Family Control, Underwriter Prestige, and IPO Underpricing: A Cross Country Analysis

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Abstract: We study the relationship between underwriter prestige, family control, and IPO underpricing in an international setting. Data are collected for 5,789 firms that went public across twenty-five countries between 1995 and 2002. We find that non-penny-stock and non-U.S. IPOs from countries where firms are predominately family-controlled benefit from associations with well-known investment bankers; i.e., these firms are less underpriced than similar firms from countries with a low level of family control. At the same time, our findings support prior evidence that suggests that underwriter prestige is positively related to underpricing in the U.S. IPO market. Family-controlled firms should consider the findings of this study, which identifies factors that are associated with more successful IPO outcomes.

1. INTRODUCTION

The objective of this study is to empirically assess the relationship between underwriter prestige, IPO underpricing, and family ownership concentration in an international framework. We employ a sample of 5,789 firms that went public across twenty-five countries between January 1995 and December 2002, combined with country level measures of family ownership from La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1999), to test our hypothesis. The research question we aim to address is whether the use of prestigious underwriters reduces IPO underpricing and whether this relationship depends on the predominant corporate ownership structure in a given country. We control for known determinants of IPO underpricing and various legal factors.

Because it is impossible to collect insider ownership data at a firm level for all countries around the world, we use a proxy of family control from La Porta et al. (1999). La Porta et al. develop their proxy based on a sample of

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the twenty largest firms and ten medium sized firms in every country.[1] We employ these measures in various model specifications and for several subsamples of our dataset to ensure the robustness of our results. While we draw our conclusions about the impact of family ownership on a country level, Claessens, Djankov, Fan, and Lang (2002) claim that firms barely change their ownership structures. In addition, La Porta et al. (1999) report that ownership structures for the top twenty to thirty East Asian firms are relatively stable over time. Nevertheless, it does not guarantee that IPOs from countries where firms have high family control have a similar ownership structure. IPOs typically do not experience significant changes in ownership structure because insiders and active investors such as venture capitalists are subject to a lock-up period that prevents them from selling their IPO shares to the public. After the expiration of that lock-up period, an IPO firm's ownership structure may change, however. To address this concern, we apply La Porta et al.'s (1999) family ownership measure that is based on ten medium sized firms in each country. We expect this family ownership measure to be most comparable with the subject of our study, IPOs. Taken together, we presume that IPOs in countries where firms have traditionally had a high level of family control should have, on average, a similar ownership structure during the initial post-IPO market. Family-controlled firms contemplating growth or liquidity options through an IPO should consider this study because it identifies factors that are associated with more successful outcomes.

Shanker and Astrachan (1996) estimate that 61 percent of U.S. firms with ultimate owners are controlled by family. In addition, the database provided by La Porta et al. (1999) shows that the mean ownership percentage controlled by families in the twenty largest (10 medium-sized) firms around the world is 30 percent (45 percent) and that among the ultimate owners of the top twenty largest (ten medium-sized) firms in most of their sample countries, families are also the largest control group. Thus, the experiences of IPO firms with a high level of family control should be relevant to the managers and owners of family-controlled firms who are at the juncture of deciding how to finance the next step in their firms' growth. We hypothesize that IPOs from countries where firms are predominately family-controlled should benefit from associations with well-known underwriters. This builds on the premise that outside expertise is beneficial, especially when brought to bear in a timely fashion.

Most of the extant literature on the relationship between underwriter prestige and IPO underpricing focuses on the U.S. stock market. A few studies test how these factors interact in other countries but they typically focus on one country at a time.[2] To our knowledge, our study is the first one to examine differences in the relationship between underwriter prestige and underpricing in countries with different magnitudes of family control. In addition, the study adds to the underpricing literature by examining whether the relationship between underwriter prestige and underpricing

varies from country to country, and particularly whether it depends on the predominance of family control in a given country.

1.1 Review of the IPO Underpricing Literature

A firm's IPO price is typically determined in stages during the IPO process. The filing price range is determined first by the investment bankers and is listed in the firm's offering prospectus, which also provides financing and other pertinent information about the issuing company. During the period from the filing of the prospectus to the final offer date, called "the waiting period," the managers of the issuing companies, analysts, and investment bankers are typically on a road show to market the IPO to investors and to assess the demand for the offering, which will in turn allow them to set an appropriate offer price. If the demand is higher than expected, the final offer price is set higher; if the demand is lower than expected, the final offer price is adjusted downward (Beatty, Riffe, and Thompson 2000).

Under the bookbuilding method, most of a firm's IPO shares are typically allocated to influential investors or institutions. Thus, the offer price reflects the information that the underwriting investment banks garnered from the most informed investors. On the other hand, once the issue starts trading in the secondary market the closing price on the IPO day and subsequent trading days reflects private information from small or retail investors who rarely receive an allocation of shares. The IPO process involves three players: firms, investment bankers, and investors, all of which have very different goals. There are several reasons for the often sizable first-day returns of IPOs, and their relative importance differs across countries and offering mechanisms.

Specifically, in most of the finance literature, IPOs have been found to have average first-day returns (the percentage difference between the first-day closing price and the offer price) of between 10 percent and 15 percent.[3] This phenomenon is referred to as *IPO underpricing*. Evidence of such first-day returns can be found in Logue (1973), Ibbotson (1975), and Ibbotson, Sindelar, and Ritter (1994) and Ibbotson and Ritter (1995). Overall, the first-day return phenomenon is explained by asymmetric information and adverse selection that forces the issuer to set the price below the firm's fundamental value. Specifically, to induce uninformed investors to participate in an IPO, the issuer has to set the offer price below the intrinsic value. At the same time, to maximize their offering proceeds, issuers may be inclined to set the offer price too high. In either case, in an efficient market, the price will move back to its intrinsic value after the issue date, leading to underpricing (or in some cases overpricing) for the respective issue.

Several researchers have attempted to explain the first-day return phenomenon. Rock (1986) and Beatty and Ritter (1986) developed the *winner's curse theory* and explain that IPO underpricing results from information asymmetries among investors. Their hypothesis follows earlier research by Baron and Holmstrom (1980) and Baron (1982) who note that IPO

underpricing may result when there is a considerable level of information asymmetry between issuers and investment bankers. Specifically, they argue that if investment bankers take advantage of their superior knowledge of market conditions to underprice offerings, which permits them to expend less marketing efforts and to ingratiate themselves with buy-side clients, IPOs will be underpriced. Another explanation offered by Benveniste and Spindt (1989) proposes that IPO underpricing is caused by information asymmetries between investment bankers and investors. Under the frequently used bookbuilding method, investment bankers may underprice IPOs to induce regular investors to reveal information during the pre-selling period, which can then be used to assist in pricing the issue. Moreover, Grinblatt and Hwang (1988), Allen and Faulhaber (1989), and Welch (1989) developed the *signaling theory* to explain the underpricing phenomenon. This theory hypothesizes that underpriced IPOs leave investors with a good taste, allowing the firms and insiders to sell shares in future offerings at a higher price than would otherwise be the case. Along these lines, Chemmanur (1993) shows that high first-day returns generate publicity for the firm. He argues that this publicity generates additional investor interest and brand awareness. Tinic (1988), Hughes and Thakor (1992), and Lowry and Shu (2002) examine the relationship between IPO underpricing and a firm's likelihood of being sued in connection with its IPO. They find that the frequency and severity of future class action lawsuits can be reduced by high first-day returns because only investors who lose money are entitled to damages. Moreover, Welch (1992) further illustrates that underpricing can occur when potential investors pay attention not only to their own information about a new issue but also to (1) whether other investors are purchasing, (2) bandwagon effects, and (3) informational cascades that may develop. Other theories are provided by Booth and Chua (1996) who list ownership dispersion as a possible explanation for underpricing, and Mauer and Senbet (1992) who relate underpricing to the incompleteness of the market.

An alternative explanation for underpricing is provided by the investor behavior literature that suggests that IPOs are not underpriced but that investors who enter the market on the first day after the issue drive the positive initial returns (Ritter 1991, and Loughran and Ritter 2002). The most puzzling aspect of the first-day return phenomenon is that, in many circumstances (see, for example, the Internet bubble of 1999 and early 2000), issuers do not object to a severe first-day return. Loughran and Ritter (2002) explain this phenomenon by using the prospect theory first developed by Kahneman and Tversky (1979) which argues that investors focus on changes in their wealth rather than on the level of their wealth. Loughran and Ritter note that most of the money left on the table is by a minority of firms for which the offer price was revised upwards during the book-building process. For these issuing firms, the executives see their personal wealth increase relative to the mid-filing price, even as they agree to leave money on the table. Loughran and Ritter argue that the issuing firm's

managers bargain less hard for a higher offer price in this circumstance than they would otherwise do. Thus, offer prices do not adjust fully to market movements during the book-building period. Furthermore, they illustrate why underwriters prefer to underprice IPOs rather than charge higher gross spreads. This happens because issuers pay less attention to the opportunity costs of first-day returns than to the direct costs of gross spreads.[4]

1.2 Insider or Family Ownership and IPO Underpricing

Leland and Pyle (1977) argue that insider ownership can be a signal of firm quality. A family member that owns or controls the firm is regarded as an insider and is supposed to know the true value of his company. His willingness to hold more shares of his company indicates his confidence in the future prospects of the firm. As a consequence, a higher percentage of insider or family ownership implies that the firm is of higher quality.

For an IPO firm, the degree of IPO underpricing is likely to depend on its level of pre-IPO insider ownership. The higher the pre-IPO percentage of insider ownership, the higher the cost imposed on insiders from reducing the firm value (Jensen and Meckling 1976). Entrepreneurs will suffer substantial economic losses if the firm's future performance is poor. Thus, in the belief that entrepreneurs with high ownership stakes must be confident about business prospects, investors will be prepared to subscribe to the new issue.

Empirical support for the retained insider ownership model is mixed. Using U.S. data, Downes and Heinkel (1982) find support for the model. Research on Canadian IPOs has found evidence both in favor of the retained insider ownership model (Clarkson, Dontoh, Richardson, and Sefcik, 1991) and against it (Krinsky and Rotenberg, 1989). How and Low (1993) report Australian results consistent with the predictions of Leland and Pyle whereas a Korean study by Kim, Krinsky, and Lee (1994) find no support for the model.

An empirical implication of Leland and Pyle's (1977) model is that insiders (including managers and members of the board of directors) may intentionally send a signal of their firm's quality by retaining a high level of pre-IPO ownership.

Allen and Faulhaber (1989), Grinblatt and Hwang (1989), and Welch (1989) model a separating equilibrium where high quality firms have high underpricing and pre-IPO insider ownership. They explain that good quality firms are willing to underprice their IPOs because they expect to raise more money after the IPO. In contrast, low-quality firms do not expect to access the capital markets for further rounds of financing; therefore, they are not willing to underprice but rather take the money from their IPO and "run." An implication of this separating equilibrium is the positive relation between underpricing and post-IPO market valuation. Moreover, underpricing is positively related to the probability of issuing SEOs and the size of SEOs.

Due to the limited availability of family ownership data and the subjective determination of family control, the relationship between family ownership and underpricing remains largely unexplored. Most studies in this field use data for a specific country but to our knowledge, there has been no study that employs data from cross-country equity markets to investigate this relationship.[5] Our study attempts to fill this gap. Moreover, as a second research question, we study whether IPOs in countries where firms have high family control benefit from being associated with prestigious underwriters. We hope that our results provide additional insights in this area and clarify some of the mixed evidence previously documented in the U.S.

