1 + the number of the same issuer's SEOs participated in by the investor in the 5 years prior to the current SEO; it is used to control for the issuer–investor relationship;

$LnMktCap$ is the logged pre-issue market capitalization (in constant 2004 $millions), measured as the price multiplied by the total number of shares outstanding at the market close before the offer;

$RelativeSize$ is the number of shares offered over the total number of shares outstanding before the offer, measured in decimals;

$LnPrice$ is the logarithm of the closing price on the day before the offer;

$NYSEAmex$ is a dummy variable that equals 1 if the issuer is listed on the NYSE or AMEX, and 0 otherwise;

$Volatiltiy$ is the standard deviation of daily close-to-close returns over the 30 trading days ending 11 days before the offer, measured in decimals;

$Institutional\ Ownership$ is the most recent institutional ownership before the offer, measured in decimals;

$InstHolding\ (\%)$ is the most recent institutional ownership before the offer, measured by the percentage of the SEO firm's equity that is held by institutional investors;

$LnShares$ is the logarithm of the number of shares issued in the current IPO;

$VCFlag$ is a dummy variable that equals 1 if the firm received financing from venture capitalists prior to the IPO (as defined by the SDC), and 0 otherwise;

$LnFirmAge$ equals the logarithm of (1 +) the number of years since the firm was founded, measured at the time of the IPO; I use the Field-Ritter data set of founding dates;

$PriceUpdate$ is the absolute value of the percentage change between the offer price and the middle of the range of prices in the prospectus;

$Utility$, $Tech$, and $Biotech$ are dummy variables that equal 1 for issuing firms that are utility, tech, or biotech firms, respectively, and 0 otherwise;

$Underpricing$ is the return from the offer price to the offer day's closing price multiplied by 100;

$Accelerated$ is a dummy variable that equals 1 if the SEO is an accelerated offer;

$LnNEquity_{SAMISSU}$ is the natural logarithm of 1 + the number of the same issuer's deals participated in by the investor in the 5 years prior to the current deal; it is used to control for the issuer–investor relationship.

5.2.3. Identification of Changes among Underwriters

Mergers and acquisitions between investment banks present a challenge for research on underwriter–investor relationships. Binay et al. (2007) choose to ignore this problem because they suggest that a merger or an acquisition becomes less and less relevant over time, as the new entity underwrites more deals. Furthermore, for their sample period, from 1980 to 2000, few large investment banks merged. However, considering my research includes the period after the 2008 financial crisis, when several big names in investment banking merged or were acquired, it is necessary to take the changes among underwriters into account.

According to Huang et al. (2008), investment banking is a relationship-based rather than transaction-based business. Moreover, considering those investment banks that merged or were acquired had few tangible assets left after the financial crisis, their intangible assets – such as underwriter–investor relationships – are likely to have been a large part of the reason for their acquisition. For example, Barclays agreed to buy Lehman Brothers' North American investment banking and capital markets business on Sep 17, 2008. Thereafter, Barclays became a top-10 player among global investment banks. Obviously, Barclays benefits from the acquisition of Lehman Brothers' investment banking business. Therefore, I assume that the business relationships established before a merger or acquisition are passed on intact to the merged new entities.

As set out in the previous section, the underwriter–investor network is here quantified in terms of the number of times an investor participated in the underwriter's previous deals. I assume that the relationships built by the target banks are absorbed and available for acquirers after the mergers or acquisitions happen. Take Lehman Brothers and Barclays for example: before Sep 17, 2008, the related investors are identified separately for Lehman Brothers and Barclays when an equity offering including at least one of them as underwriter happened. After Sep 17, 2008, the related investors of Lehman Brothers are automatically transferred to the related investors of Barclays.

Given that the networks of relatively small investment banks are not likely to be large, my research takes account only of mergers and acquisitions between investment banks ranked more than 7 in the Carter-Manaster Reputation Rank. Then, I list the history of these banks, both mergers and acquirers, as well as the timing of those mergers and acquisitions. Finally, when doing the statistics, the target-related deals are switched to acquirer-related ones and the target-related investors are treated as acquirer-related ones after the merger or acquisition.

5.2.4. Data Correction and Adjustment for the CDA Spectrum 13F Filing Database

The CDA Spectrum 13F Filing database is employed to identify the participation of an institutional investor in an offering by checking the change of the shareholdings of the quarters immediately prior to and immediately after that of the offering. Though most of the data in the CDA Spectrum 13F Filing database are accurate, sometimes they suffer the problems of systematic or non-systematic missing values.

The following is an example of the structure of the CDA Spectrum 13F Filing database:

mgrname	**mgrno**	**rdate**	**cusip**	**shares**	**change**
A	**xxxx**	**31Mar2011**	********	**N1**	**C1**
A	**xxxx**	**30Jun2011**	********	**N2**	**C2**
A	**xxxx**	**30Sep2011**	********	**N3**	**C3**
A	**xxxx**	**31Dec2011**	********	**N4**	**C4**

Here, ***mgrname*** represents the name of the institutional investor (in the example it is **A**); ***mgrno*** is the standard code for the institutional investor (in the example it is **xxxx**); ***rdate*** is the report date, which is normally the end of a quarter; ***cusip*** is the CUSIP (in the example it is **********) of the company whose shares are held by the institutional investors; ***shares*** represents the shares of the companies (identified by ***cusip***) held by the institutional investor; ***change*** represents the changes of shareholdings from last report date to the current report date and is calculated by current shareholdings minus previous shareholdings.

However, the structure of the CDA Spectrum 13F Filing database is not always so clear. A common problem is when data are missing between two non-consecutive quarters, as in the following:

mgrname	**mgrno**	**rdate**	**cusip**	**shares**	**change**
A	**xxxx**	**31Mar2011**	********	**N1**	**C1**
A	**xxxx**	**31Dec2011**	********	**N4**	**C4**

According to my analysis of the whole database, there are three principal reasons for data missing between two non-consecutive quarters:

1) The shareholding (N4) of the latter quarter (Quarter 4, 2011) is equal to the share change (C4) of that quarter (Quarter 4, 2011). In this situation, the shareholding decreases to zero after the former month (Quarter 1, 2011). This is the most reasonable explanation because the CDA Spectrum 13F Filing database does not record non-shareholding, and shareholding equal to the share change also proves non-shareholding in the quarter (Quarter 3, 2011) immediately before the latter quarter (Quarter 4, 2011). This problem is systematic. Therefore, I identify the shareholdings for the missing quarters as zero.

Figure 4 provides a specific example to explain how I deal with this situation. For the observations with mgrno (variable name, identifies unique investor) equal to “16210” and cusip (variable name, identifies unique company which is invested) equal to “00234610”, there is some information missing between “30sep2010” and “30jun2011”. Considering the value of “shares” equal to that of “change” on “30jun2011”, the value of “shares” during the gab observations is set to 0. Then, the values of “change” could be calculated as “-18765” and “0” respectively.

	mgrname	mgrno	rdate	cusip	shares	change
1	COMMERZBANK AG	12297	31mar2010	00507V10	.	.
2	COMMERZBANK AG	12297	30jun2010	00507V10	.	.
3	COMMERZBANK AG	12297	30sep2010	00507V10	.	.
4	COMMERZBANK AG	12297	31dec2010	00507V10	.	.
5	COMMERZBANK AG	12297	31mar2011	00507V10	296755	48503
6	COMMERZBANK AG	12297	30jun2011	00507V10	298341	1586
7	COMMERZBANK AG	12297	30sep2011	00507V10	268004	-30337
8	COMMERZBANK AG	12297	31dec2011	00507V10	253323	-14681
9	COMMERZBANK AG	12297	31mar2012	00507V10	170743	-82580
10	COMMERZBANK AG	12297	30jun2012	00507V10	.	.
11	COMMERZBANK AG	12297	30sep2012	00507V10	.	.
12	COMMERZBANK AG	12297	31dec2012	00507V10	87258	-83485
13	CITADEL INVESTMENT GRP, L.L.C.	16210	31mar2010	00234610	21390	0
14	CITADEL INVESTMENT GRP, L.L.C.	16210	30jun2010	00234610	31450	10060
15	CITADEL INVESTMENT GRP, L.L.C.	16210	30sep2010	00234610	18765	-12685
16	CITADEL INVESTMENT GRP, L.L.C.	16210	31dec2010	00234610	.	.
17	CITADEL INVESTMENT GRP, L.L.C.	16210	31mar2011	00234610	.	.
18	CITADEL INVESTMENT GRP, L.L.C.	16210	30jun2011	00234610	15684	15684
19	CITADEL INVESTMENT GRP, L.L.C.	16210	30sep2011	00234610	17384	1700
20	CITADEL INVESTMENT GRP, L.L.C.	16210	31dec2011	00234610	17242	-142
21	CITADEL INVESTMENT GRP, L.L.C.	16210	31mar2012	00234610	.	.
22	CITADEL INVESTMENT GRP, L.L.C.	16210	30jun2012	00234610	.	.
23	CITADEL INVESTMENT GRP, L.L.C.	16210	30sep2012	00234610	.	.
24	CITADEL INVESTMENT GRP, L.L.C.	16210	31dec2012	00234610	.	.

Figure 4 Specific Example for Data Correction

2) The shareholding (N4) of the latter quarter (Quarter 4, 2011) over the shareholding (N1) of the latter quarter (Quarter 1, 2011) equals the share change (C4) of the latter quarter (Quarter 4, 2011). In this case, I would consider the shareholdings for the missing quarters are equal to the shareholding of the former quarter (Quarter 1, 2011) because the unchanged difference between two recorded quarters suggests the shareholdings of the missing quarters remain the same as that of the former quarter. Therefore, the problem results from a non-systematic mistake.

Such situation is shown by the observations with mgrno (variable name, identifies unique investor) equal to "12297" and cusip (variable name, identifies unique company which is invested) equal to "005070V10" in Figure 4. The information gap is between "31mar2012" and "31dec2012".

On March 31st, 2012, the value of “shares” is “170743”. On December 31st, 2012, the value of “shares” is “87258” and the value of “change” is “-83485”. Obviously, latter “change” is equal to latter “shares” over former “shares”. Therefore, the values of “shares” in the gap are set to “170743” and the value of “change” in the gap could easily be calculated as “0”.

3) When neither of the above two reasons apply, the shareholdings of the missing quarters are labelled missing except for the quarter immediately prior to the latter recorded quarter (Quarter 4, 2011) because the shareholding can be calculated by the shareholding of the latter recorded quarter minus the change.

5.3. Descriptive Statistics

Table 12 presents the means and medians for the firm and offer characteristics of the 3413 IPOs in my final sample, sorted by year. It is obvious that the IPOs are very popular before 2001, peaking at 588 in 1996. The number of IPOs decreases sharply from 2001 to 2003 with fewer than 70 deals for each year. Then, the number of IPOs recovers to 178 in 2004 and stays around 150 per year during 2005 to 2007. However, there is then another drop of the number of IPOs, with only 25 in 2008. Thereafter, the number of IPOs stays at a low level, with no more than 100 deals from 2009 to 2011.

The average underpricing, which is defined as 100 times the return from the offer price to the offer day’s closing price, is 26.57%. From 1995 to 1998, the average underpricing is around 20%. Underpricing reaches its peak at 73.66%

in 1999 and drops slightly to 57.89% in 2000. However, paralleling the dramatic decrease in the number of IPOs, underpricing decreases to 14.12% in 2001. It then oscillates around 10% from 2002 to 2007. Finally, average underpricing from 2008 to 2011 decreases to less than 10%.

The average number of shares offered per IPO is 7.04 million. During 1995–1999, around 5 million shares were offered per IPO. Then, the number increases to 8.81 million in 2000 and stays around 10 million from 2001 to 2007. The number of shares offered per IPO reaches its peak at 26.89 million in 2008. The number of shares offered per IPO then drops to 16.82 million, 10.62 million and 11.89 million respectively in 2009, 2010 and 2011.

VC-Backed IPOs is the percentage of firms that received financing from venture capitalists before the IPO over all the IPO issuers. This variable fluctuates around 50% from 1995 to 2011, with a peak of 68.98% in 2000. Firm Age (years) is the number of years (at the time of IPO) since the firm was founded. The average firm age is 12.51 years. However, during the 1999–2000 internet bubble, average firm age is only 9.11 years. In 2005 and 2006, IPOs were normally triggered by ‘older’ firms, with more than 15 years since the establishment.

Price update is the absolute value of the percentage change between the middle of the range of prices in the initial registration statement and the offer price. According to Lowry et al. (2010), the price update can reflect the uncertainty of issuers. Firms presenting higher price updates normally have higher uncertainty. The average price update fluctuates around 10% every year with little variation.

Aver. Proceeds is the average proceeds of an IPO. Table 12 shows that the average proceeds of an IPO are normally between $100 miillion and $200 million after 1999, although with two exceptions, in 2000 and 2001. In 2001, the average proceeds of an IPO was $237.68 million. The average proceeds of an IPO increased dramatically to $789.61 million in 2008, which suggests the popularity of giant IPOs during the 2008 financial crisis. I also investigate the total proceeds of IPOs each year. This total was bigger before 2001 and the IPOs market was less active thereafter.

Table 13 reports the means and medians for the firm and offer characteristics of the 4953 SEOs in my final sample, sorted by year. *NO. of SEOs* is the number of SEOs each year. Before 1998, there are more than 400 SEOs per year. The number of deals then drops to less than 300 per year. The number of SEOs fluctuates between 200 and 300 from 1999 to 2007. Unlike the IPOs, the number of SEOs drops dramatically, to 157 in 2008. In 2009, the number of SEOs recovered to 384, but thereafter fell again, to 272 in 2010 and 177 in 2011.

The average underpricing of SEOs is 3.57%, which is similar to previous reports (e.g. Corwin, 2003). Obviously, the underpricing of SEOs is larger than that of IPOs. The underpricing of SEOs reaches its peak at 4.48% in 2000. The lowest value occurs in 2004, with 2.85%.

InstHolding (%) is the most recent institutional ownership before the offer. Before 2001, the institutional ownership generally varies between 35% and 40% but then increases sharply to 64.19% in 2001. After 2001, the average institutional ownership before the SEO is mostly no less than 50% and it reach 67.18% in 2008.

Volatility is calculated as the square root of 252 times the standard deviation of daily close-to-close returns over the 30 trading days ending 11 days before the offer. The average volatility of stock return before the offer is 0.59. The volatility was higher during internet bubble (1999–2000) and financial crisis (2008–2009). From 2002 to 2007, the volatility is lower and relatively stable, at no more than 0.5 per year.

Relative Size (%) is the number of shares offered over the total number of shares outstanding before the offer. The average relative size is 21.40%. In general, the relative size is larger before 1999, reaching 29.84% in 1996. The lowest relative size occurs in 2000, at only 14.86%.

Table 12 Summary Statistics for IPOs

Table 12 reports the statistics for IPO issuers and offer characteristics of IPOs by year. *No. of IPOs* is the number of IPOs. *Underpricing (%)* is defined as the return from the offer price to offer day's closing price multiplied by 100. If the offer day's closing price is not available, the closing price of the day following offer day is employed. *Shares Offered (millions)* is the number of shares offered (in millions) in the IPO. *VC-Backed IPOs (%)* is the percentage of firms received financing from venture capitalists before IPOs over all IPO firms. *Firm Age (years)* is the number of years since the firm founded at the time of IPO. *Price Update (percentage)* is the absolute value of the percentage change between the middle of the range of prices in the initial registration statement and the offer price. Aver. *Proceeds (millions of dollars)* is the average proceeds for an IPO. *Total Proceeds (billions of dollars)* is the total proceeds (in constant 2004 $millions) of all the IPOs.

Year	No. of IPOs	Underpricing (%)	Shares Offered (millions)	VC-Backed IPOs (%)	Firm Age (years)	Price Update (decimal)	Aver. Proceeds (millions of dollars)	Total Proceeds (billions of dollars)
1995	376	21.02	4.21	46.54	13.76	0.11	79.25	29.80
1996	588	15.03	3.87	41.50	11.84	0.10	69.91	41.11
1997	409	14.38	4.61	30.56	12.13	0.10	85.03	34.78
1998	248	22.15	5.04	28.63	11.77	0.09	82.59	20.48
1999	428	73.66	6.24	61.45	9.11	0.12	125.70	53.80
2000	332	57.89	8.81	68.98	9.11	0.12	147.87	49.09
2001	66	14.12	13.59	56.06	13.18	0.08	237.68	15.69
2002	61	9.33	9.83	34.43	19.10	0.08	172.74	10.54
2003	62	13.02	8.66	41.94	12.52	0.09	142.63	8.84
2004	178	11.99	9.13	51.69	14.32	0.09	141.21	25.13
2005	146	10.03	10.39	28.08	18.12	0.09	158.36	23.12
2006	150	11.84	10.70	38.00	16.17	0.11	166.67	25.00
2007	149	13.45	10.89	48.99	13.70	0.10	149.63	22.30
2008	25	6.29	26.89	36.00	12.18	0.09	789.61	19.74
2009	30	9.85	16.82	26.67	14.12	0.12	195.89	5.88
2010	95	7.00	10.62	43.16	12.26	0.12	117.80	11.19
2011	70	14.39	11.89	44.29	11.81	0.12	150.13	10.51
Total	3413	-	-		-	-		
Mean	-	26.57	7.04	42.76	12.51	0.10	119.25	23.94

Market Capital (millions of dollars) is the pre-issue market capitalization, which is measured in constant 2004 $million. The average market capitalization of each SEO is $2,005.49 million. Before 1998, the average market capitalization of each issuer is less than $1,000 million. After 1998, the market capitalization soars to more than $1,500 million. The market capitalization reaches its peak ($8,556.17 million per issuer) in 2008. The reason is that several giant companies issued SEOs in 2008.

Pre-offer Price is the closing price on the day before the offer. The average pre-offer price is $26.01. The pre-offer prices of issuers in most of the years are near the mean value. The only exceptions are during the internet bubble (1999–2000) and from 2009 to 2011. The pre-offer prices in 1999 and 2000 are much higher than average ($37.36 and $50.58 respectively), while from 2009 to 2011 they are much lower than average (less than $18 dollars).

Acc.Deals is the number of accelerated SEOs in the year. Obviously, there is a steady increase in the number of accelerated SEOs. For comparison, *Acc (%)*, the percentage of total SEOs that are accelerated SEOs, also shows an increasing trend. The peaks in both number and percentage occur in 2009 (176 and 45.83%, respectively). This agrees with previous reports (e.g. Bortolotti et al., 2008) of a boom in accelerated SEOs in recent years.

I also employ the two variables, *Aver Proceeds (millions of dollars)* and *Total Proceeds (billions of dollars)*, to investigate how active the SEO market was. The average proceeds per SEO are $189.14 million, which is 50% more than the average proceeds ($119.25 million) per IPO. The mean of total proceeds of all SEOs per year is $55.11 billion, which is more than double of that of all IPOs per year. As with IPOs, the peak of *Aver Proceeds (millions of dollars)* occurs in 2008, at $688.58 million, while the total proceeds of all SEOs per year reaches its peak ($126.73 billion) in 2009.

Meanwhile, comparing Table 12 with Table 13, we could find an interesting phenomenon that during the stock crash of 2001-2003 (after Dot-com Bubble) and 2008-2010 (Financial Crisis), the number of IPOs is considerable decreased, while the number of SEOs is not affected too much. One explanation is that poor market condition making IPOs undervalued, which decrease the willingness of IPO issuers, while according to DeAngelo et al. (2010), a near-term cash need is the primary SEO motivation.

Table 14 reports the statistics relating to investors in IPOs and SEOs, as well as other equities, by year. *No. of Investors per Deal* is the average number of investors participating in a deal. *No. of Deals per Investor* is the average number of deals each investor participates in. *No. of Investors* is the total number of investors that have participated in any deal in a given year. *No. of Investors in Both* is the total number of investors participating in both IPOs and SEOs (and not just one or the other). *NO. Both/No.IPO* is the percentage of the total number of investors participating in both IPOs and SEOs over the number of investors participating in IPOs. *NO. Both/No.SEO* is the percentage of the total number of investors participating in both IPOs and SEOs over the number of investors participating in SEOs.

Table 14 presents some interesting results. First, the number of total investors participating in IPOs does not show a significant change each year, but the number of total investors participating in SEOs shows an increasing trend from 1995 to 2011. Second, the peak of the number of investors per deal (SEOs) occurs during 2008–2009, when the average proceeds per SEO also reaches its peak. The reason for this phenomenon may be that higher proceeds per deal require more investors to participate, to share and reduce the risk of each investor. IPOs show a similar phenomenon. Third, the ratio (average 0.92) of the number of investors participating in both IPOs and SEOs over the number of investors participating in IPOs is much higher than the ratio (average 0.43) of the number of investors participating in both IPOs and SEOs over the number of investors participating in SEOs. In other words, most investors who participate in IPOs will participate in SEOs as well, while fewer than half the investors who participate in SEOs will also participate in IPOs.

Table 13 Summary Statistics for SEOs

Table 13 reports the statistics for SEO issuers and offer characteristics of SEOs by year. *No. of SEOs* is the number of SEOs. *Underpricing (%)* is defined as the return from the offer price to offer day's closing price multiplied by 100. If the offer day's closing price is not available, the closing price of the day following offer day is employed. *InstHolding (%)* is the most recent institutional ownership before the offer. *Volatility (decimals)* is the square root of 252 multiplied by the standard deviation of daily close-to-close returns over the 30 trading days ending 11 days before the offer. *Relative Size (%)* is the number of shares offered over the total number of shares outstanding before the offer. *Market Capital (millions of dollars)* is the pre-issue market capitalization (in constant 2004 $millions). *Pre-offer Price* is the closing price on the day before the offer. *Acc. Deals* is the number of accelerated SEOs in the year. *Total Proceeds (millions of dollars)* is the total proceeds (in constant 2004 $millions) of the SEOs.

Year	No. of SEOs	Underpricing (%)	InstHolding (%)	Volatility (decimals)	Relative Size (%)	Market Capital (millions of dollars)	Pre-offer Price	Acc. Deals	ACC(%)	Aver. Proceeds (millions of dollars)	Total Proceeds (billions of dollars)
1995	402	2.96	36.81	0.53	23.86	755.18	24.14	3	0.75	94.13	37.84
1996	497	4.16	35.74	0.63	29.84	590.78	23.77	1	0.20	104.29	51.83
1997	403	3.34	38.31	0.54	25.66	853.56	25.71	6	1.49	117.28	47.26
1998	276	2.99	38.42	0.52	22.72	1637.50	29.31	6	2.17	158.53	43.75
1999	316	4.20	42.34	0.78	20.55	2581.23	37.36	11	3.48	225.62	71.29
2000	314	4.48	40.49	1.02	14.86	3224.65	50.58	12	3.82	270.44	84.92
2001	254	4.25	64.19	0.63	22.16	2801.47	28.66	38	14.96	223.20	56.69
2002	237	3.36	53.45	0.50	19.96	2003.39	22.43	46	19.41	179.41	42.52
2003	269	4.03	51.86	0.46	16.95	1807.74	21.93	49	18.22	147.45	39.66
2004	304	2.85	51.07	0.42	20.69	2438.66	22.77	56	18.42	146.37	44.50
2005	246	3.03	52.55	0.47	19.40	1358.02	23.64	36	14.63	154.50	38.01
2006	229	3.36	60.10	0.41	19.82	1471.34	24.06	40	17.47	139.97	32.05
2007	216	2.40	58.33	0.46	20.50	1674.58	25.52	21	9.72	161.00	34.78
2008	157	2.91	67.18	0.68	16.58	8556.17	29.59	61	38.85	688.58	108.11
2009	384	4.22	57.90	0.73	20.54	3150.33	16.46	176	45.83	330.04	126.73
2010	272	3.41	49.26	0.52	18.06	1416.79	17.58	120	44.12	144.90	39.41
2011	177	3.77	50.71	0.56	19.57	1845.93	17.84	67	37.85	211.42	37.42
Total	4953	-	-	-	-	-	-	749		-	
Mean	-	3.57	47.97	0.59	21.40	2005.49	26.01	-	17.14	189.14	55.11

Table 14 Summary Statistics for Investors

Table 14 reports the statistics for investors in the markets of IPOs, SEOs and other equities, by year. *No. of Investors per Deal* is the average number of investors participating in a deal. *No. of Deals per Investor* is the average number of deals participated by an investor. *No. of Investors* is the total number of investors that have participated in any deal of a given year. *No. of Investors in Both* is the total number of investors participating in both IPOs and SEOs. *NO. Both/No.IPO* is the percentage of the total number of investors participating in both IPOs and SEOs over the number of investors participating in IPOs. *NO. Both/No.SEO* is the percentage of the total number of investors participating in both IPOs and SEOs over the number of investors participating in SEOs.

	IPOs			SEOs			Equities					
Year	No. of Investors per Deal	No. of Deals per Investor	No. of Investors	No. of Investors per Deal	No. of Deals per Investor	No. of Investors	No. of Investors per Deal	No. of Deals per Investor	No. of Investors	No. of Investors in Both	No.Both/ No.IPO	No.Both/ No.SEO
1995	21.78	12.43	659	41.35	16.08	1057	32.00	22.98	1096	620	0.94	0.59
1996	18.99	15.27	736	36.47	18.34	1002	27.03	27.53	1076	662	0.90	0.66
1997	20.58	10.73	790	43.84	14.71	1222	32.18	20.63	1282	730	0.92	0.60
1998	20.66	7.93	651	53.52	11.40	1333	38.14	14.91	1366	618	0.95	0.46
1999	36.84	17.03	928	72.55	16.07	1454	52.15	25.78	1519	863	0.93	0.59
2000	34.57	12.62	923	85.01	17.47	1538	58.98	23.91	1611	850	0.92	0.55
2001	46.59	4.49	705	93.22	13.86	1715	83.40	15.40	1749	671	0.95	0.39
2002	47.23	5.38	544	89.84	13.51	1576	81.00	15.02	1612	508	0.93	0.32
2003	39.15	4.86	499	96.49	15.02	1734	85.78	16.23	1755	478	0.96	0.28
2004	41.15	8.29	894	83.46	13.69	1872	67.82	17.16	1925	841	0.94	0.45
2005	40.65	6.60	899	74.15	11.27	1645	61.80	14.12	1733	811	0.90	0.49
2006	15.84	4.44	546	53.84	8.49	1458	38.66	9.63	1537	467	0.86	0.32
2007	41.82	6.69	956	81.60	9.22	1965	65.37	11.81	2076	845	0.88	0.43
2008	48.96	2.13	621	136.59	9.22	2325	123.73	9.61	2369	577	0.93	0.25
2009	57.90	3.49	498	114.42	18.00	2454	110.34	18.49	2483	469	0.94	0.19
2010	43.40	5.67	727	78.20	10.61	2012	69.22	12.17	2093	646	0.89	0.32
2011	52.34	5.19	706	79.94	8.08	1762	72.15	9.64	1856	612	0.87	0.35
Mean	36.97	7.84	722.47	77.32	13.24	1654.35	64.69	16.77	1714.00	662.82	0.92	0.43

5.4. Underwriter–Investor Relationships and Investor Participation

As has been noted by Huang and Zhang (2011) and Huang et al. (2008), investment banks establish relationships with investors through trading, research coverage, and investment banking services. Investment banks develop their investor networks through their relationship with investors, and their investor networks then become their important assets in distributing securities (Huang and Zhang, 2011). This section conducts several tests to provide evidence for the influence of underwriter–investor relationships on investor participation, firstly in IPOs and then in SEOs.

5.4.1. Underwriter–Investor Relationships and Investor Participation in IPOs

This section tests how the underwriter–investor relationships built in previous deals affects investor participation in a current IPO. To implement the tests, I employ a probit model:

$$\boldsymbol{Paticipation} = \alpha + \beta_1 LOYAL_{LEAD} + \beta_2 LOYAL_{CM} + \beta_3 LnN_{IPO} + \beta_4 LnShares + \beta_5 VCFlag + \beta_6 LnFirmAge + \beta_7 PriceUpdate + \beta_8 NYSEAmex + \beta_9 Utility + \beta_{10} Tech + \beta_{11} Biotech + \beta_{12} Underpricing$$

(Model 5.1)

The dependent variable, $Paticipation$, equals 1 if an eligible investor participates in an IPO, and is 0 otherwise. Here, retail investors are ignored because the share allocation information is proprietary. Only institutional investors are considered. 'Eligible investors' are defined as investors that have participated in at least 0.5% of all IPOs during the year of the current IPO and that participated in at least 10 IPOs during the 5 years prior to the current IPO. An investor is defined as participating in an IPO if the number of shares of the stock owned by the institutional investor increases from the quarter immediately prior to the IPO to the quarter immediately after the IPO. The participation decision concerns every IPO in my sample, and I include 1 observation for every eligible investor for each IPO.

The variables implemented in this test to capture underwriter–investor relationships are $LOYAL_{LEAD}$ and $LOYAL_{CM}$. The variable $LOYAL_{LEAD}$ is the proportion of IPOs that an eligible investor participated in in the 5 years prior to the current IPO that were underwritten by at least 1 of the current IPO's lead underwriters. It captures the influence of the lead underwriter(s) on investor participation. $LOYAL_{CM}$ is the proportion of IPOs that an eligible investor participated in during the 5 years prior to the current IPO that were underwritten by at least 1 of the current IPO's co-managers. This variable captures the influence of the co-manager(s) on investor participation. The other variables are as defined in Section 5.2.2.2.

Table 15 Underwriter–Investor Relationships Established in IPOs (Non-binary Relationship Variables) and Investor Participation in IPOs

The dependent variable, $Paticipation$, equals 1 if an eligible investor participated in an IPO. An eligible investor for an IPO is defined as an investor that participates in at least 0.5% of all IPOs during the year of the IPO and that participated in at least 10 IPOs during the 5 years prior to the current IPO. An investor is defined as participating in an IPO if the investor increases its holding of the stock from the quarter immediately prior to the IPO to the quarter immediately after the IPO according to the 13f database. For the independent variables, $LOYAL_{LEAD}$ is the proportion of IPOs that the eligible investor participated in during the 5 years prior to the current IPO that were underwritten by at least 1 lead underwriter of the current IPO. $LOYAL_{CM}$ is the proportion of IPOs that the eligible investor participated in within 5 years that were underwritten by at least 1 co-managing underwriter of the current IPO. LnN_{IPO} is the natural logarithm of 1 + the number of IPOs in which the investor participated in the 5 years prior to the current IPO. Year dummy variables ($Year\_Dummies$) are included in both regressions, but their coefficients are not reported.

Independent Variable	Year 1995-2007			Year 2008-2011		
	Coeff.	z-Stat	Econ.Eff. (%)	Coeff.	z-Stat	Econ.Eff. (%)
$Underpricing$	0.002	54.79[a]	2.03	0.006	15.07[a]	10.46
$LOYAL_{LEAD}$	0.877	50.36[a]	3.05	0.434	10.63[a]	2.50
$LOYAL_{CM}$	0.559	39.27[a]	2.10	0.271	6.48[a]	1.69
LnN_{IPO}	0.525	260.13[a]	11.56	0.756	89.03[a]	26.69
$LnShares$	0.274	62.41[a]	4.05	0.326	24.21[a]	7.95
$VCFlag$	0.042	8.72[a]	0.45	0.077	4.17[a]	1.38
$LnFirmAge$	0.017	10.33[a]	0.47	0.011	1.65	0.53
$PriceUpdate$	0.064	2.81[b]	0.22	-0.073	-0.94	-0.41
$NYSEAmex$	-0.051	-7.96[a]	-0.54	-0.003	-0.19	-0.06
$Utility$	-0.023	-1.11	-0.25	-0.054	-0.75	-0.93
$Tech$	-0.015	-3.01[b]	-0.16	-0.012	-0.65	-0.21
$Biotech$	-0.076	-8.55[a]	-0.78	-0.233	-7.05[a]	-3.85
$INTERCEPT$	-4.422	-267.94[a]	N/A	-4.952	-94.81[a]	N/A
N	1,076,530			52,548		
$Pseudo\ R^2$	0.189			0.248		
$Year\_Dummies$	Included			Included		

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

Table 15 reports the regression results of the influences of the two non-binary variables, $LOYAL_{LEAD}$ and $LOYAL_{CM}$, on the likelihood of investor participations in IPOs. The results are shown for two sample periods, 1995 to 2007 and 2008 to 2011. In the regression for both sample periods, the coefficients for both $LOYAL_{LEAD}$ and $LOYAL_{CM}$ are positive and statistically significant, suggesting that prior relationships established between a potential investor and an IPO's lead managers or co-managers increase the likelihood of the investor's participation in the IPO. The coefficients for $Underpricing$ in both sample periods are positive and statistically significant at the 1% level. The results agree with those of Binay et al. (2007), who confirm that an increasing in underpricing will encourage more investors to participate in the IPOs. The coefficients of LnN_{IPO} are both positive and statistically significant, which suggests that the more active IPO investors are more likely to participate in a new IPO. $LnShares$ is also significantly positively related to the likelihood of investor participation, suggesting that investors are more likely to participate in those IPOs in which more shares offered. The coefficients of $VCFlag$ for both sample periods are positive and statistically significant, which indicates that the IPOs of firms that receive financing from venture capitalists are more popular with investors.

Among the other variables, $LnFirmAge$, which is the nature logarithm of 1 plus firm age when the IPO happens, is positively related to the likelihood of investor participation for the period 1995–2007, and this is statistically significant at the 5% level. In other words, during this period, investors were more willing to participate in the IPOs whose issuers have relatively long history. However, $LnFirmAge$ does not show any significant influence on the likelihood of investor participation during the latter period, 2008–2011. $NYSEAmex$ shows a negative effect on the likelihood of investor participation at the 1% level during 1995–2007, denoting that NYSE- or Amex-listed issuers are less attractive for investors. Nevertheless, $NYSEAmex$ does not have a significant influence on investors' participation for the period 2008–2011.

To examine whether the likelihood of participation increases if an eligible investor has relationships with multiple managing underwriters of an IPO, I replace the relationship variables measured by fractions with three dummy variables, namely $LOYAL_{LEAD_D}$, $LOYAL_{CM_D}$ and $LOYAL_{LEAD_D} * LOYAL_{CM_D}$. The first dummy variable, $LOYAL_{LEAD_D}$, equals 1 if the eligible investor is a relationship investor of at least 1 lead manager, and 0 otherwise. The second dummy variable, $LOYAL_{CM_D}$, equals 1 if the eligible investor is a relationship investor of at least 1 co-manager, and 0 otherwise. Following Huang and Zhang (2011), an investor is viewed as a relationship investor of a bank if the investor participated in at least 10 deals for which the bank was a lead or co-manager in the 5 years prior to the current IPO. After defining the three relationship variables, I implement the following regression model:

$$\boldsymbol{Paticipation} = \alpha + \beta_1 LOYAL_{LEAD_D} + \beta_2 LOYAL_{CM_D} + \beta_3 LOYAL_{LEAD_D} * LOYAL_{CM_D} + \beta_4 LnN_{IPO} + \beta_5 LnShares + \beta_6 VCFlag + \beta_7 LnFirmAge + \beta_8 PriceUpdate + \beta_9 NYSEAmex + \beta_{10} Utility + \beta_{11} Tech + \beta_{12} Biotech + \beta_{13} Underpricing$$

(Model 5.2)

The regression results are shown in Table 16. The coefficients for both $LOYAL_{LEAD_D}$and $LOYAL_{CM_D}$ are positive and significant at the 1% level for the period 1995–2007. This result suggests that an investor is more likely to participate in an IPO if the investor is a relationship investor of at least one lead or one co-manager. The coefficient for the interaction variable

$LOYAL_{LEAD_D} * LOYAL_{CM_D}$ is also positively significantly related to the likelihood of investor participation from 1995 to 2007 at the 1% level, suggesting the increasing of the likelihood of investor participation if an investor is an relationship investor of at least one lead manager and one co-manager. Economically, during the sample period from 1995 to 2007, if we vary both $LOYAL_{LEAD_D}$ and $LOYAL_{CM_D}$ from 0 to 1, on average the likelihood of investor participation increases by 1.73% and 1.33%, and the coefficient of the economy effect of the interaction between $LOYAL_{LEAD_D}$ and $LOYAL_{CM_D}$ is 0.99%.

For the sample period from 2008 to 2011, however, neither $LOYAL_{LEAD_D}$ nor $LOYAL_{CM_D}$ have a significant influence on the likelihood of investor participation. On the other hand, the interaction between $LOYAL_{LEAD_D}$ and $LOYAL_{CM_D}$ is positively related to the likelihood of investor participation, at the 5% level. This result suggests that the investor is more likely to participate in an IPO if it is a relationship investor of at least one lead manager and one co-manager. Economically, if we vary the interaction from 0 to 1, on average the likelihood of investor participation increases by 3.24%.