2. Hypothesis Development

2.1. Family Control, Underwriter Prestige, and IPO Underpricing

Higher levels of insider ownership, as in family owned firms, have long been associated with superior company performance. Jensen and Meckling (1976), for example, show that the higher the level of insider ownership, the more valuable a firm. They rationalize their findings by arguing that managers who not only run but also own a firm tend to work harder and have incentives that are better aligned with those of the firm's shareholders. Stulz (1988), on the other hand, suggests that insider ownership over 50 percent may lead to entrenchment and, thus, a lower firm value. Morck, Schleifer, and Vishny (1988) find evidence to support Jensen and Meckling (1976), whereas McConnell and Servaes (1990) lend empirical support to Stulz (1988).[6] Despite these mixed findings, most authors agree that insider ownership, at least in some ways, provides incentives that are positively related to value and performance. Insider ownership may also provide information about a firm's quality. Insiders—who tend to have better information than outside investors—are more willing to hold shares if they expect the company to have good future prospects. Leyland and Pyle (1977) suggest that a high level of insider ownership will provide a signal of quality and mitigate information asymmetries. They develop a model that shows that outside investors are willing to invest more in a venture when insiders themselves own more. Downes and Heinkel (1982) provide supporting evidence by observing that firms where insiders retain greater ownership after the IPO are more valuable at their IPOs.

Similarly, the presence of high-ranking underwriters in a firm may provide a signal of quality. Underwriters are sophisticated and well-informed investors; therefore, the fact that they have made investments in a company serves to certify company quality, much like bank loans are a signal of quality because of the due diligence analysis a bank undertakes before lending (James, 1987). Carter and Manaster (1990) and Carter, Dark, and Singh (1998) find that underpricing is negatively related to underwriter prestige because prestigious underwriters are more likely to underwrite high quality issues with a lower level of uncertainty. Moreover, prestigious

underwriters should provide certification to an issuer, thus lowering the probability of having a lawsuit and decreasing underpricing. On the other hand, a positive relation between underwriter ranking and underpricing of non-family firms would be consistent with Cliff and Denis' (2004) finding of a positive association between underpricing and analyst coverage by prestigious underwriters. Beatty and Welch (1996) note that the relationship between underwriter prestige and underpricing has switched from negative to positive during the 1990s. Loughran and Ritter (2004) argue that the relationship between underpricing and underwriter prestige becomes positive because issuing firms see the importance of increased analyst coverage that is provided by prestigious underwriters. The more beneficial issuers view this analyst coverage, the more they are willing to pay for it. Logue, Rogalski, Seward, and Foster-Johnson (2002) find no evidence of this relationship between underwriter prestige and investor returns over different holding-periods.

Firms with family control are less likely to have outside professional management because the founding family is likely to be quite active in the company, and thus underwriters can provide important and beneficial professional input. This study will look at the characteristics and underpricing of IPOs in the countries where firms have high family control, as well as the relation of underwriter prestige to these variables. We examine 5,789 firms that went public across twenty-five countries between 1995 and 2002. We hypothesize that IPOs in the countries where firms have high family control should work with underwriters that have high prestige who can provide expertise and strategic guidance in helping them harvest the fruits of their labor through an IPO. We employ two measures of underwriter prestige. First, ***underwriter reputation*** is equal to one if the lead underwriter underwrites both domestic and international IPOs and zero if it underwrites only domestic IPOs. Consistent with Lin, Pukthuanthong-Le, and Walker (2007), we argue that underwriters with international exposure have more experience and a better reputation than underwriters who are only domestically active. Therefore, we hypothesize that IPOs in countries where firms have high family control benefit from underwriters that have high reputation and thus have low underpricing. Second, ***underwriter ranking*** is constructed based on the US$ proceeds of the IPOs each underwriter underwrote during our sample period. We hypothesize that IPOs in countries where firms have high family control benefit from high ranked underwriters and receive low underpricing. Based on the above arguments, we state our main hypothesis as follows.

> H1: IPOs in countries where firms are predominately family-controlled have a significant negative relation between underpricing and underwriter reputation/ranking.

2.2. Other International IPO Studies

The existing underpricing literature has rarely employed a comprehensive cross-country firm-specific analysis to study the underpricing of IPOs. However, a number of papers have focused on comparing pairs of countries or countries in a group or region. A survey by Ritter (2003) compares European and American IPO markets. Loughran, Ritter, and Rydqvist (1994) analyze international differences in IPO markets by consolidating the empirical results from a number of country-specific studies.[7] Even though they demonstrate that differences in underpricing in thirty-eight countries are related to the characteristics of IPO firms, they do not take the time-variation of returns, or other firm- and industry-specific factors into account. Ljungqvist, Jenkinson, and Wilhelm (2003) are the first to conduct a comprehensive empirical study to analyze international differences in IPO markets in a cross-country context. They examine IPO selling methods and the role of U.S. banks and U.S. investors outside of the U.S. Although bookbuilding has become increasingly popular outside of the U.S., they observe that bookbuilding on its own does not lead to lower underpricing. Rather, they find that the composition of the underwriting syndicate and the choice of target market are the factors that matter most. Their non-U.S. sample contains 2,143 IPOs issued in sixty-five countries between January 1992 and July 1999. However, their dataset is subject to some limitations. Their sample is collected from Equityware, which initially serves as a database of cross-border IPOs. The sample does not contain any domestic listings during 1992 and 1993. Furthermore, their sample does not representatively cover the Asian-Pacific market. For instance, domestic Japanese issues are only comprehensively incorporated in their sample starting from 1998. These exceptions make their sample somewhat unrepresentative.

We are adding to the IPO literature by providing a more comprehensive analysis of international differences of IPO underpricing in a cross-country setting and by being the first to study the relation between underwriter prestige and underpricing of IPOs in countries that have different levels of ownership concentration using a broad sample of international IPOs. Our original sample is derived from the Securities Data Company (SDC) New Issues database that allows for a full coverage of IPOs across countries. To ensure the accuracy of our data and to correct for known problems in the SDC database, we cross-reference our data set with the Record of New Issues by the Financial Post and with Bloomberg. We correct a number of errors inherent in SDC data.[8] Our data collection process makes our sample more comprehensive and reliable than most datasets that are derived from a single source and allows us to control for firm size, liquidity, hot IPO periods, industry, and country-level legal and law enforcement variables.

3. DATA

3.1. Sample Selection

We derive our sample of IPOs between January 1995 and December 2002 from the SDC New Issues database. We require issues to be listed in one of the twenty-seven countries covered by La Porta et al. (1999) because we adopt their country classifications by ownership concentration to investigate IPOs in countries for which we have data on family control.[9] We then exclude financial firms, spinoffs, private placements, and non-domestic IPOs and include only firms with SDC share types reported as Class A Shares, Common Shares, Ordinary Shares, Ordinary/Common Shares, Par Value Common Stock, Non Value Common Stock, Registered Par Value Common Stock, or Registered Non Value Common Stock.[10] In addition, firms must have closing prices available on Datastream on the seventh, fifteenth, or thirtieth calendar day after the IPO.[11]

Although the SDC database provides a relatively comprehensive coverage of worldwide new equity issues, data quality is one of our main concerns. For example, SDC lists announcement dates or subscription dates as issue dates for IPOs in a number of countries. More than 50 percent of IPOs in Canada, Hong Kong, Italy, Japan, Malaysia, Singapore, South Korea, Taiwan, and the UK are affected by this type of error. We therefore cross-reference our data set with Bloomberg and the Record of New Issues by the Financial Post. In case of missing or erroneous SDC data, we use data from Bloomberg and the Financial Post. Our final sample consists of 5,789 firms from twenty-five countries that went public between January 1995 and December 2002.

3.2. Variable description

We provide a comprehensive overview of the variables used in this study together with data sources in **Appendix 1**. Our key variables are discussed below.

3.2.1. Underpricing

For each IPO, we calculate fifteen-day underpricing, which is defined as the percentage return from the offer price to the closing price on the fifteenth calendar day. We obtain offer price data from the SDC database. U.S. IPO underpricing data are also from SDC while underpricing for non-U.S. IPOs is calculated using closing price data from Datastream. Similar to Ljungqvist et al., (2003), we measure underpricing as the fifteen-day return rather than the first-day return due to two reasons. First, there is a delay before unconstrained market prices are reported in some countries (Ritter 2003). Specifically, some governments have regulations in place that limit daily price fluctuations in their stock markets. Our approach thus allows prices to reach an equilibrium point. In addition, Jenkinson (2000) documents that some countries impose restrictions on daily price fluctuations which delay the emergence of an equilibrium price. In France and Japan, for

instance, "circuit-breakers" prevent post-IPO prices from rising by more than a certain percentage per day.[12]

Second, some data are not available. Datastream, for example, provides more comprehensive fifteen-day closing price data than first or seven-day prices. Our experience is similar to that of Ljungqvist et al. (2003) who in fifty-five cases could not find a seven-day price and instead used the first-day close (thirty-three cases) or the thirty-day price reported in Equityware (twenty-two cases).

In Panel A of **Table 1**, we list the number of IPOs and calculate the equally weighted mean and median underpricing by year. IPO volume and underpricing fluctuate over time around the world. The number of IPOs with fifteen-day returns ranges from a low of 422 in 2002 to a high of 1,094 in 2000. The average fifteen-day underpricing reaches 74.18 percent in 1999 compared to a full sample average of 38.60 percent, a difference that can likely be attributed to the IPO bubble period.

Table 1
Sample distribution across years, countries, and industries

Our sample consists of 5,789 firms from twenty-five countries that went public between January 1995 and December 2002. For each IPO, we calculate fifteen-day underpricing, which is defined as the percentage return from the offer price to the closing price on the fifteenth calendar day after the IPO. All offer price data are from the Securities Data Company (SDC) database. U.S. IPO return data are also from SDC while returns for non-U.S. IPOs are calculated using closing price data from Datastream. Financial firms, spinoffs, private placements, and non-domestic IPOs are excluded. Only firms with SDC share types equivalent to Class A Shares, Common Shares, Ordinary Shares, Ordinary/Common Shares, Par Value Common Stock, Non Value Common Stock, Registered Par Value Common Stock, or Registered Non Value Common Stock are included. In addition, firms must have fifteen-day closing prices available. In Panel A, we list the number of IPOs and calculate the equally weighted mean and median underpricing by year. In Panel B, we provide the same information by country. Panel C provides a breakdown by industry following the classification by Lowry and Shu (2002).