Table 17 reports the regression results for the influences of the two non-binary variables, $LOYAL_{LEAD}$ and $LOYAL_{CM}$, on the likelihood of investor participations in IPOs. Unlike Table 15, Table 17 focuses on the underwriter–investor relationship in all equities (including both IPOs and SEOs) instead of the relationship established purely in IPOs. The results for the sample period from 1995 to 2007 are similar to those for the same sample period in Table 15.

In general, the coefficients for variables $LOYAL_{LEAD}$ and $LOYAL_{CM}$ are both positive and significant at the 1% level, suggesting that a prior underwriter–investor relationship, whatever established purely in IPOs or in equities more generally (including both IPOs and SEOs), increases investor participation in the current IPO. Economically, if we vary $LOYAL_{LEAD}$ and $LOYAL_{CM}$ from 1 standard deviation below to 1 standard deviation above their respective actual values , on average the likelihood of investor participation increases by 0.89% and 1.06%, respectively. The coefficient of $LOYAL_{CM}$ for the sample period from 2008 to 2011 is also positively related to the likelihood of investor participation and is significant at the 1% level. However, during 2008 to 2011, the coefficient of $LOYAL_{LEAD}$ is negatively related to the likelihood of investor participation and is significant at the 1% level.

Due to the conflict results of $LOYAL_{LEAD}$ between the two subgroups, I further implement a regression for each year. The results are shown in Appendix 5. The results show that after 2009, the coefficients of $LOYAL_{LEAD}$ is significantly negative, while before 2009, the coefficients of $LOYAL_{LEAD}$ are mostly significantly positive. The reasons may be related to the limited number of IPOs after 2008 and the rising role of co-managers in underwriting syndicates.

Table 16 Underwriter–Investor Relationships Established in IPOs (Binary Relationship Variables) and Investor Participation in IPOs

The dependent variable, $Paticipation$, equals 1 if an eligible investor participated in an IPO. An eligible investor for an IPO is defined as an investor that participates in at least 0.5% of all IPOs during the year of the IPO and that participated in at least 10 IPOs during the 5 years prior to the current IPO. An investor is defined as participating in an IPO if the investor increases its holding of the stock from the quarter immediately prior to the IPO to the quarter immediately after the IPO according to the 13f database. For the independent variables, $LOYAL_{LEAD_D}$ equals 1 if the eligible investor is a relationship investor of at least 1 lead manager, and 0 otherwise. $LOYAL_{CM_D}$ equals 1 if the eligible investor is a relationship investor of at least 1 co-manager, and 0 otherwise. A relationship investor of a bank is an investor who participated in at least 10 deals for which the bank was a lead or co-manager in the 5 years prior to the current IPO. LnN_{IPO} is the natural logarithm of 1 + the number of IPOs in which the investor participated in the 5 years prior to the current IPO. Year dummy variables ($Year\_Dummies$) are included in both regressions, but their coefficients are not reported.

Independent Variable	Year 1995-2007			Year 2008-2011		
	Coeff.	z-stat	Econ.Eff (%)	Coeff.	z-stat	Econ.Eff (%)
$Underpricing$	0.002	57.56[a]	2.20	0.006	16.14[a]	11.93
$LOYAL_{LEAD_D}$	0.151	21.53[a]	1.73	-0.022	-0.96	-0.41
$LOYAL_{CM_D}$	0.116	13.89[a]	1.33	0.020	0.39	0.39
$LOYAL_{LEAD_D} * LOYAL_{CM_D}$	0.086	8.35[a]	0.99	0.161	2.92[b]	3.24
LnN_{IPO}	0.412	153.32[a]	9.27	0.694	56.74[a]	26.18
$LnShares$	0.353	88.79[a]	5.42	0.403	34.18[a]	10.55
$VCFlag$	0.043	8.87[a]	0.48	0.109	5.91[a]	2.08
$LnFirmAge$	0.018	10.95[a]	0.51	0.006	0.92	0.31
$PriceUpdate$	0.077	3.42[a]	0.27	0.016	0.21	0.10
$NYSEAmex$	-0.009	-1.47	-0.10	0.042	2.39[c]	0.81
$Utility$	0.034	1.66	0.39	-0.047	-0.65	-0.87
$Tech$	-0.009	-1.83	-0.10	0.002	0.12	0.04
$Biotech$	-0.091	-10.27[a]	-0.96	-0.275	-8.39[a]	-4.82
$INTERCEPT$	-3.867	-222.59[a]	N/A	-4.702	-77.57[a]	N/A
N	1,076,530			52,548		
$Pseudo\ R^2$	0.185			0.246		
$Year\_Dummies$	Included			Included		

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

Table 17 Underwriter–Investor Relationships Established in Equities (Non-binary Relationship Variables) and Investor Participation in IPOs

The dependent variable, $Paticipation$, equals 1 if an eligible investor participated in an IPO. An eligible investor for an IPO is defined as an investor that participates in at least 0.5% of all equities during the year of the IPO and that participated in at least 10 equities during the 5 years prior to the current IPO. An investor is defined as participating in an IPO if the investor increases its holding of the stock from the quarter immediately prior to the IPO to the quarter immediately after the IPO according to the 13f database. For the independent variables, $LOYAL_{LEAD}$ is the proportion of equity issues the eligible investor participated in during the 5 years prior to the current IPO that were underwritten by at least 1 lead underwriter of the current IPO. $LOYAL_{CM}$ is the proportion of equity issues the eligible investor participated in within 5 years that were underwritten by at least 1 co-managing underwriter of the current IPO. LnN_{Equity} is the natural logarithm of 1 + the number of equities in which the investor participated in the 5 years prior to the current IPO. Year dummy variables ($Year\_Dummies$) are included in both regressions, but their coefficients are not reported.

Independent Variable	Year 1995-2007			Year 2008-2011		
	Coeff.	z-Stat	Econ.Eff. (%)	Coeff.	z-Stat	Econ.Eff. (%)
$Underpricing$	0.002	58.80[a]	1.00	0.005	18.23[a]	3.84
$LOYAL_{LEAD}$	0.406	25.66[a]	0.89	-0.181	-5.49[a]	-0.52
$LOYAL_{CM}$	0.499	38.10[a]	1.06	0.406	10.45[a]	1.12
LnN_{Equity}	0.529	331.51[a]	7.80	0.654	130.01[a]	12.43
$LnShares$	0.272	69.97[a]	2.29	0.346	37.12[a]	3.81
$VCFlag$	0.048	11.05[a]	0.28	0.110	7.88[a]	0.85
$LnFirmAge$	0.015	10.57[a]	0.23	0.005	1.05	0.10
$PriceUpdate$	0.058	2.89[b]	0.12	-0.072	-1.24	-0.19
$NYSEAmex$	-0.035	-6.38[a]	-0.20	0.039	2.89[b]	0.30
$Utility$	-0.000	-0.02	-0.00	0.051	1.00	0.40
$Tech$	-0.017	-3.95[a]	-0.10	0.019	1.42	0.14
$Biotech$	-0.070	-8.91[a]	-0.39	-0.237	-9.29[a]	-1.61
$INTERCEPT$	-5.090	-351.47[a]	N/A	-5.670	-147.22[a]	N/A
N	2,312,686			259,573		
$Pseudo\ R^2$	0.227			0.309		
$Year\_Dummies$	Included			Included		

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

Table 18 investigates whether the investor who has a relationship (established in previous equity deals) with either the lead manager(s) or the co-manager(s) of an IPO is more likely to participate in the IPO. The coefficients of $LOYAL_{LEAD_D}$ and $LOYAL_{CM_D}$ are both insignificant. Nevertheless, the coefficients of the interaction between the two relationship dummy variables are both positive and significant at 1% and 5% level, respectively, suggesting that the likelihood of participation is much higher if an investor has relationship with both the lead manager(s) and the co-manager(s). Economically, if we vary the interaction from 0 to 1, the likelihood of investor participation increases by 1.17% and 1.10%.

Table 18 Underwriter–investor Relationships Established in Equities (Binary Relationship Variables) and Investor Participation in IPOs

The dependent variable, $Paticipation$, equals 1 if an eligible investor participated in an IPO. An eligible investor for an IPO is defined as an investor that participates in at least 0.5% of all equity issues during the year of the IPO and that participated in at least 10 equity issues during the 5 years prior to the current IPO. An investor is defined as participating in an IPO if the investor increases its holding of the stock from the quarter immediately prior to the IPO to the quarter immediately after the IPO according to the 13f database. For the independent variables, $LOYAL_{LEAD_D}$ equals 1 if the eligible investor is a relationship investor of at least 1 lead manager, and 0 otherwise. $LOYAL_{CM_D}$ equals 1 if the eligible investor is a relationship investor of at least 1 co-manager, and 0 otherwise. A relationship investor of a bank is an investor who participated in at least 10 equity deals for which the bank was a lead or co-manager in the 5 years prior to the current IPO. LnN_{Equity} is the natural logarithm of 1 + the number of equity deals in which the investor participated in the 5 years prior to the current IPO. Year dummy variables ($Year\_Dummies$) are included in both regressions, but their coefficients are not reported.

Independent Variable	Year 1995-2007			Year 2008-2011		
	Coeff.	z-Stat	Econ.Eff. (%)	Coeff.	z-Stat	Econ.Eff. (%)
$Underpricing$	0.002	61.86[a]	1.06	0.005	18.76[a]	3.91
$LOYAL_{LEAD_D}$	-0.012	-1.86	-0.07	-0.249	-13.01[a]	-1.93
$LOYAL_{CM_D}$	-0.020	-2.53[c]	-0.12	-0.080	-1.74	-0.60
$LOYAL_{LEAD_D} * LOYAL_{CM_D}$	0.192	19.80[a]	1.17	0.142	2.99[b]	1.10
LnN_{Equity}	0.479	245.14[a]	7.05	0.680	106.29[a]	12.99
$LnShares$	0.345	100.01[a]	2.97	0.377	47.39[a]	4.13
$VCFlag$	0.049	11.28[a]	0.29	0.111	8.11[a]	0.85
$LnFirmAge$	0.015	10.84[a]	0.24	0.005	0.97	0.10
$PriceUpdate$	0.057	2.84[b]	0.12	-0.037	-0.65	-0.10
$NYSEAmex$	0.001	0.18	0.01	0.073	5.61[a]	0.56
$Utility$	0.038	2.17[c]	0.23	0.109	2.18[c]	0.88
$Tech$	-0.011	-2.61[b]	-0.07	0.029	2.19[c]	0.22
$Biotech$	-0.076	-9.77[a]	-0.43	-0.237	-9.37[a]	-1.60
$INTERCEPT$	-4.873	-323.74[a]	N/A	-5.724	-139.43[a]	N/A
N	2,312,686			259,573		
$Pseudo\ R^2$	0.225			0.310		
$Year\_Dummy$	Included			Included		

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

5.4.2. Underwriter–Investor Relationships and Investor Participation in SEOs

The aim of this section is to investigate how underwriter–investor relationships established in previous deals affect the likelihood of investor participation in a current SEO. I employ two models to implement the investigation.

The first model is as follows. The purpose of this model is to capture the influences of lead managers and co-managers on investor participation.

$$\boldsymbol{Paticipation} = \alpha + \beta_1 LOYAL_{LEAD} + \beta_2 LOYAL_{CM} + \beta_3 LnN_{SEO} + \beta_4 LnNSEO_{SAMISSU} + \beta_5 Inst.Ownership + \beta_6 Volatiltiy + \beta_7 RelativeSize + \beta_8 LnMktCap + \beta_9 LnPrice + \beta_{10} NYSEAmex + \beta_{11} Utility + \beta_{12} Tech + \beta_{13} Biotech + \beta_{14} Accelerated + \beta_{15} Underpricing$$

(Model 5.3)

The dependent variable, $Paticipation$, equals 1 if an eligible investor participates in an SEO, and 0 otherwise. Here again, retail investors are ignored because the share allocation information is proprietary. Only institutional investors are considered. ‘Eligible investors’ are defined as those that have participated in at least 0.5% of all SEOs during the year of the current SEO and that participated in at least 10 SEOs during the 5 years prior to the current SEO. An investor is defined as participating in an SEO if the number of shares of the stock owned by the institutional investor increases from the quarter immediately prior to the SEO to the quarter immediately after the SEO. The participation decision concerns every SEO in my sample, and I include 1 observation for every eligible investor for each SEO.

The variables implemented in this test to capture underwriter–investor relationships are $LOYAL_{LEAD}$ and $LOYAL_{CM}$. The variable $LOYAL_{LEAD}$ is the proportion of SEOs an eligible investor participated in in the 5 years prior to the current SEO that were underwritten by at least 1 of the current SEO's lead underwriters. It captures the influence of the lead underwriter(s) on investor participation. $LOYAL_{CM}$ is the proportion of SEOs an eligible investor participated in in the 5 years prior to the current SEO that were underwritten by at least 1 of the current SEO's co-managers. This variable captures the influence of the co-manager(s) on investor participation. The other variables are as defined in Section 5.2.2.2.

Table 19 shows the regression results. As with the research on IPOs, the whole sample is further divided into two periods, 1995–2007 and 2008–2011. The coefficients of Underpricing for the two subgroups are both positive and significant at the 1% level. The coefficients for $LOYAL_{LEAD}$ and $LOYAL_{CM}$ are both positive and significant at the 1% level in each sample period as well, suggesting that prior underwriter–investor relationships established in SEOs increase the likelihood of investor participation in a current SEO.

Table 19 also suggests that an active investor, as measured by LnN_{SEO}, is more likely to participate in a current SEO. The coefficients of $LnNSEO_{SAMISSU}$, which is used to control for the issuer–investor relationship, are both positive and significant at the 1% level for both sample periods. Moreover, the results suggest that investors are more willing to participate in an SEO if the issuer has higher institutional ownership before the offering, higher market capital before the offering and when the offering technique is accelerated. In contrast, higher relative size reduces the likelihood of investor participation. In addition, the results of the influences of $LnPrice$ are mixed. The coefficient of $LnPrice$ is significantly positive for the sample period 1995–2007 but is significantly negative thereafter.

Table 19 reports the coefficients of the economy effects of variables as well. The coefficients of economy effects of $LOYAL_{LEAD}$ are 1.28% and 0.62% for 1995–2007 and for 2008–2011, respectively. If we vary $LOYAL_{CM}$ from 1 standard deviation below to 1 standard deviation above its actual values, the likelihood of investor participation increases by 0.86% and 0.52% for the two sample periods (1995–2007 and 2008–2011) respectively.

To examine whether the likelihood of participation increases if an eligible investor has relationships with multiple managing underwriters of an SEO, I replace the relationship variables measured by fractions with three dummy variables, namely $LOYAL_{LEAD_D}$, $LOYAL_{CM_D}$, and $LOYAL_{LEAD_D} * LOYAL_{CM_D}$. The first dummy variable, $LOYAL_{LEAD_D}$, equals 1 if the eligible investor is a relationship investor of at least 1 lead manager, and 0 otherwise. The second dummy variable, $LOYAL_{CM_D}$, equals 1 if the eligible investor is a relationship investor of at least 1 co-manager, and 0 otherwise. Following Huang and Zhang (2011), an investor is viewed as a 'relationship investor' of a bank if the investor participated in at least 10 deals for which the bank was a lead or co-manager in the 5 years prior to the current IPO. After defining the three relationship variables, I implement the following regression model.

$$\boldsymbol{Paticipation} = \alpha + \beta_1 LOYAL_{LEAD_D} + \beta_2 LOYAL_{CM_D} + \beta_3 LOYAL_{LEAD_D} * LOYAL_{CM_D} + \beta_4 LnN_{SEO} + \beta_5 LnNSEO_{SAMISSU} + \beta_6 Inst.Ownership + \beta_7 Volatiltiy + \beta_8 RelativeSize + \beta_9 LnMktCap + \beta_{10} LnPrice + \beta_{11} NYSEAmex + \beta_{12} Utility + \beta_{13} Tech + \beta_{14} Biotech + \beta_{15} Accelerated + \beta_{16} Underpricing$$

(Model 5.4)

Table 20 reports the regression results for above equation. The coefficients of $LOYAL_{LEAD_D}$ in both sample periods are negative and significant at the 1% level, suggesting an investor will be less likely to participate in an SEO if the SEO includes at least one lead manager that has a relationship with the investor. The coefficient of $LOYAL_{CM_D}$in the sample period 1995–2007 is negative and significant at the 1% level, while that in the sample period 2008–2011 shows no significant effect on the likelihood of investor participation. In contrast, the coefficients of $LOYAL_{LEAD_D} * LOYAL_{CM_D}$, which is the interaction between $LOYAL_{LEAD_D}$ and $LOYAL_{CM_D}$, is positive and significant at the 1% level. This result provides a hint that an investor will be more likely to participate in an SEO if the SEO includes at least one lead manager and one co-manager that have a relationship with the investor. In other words, an investor views the marketing of an SEO by two or more of its ‘relationship banks’ as being much more convincing than the marketing by only one relationship bank.

Compared with $LOYAL_{LEAD_D}$ and $LOYAL_{CM_D}$, the interaction variable $LOYAL_{LEAD_D} * LOYAL_{CM_D}$ shows larger absolute values of the coefficients of economy effects, at 1.75% and 0.82% respectively in the two sample periods. This result is evidence that multiple relationship managers have more impact on the likelihood of investor participation than any single relationship manager.

Like Table 19, Table 21 illustrates how the two non-binary variables, $LOYAL_{LEAD}$ and $LOYAL_{CM}$, affect the likelihood of investor participation. The two variables are calculated through both IPO and SEO samples in Table 21, while the two variables in Table 19 are calculated only for the pure SEO sample. In other words, Table 21 shows the influence on investor participation of underwriter–investor relationships established in both IPOs and SEOs. The coefficients of both variables are positive and significant at the 1% level, providing evidence for the hypothesis that previously established underwriter–investor relationships increase the likelihood of investor participation. For the other variables, as with Table 19, the coefficients for $Underpricing$ are positive and significant at the 1% level. Meanwhile, an active investor is more likely to participate in an SEO. Table 21 suggests that the issuer–investor relationship is an important factor that increases the likelihood of investor participation. Moreover, higher institutional ownership, higher market capital and accelerated SEOs are the three factors that increase the likelihood of investor participation.

Table 19 Underwriter–Investor Relationships Established in SEOs (Non-binary Relationship Variables) and Investor Participation in SEOs

The dependent variable, $Paticipation$, equals 1 if an eligible investor participated in an SEO. An eligible investor for an SEO is defined as an investor that participates in at least 0.5% of all SEOs during the year of the SEO and that participated in at least 10 SEOs during the 5 years prior to the current SEO. An investor is defined as participating in an SEO if the investor increases its holding of the stock from the quarter immediately prior to the SEO to the quarter immediately after the SEO according to the 13f database. For the independent variables, $LOYAL_{LEAD}$ is the proportion of SEOs an eligible investor participated in during the 5 years prior to the current SEO that were underwritten by at least 1 lead underwriter of the current SEO. $LOYAL_{CM}$ is the proportion of SEOs an eligible investor participated in within 5 years that were underwritten by at least 1 co-managing underwriter of the current SEO. LnN_{SEO} is the natural logarithm of 1 + the number of SEOs in which the investor participated in the 5 years prior to the current SEO. $LnNSEO_{SAMISSUER}$ is the natural logarithm of 1 + the number of the same issuer's SEOs in which the investor participated in the 5 years prior to the current SEO. Year dummy variables ($Year\_Dummies$) are included in both regressions, but their coefficients are not reported.

Independent Variable	Year 1995-2007			Year 2008-2011		
	Coeff.	z-Stat	Econ.Eff. (%)	Coeff.	z-Stat	Econ.Eff. (%)
$Underpricing$	0.007	38.53[a]	0.98	0.005	16.55[a]	0.64
$LOYAL_{LEAD}$	0.321	34.18[a]	1.28	0.164	14.42[a]	0.62
$LOYAL_{CM}$	0.210	30.51[a]	0.86	0.134	13.06[a]	0.52
LnN_{SEO}	0.538	479.90[a]	12.12	0.591	308.52[a]	12.72
$LnNSEO_{SAMISSU}$	0.621	120.76[a]	1.87	0.633	78.69[a]	1.80
$Inst.Ownership$	0.068	28.23[a]	0.76	0.245	28.10[a]	2.63
$Volatiltiy$	0.009	2.83[b]	0.10	0.084	16.32[a]	0.92
$RelativeSize$	-0.019	-2.49[c]	-0.11	0.303	22.18[a]	1.68
$LnMktCap$	0.211	132.81[a]	6.10	0.250	125.88[a]	6.89
$LnPrice$	0.027	10.62[a]	0.39	-0.039	-11.28[a]	-0.54
$NYSEAmex$	0.037	11.80[a]	0.38	-0.027	-4.96[a]	-0.26
$Utility$	-0.002	-0.33	-0.02	0.032	3.45[a]	0.31
$Tech$	0.008	2.45[c]	0.08	0.015	2.15[c]	0.15
$Biotech$	-0.036	-8.11[a]	-0.36	-0.126	-16.81[a]	-1.15
$Accelerated$	0.023	5.35[a]	0.23	0.033	7.53[a]	0.33
$INTERCEPT$	-5.480	-452.59[a]	N/A	-5.948	-339.52[a]	N/A
N	3,125,783			1,250,157		
$Pseudo\ R^2$	0.246			0.291		
$Year\_Dummies$	Included			Included		

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

Table 20 Underwriter–Investor Relationships Established in SEOs (Binary Relationship Variables) and Investor Participation in SEOs

The dependent variable, $Paticipation$, equals 1 if an eligible investor participated in an SEO. An eligible investor for an SEO is defined as an investor that participates in at least 0.5% of all SEOs during the year of the SEO and that participated in at least 10 SEOs during the 5 years prior to the current SEO. An investor is defined as participating in an SEO if the investor increases its holding of the stock from the quarter immediately prior to the SEO to the quarter immediately after the SEO according to the 13f database. For the independent variables, $LOYAL_{LEAD_D}$ equals 1 if the eligible investor is a relationship investor of at least 1 lead manager, and 0 otherwise. $LOYAL_{CM_D}$ equals 1 if the eligible investor is a relationship investor of at least 1 co-manager, and 0 otherwise. A relationship investor of a bank is an investor who participated in at least 10 SEOs for which the bank was a lead or co-manager in the 5 years prior to the current IPO. LnN_{SEO} is the natural logarithm of 1 + the number of SEOs in which the investor participated in the 5 years prior to the current SEO. $LnNSEO_{SAMISSUER}$ is the natural logarithm of 1 + the number of the same issuer's SEOs in which the investor participated in the 5 years prior to the current SEO. Year dummy variables ($Year\_Dummies$) are included in both regressions, but their coefficients are not reported.

Independent Variable	Year 1995-2007			Year 2008-2011		
	Coeff.	z-Stat	Econ.Eff. (%)	Coeff.	z-Stat	Econ.Eff. (%)
$Underpricing$	0.007	36.40[a]	0.93	0.004	15.13[a]	0.60
$LOYAL_{LEAD_D}$	-0.042	-10.69[a]	-0.43	-0.039	-6.77[a]	-0.39
$LOYAL_{CM_D}$	-0.036	-6.72[a]	-0.36	0.001	0.12	0.01
$LOYAL_{LEAD_D} * LOYAL_{CM_D}$	0.164	26.94[a]	1.75	0.082	6.27[a]	0.82
LnN_{SEO}	0.511	346.63[a]	11.48	0.577	242.11[a]	12.64
$LnNSEO_{SAMISSU}$	0.625	121.39[a]	1.88	0.640	79.62[a]	1.86
$Inst.Ownership$	0.063	26.83[a]	0.71	0.280	32.18[a]	3.07
$Volatiltiy$	0.007	2.28[c]	0.08	0.082	15.93[a]	0.91
$RelativeSize$	0.010	1.34	0.06	0.325	24.17[a]	1.85
$LnMktCap$	0.236	158.49[a]	6.86	0.263	137.87[a]	7.41
$LnPrice$	0.020	8.08[a]	0.29	-0.042	-12.01[a]	-0.59
$NYSEAmex$	0.044	14.03[a]	0.45	-0.011	-2.12[c]	-0.11
$Utility$	0.009	1.86	0.09	0.059	6.50[a]	0.60
$Tech$	0.005	1.60	0.05	0.019	2.62[b]	0.18
$Biotech$	-0.036	-8.06[a]	-0.35	-0.127	-16.85[a]	-1.17
$Accelerated$	0.014	3.21[b]	0.14	0.030	6.77[a]	0.30
$INTERCEPT$	-5.401	-421.32[a]	N/A	-5.915	-316.31[a]	N/A
N	3,125,783			1,250,157		
$Pseudo\ R^2$	0.246			0.291		
$Year\_Dummies$	Included			Included		

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

Table 21 Underwriter–Investor Relationships Established in All Equity Deals (Non-binary Relationship Variables) and Investor Participation in SEOs

The dependent variable, $Paticipation$, equals 1 if an eligible investor participated in an SEO. An eligible investor for an SEO is defined as an investor that participates in at least 0.5% of all equity deals during the year of the SEO and that participated in at least 10 equity deals during the 5 years prior to the current SEO. An investor is defined as participating in an SEO if the investor increases its holding of the stock from the quarter immediately prior to the SEO to the quarter immediately after the SEO according to the 13f database. For the independent variables, $LOYAL_{LEAD}$ is the proportion of equity deals an eligible investor participated in during the 5 years prior to the current SEO that were underwritten by at least 1 lead underwriter of the current SEO. $LOYAL_{CM}$ is the proportion of equity deals an eligible investor participated in within 5 years that were underwritten by at least 1 co-managing underwriter of the current SEO. LnN_{Equity} is the natural logarithm of 1 + the number of equity deals in which the investor participated in the 5 years prior to the current SEO. $LnNEquity_{SAMISSUER}$ is the natural logarithm of 1 + the number of the same issuer's equity deals in which the investor participated in the 5 years prior to the current SEO. Year dummy variables ($Year\_Dummies$) are included in both regressions, but their coefficients are not reported.

Independent Variable	Year 1995-2007			Year 2008-2011		
	Coeff.	z-Stat	Econ.Eff. (%)	Coeff.	z-Stat	Econ.Eff. (%)
$Underpricing$	0.007	39.61[a]	1.00	0.005	16.93[a]	0.70
$LOYAL_{LEAD}$	0.412	43.72[a]	1.63	0.204	18.05[a]	0.83
$LOYAL_{CM}$	0.217	31.59[a]	0.87	0.111	11.03[a]	0.46
LnN_{Equity}	0.484	457.27[a]	11.61	0.553	301.32[a]	13.74
$LnNEquity_{SAMISSU}$	0.715	153.14[a]	2.33	0.673	86.90[a]	2.26
$Inst.Ownership$	0.072	29.98[a]	0.82	0.243	28.08[a]	2.86
$Volatiltiy$	0.007	2.26[c]	0.08	0.078	15.22[a]	0.91
$RelativeSize$	-0.044	-5.51[a]	-0.25	0.303	22.32[a]	1.81
$LnMktCap$	0.196	124.65[a]	5.63	0.247	125.65[a]	7.35
$LnPrice$	0.025	9.95[a]	0.36	-0.041	-11.93[a]	-0.61
$NYSEAmex$	0.047	15.04[a]	0.48	-0.031	-5.73[a]	-0.32
$Utility$	0.000	0.05	0.00	0.026	2.82[b]	0.27
$Tech$	0.007	2.03[c]	0.07	0.011	1.49	0.11
$Biotech$	-0.029	-6.68[a]	-0.29	-0.126	-16.84[a]	-1.24
$Accelerated$	0.026	6.19[a]	0.26	0.035	7.85[a]	0.36
$INTERCEPT$	-5.275	-441.27[a]	N/A	-5.801	-334.22[a]	N/A
N	3,178,758			1,256,406		
$Pseudo\ R^2$	0.245			0.287		
$Year\_Dummies$	Included			Included		

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

Table 22 Underwriter–Investor Relationships Established in Equity Deals (Binary Relationship Variables) and Investor Participation in SEOs

The dependent variable, $Paticipation$, equals 1 if an eligible investor participated in an SEO. An eligible investor for an SEO is defined as an investor that participates in at least 0.5% of all equity deals during the year of the SEO and that participated in at least 10 equity deals during the 5 years prior to the current SEO. An investor is defined as participating in an SEO if the investor increases its holding of the stock from the quarter immediately prior to the SEO to the quarter immediately after the SEO according to the 13f database. For the independent variables, $LOYAL_{LEAD_D}$ equals 1 if the eligible investor is a relationship investor of at least 1 lead manager, and 0 otherwise. $LOYAL_{CM_D}$ equals 1 if the eligible investor is a relationship investor of at least 1 co-manager, and 0 otherwise. A relationship investor of a bank is an investor who participated in at least 10 equity deals for which the bank was a lead or co-manager in the 5 years prior to the current SEO. LnN_{Equity} is the natural logarithm of 1 + the number of equity deals in which the investor participated in the 5 years prior to the current SEO. Year dummy variables ($Year\_Dummies$) are included in both regressions, but their coefficients are not reported.

Independent Variable	Year 1995-2007			Year 2008-2011		
	Coeff.	z-Stat	Econ.Eff. (%)	Coeff.	z-Stat	Econ.Eff. (%)
$Underpricing$	0.007	37.10[a]	0.94	0.004	15.06[a]	0.64
$LOYAL_{LEAD_D}$	-0.027	-6.67[a]	-0.27	-0.039	-6.77[a]	-0.42
$LOYAL_{CM_D}$	-0.039	-7.24[a]	-0.39	-0.002	-0.17	-0.02
$LOYAL_{LEAD_D} * LOYAL_{CM_D}$	0.158	25.74[a]	1.66	0.067	5.15[a]	0.73
LnN_{Equity}	0.454	337.26[a]	10.89	0.542	241.63[a]	13.80
$LnNEquity_{SAMISSU}$	0.722	154.66[a]	2.36	0.682	88.16[a]	2.36
$Inst.Ownership$	0.066	28.10[a]	0.76	0.287	33.39[a]	3.48
$Volatiltiy$	0.006	1.78	0.06	0.076	14.86[a]	0.91
$RelativeSize$	-0.006	-0.84	-0.04	0.329	24.72[a]	2.03
$LnMktCap$	0.225	152.79[a]	6.52	0.262	138.71[a]	8.01
$LnPrice$	0.017	6.92[a]	0.25	-0.044	-12.80[a]	-0.67
$NYSEAmex$	0.056	17.81[a]	0.57	-0.012	-2.27[c]	-0.13
$Utility$	0.012	2.57[c]	0.12	0.059	6.59[a]	0.65
$Tech$	0.004	1.30	0.04	0.016	2.31[c]	0.18
$Biotech$	-0.028	-6.39[a]	-0.28	-0.127	-16.95[a]	-1.28
$Accelerated$	0.014	3.39[a]	0.14	0.029	6.66[a]	0.32
$INTERCEPT$	-5.183	-416.07[a]	N/A	-5.784	-315.56[a]	N/A
N	3,178,758			1,256,406		
$Pseudo\ R^2$	0.243			0.286		
$Year\ Dummies$	Included			Included		

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

Table 22 shows the effects of having multiple managing banks on investor participation. The coefficients of both $LOYAL_{LEAD_D}$ and $LOYAL_{CM_D}$ are negative and significant at the 1% level during the sample period from 1995 to 2007. From 2008 to 2011, though $LOYAL_{CM_D}$ shows no significant influence on investor participation, $LOYAL_{LEAD_D}$ is still negatively related to the likelihood of investor participation and is significant at the 1% level.

In contrast, the coefficients of the interaction variable, $LOYAL_{LEAD_D} * LOYAL_{CM_D}$, are positive and significant at the 1% level, suggesting that the likelihood of participation is much higher if an investor has a relationship with both the lead manager(s) and the co-manager(s).

Moreover, the absolute values for the economy effects of the interaction variable are higher than those for both $LOYAL_{LEAD_D}$ and $LOYAL_{CM_D}$, suggesting that an investor consider the marketing of an SEO is more convinced if the SEO involves more than one ‘relationship underwriter’ of that investor.

5.4.3. Underwriter–Investor Relationships and Investor Participation in Different Situations

The previous sections have investigated the influence of underwriter–investor relationships on investor participation. The empirical results have provided evidence that underwriter–investor relationships increase the likelihood of participation.

The purpose of this section is to elaborate on this by investigating whether underwriter–investor relationships increase the likelihood of investor participation in different circumstances, to provide a deeper understanding of the effects of underwriter–investor relationships.

Three specific conditions have been set up to implement this research, namely high asset holding, high total proceeds and high relative size. High asset holding equals 1 if the investor holds the highest quartile of the total value of stocks among all investors in the quarter prior to the current offering. High total proceeds equals 1 if the total proceeds of the offering belong to the top quartile of all offerings in the quarter when the offering happens. High relative size equals 1 if the relative size of the offering belongs to the top quartile of all offerings in the quarter when the offering happens.

5.4.3.1. Investor Participation, Investor Network and Assets Holdings of the Investor

To investigate how underwriter–investor relationships influence the likelihood of investor participation when the asset holdings of the investor are high before the deal, I employ three more variables, namely $HighAssetHolding$, $HighAsset * LOYAL_{LEAD}$ and $HighAsset * LOYAL_{CM}$. $HighAssetHolding$ equals 1 if the investor holds the highest quartile of the total value of stocks among all investors in the quarter prior to the current offering. $HighAsset * LOYAL_{LEAD}$ is the interaction between $HighAsset$ and $LOYAL_{LEAD}$. Similarly, $HighAsset * LOYAL_{CM}$ is the interaction between $HighAsset$ and $LOYAL_{CM}$. After controlling for the other variables, I expect $HighAsset * LOYAL_{LEAD}$ and $HighAsset * LOYAL_{CM}$ to capture the influence of underwriter–investor relationships on the likelihood of investor participation when the asset holdings of the investor are high before the deal.

Table 23 reports the influence on investor participation of underwriter–investor relationships established in IPOs. As with Table 15 and later tables, Table 23 shows the results in subgroups divided by sample periods (1995–2007 and 2008–2011). The coefficients of $LOYAL_{LEAD}$ and $LOYAL_{CM}$ are both positive and significant at the 1% level, which is similar to the results reported in Table 15. The coefficient of $HighAsset$ is positive and significant at the 1% level for the subsample 1995–2007, suggesting that investors with high asset holdings are more likely to participate in the current IPO. However, the coefficient of $HighAsset$ is negative and significant at the 10% level for the sample period 2008–2011. The coefficients of $HighAsset * LOYAL_{Lead}$ and $HighAsset * LOYAL_{CM}$ are both positive and significant for the two sample periods respectively, suggesting that underwriter–investor relationships increase the likelihood of investor participation when the asset holdings of the investor are high before the IPO.

Table 24 reports the influence on investor participation of underwriter–investor relationships established in all equity deals. The results are again reported for two sample periods, 1995–2007 and 2008–2011. The coefficients of $LOYAL_{CM}$ are both positive and significant at the 1% level. However, as with Table 17, the coefficient of $LOYAL_{Lead}$ is significantly positive during 1995–2007 while it is significantly negative during 2008–2011. The coefficients of $HighAsset * LOYAL_{LEAD}$are both positive and significant at the 1% level, suggesting a lead manager–investor relationship can increase investor participation if the investor holds a high total value of stocks before the deal. The coefficient of $HighAsset * LOYAL_{CM}$ is positive and significant at the 1% level from 1995 to 2007, suggesting a co-manager–investor relationship can increase investor participation if the investor holds a high total value of stocks before the deal. However, the coefficient of $HighAsset * LOYAL_{CM}$ shows no significant relationship with the likelihood of investor participation from 2008 to 2011.

The influence on investor participation of underwriter–investor relationships established in SEOs is shown in Table 25. The coefficient of $HighAsset * LOYAL_{LEAD}$ is negative and significant at the 1% level for the sample period from 1995 to 2007. This result provides evidence that the lead manager–investor relationship decreases the likelihood of investor participation in an SEO if the investor holds a high total value of stocks before the SEO. In other words, an investor with high assets holding treats the relationship with any lead managers of an SEO as a negative factor. The coefficient of $HighAssetHolding$ for the sample from 2008 to 2011 is also negative and significant at the 10% level. For the sample period from 1995 to 2007, $HighAsset * LOYAL_{CM}$ is positively related to the likelihood of investor participation and the coefficient is significant at the 10% level, suggesting co-manager–investor relationships increase investor participation if the investor holds a high total value of stocks before the SEO. On the other hand, the coefficient of $HighAsset * LOYAL_{CM}$ is negative and significant at the 5% level for the sample period from 2008 to 2011. In contrast, the coefficients of $HighAssetHolding$ are both positive and significant at the 1% level, showing that investors with high assets holdings are more likely to participate in a current SEO.