PANEL A: SAMPLE DISTRIBUTION ACROSS YEARS

		Fifteen-day underpricing (%)	
Year	No. of IPOs	Equally weighted Mean	Median
1995	686	27.47	14.29
1996	927	29.52	11.46
1997	766	26.00	9.38
1998	556	29.03	13.33
1999	868	74.18	29.44
2000	1,094	47.43	11.28
2001	470	27.81	8.00
2002	422	28.63	5.98
Total sample	5,789	38.60	12.50

In Panel B, we provide the number of IPOs and calculate the equally-weighted mean and median underpricing by country. The number of IPOs and the level of underpricing vary substantially from country to country. The U.S. dominates in terms of IPO volume, followed by Japan, the UK, France, Canada, Australia, Germany, and Hong Kong. On average, South Korean investors reap the highest fifteen-day return, followed by investors from Greece, Canada, Germany, the UK, and the U.S.[13]

Table 1 (*continued*)

PANEL B: SAMPLE DISTRIBUTION ACROSS COUNTRIES

		Fifteen-day underpricing (%)	
Country	**No. of IPOs**	**Equally weighted Mean**	**Median**
Argentina	1	16.71	16.71
Australia	289	17.33	0.00
Austria	12	25.61	3.08
Belgium	26	14.81	7.40
Canada	300	98.50	31.35
Denmark	15	7.54	4.68
Finland	29	14.09	0.00
France	306	18.70	7.81
Germany	281	45.84	15.38
Greece	86	102.08	32.18
Hong Kong	225	16.23	6.00
Italy	86	20.39	0.34
Japan	904	26.11	5.87
Mexico	5	0.11	1.13
Netherlands	20	25.78	7.58
New Zealand	5	29.93	12.00
Norway	21	1.67	0.00
Portugal	4	17.94	17.77
Singapore	173	18.85	8.70
South Korea	128	121.14	49.08
Spain	16	25.88	11.36
Sweden	29	6.62	0.86
Switzerland	24	12.96	5.21
United Kingdom	341	38.84	12.28
United States	2,463	36.84	16.67
Total Sample	5,789	38.60	12.50

Table 1 (*continued*)

PANEL C: SAMPLE DISTRIBUTION ACROSS INDUSTRIES

Industry	SIC codes	No. of IPOs	Fifteen-day underpricing (%) Equally Weighted Mean	Median
Agriculture and Mining	100–1299, 1400–1499	183	48.02	6.60
Apparel	2200–2399, 3100–3199	95	18.39	6.30
Communications, Computers and Electronics	3570–3579, 3600–3699, 4800–4899, 7370–7379	2,089	50.71	19.23
Construction	1500–1799	98	13.13	3.77
Food	2000–2099	118	15.93	6.80
Health	8000–8099	114	14.35	7.24
Manufacturing	2400–2499, 2600–2699, 2800–2899, 3000–3099, 3200–3569, 3580–3599, 3900–3999	819	24.47	8.33
Oil and Gas	1300–1399, 2900–2999, 4600–4699, 4920–4929	143	43.51	19.33
Printing and Publishing	2700–2799	86	29.32	9.48
Recreation	7000–7099, 7800–7999	162	27.28	8.00
Science	3800–3899, 8710–8719, 8730–8739	383	28.23	7.32
Services	6500–6599, 7200–7369, 7380–7399, 7600–7699, 8100–8399, 8720–8729, 8740–8749	481	36.73	16.67
Trade	5000–5999	705	28.61	9.56
Transportation	3700–3799, 4000–4299, 4400–4599, 4700–4799, 7510–7549	212	45.16	7.95
Utilities	4910–4919, 4930–4979	48	29.08	15.38
Other		53	32.13	5.93
Total sample		5,789	38.60	12.50

Panel C of Table 1 provides a breakdown by industry following the classification by Lowry and Shu (2002). Our data show that the communications, computers, and electronics industry has the highest number of IPOs, accounting for more than one-third of the new equity issues in our sample. IPOs in this industry also have the highest fifteen-day returns during our sample period.

3.2.2. Underwriter prestige

To control for underwriter prestige, we develop two measures, a binary ***underwriter reputation*** dummy and a scaled ***underwriter ranking***. We consider only lead underwriters when creating both of these variables. Under the first approach, we define a high-quality underwriter as one that underwrites both domestic and international IPOs while low-quality

underwriters only underwrite domestic IPOs. We argue that underwriters with international exposure have more experience and a better reputation than underwriters who are only domestically active. Under the second approach, we construct an international underwriter ranking based on the SDC's top 500 book runners during our sample period. While Carter and Manaster (1990) and Carter et al. (1998) assign reputation rankings to U.S. underwriters, the extant IPO literature provides no underwriter ranking in an international setting. We extend Carter and Manaster's (1990) and Carter et al.'s (1998) approach to an international framework by assigning underwriter ranks on a scale from 0 to 9, with higher scores implying better reputation. Our ranking is based on the US$ proceeds of the IPOs each underwriter underwrote during our sample period (see Appendix 1 for more details).

3.2.3. Family ownership

We employ the country-level family ownership proxy as provided by La Porta et al. (1999). To measure the typical ownership structure in a given country, La Porta et al. distinguish between different types of owners and aggregate their percentage holdings across different groups of firms (large and medium-sized firms). Their database covers the twenty-seven richest countries based on 1993 per capita income, excluding a number that do not have significant stock markets such as Kuwait, the United Arab Emirates, and Saudi Arabia. Their first ownership concentration proxy focuses on ***large caps***, i.e., the top twenty firms in each country as ranked by the market capitalization of common equity at the end of 1995. Because large companies tend to have less concentrated ownership and because there are large variations in the average firm size of the twenty largest firms in each country, La Porta et al.'s measure may introduce a bias in our analysis as they may simply proxy for differences in firm size across countries, not differences in ownership concentration. To eliminate this bias, we use another measure that is also collected by La Porta et al. for the ***ten smallest firms*** in each country with a market capitalization of common equity of at least $500 million at the end of 1995. We call the first sample "***large firms***" and the second sample "***medium firms***." To be comparable across countries and firms, our empirical test is based on the latter sample, "***medium firms***." For countries with small stock markets, the two samples intersect. La Porta et al. claim that there are a few additional restrictions on these samples of companies. First, all affiliates of foreign firms (i.e., companies that have over 50 percent of their votes controlled by a foreign firm) are excluded. Second, firms that are wholly owned by the government or privately owned are excluded. Third, to prevent banks and utilities from dominating the sample, La Porta et al. exclude them from the sample. As a result, these sample selection criteria should bias La Porta et al.'s results toward finding fewer firms that are family owned.

3.2.4. Other variables

La Porta et al. (1999) provide a measure of ownership control by distinguishing between firms with ultimate owners and no ultimate owners. There are five types of ultimate owners: (1) a family or an individual, (2) the state, (3) a financial institution such as a bank or an insurance company, (4) a corporation, or (5) other entities, such as a cooperative, a voting trust, or a group with no single controlling investor.[14]

If an entity in one of these five groups owns more than 20 percent of a firm—either directly or indirectly—that firm is identified as having an ultimate owner. In contrast, La Porta et al. (1999) define widely held firms as firms that do not have ultimate owners.[15]

Our study will focus only on families as ultimate owners. **Table 2** provides the ownership concentration measure from La Porta et al. (1999) for each of the twenty-five countries represented in our sample. Table 2, Panel A, shows that, for the sample of the top twenty ***largest firms***, and using the 20 percent definition of control, 30 percent are family-controlled. La Porta et al. (1999) report that the majority of firms are owned by either the state or the family. Since their sample is composed of the top twenty largest firms in each country, having the state as an ultimate owner is not surprising as many governments are still in the process of privatizing their state-owned enterprises. At the same time, La Porta et al. point out that it is somewhat surprising that in most countries around the world, families (rather than banks or corporations) are by far the most dominant ownership group. With respect to family control, we find that UK firms have the lowest percentage of family ownership. Japan and Australia are the second least controlled by family. On the other hand, firms in Mexico are highly controlled by family. Hong Kong and Argentina are second and third, respectively.

Panel B provides ownership concentration statistics for ***medium-sized*** publicly traded firms in each country. We focus on these firms because La Porta et al. note that firms in countries that have better shareholder protection tend to be larger and have more dispersed ownership. Among the firms in their sample, approximately 23 percent have dispersed ownership, compared to 37 percent for large firms. As size decreases, the definition of control is more relaxed and the number of firms with no ultimate owners decreases. Among medium firms, the percentage of family control increases to 46 percent and becomes the dominant ownership form. In terms of family ownership, medium-sized firms in Mexico and Greece lead our sample. Hong Kong and Argentina are third and fourth, respectively. On the other hand, medium-sized firms in Japan and the U.S. have the least family control. Austria and New Zealand are third and fourth, respectively. Given the aforementioned concerns, we use family ownership as measured for medium-sized firms for the rest of our analyses in order to be consistent with the subject of our study, IPOs.

Table 2
Control of Large- and Medium-Sized Publicly Traded Firms around the World

This table, based on data provided by La Porta et al. (1999), classifies countries according to their ownership concentration. Panel A (B) presents means for each variable using 20 percent as the criterion for ultimate control for a sample of the twenty largest firms (ten firms with stock market capitalization of at least $500 million or higher) by stock market capitalization of equity at the end of 1995. Definitions for each of the variables are given in Appendix 1.

PANEL A: LARGE PUBLICLY TRADED FIRMS

Country	Proportion of widely held firms	Family	State	Financial	Corp.	Misc.
Argentina	0.00	0.65	0.15	0.05	0.15	0.00
Australia	0.65	0.05	0.05	0.00	0.25	0.00
Austria	0.05	0.15	0.70	0.00	0.00	0.10
Belgium	0.05	0.50	0.05	0.30	0.00	0.10
Canada	0.60	0.25	0.00	0.00	0.15	0.00
Denmark	0.40	0.35	0.15	0.00	0.00	0.10
Finland	0.35	0.10	0.35	0.05	0.05	0.10
France	0.60	0.20	0.15	0.05	0.00	0.00
Germany	0.50	0.10	0.25	0.15	0.00	0.00
Greece	0.10	0.50	0.30	0.10	0.00	0.00
Hong Kong	0.10	0.70	0.05	0.05	0.00	0.10
Italy	0.20	0.15	0.40	0.05	0.10	0.10
Japan	0.90	0.05	0.05	0.00	0.00	0.00
Mexico	0.00	1.00	0.00	0.00	0.00	0.00
Netherlands	0.30	0.20	0.05	0.00	0.10	0.35
New Zealand	0.30	0.25	0.25	0.00	0.20	0.00
Norway	0.25	0.25	0.35	0.05	0.00	0.10
Portugal	0.10	0.45	0.25	0.15	0.00	0.05
Singapore	0.15	0.30	0.45	0.05	0.05	0.00
South Korea	0.55	0.20	0.15	0.00	0.05	0.05
Spain	0.35	0.15	0.30	0.10	0.10	0.00
Sweden	0.25	0.45	0.10	0.15	0.00	0.05
Switzerland	0.60	0.30	0.00	0.05	0.00	0.05
United Kingdom	1.00	0.00	0.00	0.00	0.00	0.00
United States	0.80	0.20	0.00	0.00	0.00	0.00
Sample Average	0.37	0.30	0.18	0.05	0.05	0.05

PANEL B: MEDIUM-SIZED PUBLICLY TRADED FIRMS

Proportion of widely held firms	Family	State	Financial	Corp.	Misc.
0.00	0.80	0.20	0.00	0.00	0.00
0.30	0.50	0.00	0.00	0.20	0.00
0.00	0.17	0.83	0.00	0.00	0.00
0.20	0.40	0.30	0.10	0.00	0.00
0.60	0.30	0.10	0.00	0.00	0.00
0.30	0.40	0.20	0.00	0.00	0.10
0.20	0.20	0.20	0.10	0.10	0.20
0.00	0.50	0.20	0.20	0.00	0.10
0.10	0.40	0.20	0.20	0.10	0.00
0.00	1.00	0.00	0.00	0.00	0.00
0.00	0.90	0.00	0.00	0.00	0.10
0.00	0.60	0.00	0.00	0.10	0.30
0.30	0.10	0.00	0.00	0.00	0.60
0.00	1.00	0.00	0.00	0.00	0.00
0.10	0.20	0.10	0.00	0.10	0.50
0.57	0.29	0.14	0.00	0.00	0.00
0.20	0.40	0.20	0.10	0.00	0.10
0.00	0.50	0.50	0.00	0.00	0.00
0.40	0.40	0.20	0.00	0.00	0.00
0.30	0.50	0.00	0.00	0.20	0.00
0.00	0.30	0.20	0.40	0.10	0.00
0.10	0.60	0.20	0.00	0.00	0.10
0.50	0.50	0.00	0.00	0.00	0.00
0.60	0.40	0.00	0.00	0.00	0.00
0.90	0.10	0.00	0.00	0.00	0.00
0.23	0.46	0.15	0.04	0.04	0.08

3.2.5. Control Variables

3.2.5.1 Litigation Risk Variables

La Porta et al. (2006) find that public enforcement plays, at best, a modest role in the development of stock markets. In contrast, the development of stock markets is strongly associated with extensive disclosure requirements and a relatively low burden of proof on investors seeking to recover damages resulting from omissions of material information from the prospectus. To control for these factors, we use proxies for public enforcement, the burden of proof, and disclosure requirements as developed by La Porta et al. (1998, 2006).[16] See Appendix 1 for their description.