Table 23 Investor Participation in IPOs, Investor Network Established in IPOs and Asset Holdings of Investors

The dependent variable, $Paticipation$, equals 1 if an eligible investor participated in an IPO. An eligible investor for an IPO is defined as an investor that participates in at least 0.5% of all IPOs during the year of the IPO and that participated in at least 10 IPOs during the 5 years prior to the current IPO. An investor is defined as participating in an IPO if the investor increases its holding of the stock from the quarter immediately prior to the IPO to the quarter immediately after the IPO according to the 13f database. For the independent variables, $LOYAL_{LEAD}$ is the proportion of IPOs an eligible investor participated in during the 5 years prior to the current IPO that were underwritten by at least 1 lead underwriter of the current IPO. $LOYAL_{CM}$ is the proportion of IPOs an eligible investor participated in within 5 years that were underwritten by at least 1 co-managing underwriter of the current IPO. $HighAssetHolding$ equals 1 if the investor holds the highest quartile of the total value of stocks among all investors in the quarter prior to current IPO. $HighAsset * LOYAL_{LEAD}$ is the interaction between $HighAsset$ and $LOYAL_{LEAD}$. $HighAsset * LOYAL_{CM}$ is the interaction between $HighAsset$ and $LOYAL_{CM}$. LnN_{IPO} is the natural logarithm of 1 + the number of IPOs in which the investor participated in the 5 years prior to the current IPO. Year dummy variables ($Year\_Dummies$) are included in both regressions, but their coefficients are not reported.

Independent Variable	Year 1995-2007		Year 2008-2011	
	Coeff.	z-Stat	Coeff.	z-Stat
$Underpricing$	0.002	54.83[a]	0.006	15.05[a]
$LOYAL_{LEAD}$	0.764	31.61[a]	0.267	4.56[a]
$LOYAL_{CM}$	0.345	17.38[a]	0.248	4.09[a]
$HighAssetHolding$	0.044	6.27[a]	-0.084	-2.14[c]
$HighAsset * LOYAL_{LEAD}$	0.114	3.75[a]	0.260	3.60[a]
$HighAsset * LOYAL_{CM}$	0.365	15.07[a]	0.034	0.44
LnN_{IPO}	0.492	209.41[a]	0.743	76.61[a]
$LnShares$	0.276	62.46[a]	0.326	24.20[a]
$VCFlag$	0.043	8.80[a]	0.077	4.12[a]
$LnFirmAge$	0.017	10.41[a]	0.011	1.65
$PriceUpdate$	0.065	2.85[b]	-0.070	-0.90
$NYSEAmex$	-0.051	-7.94[a]	-0.003	-0.18
$Utility$	-0.021	-1.01	-0.056	-0.79
$Tech$	-0.014	-2.82[b]	-0.011	-0.61
$Biotech$	-0.075	-8.46[a]	-0.231	-6.99[a]
$INTERCEPT$	-4.314	-256.90[a]	-4.852	-86.71[a]
N	1,076,530		52,548	
$Pseudo\ R^2$	0.192		0.249	
$Year\_Dummies$	Included		Included	

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

Table 24 Investor Participation in IPOs, Investor Network Established in All Equity Deals and Asset Holdings of Investors

The dependent variable, $Paticipation$, equals 1 if an eligible investor participated in an IPO. An eligible investor for an IPO is defined as an investor that participates in at least 0.5% of all equities during the year of the IPO and that participated in at least 10 equities during the 5 years prior to the current IPO. An investor is defined as participating in an IPO if the investor increases its holding of the stock from the quarter immediately prior to the IPO to the quarter immediately after the IPO according to the 13f database. For the independent variables, $LOYAL_{LEAD}$ is the proportion of equity deals an eligible investor participated in during the 5 years prior to the current IPO that were underwritten by at least 1 lead underwriter of the current IPO. $LOYAL_{CM}$ is the proportion of equity deals an eligible investor participated in within 5 years that were underwritten by at least 1 co-managing underwriter of the current IPO. $HighAssetHolding$ equals 1 if the investor holds the highest quartile of the total value of stocks among all investors in the quarter prior to current IPO. $HighAsset * LOYAL_{LEAD}$ is the interaction between $HighAsset$ and $LOYAL_{LEAD}$. $HighAsset * LOYAL_{CM}$ is the interaction between $HighAsset$ and $LOYAL_{CM}$. LnN_{Equity} is the natural logarithm of 1 + the number of equity deals in which the investor participated in the 5 years prior to the current IPO. Year dummy variables ($Year\_Dummies$) are included in both regressions, but their coefficients are not reported.

Independent Variable	Year 1995-2007		Year 2008-2011	
	Coeff.	z-Stat	Coeff.	z-Stat
$Underpricing$	0.002	58.58[a]	0.005	18.15[a]
$LOYAL_{LEAD}$	0.334	15.04[a]	-0.310	-6.85[a]
$LOYAL_{CM}$	0.329	17.59[a]	0.433	8.05[a]
$HighAssetHolding$	0.004	0.56	-0.066	-2.43[c]
$HighAsset * LOYAL_{LEAD}$	0.115	4.15[a]	0.229	4.05[a]
$HighAsset * LOYAL_{CM}$	0.284	12.83[a]	-0.048	-0.71
LnN_{Equity}	0.508	259.05[a]	0.649	107.24[a]
$LnShares$	0.271	69.33[a]	0.345	36.80[a]
$VCFlag$	0.047	10.81[a]	0.108	7.73[a]
$LnFirmAge$	0.015	10.52[a]	0.006	1.10
$PriceUpdate$	0.057	2.82[b]	-0.073	-1.26
$NYSEAmex$	-0.037	-6.59[a]	0.037	2.77[b]
$Utility$	0.001	0.06	0.049	0.97
$Tech$	-0.017	-3.91[a]	0.019	1.44
$Biotech$	-0.069	-8.81[a]	-0.235	-9.21[a]
$INTERCEPT$	-4.986	-332.79[a]	-5.605	-135.81[a]
N	2,312,686		259,573	
$Pseudo\ R^2$	0.228		0.309	
$Year\_Dummies$	Included		Included	

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

Table 25 Investor Participation in SEOs, Investor Network Established in SEOs and Assets Holdings of Investors

The dependent variable, $Paticipation$, equals 1 if an eligible investor participated in an SEO. An eligible investor for an SEO is defined as an investor that participates in at least 0.5% of all SEOs during the year of the SEO and that participated in at least 10 SEOs during the 5 years prior to the current SEO. An investor is defined as participating in an SEO if the investor increases its holding of the stock from the quarter immediately prior to the SEO to the quarter immediately after the SEO according to the 13f database. For the independent variables, $LOYAL_{LEAD}$ is the proportion of SEOs an eligible investor participated in during the 5 years prior to the current SEO that were underwritten by at least 1 lead underwriter of the current SEO. $LOYAL_{CM}$ is the proportion of SEOs an eligible investor participated in within 5 years that were underwritten by at least 1 co-managing underwriter of the current SEO. LnN_{SEO} is the natural logarithm of 1 + the number of SEOs in which the investor participated in the 5 years prior to the current SEO. $LnNSEO_{SAMISSUER}$ is the natural logarithm of 1 + the number of the same issuer's SEOs in which the investor participated in the 5 years prior to the current SEO. $HighAssetHolding$ equals 1 if the investor holds the highest quartile of the total value of stocks among all investors in the quarter prior to current SEO. $HighAsset * LOYAL_{LEAD}$ is the interaction between $HighAsset$ and $LOYAL_{LEAD}$. $HighAsset * LOYAL_{CM}$ is the interaction between $HighAsset$ and $LOYAL_{CM}$. Year dummy variables ($Year\_Dummies$) are included in both regressions, but their coefficients are not reported.

Independent Variable	Year 1995-2007		Year 2008-2011	
	Coeff.	z-Stat	Coeff.	z-Stat
$Underpricing$	0.007	38.39[a]	0.005	16.46[a]
$LOYAL_{LEAD}$	0.368	30.90[a]	0.180	12.24[a]
$LOYAL_{CM}$	0.194	20.98[a]	0.157	11.51[a]
$HighAssetHolding$	0.146	31.45[a]	0.110	13.75[a]
$HighAsset * LOYAL_{LEAD}$	-0.133	-8.23[a]	-0.046	-2.29[c]
$HighAsset * LOYAL_{CM}$	0.028	2.26[c]	-0.050	-2.61[b]
LnN_{SEO}	0.506	366.18[a]	0.570	249.46[a]
$LnNSEO_{SAMISSU}$	0.624	121.15[a]	0.635	78.92[a]
$Inst.Ownership$	0.068	28.26[a]	0.247	28.27[a]
$Volatiltiy$	0.009	2.81[b]	0.083	16.11[a]
$RelativeSize$	-0.018	-2.36[c]	0.305	22.31[a]
$LnMktCap$	0.212	133.36[a]	0.250	125.99[a]
$LnPrice$	0.027	10.59[a]	-0.040	-11.36[a]
$NYSEAmex$	0.038	11.97[a]	-0.026	-4.81[a]
$Utility$	-0.001	-0.20	0.033	3.54[a]
$Tech$	0.008	2.56[c]	0.016	2.26[c]
$Biotech$	-0.035	-8.00[a]	-0.126	-16.77[a]
$Accelerated$	0.021	4.98[a]	0.033	7.33[a]
$INTERCEPT$	-5.420	-437.01[a]	-5.909	-327.03[a]
N	3,125,783		1,250,157	
$Pseudo\ R^2$	0.247		0.291	
$Year\_Dummies$	Included		Included	

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

Table 26 Investor Participation in SEOs, Investor Network Established in All Equity Deals, and Assets Holdings of Investors

The dependent variable, $Paticipation$, equals 1 if an eligible investor participated in an equity offering. An eligible investor for an SEO is defined as an investor that participates in at least 0.5% of all equity deals during the year of the SEO and that participated in at least 10 equity deals during the 5 years prior to the current SEO. An investor is defined as participating in an SEO if the investor increases its holding of the stock from the quarter immediately prior to the SEO to the quarter immediately after the SEO according to the 13f database. For the independent variables, $LOYAL_{LEAD}$ is the fraction of equity deals participated in by the eligible investor during the 5 years prior to the current SEO that were underwritten by at least 1 lead underwriter of the current SEO. $LOYAL_{CM}$ is the fraction of equity deals participated in by the eligible investor within 5 years that were underwritten by at least 1 comanaging underwriter of the current SEO. LnN_{Equity} is the natural logarithm of 1 + the number of equity deals in which the investor participated in the 5 years prior to the current SEO. $LnNEquity_{SAMISSUER}$ is the natural logarithm of 1 + the number of the same issuer's equities in which the investo participated in the 5 years prior to the current SEO. $HighAssetHolding$ equals 1 if the investor holds the highest quartile of the total value of stocks among all investors in the quarter prior to current SEO. $HighAsset * LOYAL_{LEAD}$ is the interaction between $HighAsset$ and $LOYAL_{LEAD}$. $HighAsset * LOYAL_{CM}$ is the interaction between $HighAsset$ and $LOYAL_{CM}$. Year dummy variables ($Year\_Dummies$) are included in both regressions, but their coefficients are not reported.

Independent Variable	Year 1995-2007		Year 2008-2011	
	Coeff.	z-Stat	Coeff.	z-Stat
$Underpricing$	0.007	39.47[a]	0.005	16.81[a]
$LOYAL_{LEAD}$	0.436	36.35[a]	0.234	15.89[a]
$LOYAL_{CM}$	0.218	23.52[a]	0.132	9.82[a]
$HighAssetHolding$	0.169	36.71[a]	0.123	15.30[a]
$HighAsset * LOYAL_{LEAD}$	-0.104	-6.47[a]	-0.079	-3.99[a]
$HighAsset * LOYAL_{CM}$	-0.010	-0.77	-0.047	-2.49[c]
LnN_{Equity}	0.448	346.33[a]	0.532	243.75[a]
$LnNEquity_{SAMISSU}$	0.718	153.64[a]	0.675	87.20[a]
$Inst. Ownership$	0.072	29.93[a]	0.246	28.38[a]
$Volatiltiy$	0.007	2.25[c]	0.077	15.06[a]
$RelativeSize$	-0.042	-5.23[a]	0.305	22.50[a]
$LnMktCap$	0.198	125.57[a]	0.248	125.88[a]
$LnPrice$	0.025	9.88[a]	-0.041	-12.00[a]
$NYSEAmex$	0.048	15.21[a]	-0.030	-5.50[a]
$Utility$	0.001	0.18	0.027	2.99[b]
$Tech$	0.007	2.17[c]	0.012	1.64
$Biotech$	-0.029	-6.55[a]	-0.126	-16.80[a]
$Accelerated$	0.024	5.69[a]	0.034	7.59[a]
$INTERCEPT$	-5.212	-426.13[a]	-5.771	-322.20[a]
N	3,178,758		1,256,406	
$Pseudo\ R^2$	0.246		0.288	
$Year\_Dummies$	Included		Included	

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

Table 26 illustrates how investor network established in all equity deals affect the participation in SEOs of investors with a high assets holding. The results are again reported for two sample periods, 1995–2007 and 2008–2011. As in Table 25, the coefficients of $HighAssetHolding$ are both positive and significant at the 1% level. However, the interaction variable $HighAsset * LOYAL_{LEAD}$ is significantly negatively related to the likelihood of investor participation in the SEO, suggesting investors with high assets holdings are less likely to participate in SEOs that have lead managers with whom they have an established relationship. Another interaction variable, $HighAsset * LOYAL_{CM}$, shows no significant effect on investor participation for the sample period from 1995 to 2007. The coefficient of $HighAsset * LOYAL_{CM}$ is negative and significant at the 10% level for the sample period from 2008 to 2011.

5.4.3.2. Investor Participation, Investor Network and Total Proceeds of Offerings

To investigate how underwriter–investor relationships influence the likelihood of investor participation if the total proceeds of a deal are high, I employ three additional variables, namely $HighProc$, $HighProc * LOYAL_{LEAD}$ and $HighProc * LOYAL_{CM}$. $HighProc$ equals 1 if the total proceeds of the offer belongs to the highest quartile of all offers in the same year. $HighProc * LOYAL_{LEAD}$ is the interaction between $HighProc$ and $LOYAL_{LEAD}$. Similarly, $HighProc * LOYAL_{CM}$ is the interaction between $HighProc$ and $LOYAL_{CM}$. After controlling for other variables, I expect $HighProc * LOYAL_{LEAD}$ and $HighProc * LOYAL_{CM}$ to capture the influence of underwriter–investor relationships on the likelihood of investor participation in the deals with high total proceeds.

Table 27 illustrates the influence of underwriter–investor relationships established in IPOs on investor participation in IPOs with high total proceeds. The results are again divided by the sample period. As in Table 15, the coefficients of $LOYAL_{LEAD}$ and $LOYAL_{CM}$ are positive and significant at the 1% level. The coefficients of $HighProc$ in both sample periods are positive and significant at the 1% and 5% level respectively, which indicates that IPOs with high total proceeds are more attractive for investors. However, for these IPOs with high total proceeds, underwriter–investor relationships reduce the likelihood of investor participation. In other words, investors avoid participating in these IPOs if the underwriter syndicate includes a bank with which the investor has an established relationship.

According to Table 28, the coefficients of $LOYAL_{CM}$ in the two sample periods are positive and significant at the 1% level, which is similar to the results shown in previous tables. The coefficient of $LOYAL_{Lead}$ is positive and significant at the 1% level for the sample period from 1995 to 2007, while the coefficient of $LOYAL_{Lead}$ for the sample period from 2008 to 2011 is negative and significant at the 5% level. In Table 28, $HighProc$ is positively related to the likelihood of investor participation in both sample periods and the coefficients are both significant. During 1995–2007, the coefficients of both $HighProc * LOYAL_{LEAD}$ and $HighProc * LOYAL_{CM}$ are negative and significant at the 1% level, suggesting the underwriter–investor relationships established in all equity deals have a negative impact on investor participation in an IPO if the IPO belongs to the highest quartile of total proceeds in the IPO year.

Table 29 and Table 30 show the impact of the investor network of underwriters on investor participation in SEOs if the SEOs are categorized into the group of the highest quartile of total proceeds in the offering year. In line with the above analyses, the results are divided by sample period, 1995–2007 and 2008–2011.

Table 29 focuses on investor networks established purely in SEOs. The coefficient of $LOYAL_{Lead}$ is positive and significant at the 1% level during the sample period 1995 to 2007. However, $LOYAL_{Lead}$ has significantly negative influence on the likelihood of investor participation from 2008 to 2011, which is different from the results reported in the previous tables such as Table 19. As with previous regressions, the coefficients of $LOYAL_{CM}$ in both sample periods are positive and significant at the 1% level. $HighProc$ has a significantly negative influence on investor participation, suggesting SEOs with high total proceeds are not popular with investors. In contrast, the coefficients of $HighProc * LOYAL_{LEAD}$ in both sample periods are positive and significant at the 1% level. In other words, lead manager–investor relationships change investors' preferences and motivate them to participate in SEOs that have high proceeds. However, co-manager–investor relationships do not have a similar influence.

Table 30 illustrates the influence of underwriter–investor relationships established in all equity deals (both IPOs and SEOs) on the likelihood of investor participation in high-proceeds SEOs. Nevertheless, table 30 provide a similar conclusion with table 29.

5.4.3.3. Investor Participation, Investor Network and Relative Size

This section advances previous studies on underwriter–investor relationships and investor participation in SEOs by considering investor participation in SEOs via investor participation in the SEOs with high relative size. To implement this, I employ three more additional variables based on the equations investigating the effects of underwriter-investor relationships on investor participation in SEOs, namely $HighRelSize$, $HighRelSize * LOYAL_{LEAD}$ and $HighRelSize * LOYAL_{CM}$. $HighRelSize$ equals 1 if, by relative size, the SEO belongs to the highest quartile of all SEOs in the current year of the SEO. $HighRelSize * LOYAL_{LEAD}$ is the interaction between $HighRelSize$ and $LOYAL_{LEAD}$. Similarly, $HighRelSize * LOYAL_{CM}$ is the interaction between $HighRelSize$ and $LOYAL_{CM}$. I expect the influence of underwriter–investor relationships on the likelihood of investor participation in SEOs with high relative size to be captured by $HighRelSize * LOYAL_{LEAD}$ and $HighRelSize * LOYAL_{CM}$.