3.2.5.2 IPO characteristics

We follow the industry classification of Loughran and Ritter (2004) and Cliff and Denis (2004) to identify whether or not a firm is in the technology sector.[17] We use the resulting tech dummy variable to control for industry effects in our regression models.

In addition, we introduce IPO volume as a proxy for hot IPO markets. We define IPO volume as the number of IPOs over the previous twelve-month period, including the month of issue. IPO volume controls for variations in levels of IPO underpricing during hot and cold issue markets and for the issuers' tendency to take their firms public during favorable climates in the IPO market (Cliff and Denis, 2004).

We also control for firm size measured as the natural logarithm of IPO proceeds. Consistent with Baron (1982), Beatty and Ritter (1986), and Rock (1986), we expect that larger firms are less risky and are thus less underpriced.

Furthermore, we control for IPO selling methods. Ljungqvist et al. (2003) observe that bookbuilding does not cause lower underpricing even though it gains popularity worldwide. In fact, Sherman (2005) suggests that bookbuilding IPOs are more underpriced than auction IPOs because underwriters who manage the book need to underprice the offer to provide an incentive for their favorite clients who invest in the issue. We examine the impact of IPO selling methods on IPO underpricing using the country-level data provided in Ljungqvist et al. (2003).

We then separate our IPO sample into three groups based on the level of family control in each country. **Table 3** provides descriptive statistics for each IPO. The results suggest that underpricing is higher for IPOs in countries where firms have high family control. Underwriter ranking and reputation are also higher for IPOs in countries where firms have high family control but are lowest for IPOs in countries where firms have medium family control.

In addition, we perform a sensitivity analysis to ensure that our results are robust to the exclusion of penny stocks from our sample. The results show that IPOs in countries where firms have high family control also have higher fifteen-day returns and are underwritten by higher ranked investment bankers with higher reputations.

Table 3
Descriptive Statistics across Countries by Level of Family Control

This table reports the mean, median, and standard deviation of fifteen-day underpricing, underwriter ranking, underwriter reputation, and family control level. The results are based on our full IPO sample from 1995 to 2002 across twenty-five countries separated into three levels of family control (high, medium, and low). Definitions for all variables are given in Appendix 1.

IPOs in countries with different levels of family control

	Fifteen-day underpricing (in decimals)	Under-writer ranking	Under-writer reputation	Family control	Fifteen-day underpricing (in decimals)	Under-writer ranking	Under-writer reputation	Family control	Fifteen-day underpricing (in decimals)	Under-writer ranking	Under-writer reputation	Family control
Family Control	**Low**				**Medium**				**High**			
Full sample												
Mean	0.30	3.30	0.47	0.05	0.29	2.46	0.31	0.20	0.53	3.98	0.54	0.30
Median	0.07	0.00	0.00	0.05	0.13	0.00	0.00	0.20	0.18	3.00	1.00	0.20
Std. Dev.	1.03	4.10	0.50	0.04	0.99	3.56	0.46	0.01	1.24	3.91	0.50	0.17
Observations	1,929	1,928	1,929	1,929	1,827	1,930	1,930	1,930	1,900	1,929	1,930	1,930
Without penny stocks												
Mean	0.28	3.76	0.55	0.06	0.22	2.85	0.36	0.20	0.53	3.88	0.54	0.24
Median	0.08	0.00	1.00	0.05	0.13	0.00	0.00	0.20	0.18	0.00	1.00	0.20
Std. Dev.	0.74	4.24	0.50	0.04	0.37	3.76	0.48	0.00	1.33	4.19	0.50	0.09
Observations	1,595	1,595	1,595	1,595	1,488	1,596	1,596	1,596	1,573	1,596	1,596	1,596
Without penny stocks and no U.S. IPOs												
Mean	0.23	4.55	0.66	0.04	0.33	3.09	0.45	0.08	0.41	1.88	0.29	0.27
Median	0.09	6.00	1.00	0.05	0.06	0.00	0.00	0.10	0.09	0.00	0.00	0.20
Std. Dev.	0.71	4.24	0.47	0.02	0.78	4.13	0.50	0.03	1.57	3.27	0.45	0.13
Observations	775	775	775	775	775	775	775	775	768	775	775	775

Furthermore, we are concerned about the fact that with over 35 percent of all observations, the United States dominates our dataset. Therefore, we do another robustness test by excluding U.S. stocks to ensure that our results hold outside the U.S. As before, we find that firms in countries with higher family control also have higher returns. Contrary to the full sample, however, we find that IPOs in high family control countries tend to be underwritten by less prestigious underwriters. This finding is consistent with Carter and Manaster's (1990) and Carter et al.'s (1998) explanation that firms associated with prestigious underwriters benefit from lower underpricing and with the notion that these beneficial effects are stronger for family controlled firms, i.e., that they are more prominent in countries with a high level of family control. Perhaps analyst coverage does not play the same crucial role in these equity markets as it does in the U.S. equity market where family control is low. If that is the case, then issuers in countries where firms have low family control may not be willing to bear the high costs associated with analyst coverage provided by prestigious underwriters and instead focus on maximizing their offering proceeds. Moreover, because management positions in family controlled firms are typically passed down from generation to generation, the managers of these firms may not have the same industry experience as managers in other firms and may be inclined to hire prestigious investment banks to signal their firm's quality and certify the quality of their IPO.

4. Univariate Tests

In this section, we conduct univariate tests to compare IPO underpricing by underwriter prestige and by firm characteristics.

4.1. Univariate Comparison of Underpricing by Firm Characteristics

Table 4 compares average and median underpricing by industry (tech versus non-tech), underwriter prestige, and family ownership. The value of technology firms comes mainly from growth opportunities, which result in more ex-ante uncertainty and higher risk. These uncertainties should lead to a higher level of underpricing. Consistent with Beatty and Welch (1996) and Cliff and Denis (2004) who argue that prestigious underwriters take higher quality firms public, the results in Panel A for the entire IPO sample show that the presence of prestigious underwriters is positively related to IPO underpricing.

Tech firms have fifteen-day average underpricing of 48.89 percent compared to 29.83 percent for non-tech firms. The differences are significant at the 0.1 percent level. We find no significant differences in mean IPO underpricing when using a reputation dummy to distinguish between domestically and internationally active underwriters. Our proceeds-based ranking, on the other hand, suggests that IPOs underwritten by high-ranking underwriters are more underpriced than IPOs underwritten by low-ranking

Table 4
Univariate Tests of Mean and Median IPO Underpricing by Firm Characteristics

This table reports equally-weighted mean and median fifteen-day underpricing by firm-specific dummy variables. We distinguish between tech and non-tech firms following the classification by Loughran and Ritter (2004) and Cliff and Denis (2004) who categorize firms with the following SIC codes as tech firms: 2833, 2834, 2835, 2836, 3571, 3572, 3575, 3577, 3578, 3661, 3663, 3669, 3674, 3812, 3823, 3825, 3826, 3827, 3829, 3841, 3845, 4812, 4813, 4899, 7370, 7371, 7372, 7373, 7374, 7375, 7377, 7378, and 7379. In addition, we distinguish between prestigious and non-prestigious underwriters. We consider two proxies for underwriter prestige: First, we define a prestigious underwriter as an underwriter who underwrites both domestic and international IPOs. Underwriters who only underwrite domestic IPOs are classified as non-prestigious underwriters. Second, we distinguish between high-rank underwriters (those with a scaled underwriter ranking of 7 or above) and low-rank underwriters (those with an underwriter ranking below 7). The high family control group includes all IPOs from the countries that have the highest level of family control. Specifically, we separate IPOs into three terciles based on their respective country's level of family control. Fifteen-day underpricing is defined as the percentage return from the offer price to the closing price on the fifteenth calendar day after the IPO. For each category, we report the number of observations as well as the equally-weighted mean and median underpricing. In addition, we report p-values for a t-test for the equality of means and a Wilcoxon test for the equality of medians across groups.

Panel A: Entire Sample

Category 1	N mean median	Category 2	N mean median	Equality tests: means (p-value) medians (p-value)
Tech firms	2,223	Non-tech firms	3,433	
	48.89%		29.83%	<0.001
	17.65%		9.63%	<0.001
International underwriter	2,476	Domestic-only underwriter	3,180	
	39.10%		35.94%	0.283
	12.50%		11.62%	0.145
High-rank underwriter	1,619	Low-rank underwriter	4,037	
	40.58%		36.02%	0.158
	13.13%		11.46%	0.026
High family control	1,049	Low family control	4,607	
	58.62%		32.74%	<0.001
	14.18%		11.46%	0.009

Panel B: Non-U.S./Non-penny Stock Sample

Category 1	N mean median	Category 2	N mean median	Equality tests: means (p-value) medians (p-value)
Tech firms	761	Non-tech firms	1,557	
	42.67%		26.96%	0.001
	11.92%		6.91%	0.001
International underwriter	1,236	Domestic-only underwriter	1,082	
	25.32%		38.06%	0.005
	6.51%		9.45%	0.012
High-rank underwriter	840	Low-rank underwriter	1,478	
	25.62%		35.81%	0.030
	7.07%		8.71%	0.098
High family control	838	Low family control	1,480	
	39.68%		27.83%	0.012
	8.42%		8.00%	0.100

Table 4 (*continued*)

PANEL C: U.S./NON-PENNY STOCK SAMPLE

Category 1	N mean median	Category 2	N mean median	Equality tests: means (p-value) medians (p-value)
Tech firms	1,219	Non-tech firms	1,119	
	49.76%		22.68%	<0.001
	22.51%		12.50%	<0.001
International	1,167	Domestic-only	1,171	
underwriter	50.72%	underwriter	22.93%	<0.001
	20.91%		12.50%	<0.001
High-rank	929	Low-rank	1,409	
underwriter	51.98%	underwriter	26.80%	<0.001
	20.32%		14.38%	<0.001

underwriters.[18] In addition, IPOs in countries where firms have high family control have significantly higher underpricing than IPOs in countries where firms have low family control.

In Panel B, we provide results for a subsample of non-U.S. and non-penny stocks. Our results are consistent with those in Panel A in the sense that technology offerings in countries where firms have high family ownership are significantly more underpriced. On the other hand, IPOs that are underwritten by more prestigious underwriters have less underpricing. This difference in the impact of underwriter prestige on underpricing between our full sample and non-U.S. non-penny IPOs implies that U.S. IPOs are affected differently by underwriter prestige than IPOs in other countries. To investigate further, we perform the same univariate analysis for U.S. and non-penny offerings. The results in Panel C confirm our presumption that U.S. non-penny IPOs that are associated with high-prestige underwriters have more underpricing.[19]

5. MULTIVARIATE TESTS

In this section, we present our model specification and examine the link between underpricing and underwriter ranking/reputation across twenty-five countries. To ensure the robustness of our results we use a large number of regressors in various model specifications. In addition, we perform a battery of sensitivity analyses to ensure that our results are robust.