Table 27 Investor Participation in IPOs, Investor Network Established in IPOs and High-Proceeds IPOs

The dependent variable, $Paticipation$, equals 1 if an eligible investor participated in an IPO. An eligible investor for an IPO is defined as an investor that participates in at least 0.5% of all IPOs during the year of the IPO and that participated in at least 10 IPOs during the 5 years prior to the current IPO. An investor is defined as participating in an IPO if the investor increases its holding of the stock from the quarter immediately prior to the IPO to the quarter immediately after the IPO according to the 13f database. For the independent variables, $LOYAL_{LEAD}$ is the proportion of IPOs an eligible investor participated in during the 5 years prior to the current IPO that were underwritten by at least 1 lead underwriter of the current IPO. $LOYAL_{CM}$ is the proportion of IPOs an eligible investor participated in within 5 years that were underwritten by at least 1 co-managing underwriter of the current IPO. $HighProc$ equals 1 if the total proceeds of the offer belongs to the highest quartile of all offers in the same year. $HighProc * LOYAL_{LEAD}$ is the interaction between $HighProc$ and $LOYAL_{LEAD}$. Similarly, $HighProc * LOYAL_{CM}$ is the interaction between $HighProc$ and $LOYAL_{CM}$. LnN_{IPO} is the natural logarithm of 1 + the number of IPOs in which the investor participated in the 5 years prior to the current IPO. Year dummy variables ($Year\_Dummies$) are included in both regressions, but their coefficients are not reported.

Independent Variable	Year 1995-2007		Year 2008-2011	
	Coeff.	z-Stat	Coeff.	z-Stat
$Underpricing$	0.002	51.12[a]	0.006	15.36[a]
$LOYAL_{LEAD}$	1.074	49.91[a]	0.605	11.82[a]
$LOYAL_{CM}$	0.731	38.88[a]	0.342	6.19[a]
$HighProc$	0.216	25.42[a]	0.136	2.64[b]
$HighProc * LOYAL_{LEAD}$	-0.474	-15.62[a]	-0.384	-4.83[a]
$HighProc * LOYAL_{CM}$	-0.319	-12.36[a]	-0.178	-2.16[c]
LnN_{IPO}	0.526	260.16[a]	0.758	89.09[a]
$LnShares$	0.246	45.66[a]	0.377	22.85[a]
$VCFlag$	0.033	6.81[a]	0.053	2.83[b]
$LnFirmAge$	0.016	9.62[a]	0.009	1.23
$PriceUpdate$	0.040	1.77	-0.166	-2.07[c]
$NYSEAmex$	-0.047	-7.33[a]	-0.001	-0.06
$Utility$	0.035	1.64	-0.047	-0.66
$Tech$	-0.009	-1.89	-0.007	-0.37
$Biotech$	-0.072	-8.02[a]	-0.213	-6.30[a]
$INTERCEPT$	-4.431	-249.76[a]	-5.122	-90.30[a]
N	1,076,530		52,548	
$Pseudo\ R^2$	0.191		0.250	
$Year\_Dummies$	Included		Included	

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

Table 28 Investor Participation In IPOs, Investor Network Established in Equities and High-Proceeds IPOs

The dependent variable, $Paticipation$, equals 1 if an eligible investor participated in an IPO. An eligible investor for an IPO is defined as an investor that participates in at least 0.5% of all equities during the year of the IPO and that participated in at least 10 equities during the 5 years prior to the current IPO. An investor is defined as participating in an IPO if the investor increases its holding of the stock from the quarter immediately prior to the IPO to the quarter immediately after the IPO according to the 13f database. For the independent variables, $LOYAL_{LEAD}$ is the proportion of IPOs an eligible investor participated in during the 5 years prior to the current IPO that were underwritten by at least 1 lead underwriter of the current IPO. $LOYAL_{CM}$ is the proportion of IPOs an eligible investor participated in within 5 years that were underwritten by at least 1 co-managing underwriter of the current IPO. $HighProc$ equals 1 if the total proceeds of the offer belongs to the highest quartile of all offers in the same year. $HighProc * LOYAL_{LEAD}$ is the interaction between $HighProc$ and $LOYAL_{LEAD}$. Similarly, $HighProc * LOYAL_{CM}$ is the interaction between $HighProc$ and $LOYAL_{CM}$. LnN_{Equity} is the natural logarithm of 1 + the number of equities in which the investor participated in the 5 years prior to the current IPO. Year dummy variables ($Year\_Dummies$) are included in both regressions, but their coefficients are not reported.

Independent Variable	Year 1995-2007		Year 2008-2011	
	Coeff.	z-Stat	Coeff.	z-Stat
$Underpricing$	0.002	55.06[a]	0.005	18.39[a]
$LOYAL_{LEAD}$	0.659	33.16[a]	-0.142	-3.27[b]
$LOYAL_{CM}$	0.690	39.39[a]	0.766	14.35[a]
$HighProc$	0.226	29.76[a]	0.099	2.92[b]
$HighProc * LOYAL_{LEAD}$	-0.585	-21.17[a]	-0.051	-0.84
$HighProc * LOYAL_{CM}$	-0.335	-14.19[a]	-0.676	-9.28[a]
LnN_{Equity}	0.529	331.17[a]	0.654	129.81[a]
$LnShares$	0.256	54.48[a]	0.382	34.25[a]
$VCFlag$	0.037	8.42[a]	0.087	6.12[a]
$LnFirmAge$	0.014	9.79[a]	0.003	0.58
$PriceUpdate$	0.027	1.34	-0.166	-2.79[b]
$NYSEAmex$	-0.030	-5.46[a]	0.039	2.84[b]
$Utility$	0.066	3.69[a]	0.129	2.52[c]
$Tech$	-0.011	-2.58[b]	0.036	2.63[b]
$Biotech$	-0.066	-8.35[a]	-0.196	-7.49[a]
$INTERCEPT$	-5.124	-329.78[a]	-5.803	-140.07[a]
N	2,312,686		259,573	
$Pseudo\ R^2$	0.229		0.311	
$Year\_Dummies$	Included		Included	

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

Table 29 Investor Participation in SEOs, Investor Network Established in SEOs, and High-Proceeds SEOs

The dependent variable, $Paticipation$, equals 1 if an eligible investor participated in an SEO. An eligible investor for an SEO is defined as an investor that participates in at least 0.5% of all SEOs during the year of the SEO and that participated in at least 10 SEOs during the 5 years prior to the current SEO. An investor is defined as participating in an SEO if the investor increases its holding of the stock from the quarter immediately prior to the SEO to the quarter immediately after the SEO according to the 13f database. For the independent variables, $LOYAL_{LEAD}$ is the proportion of SEOs an eligible investor participated in during the 5 years prior to the current SEO that were underwritten by at least 1 lead underwriter of the current SEO. $LOYAL_{CM}$ is the proportion of SEOs an eligible investor participated in within 5 years that were underwritten by at least 1 co-managing underwriter of the current SEO. LnN_{SEO} is the natural logarithm of 1 + the number of SEOs in which the investor participated in the 5 years prior to the current SEO. $LnNSEO_{SAMISSUER}$ is the natural logarithm of 1 + the number of the same issuer's SEOs in which the investor participated in the 5 years prior to the current SEO. $HighProc$ equals 1 if the total proceeds of the offer belongs to the highest quartile of all offers in the same year. $HighProc * LOYAL_{LEAD}$ is the interaction between $HighProc$ and $LOYAL_{LEAD}$. Similarly, $HighProc * LOYAL_{CM}$ is the interaction between $HighProc$ and $LOYAL_{CM}$. Year dummy variables ($Year\_Dummies$) are included in both regressions, but their coefficients are not reported.

Independent Variable	Year 1995-2007		Year 2008-2011	
	Coeff.	z-Stat	Coeff.	z-Stat
$Underpricing$	0.007	37.99[a]	0.005	15.20[a]
$LOYAL_{LEAD}$	0.177	14.62[a]	-0.078	-4.99[a]
$LOYAL_{CM}$	0.271	26.01[a]	0.255	14.55[a]
$HighProc$	-0.037	-6.50[a]	-0.167	-14.68[a]
$HighProc * LOYAL_{LEAD}$	0.317	19.15[a]	0.523	23.32[a]
$HighProc * LOYAL_{CM}$	-0.125	-9.39[a]	-0.195	-9.18[a]
LnN_{SEO}	0.539	479.91[a]	0.593	308.71[a]
$LnNSEO_{SAMISSU}$	0.622	120.77[a]	0.635	78.67[a]
$Inst.Ownership$	0.071	28.78[a]	0.276	30.67[a]
$Volatiltiy$	0.010	3.17[b]	0.082	15.87[a]
$RelativeSize$	-0.029	-3.58[a]	0.305	21.07[a]
$LnMktCap$	0.210	114.07[a]	0.256	98.78[a]
$LnPrice$	0.028	10.88[a]	-0.041	-11.81[a]
$NYSEAmex$	0.036	11.29[a]	-0.027	-4.88[a]
$Utility$	-0.002	-0.48	0.019	2.07[c]
$Tech$	0.008	2.60[b]	0.015	2.14[c]
$Biotech$	-0.034	-7.76[a]	-0.125	-16.61[a]
$Accelerated$	0.018	4.33[a]	0.030	6.75[a]
$INTERCEPT$	-5.462	-399.68[a]	-5.961	-298.27[a]
N	3,125,783		1,250,157	
$Pseudo\ R^2$	0.247		0.292	
$Year\_Dummies$	Included		Included	

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

Table 30 Investor Participation in SEOs, Investor Network Established in All Equity Deals and High-Proceeds SEOs

The dependent variable, $Paticipation$, equals 1 if an eligible investor participated in an SEO. An eligible investor for an SEO is defined as an investor that participates in at least 0.5% of all equity deals during the year of the SEO and that participated in at least 10 equity deals during the 5 years prior to the current SEO. An investor is defined as participating in an SEO if the investor increases its holding of the stock from the quarter immediately prior to the SEO to the quarter immediately after the SEO according to the 13f database. For the independent variables, $LOYAL_{LEAD}$ is the proportion of equity deals an eligible investor participated in during the 5 years prior to the current SEO that were underwritten by at least 1 lead underwriter of the current SEO. $LOYAL_{CM}$ is the proportion of equity deals an eligible investor participated in within 5 years that were underwritten by at least 1 co-managing underwriter of the current SEO. LnN_{Equity} is the natural logarithm of 1 + the number of equity deals in which the investor participated in the 5 years prior to the current SEO. $LnNEquity_{SAMISSUER}$ is the natural logarithm of 1 + the number of the same issuer's equities in which the investor participated in the 5 years prior to the current SEO. $HighProc$ equals 1 if the total proceeds of the offer belongs to the highest quartile of all offers in the same year. $HighProc * LOYAL_{LEAD}$ is the interaction between $HighProc$ and $LOYAL_{LEAD}$. Similarly, $HighProc * LOYAL_{CM}$ is the interaction between $HighProc$ and $LOYAL_{CM}$. Year dummy variables ($Year\_Dummies$) are included in both regressions, but their coefficients are not reported.

Independent Variable	Year 1995-2007		Year 2008-2011	
	Coeff.	z-Stat	Coeff.	z-Stat
$Underpricing$	0.007	39.10[a]	0.005	15.59[a]
$LOYAL_{LEAD}$	0.272	22.61[a]	-0.037	-2.42[c]
$LOYAL_{CM}$	0.274	26.33[a]	0.235	13.76[a]
$HighProc$	-0.043	-7.69[a]	-0.173	-15.05[a]
$HighProc * LOYAL_{LEAD}$	0.311	18.92[a]	0.528	23.69[a]
$HighProc * LOYAL_{CM}$	-0.116	-8.70[a]	-0.200	-9.60[a]
LnN_{Equity}	0.485	457.31[a]	0.554	301.54[a]
$LnNEquity_{SAMISSU}$	0.715	153.19[a]	0.675	86.95[a]
$Inst.Ownership$	0.075	30.28[a]	0.273	30.67[a]
$Volatiltiy$	0.008	2.68[b]	0.075	14.72[a]
$RelativeSize$	-0.051	-6.08[a]	0.305	21.17[a]
$LnMktCap$	0.196	107.57[a]	0.253	98.50[a]
$LnPrice$	0.026	10.35[a]	-0.043	-12.48[a]
$NYSEAmex$	0.046	14.57[a]	-0.031	-5.67[a]
$Utility$	-0.000	-0.10	0.013	1.40
$Tech$	0.007	2.15[c]	0.011	1.52
$Biotech$	-0.028	-6.35[a]	-0.126	-16.72[a]
$Accelerated$	0.022	5.17[a]	0.032	7.08[a]
$INTERCEPT$	-5.266	-389.15[a]	-5.814	-293.29[a]
N	3,178,758		1,256,406	
$Pseudo\ R^2$	0.245		0.288	
$Year\_Dummies$	Included		Included	

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

Table 31 shows the influence of underwriter–investor relationships established in SEOs on investor participation in SEOs with high relative size. In line with previous tables, Table 31 also divides the results into two sample periods. In the sample period from 1995 to 2007, the coefficients of $LOYAL_{LEAD}$ and $LOYAL_{CM}$ are positive and significant at the 1% level. The coefficient of $HighRelSize$ is positive and significant at the 1% level, indicating that SEOs with high relative size are more popular among investors. The interaction variable $HighRelSize * LOYAL_{LEAD}$ is negatively related to the likelihood of investor participation in the sample period 1995–2007. On the other hand, the interaction variable $HighRelSize * LOYAL_{CM}$ is positively and significantly related to the likelihood of investor participation in the same period. The difference between the coefficients of the two interaction variables suggests that lead manager–investor relationships deter investors from participating in SEOs with high relative size, while the co-manager–investor relationships motivate investors to participate in SEOs with high relative size in the sample period from 1995 to 2007.

The variables in the second sample period in Table 31 show a similar pattern of results to those in the first sample period. The coefficients of $LOYAL_{LEAD}$ and $LOYAL_{CM}$ are positive and significant at the 1% level, suggesting membership of the underwriter's network motivates investors to participate in SEOs. $HighRelSize$ also shows a significantly positive influence on investor participation. The coefficient of $HighRelSize * LOYAL_{LEAD}$ is still negative and significant at the 1% level. However, $HighRelSize * LOYAL_{CM}$ reveals a negative and significant impact on investor participation, which is different from the results for the first sample period.

To further illustrate how $HighRelSize * LOYAL_{CM}$ affects the likelihood of investor participation, I implement a regression for each year. The results are reported in Appendix 6. The coefficient of $HighRelSize * LOYAL_{CM}$ is significantly negative in 2009, while it is significantly positive in 2008. However, as there are much more observations in 2009, the coefficient of $HighRelSize * LOYAL_{CM}$ is negative and significant at 1% level. The results could be treated as the implication of the increasing power of investors and the relatively poorer quality of SEOs after financial crisis.

Table 32 shows the influence of underwriter–investor relationships established in all equity deals (rather than in just SEOs) on investor participation in SEOs with high relative size. The results in Table 32 are again presented for two separate sample periods. The results are similar to those reported in Table 31. The coefficients of $LOYAL_{LEAD}$, $LOYAL_{CM}$ and $HighRelSize$ are positive and significant at the 1% level. The coefficients of $HighRelSize * LOYAL_{LEAD}$ in the two sample periods are negative and significant at the 1% level. $HighRelSize * LOYAL_{CM}$ shows a positive effect on investor participation and is significant at the 10% level in the period 1995–2007 while it is negatively related to investor participation in period 2008–2011.

Similar with Table 31, I implement a regression for each year to illustrate how $HighRelSize * LOYAL_{CM}$ affects investor participation in Appendix 7. The results come out to be the similar pattern with those of Appendix 6. The results also suggest institutional investors may have more power in investment banking industry and the relatively poorer quality of SEOs after financial crisis.

5.5. Conclusion

Huang and Zhang (2011) use a sample that includes traditional book-building US SEOs from 1995 to 2004 to examine the effects of underwriter–investor relationships on investor participation and offer price discount. Their results indicate that previously established underwriter–investor relationships increase the likelihood of investor participation in traditional book-building SEOs and reduce the offer price discount. Huang and Zhang (2011) claim this is proof of the marketing function of investor networks. In other words, the investor networks of underwriters should be effective only for traditional book-building equity offerings, but should be useless for those types of offering (e.g. accelerated SEOs) that do not involve any marketing function.

Table 31 Investor Participation in SEOs, Investor Networks Established in SEOs and SEOs with High Relative Size

The dependent variable, $Paticipation$, equals 1 if an eligible investor participated in an SEO. An eligible investor for an SEO is defined as an investor that participates in at least 0.5% of all SEOs during the year of the SEO and that participated in at least 10 SEOs during the 5 years prior to the current SEO. An investor is defined as participating in an SEO if the investor increases its holding of the stock from the quarter immediately prior to the SEO to the quarter immediately after the SEO according to the 13f database. For the independent variables, $LOYAL_{LEAD}$ is the proportion of SEOs an eligible investor participated in during the 5 years prior to the current SEO that were underwritten by at least 1 lead underwriter of the current SEO. $LOYAL_{CM}$ is the proportion of SEOs an eligible investor participated in within 5 years that were underwritten by at least 1 co-managing underwriter of the current SEO. LnN_{SEO} is the natural logarithm of 1 + the number of SEOs in which the investor participated in the 5 years prior to the current SEO. $LnNSEO_{SAMISSUER}$ is the natural logarithm of 1 + the number of the same issuer's SEOs in which the investor participated in the 5 years prior to the current SEO. $HighRelSize$ equals 1 if, by relative size, the SEO belongs to the highest quartile of all SEOs in the current year of the SEO. $HighRelSize * LOYAL_{LEAD}$ is the interaction between $HighRelSize$ and $LOYAL_{LEAD}$. Similarly, $HighRelSize * LOYAL_{CM}$ is the interaction between $HighRelSize$ and $LOYAL_{CM}$. Year dummy variables ($Year\_Dummies$) are included in both regressions, but their coefficients are not reported.