5.1. Model Development

To test our hypothesis in a cross-country framework, we employ several multivariate regression models. The relationship between IPO underpricing and underwriter ranking/reputation is expressed by the following equation:

$$Underpricing_{i,j} = \alpha + \sum_{m=1}^{M} \beta_m C_{m,i,j} + \sum_{n=1}^{N} \gamma_n F_{n,i,j} + \varepsilon_{i,j} \quad (1)$$

where $Underpricing_{i,j}$ is the percentage underpricing return of firm i which went public in country j. $C_{m,i,j}$ are country-level measures such as our family control measure as well as law variables such as public enforcement, burden of proof, and the disclosure requirement index. $F_{n,i,j}$ are firm-level variables including underwriter ranking and underwriter reputation as well as other firm-specific control variables such as the IPO volume during the current and the prior eleven months, a tech dummy, the natural log of offering proceeds, and year 1995 to 2001 dummy variables that capture the IPO's year of issue. The error term $\varepsilon_{i,j}$ can be characterized by an independently distributed random variable with mean zero and variance $\sigma^2_{i,j}$. We calculate standard errors that are adjusted for serial autocorrelation and heteroskedasticity following the procedure described by Newey and West (1988). We describe these variables in more detail and identify the measures we use to present them in Appendix 1.

To investigate the correlation among our variables, we present correlation coefficients for firm level data by assigning the appropriate country variables to each IPO in **Table 5**. The pairwise correlation coefficients for the entire IPO sample are shown above the diagonal, while for non-U.S. non-penny IPOs they are shown below the diagonal. The correlation coefficients between public enforcement and the disclosure index, and between the disclosure index and burden of proof on a firm level are 0.686 (0.170) and 0.847 (0.634) for the entire IPO sample (for the non-U.S. non-penny sample), respectively. Although not presented here, we also performed robustness tests with models that exclude either of these variables but observed no apparent multicollinearity problem despite the high correlation of these variables. Thus, we include all three variables in our models. For the entire IPO sample, underwriter ranking is significantly and positively correlated with underpricing whereas the underwriter reputation dummy is insignificantly correlated with underpricing. In contrast, in the non-U.S. non-penny sample, the underwriter reputation dummy and underwriter ranking are significantly negatively correlated with underpricing. Our findings confirm our univariate test results in Table 4 and imply that for U.S. IPOs the relationship between underwriter prestige and underpricing is different from that for IPOs in other parts of the world. To explore these differences in more detail, we will perform multivariate regressions for four subsamples of our dataset, i.e., for all IPOs, for non-U.S. non-penny IPOs, for non-U.S. penny IPOs, and for U.S. non-penny IPOs.

5.2. Regression Results

In order to maximize the advantage of having a high number of observations, we include our full IPO sample in each regression and use four dummy variables (U.S., non-U.S., penny, and non-penny) to distinguish between different types of IPOs. Our OLS regression results for the resulting four groups (all IPOs, non-U.S. non-penny stocks, non-U.S. penny

Table 5
Correlation Matrix

This table reports correlation coefficients between all variables that are used in our multivariate regression analysis. These correlation coefficients are for firm level data after we assign the appropriate country-level variable to each IPO. The definitions for all variables are given in Appendix 1. The correlation coefficients for the entire IPO sample are reported above the diagonal and those for the non-U.S. non-penny sample are reported below the diagonal. ***, **, and * indicate statistical significance at the 1 percent, 5 percent, and 10 percent level, respectively.

Variables	Fifteen-day under-pricing	Log of proceeds	Under-writer reputation	Under-writer ranking	Tech dummy	IPO volume	Dis-closure index	Public enforce-ment	Burden of proof	Family control (medium firms)
Fifteen-day underpricing		-0.101***	0.014	0.027**	0.085***	-0.022*	-0.006	0.008	0.039***	0.033**
Log of proceeds	-0.031		0.361***	0.271***	0.140***	0.217***	0.066***	-0.013	0.083***	-0.072***
Underwriter reputation	-0.058***	0.232***		0.659***	0.049***	0.035***	0.102***	-0.150***	0.131***	-0.082***
Underwriter ranking	-0.035*	0.200***	0.670***		0.025*	0.072***	0.155***	-0.081***	0.191***	-0.084***
Tech dummy	0.068***	0.044**	-0.070***	-0.055***		0.168***	0.109***	0.139***	0.089***	-0.045***
IPO volume	-0.089***	-0.123***	0.189***	0.238***	0.071***		0.665***	0.495***	0.690***	-0.164***
Disclosure index	-0.084***	-0.140***	0.218***	0.250***	-0.063***	0.352***		0.686***	0.847***	0.068***
Public enforcement	-0.034	-0.049**	-0.332***	-0.263***	0.136***	-0.153***	0.170***		0.517***	0.262***
Burden of proof	-0.018	-0.002	0.290***	0.319***	-0.121***	0.228***	0.634***	-0.210***		0.020
Family control (medium firms)	0.110***	0.055	-0.198***	-0.196***	-0.011***	-0.518***	-0.316***	0.234***	-0.041**	

stocks, and U.S. non-penny stocks) and fifteen-day underpricing as a dependant variable[20] are shown in Models (1) to (4) of **Table 6**.

We examine our hypothesis by employing an interaction term of underwriter ranking and family ownership as an independent variable. We then multiply this term by some of our four dummy variables (penny, non-penny, U.S., and non-U.S.) in order to separately examine our hypothesis for the four groups mentioned above. For the entire IPO sample, we use underwriter ranking multiplied by family ownership (X) as an independent variable. For non-U.S. non-penny IPOs, we multiply X by the non-U.S. and non-penny dummies. For non-U.S. penny IPOs, we multiply X by the non-U.S. and penny dummies and, for U.S. non-penny IPOs, we multiply X by the U.S. and non-penny dummies. Furthermore, to examine the non-linear relationship between family ownership and underpricing and whether the relationship between underwriter prestige and underpricing changes nonlinearly with the level of family ownership, we include family ownership squared and underwriter ranking multiplied by family ownership squared as independent variables.

Carter and Manaster (1990) and Carter et al. (1998) posit that underpricing is negatively related to underwriter prestige because prestigious underwriters are more likely to underwrite high quality issues with a lower level of uncertainty. On the other hand, Beatty and Welch (1996) observe that the relationship between underwriter prestige and underpricing switches from negative to positive during the 1990s. Moreover, Cliff and Denis (2004) find a positive association between underpricing and analyst coverage by prestigious underwriters. Our findings are different among our four sample groups. For the entire IPO sample in Model (1), underwriter ranking is insignificantly related to underpricing (underwriter ranking coefficient = 0.003 with a t-statistic of 0.201), and underwriter ranking does not have any effect on underpricing for IPOs in countries where firms have different levels of family ownership (the coefficient of underwriter ranking*family ownership equals 0.102 with a t-statistic of 0.958). In Model (2), an interesting result emerges in that IPOs in countries where firms have high family ownership benefit from lower underpricing by being associated with high-ranked underwriters. The coefficient of underwriter ranking*family ownership*A where A is non-penny*non-U.S. is -0.253 with a t-statistic of -4.809. The relationship between underwriter ranking and underpricing is insignificantly nonlinear with underpricing. The results show that high family ownership is nonlinearly related to underpricing with a family ownership coefficient of 1.468 and a family ownership squared coefficient of -1.542. Both coefficients are significant at the 5 percent level.

Next, we examine whether our hypothesis holds for non-U.S. penny stock IPOs. The results in Model (3) show that the coefficients of the interaction term between underwriter ranking and family ownership and that between underwriter ranking and family ownership squared are insignificant. Finally, we examine the last portion of our IPO sample, namely U.S.

Table 6
Multivariate Regressions

This table reports results for ordinary least squares regressions of our full IPO sample, including IPOs from 1995 to 2002 across twenty-five countries as well as three subsamples based on U.S. versus non-U.S. and penny stock vs. non-penny-stock IPOs. The dependent variable is fifteen-day underpricing. Definitions for all variables are given in Appendix 1. The third row provides the name of the dummy variable (A) that is used as part of the interaction terms. All t-statistics have been adjusted for autocorrelation and heteroskedasticity using Newey-West's (1988) procedure. The sample size and adjusted R-squared for each regression model are reported in the last two rows. ***, **, and * indicate statistical significance at the 1 percent, 5 percent, and 10 percent level, respectively.

IPO sample	Entire IPOs sample		Non-U.S. non-penny		Non-U.S. penny		U.S. non-penny	
Model	(1)		(2)		(3)		(4)	
Dummy **(A)** in interaction term	1		non-penny*non-U.S.		non-U.S.*penny			
Independent variables	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
Constant	1.676***	4.689	1.720***	4.844	1.595***	4.728	1.921***	5.198
Log of proceeds	-0.097***	-5.117	-0.095***	-5.101	-0.091***	-5.152	-0.101***	-5.342
Underwriter ranking	0.003	0.201	0.022***	4.531	0.011***	3.144		
Underwriter ranking*U.S.							0.023***	5.104
Family ownership	0.800	1.013	1.468**	2.198	0.762	1.111		
Family ownership squared	-0.414	-0.432	-1.542**	-2.004	-0.381	-0.452		
Underwriter ranking * family ownership*(A)	0.102	0.958	-0.253***	-4.809	0.222	1.295		
Underwriter ranking * family ownership squared*(A)	-0.232	-1.586	0.296	1.729	-0.426	-1.677		
Tech dummy	0.181***	6.167	0.181***	6.121	0.184***	6.367	0.174***	5.842
IPO volume	-0.001***	-2.896	-0.001***	-3.042	-0.001**	-2.677	-0.001***	-3.588
1995 dummy	0.124	1.491	0.130	1.549	0.116	1.412	0.135	1.604
1996 dummy	0.227*	1.893	0.245**	2.005	0.213*	1.814	0.257**	2.066
1997 dummy	0.128	1.170	0.131	1.189	0.116	1.058	0.145	1.267
1998 dummy	0.090	1.018	0.095	1.077	0.085	0.972	0.095	1.075
1999 dummy	0.483***	4.787	0.481***	4.759	0.479***	4.786	0.479***	4.810
2000 dummy	0.200**	2.049	0.202**	2.066	0.193*	1.990	0.203**	2.064
2001 dummy	0.022	0.270	0.019	0.231	0.017	0.213	0.022	0.257
Disclosure index	-0.704**	-2.067	-0.810**	-2.273	-0.697**	-2.064	-0.767**	-2.067
Public enforcement	0.104	1.237	0.017	0.193	0.096	1.172	0.143	1.734
Burden of proof	0.488***	3.116	0.524***	3.260	0.478***	3.077	0.546***	3.176
Bookbuilding dummy	0.321***	4.444	0.306***	4.269	0.319***	4.463	0.330***	4.010
Adjusted R-squared	16.56%		16.78%		16.58%		16.41%	
Number of observations	5,558		5,558		5,558		5,558	

non-penny IPOs in Model (4). We do not control for family ownership in this regression because we focus only on the U.S. and family ownership is a country-level measure. The results for the U.S. sample are consistent with Beatty and Welch (1996) and Cliff and Denis (2004) in that IPOs that are associated with high-ranked underwriters are more underpriced. Controlling for country-level legal variables and firm-level IPO characteristics, the results show that IPOs in the U.S. have a positive relationship between underwriter ranking and underpricing. Cliff and Denis (2004) explain that high-ranked underwriters tend to underprice IPOs in order to attract more analyst coverage, i.e., underpricing is a compensation for post-IPO analyst coverage. It appears that any adverse findings regarding more prestigious underwriters and underpricing—viz., the positive relationship between underwriter prestige and underpricing—may be artifacts of the U.S. IPO market, which exhibits high underpricing in most years and accounts for a large proportion of international IPOs (over 35 percent of all observations). U.S. underwriters generally rank high in our prestige rankings, which may contribute to the fact that underwriter prestige is positively related to underpricing in our sample.