Independent Variable	Year 1995-2007		Year 2008-2011	
	Coeff.	z-Stat	Coeff.	z-Stat
$Underpricing$	0.007	36.27[a]	0.005	15.46[a]
$LOYAL_{LEAD}$	0.364	36.15[a]	0.190	15.32[a]
$LOYAL_{CM}$	0.193	26.22[a]	0.150	13.43[a]
$HighRelSize$	0.138	24.97[a]	0.140	14.81[a]
$HighRelSize * LOYAL_{LEAD}$	-0.260	-11.36[a]	-0.127	-5.09[a]
$HighRelSize * LOYAL_{CM}$	0.064	3.51[a]	-0.111	-4.17[a]
LnN_{SEO}	0.539	479.96[a]	0.592	308.54[a]
$LnNSEO_{SAMISSU}$	0.621	120.60[a]	0.635	78.89[a]
$Inst.Ownership$	0.096	33.73[a]	0.260	29.50[a]
$Volatiltiy$	0.009	2.97[b]	0.086	16.45[a]
$RelativeSize$	-0.134	-13.50[a]	0.177	10.09[a]
$LnMktCap$	0.217	133.31[a]	0.251	125.72[a]
$LnPrice$	0.023	8.90[a]	-0.041	-11.71[a]
$NYSEAmex$	0.035	10.94[a]	-0.030	-5.42[a]
$Utility$	0.002	0.48	0.034	3.70[a]
$Tech$	0.011	3.37[a]	0.023	3.27[b]
$Biotech$	-0.027	-6.05[a]	-0.122	-16.23[a]
$Accelerated$	0.020	4.62[a]	0.034	7.59[a]
$INTERCEPT$	-5.536	-445.96[a]	-5.975	-336.85[a]
N	3,125,783		1,250,157	
$Pseudo\ R^2$	0.247		0.291	
$Year\_Dummies$	Included		Included	

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

Table 32 Investor Participation in SEOs, Investor Network Established in All Equity Deals and SEOs with High Relative Size

The dependent variable, $Paticipation$, equals 1 if an eligible investor participated in an SEO. An eligible investor for an SEO is defined as an investor that participates in at least 0.5% of all equity deals during the year of the SEO and that participated in at least 10 equity deals during the 5 years prior to the current SEO. An investor is defined as participating in an SEO if the investor increases its holding of the stock from the quarter immediately prior to the SEO to the quarter immediately after the SEO according to the 13f database. For the independent variables, $LOYAL_{LEAD}$ is the proportion of equity deals an eligible investor participated in during the 5 years prior to the current SEO that were underwritten by at least 1 lead underwriter of the current SEO. $LOYAL_{CM}$ is the proportion of equity deals an eligible investor participated in within 5 years that were underwritten by at least 1 co-managing underwriter of the current SEO. LnN_{Equity} is the natural logarithm of 1 + the number of equity deals in which the investor participated in the 5 years prior to the current SEO. $LnNEquity_{SAMISSUER}$ is the natural logarithm of 1 + the number of the same issuer's equity deals in which the investor participated in the 5 years prior to the current SEO. $HighRelSize$ equals 1 if, by relative size, the SEO belongs to the highest quartile of all SEOs in the current year of the SEO. $HighRelSize * LOYAL_{LEAD}$ is the interaction between $HighRelSize$ and $LOYAL_{LEAD}$. Similarly, $HighRelSize * LOYAL_{CM}$ is the interaction between $HighRelSize$ and $LOYAL_{CM}$. Year dummy variables ($Year\_Dummies$) are included in both regressions, but their coefficients are not reported.

Independent Variable	Year 1995-2007		Year 2008-2011	
	Coeff.	z-Stat	Coeff.	z-Stat
$Underpricing$	0.007	37.35[a]	0.005	15.89[a]
$LOYAL_{LEAD}$	0.455	45.04[a]	0.227	18.38[a]
$LOYAL_{CM}$	0.204	27.84[a]	0.126	11.55[a]
$HighRelSize$	0.140	25.38[a]	0.132	13.90[a]
$HighRelSize * LOYAL_{LEAD}$	-0.256	-11.31[a]	-0.109	-4.40[a]
$HighRelSize * LOYAL_{CM}$	0.038	2.08[c]	-0.106	-4.09[a]
LnN_{Equity}	0.485	457.35[a]	0.553	301.33[a]
$LnNEquity_{SAMISSU}$	0.715	153.02[a]	0.674	87.05[a]
$Inst.Ownership$	0.101	35.47[a]	0.257	29.36[a]
$Volatiltiy$	0.008	2.43[c]	0.079	15.26[a]
$RelativeSize$	-0.160	-16.03[a]	0.181	10.40[a]
$LnMktCap$	0.202	125.25[a]	0.249	125.48[a]
$LnPrice$	0.021	8.32[a]	-0.043	-12.33[a]
$NYSEAmex$	0.045	14.18[a]	-0.034	-6.23[a]
$Utility$	0.004	0.82	0.028	3.07[b]
$Tech$	0.009	2.87[b]	0.018	2.58[b]
$Biotech$	-0.021	-4.69[a]	-0.123	-16.30[a]
$Accelerated$	0.023	5.48[a]	0.036	7.99[a]
$INTERCEPT$	-5.329	-435.39[a]	-5.827	-331.48[a]
N	3,178,758		1,256,406	
$Pseudo\ R^2$	0.245		0.287	
$Year\_Dummies$	Included		Included	

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

However, according to Huang et al. (2008), investment banks develop relationships with investors through repeat business in securities offerings, brokerage services, and analyst research. In other words, the underwriter–investor relationship cannot be simply treated as a marketing component and it would exist even in the absence of marketing activity. Therefore, given that the underwriter–investor relationship is not only derived from marketing activities but also from the repeat dealings in the process of securities offerings, I hypothesize that the relationship influences investors' decisions on whether or not to participate not only in traditional book-building SEOs but also in accelerated SEOs, which have been booming during recent years and with little marketing effort. Additionally, as many underwriters and investors deal with both IPOs and SEOs, the relationships established during IPOs should also be effective in SEOs, and vice versa.

To implement this research, I choose to sample all equity offerings from 1990 to 2011 and to apply selection criteria used in similar studies. Thus, underwriter–investor networks are evaluated according to the method proposed by Huang and Zhang (2011). There are two types of relationship variables employed in this research, namely fractional variables and binary variables. The tests are mainly run on three categories of relationship: those based purely on previous IPOs, those based purely on previous SEOs and those based on all equity deals (a mixed group). The regression results support my hypothesis that underwriter–investor relationships increase the likelihood of investor participation in equity offerings. Such underwriter–investor relationships can be established in both IPOs and SEOs and are effective interactively. Finally, I extend the tests in different circumstance and study how underwriter–investors relationships affect the likelihood of investor participation in these conditions.

The contributions of this study are threefold. Firstly, to the best of my knowledge, this study is the first to show that underwriter–investor networks increase the likelihood of investor participation and such influence is separate from the marketing function of the underwriters; secondly, it shows that underwriter–investor relationships are effective not only in pure IPOs or pure SEOs but also interactively; finally, it is not just the relationships established by lead managers that are effective, but also those established by co-managers.

Chapter 6: Conclusion

There were two chief motivations for the present research. Firstly, commercial bank co-managers are becoming more and more popular in SEO underwriting, but a deeper and more detailed understanding of their effects on SEO flotation costs is lacking, and empirical studies in this field have hitherto failed to distinguish market perceptions of the involvement of commercial banks in underwriting in different conditions. Secondly, though investment banking is a relationship-based rather transaction-based business, few previous studies focus on whether the underwriter–investor network affects investors' participation in equity offerings. This thesis aims to contribute to the literature by finding that commercial bank co-managers do not always benefit SEO issuers by reducing flotation costs, and the underwriter–investor network mostly positively affected investors' decisions to participate in equity offerings from 1995 to 2011.

Chapter 4 investigated whether having commercial banks act as co-managers always works to the benefit of issuers by reducing flotation costs. I hypothesize that SEOs with commercial bank co-managers who acted as opportunists in their last deal and who may play the same role in the current underwriting would experience higher flotation costs. The category (commercial bank versus investment bank) of each underwriter is determined by the characteristic of its holding company when the SEO occurs. A co-manager is identified as a potential opportunist if the leverage of the issuer of the SEO underwritten by the co-manager is higher than the industry average before the issue and lower thereafter. The potential opportunists will be suspected to act as opportunists again if the leverage of the issuers is higher than the industry average before the SEO. The other control variables selected are mainly based on the previous literature. Additionally, considering the boom in accelerated offerings and overnight offerings after 2007, I include two dummy variables to control the effects. The multivariate results provide evidence for my hypothesis in terms of SEO discount while commercial bank co-managers show no statistically significant influence on SEO announcement returns for the sample from 1995 to 2011. Moreover, the involvement of commercial bank co-managers increases the underwriting spread and commercial bank co-managers will ask for more underwriting spread if the leverage of the issuers is higher than the industry average.

Chapter 5 focuses on the effects of underwriter–investor relationships on investors' participation in equity offerings. Before implementing the regressions, I firstly identify the group of eligible investors. An investor is considered an eligible investor if it participates in at least 0.5% of all equity offerings during the year of the current deal and participated in at least 10 equity offerings during the 5 years prior to the current deal. I expect such an eligible investor group to capture the investors that are activated during the year of the current deal and have the possibility of participation in the current deal. The underwriter–investor relationships include the relationships between investors and both lead managers and co-managers. According to the previous literature, the underwriter–investor relationships in equity offerings are established through previous transactions. Consequently, I quantify these relationships by calculating the number of deals involving the same investors and underwriters of the current deal during the 5 years prior to the current deal. Then, to capture the influence of the managing underwriter(s) on investor participation, I employ two variables calculated as the investors' percentage participation in deals with lead manager(s) and co-manager(s) respectively over all deals the investors participated in previous five years. Further, to capture how multiple managing underwriters of a deal will influence the likelihood of participation of eligible investors, I employ three dummy variables. The other variables are chosen based on Huang and Zhang (2011) and Binay et al. (2007).

Since Huang et al. (2008) point out that underwriter–investor network are established through previous deals, I derive the network from not only pure IPO or SEO samples but also from a sample of all IPOs and SEOs. The sample period I choose is from 1995 to 2011. Given that, in 2008, the financial crisis eliminated several big names in the investment banking industry, I merge the network built by the eliminated banks with their successors or acquirers and, further, divide the sample into two periods, 1995–2007 and 2008–2011. The results of all the regressions concerning pure IPO or SEO samples and utilizing fractional variables to measure underwriter–investor relationships support my hypothesis. The two single dummy variables show mixed results, but the interaction of the two dummy variables again provides support for my hypothesis. Most of the results of the multivariate tests for all the equity deals are similar to those based purely on IPOs or SEOs, though the network established from all previous equity offerings shows a significantly negative influence on investor participation in current IPOs during 2008 to 2011. To summarize, the empirical results provide strong evidence for my hypothesis that underwriter–investor relationships increase the likelihood of investor participation in current equity offerings.

I further extend the tests by adding three dummy variables, namely *HighInvHolding*, *HighProceeds* and *HighRelSize*, that equal 1 if the investor's total stock holding, the total proceeds of the offering, and the relative size of SEO is high, respectively. I also employ interactions between fractional relationship variables and the three dummy variables to investigate how underwriter–investor relationships affect investors' participation in different situations. The results suggest that the underwriter–investor network will increase the likelihood of investors' participation in IPOs for investors with high stock holdings. However, the same situation will decrease the likelihood of investors' participation in SEOs. The IPOs with high total proceeds are more attractive for investors. Nevertheless, underwriter–investor relationships then decrease the likelihood of investor participation. On the other hand, SEOs with high total proceeds are less attractive for investors while the relationships between lead managers and investors encourage the participation of investors. Thirdly, investors prefer SEOs with high relative size. However, the relationships between lead managers and investors deter investors from participating in these SEOs with high relative size.

The results presented in this thesis have two main implications. Firstly, the involvement of commercial banks as co-managers may increase the SEO discount instead of always reducing it. This result supports the concern about a conflict of interest for commercial banks in the underwriting business. Secondly, underwriter–investor relationships, established previously purely in IPOs or in SEOs, or in all equity offerings, increase the likelihood of investor participation in current equity offerings.

However, there are several limitations to this research. One is the fact that the empirical results document that the lead managers and investors' relationships established in all equity offerings seemed to reduce the likelihood of investors' participation in IPOs for the sample period from 2008 to 2011. Although all the results derived from the earlier sample period support my hypothesis, this issue cannot be easily explained. One suggestion is that there were changes in IPO offerings. For instance, the number of deals decreased dramatically. Moreover, the financial crisis is likely to have overturned the normal rules and even players in equity offerings and to have led to some influential changes in the investment banking industry, such as the boom in accelerated SEOs. Therefore, the lead managers and investors' relationships established in all previous equity deals show a negative effect on investors' participation. Another limitation is the lack of a ready explanation for the mixed results of the tests, including several dummy variables in the analysis of investors with high total stock holdings, of deals with high total proceeds and SEOs with high relative size. In particular, some analyses produce contrasting results for IPOs and SEOs. The reason may be related to the different underlying mechanics and characteristics of IPOs and SEOs. To solve these problems, further work is necessary.

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Appendix 1. List of Variables in Descriptive Statistics of Chapter 4

This section is to give a list of variables that are used in the descriptive statistics of Chapter 4.

Variables name	Definition
ANN RET	Announcement returns; cumulative abnormal returns around announcement day; is normally calculated over the three-day [-1,1] or five-day [-2,2] window.
CB Proc. Ratio	SEOs proceeds underwritten by commercial bank divided by total SEO proceeds.
CB Ratio	The number of commercial bank underwritten deals divided by total number of SEOs deals.
CMCB Proc. Ratio	SEOs proceeds underwritten by commercial bank co-managers divided by total SEO proceeds.
CMCB Ratio	The number of deals with commercial bank co-managers divided by total number of SEO deals.
Discount	The return from the offer price to pre-offer day's closing price.
DR&CB Ratio	The number of deals with commercial bank underwriters and used to reduce debt divided by total SEO number.
DR&IB Ratio	The number of SEOs deals with pure investment bank syndicate and used to reduce debt divided by total SEO number.
Gross Spread	The percent of underwriter gross spread in offer size.
HL Ratio	The number of SEOs with high leveraged issuer divided by total SEO number.
HL&CB Ratio	The number of SEOs with high leveraged issuer and commercial bank underwriters divided by total SEO number.
HL&IB Ratio	The number of SEOs with high leveraged issuer and pure investment bank syndicate divided by total SEO number.
NO. of COM	The number of co-managers.
NO. of Deals	The number of SEO deals.
NO. of Lead	The number of book managers.
NO. of Mgr	The number of all the underwriters.
Proc. Avg	Average proceeds of SEO deals.
Proc. Sum	Total proceeds of SEO deals.

Appendix 2. List of Variables in Regressions of Chapter 4

This section is to give a list of variables that are used in the regression of Chapter 4.

Variables Name	Definition
Accelerate	Dummy variable; equals one if an offer is accelerated SEO.
ACTMAR	Dummy variable; represents Active-Market; denotes whether SEOs frequently happen in current market.
Announcement returns	Cumulative abnormal returns around announcement day; is normally calculated over the three-day [-1,1] or five-day [-2,2] window.
CB-COM	Dummy variable; equals one if underwriter syndicate includes at least one commercial bank co-manager.
CB-Lead	Dummy variable; equals one if underwriter syndicate includes at least one commercial bank book manager.
CMCB-HL	Dummy variable; equals one if underwriter syndicate includes at least one commercial bank co-manager and issuer's leverage is higher than industry average.
CMCB-Susp	Dummy variable; equals one if underwriter syndicate includes at least one commercial bank co-manager and this commercial bank co-manager reflect potential conflict of interest in its last underwriting deal, that is, it helped a high leverage issuer obtain money from equity market to reduced debt in its last deal.
CMCB-Susp&HL	Dummy variable; equals one if underwriter syndicate includes at least one commercial bank co-manager and this commercial bank co-manager reflect potential conflict of interest in its last underwriting deal. Additionally, current issuer's leverage is higher than industry average.
Discount	The return from the offer price to pre-offer day's closing price.
Integer	Dummy variable; equals one if an offer is priced at an integer.
Lead rank	Dummy variable; equals one if a syndicate include reputable book managers whose Carter-Manaster rank is greater than 8.
Leverage	The ratio of total debt to total assets.
LnAnalyst	The natural logarithm of analyst recommendations obtained from Institutional Brokers' Estimation System (I/B/E/S).
Lnassets	The natural logarithm of total assets.
Lnproceeds	The natural logarithm of the number of shares issued multiplied by offer price.
Market to book	The sum of total assets and market value of equity minus book value of equity divided by total assets.
Multi-book	Dummy variable; equals one if a syndicate includes more than one book manager.

List of Variables in Regressions of Chapter 4 (Continued)

NASDAQ	Dummy variable; equals one if an offer is issued by a NASDAQ-listed firm.

Appendix 3. List of Variables in Descriptive Statistics of Chapter 5

This section is to give a list of variables that are used in the descriptive statistics of Chapter 5.

Variables Name	Definition
ACC(%)	The percent of the number of accelerated SEOs over the number of total SEOs
Acc.Deals	The number of accelerated SEOs
Aver.Proceeds	The average proceeds per deal in a given year
Firm Age	The number of years since the firm founded at the time of IPO
InstHolding	the most recent institutional ownership before the offer
Market Capital	the pre-issue market capitalization (in constant 2004 $millions)
No. Both / No.IPO	The percent of the total number of investors participating in both IPOs and SEOs over the number of investors participating in IPOs
No. of Deals per Investor	the average number of deals participated by an investor
No. of Investors	the total number of investors that have participated in any deal of a given year
No. of Investors in Both	the total number of investors participating in both IPOs and SEOs
No. of Investors per Deal	the average number of investors participating in a deal
No. of IPOs	the number of shares offered (in millions) in the IPO
No. of SEOs	the number of SEOs
No.Both / No.SEO	the percent of the total number of investors participating in both IPOs and SEOs over the number of investors participating in SEOs
Pre-offer Price	the closing price on the day before the offer
Price Update	the absolute value of the percentage change between the middle of the range of prices in the initial registration statement and the offer price
Relative Size	the number of shares offered over the total number of shares outstanding before the offer
Shares Offered	the number of shares offered (in millions) in the IPO
Total Proceeds	the total proceeds (in constant 2004 $millions) of all the deals
Underpricing	the return from the offer price to offer day’s closing price multiplied by 100
VC-Backed IPOs	the percentage of firms received financing from venture capitalists before IPOs over all IPO firms
Volatility	the square root of 252 multiplied by the standard deviation of daily close-to-close returns over the 30 trading days ending 11days before the offer

Appendix 4. List of Variables in Regressions of Chapter 5

This section is to give a list of variables that are used in the regression of Chapter 5.