In contrast, non-U.S. non-penny IPOs in countries where firms have high family ownership are less underpriced if they are associated with high-ranked underwriters, thus supporting the positive view of prestigious underwriters proposed by Carter and Manaster (1990) and Carter et al. (1998). In other words, our findings suggest that highly ranked investment bankers help IPO issuers in countries where firms have high family control to leave less money on the table than do less prestigious underwriters.

With respect to our control variables, we find that, consistent with the extant IPO literature that suggests that larger offerings have lower information asymmetry, they are associated with lower underpricing. Also consistent with the literature, we find that high-tech IPOs are more underpriced and IPOs that are issued during periods of high IPO volume are less underpriced. In line with Lin, Pukthuanthong-Le, and Walker (2007), IPOs in countries with a high level of disclosure but a low burden of proof are less underpriced. Finally, consistent with Sherman (2005), bookbuilding IPOs have higher underpricing than IPOs that adopt other selling methods.

5.3 Robustness Checks

To ensure that our results are not model or sample-specific, we perform a plethora of robustness checks in which we employ alternative model specifications, methodological approaches, sample periods, and different definitions for our dependent and independent variables.

5.3.1 Alternative Model Specifications and Sample Periods

In our first robustness test, we apply White (1980) heteroskedasticity-adjusted standard errors, which are lower (by construction) than Newey-West standard errors. The results, presented in Models (1) to (3) of **Table 7**, retain the essence of our main results, i.e., that non-U.S. non-penny IPOs in

countries where firms have high family ownership are less underpriced, and that, on the other hand, U.S. non-penny IPOs that are underwritten by highly ranked investment bankers are more underpriced. The significance levels in these regressions are only marginally different form those that used Newey-West autocorrelation and heteroskedasticity-adjusted standard errors.

Second, to ensure that our results are robust across different time periods, we perform a robustness test in which we split our IPO sample into two halves, i.e., January 1995 to December 1998 and January 1999 to December 2002. We then test whether we have similar findings in each subperiod. Our findings are little affected as our subperiod results are qualitatively and quantitatively consistent with the results for the full sample. The interaction term of underwriter ranking and family ownership for non-U.S. non-penny firms that went public during the 1999–2002 period, shown in Models (7) to (9), is more significant than that for non-U.S. non-penny firms going public during the 1995–1998 period, shown in Models (4) to (6).

Finally, we employ country-level regressions where each country is weighted equally, thus eliminating potential undue influences by countries with a large number of observations. Recognizing that IPO underpricing is affected by certain IPO characteristics such as proceeds and underwriter ranking and by industry and cyclical effects, we take the average of firm-level control variables and perform a country-level regression. Our sample comprises twenty-five country-level observations. The results in Models (11) to (12) are consistent with the full-sample results in Table 3 although the significance level for our country-level regression is much lower.

5.3.2 Alternative Definitions for Our Dependent and Independent Variables

In a second set of robustness tests, we employ alternative definitions for our dependent and independent variables. Specifically, we first employ a proxy of family ownership that is based on ***large firms***, i.e., the top twenty firms in each country as ranked by market capitalization of common equity at the end of 1995. Recall that so far, our test employed La Porta et al.'s (1999) measure of country-level family ownership that was based on ***medium-sized firms***, defined as those with market valuations above, but near, $500 million. Our results in Models (1) to (3) confirm our hypothesis that IPOs in countries where firms have a high level of family control benefit by having lower underpricing if they are associated with highly ranked investment bankers.

Thus far, we have been using fifteen-day underpricing measured from the offer price to the closing price on the fifteenth calendar day (or the closest trading day) after issuance. Yet, for some exchanges that impose limits on daily price fluctuations, fifteen days may not be long enough to measure IPO underpricing; on the other hand, for exchanges without price limits, fifteen days may be too long to measure IPO underpricing and the resulting underpricing measure may be affected by some unknown factors. One

Table 7
Multivariate Regressions Using Alternative Model Specifications and Sample Periods

The table reports results for ordinary least squares regressions based on three subsets (non-U.S. non-penny stocks, non-U.S. penny stocks, and U.S. non-penny stocks) of our full IPO sample. We further distinguish between different types of standard error calculations, i.e., White (1980), used in models (1) to (3), and Newey-West (1988), used in models (4) to (11). Models (4) to (9) distinguish between different time periods (1995–1998 vs. 1999–2000) and models (10) and (11) perform country-level regressions, i.e., regressions in which all variables are aggregated on a country level. The dependent variable is 15-day underpricing. Definitions for all variables are given in Appendix 1. ***, **, and * indicate statistical significance at the 1 percent, 5 percent, and 10 percent level, respectively. All t-statistics (except in the first three models) have been adjusted for autocorrelation and heteroskedasticity using Newey-West's (1988) procedure and are shown in parentheses. The sample size and adjusted R-squared for each regression model are reported in the last two rows.

Model specification	White heteroskedasticity-adjusted standard errors			POs offered between 1995 and 1998			IPOs offered between 1999 and 2002			Country level regressions	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Type of IPO sample	Non-U.S. non-penny	Non-U.S. penny	U.S. non-penny	Non-U.S. non-penny	Non-U.S. penny	U.S. non-penny	Non-U.S. non-penny	Non-U.S. penny	U.S. non-penny	Non-U.S. non-penny	Non-U.S. penny
Dummy (A) in interaction term	non-penny *non-U.S.	non-U.S.* penny		non-penny *non-U.S.	non-U.S.* penny		non-penny *non-U.S.	non-U.S.* penny		non-penny *non-U.S.	non-U.S.* penny
Independent variables	Coefficient (t-stat)	Coefficient (t-stat)	Coefficient (t-stat)	Coefficient (t-stat)	Coefficient (t-stat)	Coefficient (t-stat)	Coefficient (t-stat)	Coefficient (t-stat)	Coefficient (t-stat)	Coefficient (t-stat)	Coefficient (t-stat)
Constant	1.720***	1.595***	1.921***	1.618***	1.498***	1.920***	1.813***	1.666***	1.985***	4.489***	4.056***
	(6.388)	(6.157)	(7.051)	(5.091)	(5.558)	(5.757)	(4.787)	(4.428)	(5.268)	(2.931)	(3.850)
Log of proceeds	-0.095***	-0.091***	-0.101***	-0.095***	-0.087***	-0.102***	-0.091***	-0.088***	-0.095***	-0.070**	-0.039
	(-6.149)	(-5.948)	(-6.471)	(-4.832)	(-4.550)	(-4.837)	(-4.087)	(-3.925)	(-4.303)	(-2.125)	(-2.563)
Underwriter ranking	0.022***	0.011***	0.017***	0.010***		0.022***	0.007		-0.147	0.173	
	(5.196)	(3.360)	(3.269)	(3.680)		(3.305)	(1.371)		(-1.047)	(1.973)	
Underwriter ranking * U.S.			0.023***			0.016***			0.026***		
			(5.900)			(4.048)			(3.377)		
Family ownership	1.468***	0.762		2.624***	2.121**		1.184	0.222		-4.473**	-3.053*
	(2.851)	(1.394)		(3.043)	(2.269)		(1.639)	(0.317)		(-2.141)	(-1.990)
Family ownership squared	-1.542**	-0.381		-3.156***	-2.352**		-1.027	0.553		4.247**	3.524
	(-2.551)	(-0.576)		(-3.088)	(-2.221)		(-1.240)	(0.650)		(2.091)	(2.238)
Underwriter ranking * family ownership * (A)	-0.253***	0.222		-0.172**	0.306		-0.260***	0.244		-1.316*	1.658
	(-5.464)	(1.324)		(-2.470)	0(.880)		(-2.970)	(1.389)		(-1.852)	(1.562)

Table 7 (*continued*)

Model specification	White heteroskedasticity-adjusted standard errors			IPOs offered between 1995 and 1998			IPOs offered between 1999 and 2002			Country level regressions	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Type of IPO sample	Non-U.S. non-penny	Non-U.S. penny	U.S. non-penny	Non-U.S. non-penny	Non-U.S. penny	U.S. non-penny	Non-U.S. non-penny	Non-U.S. penny	U.S. non-penny	Non-U.S. non-penny	Non-U.S. penny
Dummy (A) in interaction term	non-penny *non-U.S.	non-U.S.* penny		non-penny *non-U.S.	non-U.S.* penny		non-penny *non-U.S.	non-U.S.* penny		non-penny *non-U.S.	non-U.S.* penny
Independent variables	Coefficient (t-stat)	Coefficient (t-stat)	Coefficient (t-stat)	Coefficient (t-stat)	Coefficient (t-stat)	Coefficient (t-stat)	Coefficient (t-stat)	Coefficient (t-stat)	Coefficient (t-stat)	Coefficient (t-stat)	Coefficient (t-stat)
Underwriter ranking * family ownership squared * (A)	0.296	-0.426		0.234	-0.502		0.271	-0.475*		0.990	-4.040*
	(1.098)	(-1.722)		(1.528)	(-1.006)		(1.359)	(-1.787)		(1.447)	(-1.997)
Tech dummy	0.181***	0.184***	0.174***	0.114***	0.116***	0.105***	0.223***	0.230***	0.221***	0.317	1.111
	(6.545)	(6.734)	(6.249)	(4.400)	(4.512)	(3.988)	(4.454)	(4.646)	(4.412)	(0.347)	(0.933)
IPO volume	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	0.000	0.001*	0.000	0.001	0.000
	(-3.990)	(-3.380)	(-4.433)	(-4.129)	(-3.551)	(-4.309)	(1.451)	(1.865)	(0.726)	(0.874)	(-0.254)
Disclosure index	-0.810***	-0.697***	-0.767***	-0.529**	-0.510*	-0.506**	-0.881***	-0.744***	-0.837***	-0.231	-0.743
	(-4.391)	(-3.921)	(-4.176)	(-2.208)	(-1.994)	(-2.276)	(-3.391)	(-3.062)	(-3.349)	(-0.309)	(-1.062)
Public enforcement	0.017	0.096	0.143**	0.058	0.104	0.197**	-0.222*	-0.105	-0.103	0.563	0.602
	(0.255)	(1.619)	(2.560)	(0.450)	(0.940)	(2.575)	(-1.924)	(-0.997)	(-0.845)	(0.886)	(1.181)
Burden of proof	0.524***	0.478***	0.546***	0.286**	0.233*	2.575***	0.563***	0.504***	0.594***	0.103	0.487
	(5.771)	(5.349)	(5.766)	(2.249)	(1.976)	(2.822)	(4.331)	(3.952)	(4.431)	(0.256)	(1.549)
Bookbuilding dummy	0.306***	0.319***	0.330***	0.381***	0.377***	0.456***	0.085	0.138	0.084	0.322	-0.435
	(5.882)	(6.056)	(5.277)	(4.806)	(4.633)	(4.445)	(1.012)	(1.682)	(0.864)	(0.873)	(-0.819)
Year dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Adjusted R-squared	16.78%	16.58%	16.41%	17.64%	17.64%	16.94%	16.58%	16.39%	16.10%	72.18%	74.76%
Number of observations	5,558	5,558	5,558	2,821	2,821	2,821	2,737	2,737	2,737	25	25

solution would be to adjust underpricing based on the IPO regulations in each market. This would lead to somewhat inconsistent variable definitions, however, and would be difficult to implement because the IPO regulations in each market are not well documented enough to identify whether a market has price limits (or uses "circuit-breakers") or not.[21, 22] Nevertheless, to address this concern, we perform robustness tests using thirtieth-day and seventh-day underpricing in Models (4) and (7) and Models (8) to (10) of **Table 8**, respectively. Our results are consistent with those for our fifteen-day underpricing measure. Although underpricing measured by different post-IPO closing-day prices may capture different unknown factors, they should not be significantly different. In the extant U.S. IPO literature, the aftermarket volatility of IPOs is low (Jog and Wang, 2002) for the following reasons. First, insiders and venture capitalists are subject to lockup agreements, which last on average six months. Moreover, they are subject to other investing agreements that limit their stock sales. As a result, both trading volume and price volatility are comparatively low in the initial post-IPO market. Moreover, price variability during the first twenty days is lower due to the practice of underwriter price stabilization (Aggarwal, 2000; Hanley, Kumar, and Sequin, 2003). Taken together, although different markets have different IPO regulations, the trading prices during the initial post-IPO period tend to have low volatility. This, in turn, reduces the magnitude of any differences between our underpricing measures.

Finally, we replace our underwriter ranking measure with an underwriter reputation dummy (see our discussion in Section 3.2.2). Our results, shown in Model (10) to (12), are similar to those in Table 6. Specifically, they suggest that non-U.S. non-penny IPOs in countries where firms have high family control benefit from lower underpricing by being associated with underwriters who do both domestic and international deals.

To summarize, we find strong evidence that non-U.S. non-penny offerings benefit from lower underpricing if they are associated with more prestigious underwriters. We find opposite results for U.S. non-penny IPOs in the sense that IPOs that are associated with more prestigious underwriters are more underpriced. Numerous sensitivity analyses indicate that our findings are robust to alternative sample compositions, model specifications, and estimation methods.

Table 8
Multivariate Regressions Using Alternative Dependent and Independent Variables

The table reports results for ordinary least squares regressions based on three subsets (non-U.S. non-penny stocks, non-U.S. penny stocks, and U.S. non-penny stocks) of our full IPO sample. We further vary the definitions of our dependent and some of our independent variables. Specifically, models (1) and (2) use a family control measure based on the largest (rather than medium-sized) firms in each country. Models (3) to (5) and (6) to (8) replace fifteen-day underpricing with thirty- and seven-day underpricing, respectively. Models (9) to (11) employ an underwriter prestige dummy instead of underwriter ranking. The dependent variable is fifteen-day underpricing. Definitions for all variables are given in Appendix 1. ***, **, and * indicate statistical significance at the 1 percent, 5 percent, and 10 percent level, respectively. All t-statistics have been adjusted for autocorrelation and heteroskedasticity using Newey-West's (1988) procedure and are shown in parentheses. The sample size and adjusted R-squared for each regression model are reported in the last two rows.

Dependent and independent variable	Family ownership measured based on large public firms		Thirty-day return as a dependent variable			Seven-day return as a dependent variable			Underwriter prestige dummy substituted for underwriter ranking		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Type of IPO sample	Non-U.S. non-penny	Non-U.S. penny	Non-U.S. non-penny	Non-U.S. penny	U.S. non-penny	Non-U.S. non-penny	Non-U.S. penny	U.S. non-penny	Non-U.S. non-penny	Non-U.S. penny	U.S. non-penny
Dummy (A) in interaction term	non-penny *non-U.S.	non-U.S.* penny	non-penny *non-U.S.	non-U.S.* penny		non-penny *non-U.S.	non-U.S.* penny		non-penny *non-U.S.	non-U.S.* penny	
Constant	1.032**	1.155***	1.752***	1.630***	2.002***	1.712***	1.600***	1.936***	1.823***	1.716***	2.037***
	(2.477)	(2.835)	(4.614)	(4.491)	(5.137)	(4.828)	(4.725)	(5.240)	(5.045)	(4.791)	(5.375)
Log of proceeds	-0.093***	-0.095***	-0.103***	-0.101***	-0.112***	-0.097***	-0.094***	-0.104***	-0.099***	-0.099***	-0.107***
	(-5.041)	(-5.228)	(-5.064)	(-5.133)	(-5.330)	(-5.186)	(-5.244)	(-5.436)	(-5.159)	(-5.069)	(-5.482)
Underwriter ranking	0.020***	0.013***	0.024***	0.012***		0.023***	0.012***		0.192***	0.096***	
	(4.609)	(3.904)	(4.518)	(3.110)		(4.642)	(3.299)		(5.548)	(3.059)	
Underwriter ranking * U.S.					0.028***			0.025***			0.232***
					(5.512)			(5.374)			(5.677)
Family ownership	2.512**	1.536	1.663**	0.914		1.552**	0.860		1.606**	0.925	
	(2.608)	(1.528)	(2.055)	(1.110)		(2.221)	(1.193)		(2.408)	(1.364)	
Family ownership squared	-1.586*	-0.677	-1.813*	-0.558		-1.652**	-0.496		-1.727**	-0.684	
	(-1.946)	(-0.761)	(-1.965)	(-0.566)		(-2.054)	(-0.564)		(-2.270)	(-0.837)	
Underwriter ranking * family ownership * (A)	-0.098**	0.138	-0.300***	0.189		-0.265***	0.181		-2.285***	0.744	
	(-2.456)	(1.347)	(-5.104)	(0.989)		(-4.859)	(1.029)		(-5.114)	(0.732)	

Table 8 (*continued*)

Dependent and independent variable	Family ownership measured based on large public firms		Thirty-day return as a dependent variable			Seven-day return as a dependent variable			Underwriter prestige dummy substituted for underwriter ranking		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Type of IPO sample	Non-U.S. non-penny	Non-U.S. penny	Non-U.S. non-penny	Non-U.S. penny	U.S. non-penny	Non-U.S. non-penny	Non-U.S. penny	U.S. non-penny	Non-U.S. non-penny	Non-U.S. penny	U.S. non-penny
Dummy (A) in interaction term	non-penny *non-U.S.	non-U.S.* penny	non-penny *non-U.S.	non-U.S.* penny		non-penny *non-U.S.	non-U.S.* penny		non-penny *non-U.S.	non-U.S.* penny	
Underwriter ranking * family ownership squared * (A)	0.053	-0.227*	0.371	-0.392		0.315	-0.373		2.538	-1.557	
	(0.822)	(-1.804)	(1.159)	(-1.402)		(1.448)	(-1.440)		(1.586)	(-1.018)	
Tech dummy	0.191***	0.193***	0.215***	0.218***	0.208***	0.187***	0.189***	0.180***	0.180***	0.181***	0.171***
	(6.470)	(6.667)	(5.710)	(5.879)	(5.412)	(6.074)	(6.272)	(5.791)	(6.106)	(6.123)	(5.744)
IPO volume	0.000	0.000	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(-1.505)	(-1.554)	(-3.268)	(-2.902)	(-3.785)	(-3.167)	(-2.831)	(-3.670)	(-2.990)	(-2.749)	(-3.643)
Disclosure index	-0.440	-0.384	-0.778**	-0.653*	-0.738*	-0.813**	-0.696**	-0.775**	-0.857**	-0.763**	-0.778**
	(-1.208)	(-1.089)	(-2.144)	(-1.881)	(-1.954)	(-2.299)	(-2.069)	(-2.093)	(-2.417)	(-2.219)	(-2.099)
Public enforcement	-0.549**	-0.359	0.037	0.137	0.177*	0.030	0.118	0.161*	0.005	0.128	0.135
	(-2.338)	(-1.526)	(0.384)	(1.496)	(1.940)	(0.336)	(1.400)	(1.904)	(0.050)	(1.435)	(1.649)
Burden of proof	0.755***	0.675***	0.549***	0.499***	0.567***	0.533***	0.486***	0.555***	0.524***	0.509***	0.531***
	(4.501)	(4.267)	(3.245)	(3.030)	(3.162)	(3.305)	(3.108)	(3.212)	(3.265)	(3.206)	(3.107)
Bookbuilding dummy	0.249***	0.256***	0.342***	0.358***	0.364***	0.317***	0.332***	0.342***	0.289***	0.330***	0.328***
	(3.674)	(3.813)	(4.527)	(4.764)	(4.142)	(4.379)	(4.586)	(4.068)	(4.027)	(4.546)	(4.006)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	17.23%	17.14%	16.62%	16.40%	16.35%	16.91%	16.69%	16.58%	16.94%	16.51%	16.54%
Number of observations	5,558	5,558	5,632	5,362	5,362	5,691	5,691	5,691	5,558	5,558	5,558

6. Conclusions and Discussion

We study the relationship between underwriter prestige, family control, and IPO underpricing in an international setting. Data are collected for 5,789 firms that went public across twenty-five countries between 1995 and 2002.

IPOs in non-U.S. countries where firms have high family control presumably benefit from choosing prestigious investment banking firms, that is, investment banks that tend to underwrite a large number of high-profile offerings and that are active both domestically and internationally. These investment banks tend to be well experienced in IPO valuation and typically have a worldwide network of investors that can help them protect their issuing clients against the risk of potential undersubscription during the pre-IPO period. Therefore, they help issuers leave less money on the table. Our findings suggest that outside the U.S., IPO firms indeed benefit from lower underpricing if they are underwritten by prestigious investment banks. Furthermore, we find that IPOs in countries with a high level of family control benefit particularly from associations with prestigious investment banks. As such, our results support earlier findings by Carter and Manaster (1990) and Carter et al. (1998) who document a negative relation between IPO underpricing and underwriter prestige. In contrast, for U.S. IPOs we document the same reversal effect that has previously been documented by Beatty and Welch (1996) and Cliff and Denis (2004). In other words, we find that U.S. IPO firms that choose prestigious investment banks tend to be more underpriced. The extant IPO literature provides numerous explanations for this puzzle. One is that these big banks prefer to allocate highly underpriced IPO shares to their favorite clients such as mutual funds or wealthy individuals.

The results of this study have implications for family-controlled firms, a group of firms that is not often addressed in IPO research. The main reason for the lack of prior studies in this area is likely related to the fact that the determination of family control in IPO firms is too difficult, time consuming, and somewhat subjective. In a non-IPO context, McConaughy, Walker, Henderson, and Mishra (1998) and McConaughy, Matthews, and Fialko (2001) use family ownership measures to examine the effect of family control on a firm's performance, efficiency, and value. These studies are biased against finding results, however, because their measures cannot identify all family-controlled firms (Astrachan and McConaughy 2001.)

Research on family-controlled firms is important, as Shanker and Astrachan (1996) estimate that about 61 percent of closely held corporations are family controlled. The issue of family control in an IPO setting should be well investigated as liquidity is a critical factor for family-controlled firms and an IPO is one of the most important sources of liquidity. The results of our study help answer the question of what factors contribute to the success of IPOs that are issued by family-controlled firms. Issuing firms can implement the results of this study well in advance before going public. In sum, our findings suggest that big investment banks contribute to a

firm's IPO success by reducing underpricing particularly for non-U.S. non-penny IPOs in countries with a high level of family control.

One of the policy implications of our findings is that non-U.S. governments should encourage more international firms to enter their domestic underwriting business or have business policies in place that support local underwriters to do both domestic and international deals. Underwriters that are active both domestically and internationally tend to have more experience in IPO pricing; therefore, they can help issuers evaluate their IPOs correctly and reduce underpricing. Our study also provides timely information in light of the increasing number of cross-border listings, i.e., the trend that firms raise money not only in their domestic capital markets but also abroad. Specifically, our findings suggest that U.S. issuers that choose to be listed abroad or foreign firms that choose to raise funds in the U.S. should be aware of the impact that their choice of underwriter may have on the pricing of their IPO shares.