Variables Name	Definition
$Underpricing$	the return from the offer price to offer day's closing price multiplied by 100
$LOYAL_{LEAD}$	the fraction of equities participated in by the eligible investor during the 5 years prior to the current deal that were underwritten by at least 1 lead underwriter of the current deal
$LOYAL_{CM}$	the fraction of equities participated in by the eligible investor during the 5 years prior to the current deal that were underwritten by at least 1 co-manager of the current deal
LnN_{IPO}	The natural logarithm of 1 + the number of IPOs in which the investor participated in the 5 years prior to the current IPO, is used to control for how active the investor has been regarding with considering the IPO sample
$LnShares$	The logarithm of the number of shares issued for current IPO
$VCFlag$	Dummy variable that equals one if the firm received financing from venture capitalists prior to the IPO (as defined by SDC), and zero otherwise
$LnFirmAge$	The logarithm of (one plus) the number of years since the firm was founded, measured at the time of the IPO. I use the Field-Ritter data set of founding dates
$PriceUpdate$	The absolute value of the percentage change between the offer price and the middle of the range of prices in the prospectus
$NYSEAmex$	Dummy variable that equals 1 if the issuer is listed on the NYSE or AMEX, and 0 otherwise
$Utility$	Dummy variable that equals 1 for issuing firms that are utility firms
$Tech$	Dummy variable that equals 1 for issuing firms that are tech firms
$Biotech$	Dummy variable that equals 1 for issuing firms that are biotech firms
$LOYAL_{LEAD_D}$	Dummy variable that equals 1 if the eligible investor is a relationship investor of at least 1 lead manager
$LOYAL_{CM_D}$	Dummy variable that equals 1 if the eligible investor is a relationship investor of at least 1 co-manager
LnN_{Equity}	The natural logarithm of 1 + the number of IPOs and SEOs in which the investor participated in the 5 years prior to the current offering, is used to control for how active the investor has been regarding with the IPO and SEO sample

List of Variables in Regressions of Chapter 5 (Continued)

LnN_{SEO}	The natural logarithm of 1 + the number of SEOs in which the investor participated in the 5 years prior to the current SEO, is used to control for how active the investor has been regarding with considering the SEO sample
$LnNSEO_{SAMISSU}$	The natural logarithm of 1 + the number of the same issuer's SEOs participated in by the investor in the 5 years prior to the current SEO, is used to control for the issuer-investor relationship
$Inst.Ownership$	The most recent institutional ownership before the offer, measured in decimals
$Volatiltiy$	The standard deviation of daily close-to-close returns over the 30 trading days ending 11 days before the offer, measured in decimals
$RelativeSize$	The number of shares offered over the total number of shares outstanding before the offer, measured in decimals
$LnMktCap$	The logged pre-issue market capitalization (in constant 2004 $millions), measured as the price multiplied by the total number of shares outstanding at the market close before the offer
$LnPrice$	The logarithm of the closing price on the day before the offer
$Accelerated$	Dummy variable that equals 1 if the SEO is an accelerated offer
$LnNEquity_{SAMISSU}$	The natural logarithm of 1 + the number of the same issuer's deals participated in by the investor in the 5 years prior to the current deal, is used to control for the issuer-investor relationship
$HighAssetHolding$	Dummy variable that equals 1 if the investor holds the highest quartile of the total value of stocks among all investors in the quarter prior to current deal
$HighProc$	Dummy variable that equals 1 if the total proceeds of the offer belongs to the highest quartile of all offers in the same year
$HighRelSize$	Dummy variable that equals 1 if the relative size of the SEO belongs to the highest quartile of all SEOs in the current year of the SEO

Appendix 5. Further Regression for Table 17 for Each Year

This table is the further regression for Table 17 for each year as the results of $LOYAL_{LEAD}$ are inconsistent in splitting period into two. The definitions of all independent variables are the same with those of all independent variables in Table 17.

Independent Variables	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
$Underpricing$	0.410[a]	0.459[a]	0.501[a]	0.420[a]	0.508[a]	0.765[a]	0.618[a]	0.828[a]	0.370[a]	0.524[a]	0.552[a]	0.952[a]	0.662[a]	1.293[a]	0.720[a]	0.174[b]	0.587[a]
$LOYAL_{LEAD}$	0.511[a]	0.544[a]	0.571[a]	0.895[a]	0.713[a]	0.601[a]	-0.004	-0.255[b]	-0.032	0.295[a]	0.226[a]	-0.378[a]	0.191[a]	1.052[a]	-0.332[c]	-0.469[a]	-0.265[a]
$LOYAL_{CM}$	0.271[a]	0.424[a]	0.310[a]	0.641[a]	0.685[a]	0.813[a]	0.755[a]	0.517[a]	0.183	0.414[a]	0.236[a]	0.156	0.575[a]	0.584[a]	-0.178	0.640[a]	0.502[a]
LnN_{Equity}	2.826[a]	2.890[a]	3.002[a]	3.576[a]	3.413[a]	3.670[a]	3.231[a]	3.361[a]	3.503[a]	3.478[a]	3.198[a]	3.958[a]	3.304[a]	3.465[a]	3.770[a]	3.802[a]	3.359[a]
$LnShares$	0.856[a]	0.783[a]	1.037[a]	0.896[a]	0.592[a]	0.497[a]	1.087[a]	0.882[a]	0.939[a]	0.832[a]	0.939[a]	1.221[a]	0.663[a]	2.704[a]	1.407[a]	0.979[a]	0.968[a]
$VCFlag$	0.249[a]	-0.015	-0.005	0.129[b]	0.163[a]	-0.102[a]	0.234[b]	0.105	0.302[a]	0.147[b]	0.065	-0.236[c]	-0.069	-0.242	0.294[c]	0.540[a]	0.055
$LnFirmAge$	-0.017	0.069[b]	0.008	0.058	0.173[a]	0.140[a]	-0.101	-0.225[a]	0.115	0.149[a]	0.226[a]	0.364[a]	0.089[c]	-0.531[a]	0.151	-0.009	-0.065
$PriceUpdate$	-0.007	0.050	0.056	0.082	0.152[a]	0.013	-0.160[b]	-0.012	0.077	-0.112[b]	-0.100[c]	-0.296[a]	-0.135[a]	-0.917[b]	0.103	-0.145[b]	-0.040
$NYSEAmex$	0.115[b]	-0.189[a]	-0.067	-0.188[a]	-0.051[c]	0.058	-0.093	0.113	-0.170[c]	-0.118[b]	-0.180[a]	0.046	-0.175[a]	-1.335[a]	0.447[a]	0.291[a]	-0.010
$Utility$	0.000	-0.022	0.016	-0.009	-0.067[b]	0.050[c]	0.170[a]	0.000	0.000	-0.119[a]	0.092[b]	0.118	0.026	0.162	0.000	0.000	0.000
$Tech$	-0.052	-0.074[c]	-0.213[a]	-0.072	0.284[a]	0.056	-0.364[a]	0.106	-0.320[a]	0.002	-0.170[a]	-0.274[b]	-0.102[c]	0.864[a]	0.192	-0.138[b]	0.313[a]
$Biotech$	-0.021	-0.155[a]	-0.184[a]	-0.160[b]	0.056[c]	0.306[a]	-0.137[c]	0.192[b]	-0.522[a]	-0.245[a]	-0.042	-0.176	-0.365[a]	0.981[c]	-0.062	-0.536[a]	-0.349[a]
N	213251	298931	240271	168598	327960	271762	66037	59757	69193	189909	141087	130571	155549	29881	39152	119864	71806

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

Appendix 6. Further Regression for Table 31 for Each Year

This table is the further regression for Table 31 for each year as the results of $HighRelSize * LOYAL_{CM}$ are inconsistent in splitting period into two. The definitions of all independent variables are the same with those of all independent variables in Table 31.

Independent Variables	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
$Underpricing$	0.195[a]	0.231[a]	0.167[a]	0.151[a]	0.235[a]	0.177[a]	0.185[a]	0.154[a]	0.161[a]	0.136[a]	0.165[a]	0.089[b]	0.159[a]	0.107[a]	0.107[a]	0.305[a]	0.124[a]
$LOYAL_{LEAD}$	0.258[a]	0.358[a]	0.366[a]	0.369[a]	0.376[a]	0.394[a]	0.293[a]	0.203[a]	0.189[a]	0.238[a]	0.052[c]	0.020	-0.018	0.227[a]	0.268[a]	0.169[a]	-0.034
$LOYAL_{CM}$	0.320[a]	0.290[a]	0.176[a]	0.444[a]	0.252[a]	0.247[a]	-0.160[a]	0.095[a]	0.019	0.082[a]	0.157[a]	0.134[a]	0.178[a]	0.032	0.105[a]	0.124[a]	0.413[a]
$HighRelSize$	0.047	0.283[a]	0.143[a]	0.231[a]	0.127[a]	0.159[a]	0.267[a]	0.229[a]	0.139[a]	0.204[a]	0.119[b]	0.064	-0.003	0.189[a]	0.333[a]	0.069[c]	0.133[b]
$HighRelSize * LOYAL_{LEAD}$	-0.024	-0.151[a]	-0.015	0.017	-0.226[a]	-0.035	-0.300[a]	-0.149[a]	-0.232[a]	-0.162[a]	-0.160[a]	-0.167[a]	-0.085[c]	-0.272[a]	-0.125[a]	0.056	0.016
$HighRelSize * LOYAL_{CM}$	-0.073[b]	0.001	-0.083[b]	-0.175[a]	0.007	-0.129[a]	0.112[a]	0.048	0.059[c]	0.130[a]	0.118[a]	0.059	-0.039	0.157[a]	-0.188[a]	-0.002	0.015
LnN_{SEO}	2.079[a]	2.241[a]	2.239[a]	2.295[a]	2.260[a]	2.376[a]	2.213[a]	2.170[a]	2.269[a]	2.420[a]	2.069[a]	2.316[a]	1.995[a]	1.816[a]	2.381[a]	2.463[a]	2.429[a]
$LnNSEO_{SAMISSU}$	0.352[a]	0.347[a]	0.350[a]	0.313[a]	0.222[a]	0.310[a]	0.288[a]	0.267[a]	0.393[a]	0.394[a]	0.473[a]	0.641[a]	0.487[a]	0.357[a]	0.351[a]	0.462[a]	0.518[a]
$Inst.Ownership$	0.277[a]	0.240[a]	0.263[a]	0.282[a]	0.511[a]	0.477[a]	0.176[c]	0.288[a]	0.349[a]	0.332[a]	0.460[a]	0.389[a]	0.353[a]	0.175[a]	0.258[a]	0.303[a]	0.367[a]
$Volatiltiy$	0.049[c]	0.059[a]	0.006	0.229[a]	0.061[a]	-0.012	0.043[c]	0.057[a]	0.168[a]	0.095[a]	0.131[a]	0.146[a]	-0.027	0.077[a]	0.199[a]	0.020	0.031
$RelativeSize$	0.243[a]	-0.037	0.205[a]	0.020	0.117[a]	0.067[b]	0.002	0.111[a]	0.207[a]	0.080[a]	0.062	0.086	0.221[a]	0.104[a]	0.088[a]	0.315[a]	0.187[a]
$LnMktCap$	0.915[a]	0.712[a]	1.189[a]	0.980[a]	0.920[a]	0.924[a]	1.336[a]	0.943[a]	1.139[a]	1.076[a]	0.817[a]	1.121[a]	1.112[a]	1.108[a]	1.486[a]	1.579[a]	1.296[a]
$LnPrice$	0.155[a]	0.246[a]	0.031	0.172[a]	-0.127[a]	0.049[c]	0.092[a]	0.100[a]	-0.015	-0.029	0.081[b]	-0.036	0.032	-0.068[b]	-0.132[a]	-0.096[a]	-0.138[a]
$NYSEAmex$	-0.064[b]	0.106[a]	0.045[c]	0.032	0.053[b]	0.180[a]	0.133[a]	0.010	0.030	0.071[a]	-0.022	-0.108[a]	0.053[c]	-0.064[b]	-0.035[c]	-0.049[c]	-0.092[a]
$Utility$	0.005	-0.007	-0.089[a]	0.121[a]	0.006	0.027	0.099[a]	0.116[a]	0.034[c]	0.072[a]	0.043[c]	0.085[a]	-0.126[a]	-0.033	0.038[b]	-0.021	-0.014
$Tech$	0.029	-0.040[c]	-0.056[b]	0.001	0.228[a]	-0.063[a]	0.036[c]	0.043[c]	0.004	-0.034	0.104[a]	0.153[a]	0.113[a]	0.041[c]	-0.003	0.115[a]	0.065[b]
$Biotech$	0.022	-0.063[b]	-0.093[a]	-0.020	0.072[a]	-0.001	-0.022	-0.077[a]	-0.033	-0.100[a]	-0.034	-0.103[a]	-0.004	-0.112[a]	-0.203[a]	-0.029	-0.191[a]
$Accelerated$	-0.046[b]	0.035[c]	0.047[b]	0.035	0.163[a]	0.023	-0.215[a]	-0.021	0.071[a]	0.031	0.058[b]	0.059[c]	0.008	0.151[a]	0.007	0.051[c]	0.186[a]
N	235550	275908	251468	185463	241881	257089	240769	217515	282157	329337	226176	180259	202211	179546	519208	328570	222833

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.

Appendix 7. Further Regression for Table 32 for Each Year

This table is the further regression for Table 32 for each year as the results of $HighRelSize * LOYAL_{CM}$ are inconsistent in splitting period into two. The definitions of all independent variables are the same with those of all independent variables in Table 32.

Independent Variables	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
$Underpricing$	0.212[a]	0.231[a]	0.160[a]	0.156[a]	0.247[a]	0.177[a]	0.189[a]	0.154[a]	0.169[a]	0.138[a]	0.180[a]	0.066[c]	0.186[a]	0.109[a]	0.108[a]	0.306[a]	0.124[a]
$LOYAL_{LEAD}$	0.360[a]	0.412[a]	0.420[a]	0.420[a]	0.438[a]	0.445[a]	0.391[a]	0.264[a]	0.227[a]	0.269[a]	0.121[a]	0.074[c]	0.098[a]	0.251[a]	0.303[a]	0.199[a]	0.028
$LOYAL_{CM}$	0.324[a]	0.286[a]	0.229[a]	0.442[a]	0.289[a]	0.276[a]	-0.151[a]	0.117[a]	0.016	0.078[a]	0.148[a]	0.145[a]	0.185[a]	0.015	0.095[a]	0.106[a]	0.352[a]
$HighProc$	0.089[c]	0.276[a]	0.151[a]	0.263[a]	0.138[a]	0.184[a]	0.316[a]	0.245[a]	0.137[a]	0.173[a]	0.128[b]	0.069	0.030	0.187[a]	0.330[a]	0.053	0.101[c]
$HighProc * LOYAL_{LEAD}$	-0.049	-0.137[a]	-0.005	0.003	-0.242[a]	-0.053[c]	-0.313[a]	-0.151[a]	-0.232[a]	-0.133[a]	-0.168[a]	-0.194[a]	-0.098[c]	-0.265[a]	-0.129[a]	0.076[c]	0.048
$HighProc * LOYAL_{CM}$	-0.075[b]	-0.017	-0.110[a]	-0.164[a]	-0.010	-0.148[a]	0.079[b]	0.037	0.045	0.127[a]	0.116[a]	0.055	-0.053	0.149[a]	-0.177[a]	-0.004	0.006
LnN_{Equity}	2.005[a]	2.008[a]	2.045[a]	2.180[a]	2.108[a]	2.203[a]	2.209[a]	2.147[a]	2.220[a]	2.293[a]	2.090[a]	2.327[a]	2.070[a]	1.789[a]	2.338[a]	2.489[a]	2.160[a]
$LnNEquity_{SAMISSU}$	0.521[a]	0.543[a]	0.492[a]	0.495[a]	0.397[a]	0.465[a]	0.331[a]	0.307[a]	0.450[a]	0.436[a]	0.563[a]	0.758[a]	0.542[a]	0.418[a]	0.377[a]	0.493[a]	0.584[a]
$Inst.Ownership$	0.269[a]	0.231[a]	0.260[a]	0.264[a]	0.518[a]	0.500[a]	0.252[b]	0.288[a]	0.350[a]	0.319[a]	0.488[a]	0.407[a]	0.383[a]	0.207[a]	0.236[a]	0.322[a]	0.359[a]
$Volatiltiy$	0.055[b]	0.074[a]	0.018	0.223[a]	0.049[b]	-0.030[c]	0.028	0.047[b]	0.173[a]	0.089[a]	0.138[a]	0.156[a]	-0.036	0.072[a]	0.180[a]	0.013	0.034
$RelativeSize$	0.205[a]	-0.070[c]	0.176[a]	-0.031	0.106[a]	0.048	-0.084	0.106[a]	0.204[a]	0.060[b]	0.027	0.068	0.193[a]	0.112[a]	0.089[a]	0.319[a]	0.165[a]
$LnMktCap$	0.833[a]	0.611[a]	1.064[a]	0.942[a]	0.816[a]	0.807[a]	1.316[a]	0.913[a]	1.101[a]	0.988[a]	0.760[a]	1.046[a]	1.059[a]	1.128[a]	1.478[a]	1.600[a]	1.192[a]
$LnPrice$	0.151[a]	0.198[a]	0.028	0.150[a]	-0.160[a]	0.034	0.083[a]	0.094[a]	0.004	-0.012	0.073[b]	-0.043	0.040	-0.076[a]	-0.133[a]	-0.116[a]	-0.152[a]
$NYSEAmex$	-0.041	0.140[a]	0.067[a]	0.033	0.079[a]	0.199[a]	0.152[a]	0.019	0.046[c]	0.076[a]	-0.003	-0.076[b]	0.059[b]	-0.069[b]	-0.044[b]	-0.058[b]	-0.092[a]
$Utility$	0.002	-0.011	-0.087[a]	0.122[a]	-0.025	0.029[c]	0.098[a]	0.115[a]	0.031[c]	0.075[a]	0.032	0.097[a]	-0.128[a]	-0.023	0.020	-0.016	-0.017
$Tech$	0.040	-0.040[c]	-0.077[a]	-0.022	0.238[a]	-0.056[b]	0.024	0.047[b]	0.000	-0.038[c]	0.105[a]	0.174[a]	0.109[a]	0.041[c]	-0.006	0.108[a]	0.037
$Biotech$	0.037	-0.048[c]	-0.095[a]	-0.020	0.069[a]	0.046[c]	-0.028	-0.079[a]	-0.029	-0.101[a]	-0.049[c]	-0.074[c]	0.003	-0.121[a]	-0.199[a]	-0.035	-0.191[a]
$Accelerated$	-0.056[b]	0.032[c]	0.054[a]	0.027	0.183[a]	0.033[c]	-0.195[a]	-0.012	0.072[a]	0.038[c]	0.068[a]	0.081[b]	0.029	0.151[a]	0.010	0.057[b]	0.185[a]
N	237080	251327	241588	189090	238448	253041	257926	231112	294873	319705	244672	195653	224243	192809	526701	345153	191743

[a] Statistical significance at the 1% level.
[b] Statistical significance at the 5% level.
[c] Statistical significance at the 10% level.