With respect to future research, our study could be improved by using a firm-level instead of a country-level family ownership measure. Due to the unavailability of a standard dataset in this area, the time consuming and difficult task of collecting the data manually, and the subjectivity of determining family control, this task is difficult to accomplish, however. Furthermore, the study could benefit from employing a country-level family ownership measure that is based on newly listed or IPO firms. The country-level family ownership measure provided by La Porta et al. (1999) is based on listed firms and may not fully resemble the true characteristics of a typical IPO firm in a given country. To our knowledge, no such measure has been created to date, and researchers who want to establish such a measure should be aware that its creation will be subject to the same difficulties and biases as a firm-level measure.

Appendix 1
Variable Descriptions

Variable	Sources	Description
OWNERSHIP CONCENTRATION VARIABLES		
No ultimate owners	La Porta et al. (1999)	Equals one if there is no controlling shareholder. To measure control, La Porta et al. (1999) combine a shareholder's *direct* (i.e., through shares registered in her name) and *indirect* (i.e., through shares held by entities that, in turn, she controls) voting rights in the firm. A shareholder has an *x percent indirect control* over firm A if: (1) it controls directly firm B which, in turn, directly controls x percent of the votes in firm A; or (2) it controls directly firm C which in turn controls firm B (or a sequence of firms leading to firm B, each of which has control over the next one, i.e., they form a control chain) which, in turn, directly controls x percent of the votes in firm A. A group of companies form a *chain of control* if each firm 1 through n-1 controls the consecutive firm. Therefore, a firm in our sample has a controlling shareholder if the sum of her direct and indirect voting rights exceeds an arbitrary cutoff value, which, alternatively, is 20 percent or 10 percent. When two or more shareholders meet our criteria for control, we assign control to the shareholder with the largest (direct plus indirect) voting stake.
Family	La Porta et al. (1999)	Equals one if a person is the controlling shareholder, and zero otherwise (see La Porta et al. 1999).
LITIGATION RISK VARIABLES		
Burden of proof	La Porta et al. (2005)	The arithmetic mean of the burden director index, burden distributor index, and burden accountant index (see La Porta et al. 2005), with higher ratings for less procedural difficulty in recovering losses. The burden director/distributor index proxies for "the procedural difficulty in recovering losses from the issuer's directors/the distributor in a civil liability case" caused by misleading statements in the prospectus. The burden accountant index measures "the procedural difficulty in recovering losses from the accountant in a civil liability case for losses due to misleading statements in the audited financial information accompanying the prospectus."
Public enforcement	La Porta et al. (2005)	The index of public enforcement equals the arithmetic mean of: (1) the supervisor characteristics index; (2) the rule-making power index; (3) the investigative powers index; (4) the orders index; and (5) the criminal index (see La Porta et al. 2005).
Disclosure requirements	La Porta et al. (2005)	The index of disclosure equals the arithmetic mean of: (1) prospect; (2) compensation; (3) shareholders; (4) inside ownership; (5) contracts index irregular; and (6) transactions (see La Porta et al. 2005).

Variable	Sources	Description
UNDERWRITER PRESTIGE MEASURES		
Underwriter ranking	SDC	Underwriter ranking based on the SDC's top 500 book runners during our sample period. We assign underwriter ranks on a scale from 0 to 9 based on the U.S.$ proceeds of the IPOs they underwrote during our sample period: = 9 if proceeds ≥ $20 billion; = 8 if proceeds ≥ $10 billion; = 7 if proceeds ≥ $5 billion; = 6 if proceeds ≥ $2 billion; = 5 if proceeds ≥ $1 billion; = 4 if proceeds ≥ $0.5 billion; = 3 if proceeds ≥ $0.2 billion; = 2 if proceeds ≥ $0.1 billion; = 1 if proceeds < $0.1 billion; = 0 if the lead underwriter is not in the SDC's top 500 ranking.
Underwriter reputation dummy	SDC	Dummy variable, = 1 if the lead underwriter underwrites both domestic and international IPOs, and = 0 if the lead underwriter only underwrites domestic IPOs.
CONTROL VARIABLES		
IPO volume	SDC	The number of IPOs in the month of issue and during the prior eleven months.
Tech dummy	SDC	Dummy variable = 1 if the firm is in the technology industry, and = 0 otherwise. We follow Loughran and Ritter (2004) and Cliff and Denis (2004) who classify firms with the following SIC codes as tech firms: 2833, 2834, 2835, 2836, 3571, 3572, 3575, 3577, 3578, 3661, 3663, 3669, 3674, 3812, 3823, 3825, 3826, 3827, 3829, 3841, 3845, 4812, 4813, 4899, 7370, 7371, 7372, 7373, 7374, 7375, 7377, 7378, and 7379.
Log proceeds	SDC	Natural logarithm of IPO proceeds, converted to U.S. dollars.
IPO selling method dummy	SDC, Ljungqvist et al. (2003)	Dummy variable = 1 if the firm adopts the bookbuilding method, and = 0 otherwise.
OUTCOME VARIABLES		
Underpricing	SDC, Datastream, Bloomberg, Financial Post	IPO return from the offer price to the closing price on the seventh, fifteenth, or thirtieth calendar day after the IPO. If that day falls on a weekend or holiday, we use the closing price on the closest trading day instead. Offer price data are from SDC. U.S. IPO return data are also from SDC while returns for non-U.S. IPOs are calculated using closing price data from Datastream. We cross-reference our data set with Bloomberg and the Financial Post's Record of New Issues. In case of missing or erroneous entries, we use data from Bloomberg and the Financial Post (see Appendix 2).

Appendix 2
Data Corrections

Affected Variable	Affected Countries	Main Problem	Resolution
IPO issue date	Argentina, Australia, Austria, Belgium, Canada, Finland, France, Germany, Greece, Hong Kong, Indonesia, Italy, Japan, Malaysia, the Netherlands, New Zealand, Norway, the Philippines, Singapore, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, and the UK	SDC provides announcement dates or subscription dates as issue dates for some IPOs. Canada, Hong Kong, Italy, Japan, Malaysia, Singapore, South Korea, Taiwan, and the UK are heavily affected by the error (with an error rate of more than 50 percent).	We used Bloomberg to revise and correct the erroneous issue dates. In addition, we used the Record of New Issues by the Financial Post to check the issue dates of Canadian IPOs.
Closing price	India	Datastream's price data for Indian IPOs is too limited. Out of 1,771 Indian IPOs listed on SDC, only 155 issuers are in Datastream's firm list. Among these, there are only 46 IPOs with fifteen-day or thirty-day closing price data.	Exclude all Indian IPOs.
Offer price	Australia, Belgium, Canada, Greece, Indonesia, Philippines, South Korea, and the UK	Offer prices for some IPOs listed on SDC are incorrect or missing. South Korean IPOs are most affected.	We used Bloomberg to check inaccurate offer prices and fill in missing offer prices. In addition, we used the Record of New Issues by the Financial Post to check the offer prices of Canadian IPOs.

NOTES

1. Medium-sized firms are defined as the smallest firms in a given country that have a stock market capitalization at least $500 million.
2. Countries in which such studies have been performed include, for example, Australia (Lee et al. 1996), Finland (Keloharju 1993), Germany (Ljungqvist 1995), Japan (Beller et al. 1992), New Zealand (Vos and Cheung 1992), Sweden (Rydqvist 1994), Switzerland (Kunz and Aggarwal 1994), and the United Kingdom (Jenkinson 1990).
3. Note that during so-called "hot IPO markets" such as during the 1999–2000 Internet bubble period, IPO underpricing was often much higher and frequently exceeded 50 percent.
4. There are various other explanations for IPO underpricing that we do not discuss in this paper in the interests of brevity. For a thorough literature review see Ljungqvist (2006).
5. Mazzola and Marchisio (2002) investigate the effect of family ownership on an IPO's long-term performance in Italy. Ehrhardt and Nowak (2003) perform a similar analysis for German family-owned IPOs. Jaskiewicz, Gonzalez, Menendez, and Schiereck (2005) study German and Spanish family-owned firms.
6. Due to the conflict of these findings, we include family ownership squared as an independent variable in our multivariate regression models of underpricing in order to investigate the non-linear relation between underpricing and family ownership. We thank an anonymous referee for pointing this out.
7. The authors provide an updated version of this article on Jay Ritter's Web site. The current version provides information on cross-country underpricing until 2002.
8. For a complete list of errors please refer to Appendix 2.
9. We do not have IPO data for Israel and Ireland, for which La Porta et al. (1999) provide ownership data.
10. Par Value Common Stock, Non Value Common Stock, Registered Par Value Common Stock, and Registered Non Value Common Stock are the share types used in the Japanese stock market.
11. If one of these calendar days falls on a weekend or holiday we use the closest trading day instead.
12. To ensure the robustness of our results, we also performed our tests using seven-day and thirty-day underpricing returns. Our results are qualitatively and quantitatively similar for both underpricing measures. We provide the respective results in the robustness test section.
13. The equally-weighted mean of Canadian IPO returns is largely driven by small issues because over 70 percent of Canadian IPOs in our sample are penny stocks. We define a penny stock as an issue with a converted offer price below US$1.00.

14. La Porta et al. (1999) note that "a corporation has a controlling shareholder (an ultimate owner) if this shareholder's direct and indirect voting rights in the firm exceed 20 percent. A shareholder has x percent indirect control over firm A if (1) it directly controls firm B, which in turn directly controls x percent of the votes in firm A; or (2) it directly controls firm C, which in turn controls firm B (or a sequence of firms leading to firm B, each of which has control over the next one, i.e., they form a control chain), which directly controls x percent of the votes in firm A."
15. See La Porta et al. (1999) for several examples on direct and indirect control and the resulting firm classifications.
16. We thank Rafael La Porta for making the burden of proof and class action lawsuit data available on his Web site (http://mba.tuck.dartmouth.edu/pages/faculty/rafael.laporta/publications.html).
17. Loughran and Ritter (2004) and Cliff and Denis (2004) classify firms with the following SIC codes as technology firms: 2833, 2834, 2835, 2836, 3571, 3572, 3575, 3577, 3578, 3661, 3663, 3669, 3674, 3812, 3823, 3825, 3826, 3827, 3829, 3841, 3845, 4812, 4813, 4899, 7370, 7371, 7372, 7373, 7374, 7375, 7377, 7378, and 7379.
18. We divide our sample into a low and high prestige group based on proceeds-based rankings with a breakpoint of 7. The significance of this variable is robust to alternative breakpoints ranging from 4 to 9.
19. Note that all U.S. IPOs in our sample are non-penny stocks since we use US$ 1 as a benchmark below which we define penny stocks and because all U.S. IPOs in our sample have offer prices above US$ 1.
20. Recall that our dataset does not include any penny stock issues in the U.S. Thus, there is no need for a fifth subsample that would cover U.S. penny stocks.
21. Jenkinson (2000) explains that France and Japan apply "circuit-breakers" but neither his nor any other studies we are aware of provide a comprehensive overview of IPO regulations in other markets. We were unable to collect the information ourselves due to language barriers and the fact that many markets such as Argentina, Greece, and Spain do not provide any information about IPO regulations on their respective stock market Web sites.
22. Another concern is that La Porta et al.'s (1999) data does not reflect recent political or regulatory developments that may have taken place in some of our sample countries. South Korea, for example, has undergone considerable changes during the last two administrations that have raised concerns among many U.S. government officials. We thank an anonymous referee for pointing this out. To address this issue, we performed a robustness test in which we excluded South Korean IPOs from our sample. Our results (not reported here for brevity's sake) are only marginally affected by this exclusion.

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