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The signalling hypothesis revisited: Evidence from foreign IPOs

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The signalling hypothesis revisited: Evidence from foreign IPOs

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Abstract

While the signalling hypothesis has played a prominent role as the economic rationale associated with the initial public offering (IPO) underpricing puzzle (Welch, 1989), the empirical evidence on it has been mixed at best (Jegadeesh, Weinstein and Welch, 1993; Michaely and Shaw, 1994). This paper revisits the issue from the vantage point of close to two decades of additional experience by examining a sample of foreign IPOs – firms from both financially integrated and segmented markets – in US markets. The evidence indicates that signalling does matter in determining IPO underpricing, especially for firms domiciled in countries with segmented markets, which as a result face higher information asymmetry and lack access to external capital markets. We find a significant positive and robust relationship between the degree of IPO underpricing and segmented-market firms' seasoned equity offering activities. For firms from integrated markets, in contrast, the analyst-coverage-purchase hypothesis appears to matter more in explaining IPO underpricing and the aftermarket price appreciation explains these firms' seasoned equity offering activities. The evidence, therefore, clearly supports the notion that some firms are willing to leave money on the table voluntarily to get a more favorable price at seasoned offerings when they are substantially wealth constrained, a prediction embedded in the signalling hypothesis.

Keywords: IPO underpricing, seasoned equity offering, cross-listing, signalling hypothesis, financial market integration, market-feedback hypothesis

JEL classification numbers: G14, G15, G30, G32

Saako signalointihypoteesi empiiristä tukea ulkomailla toteutettavista listautumisanneista?

Suomen Pankin keskustelualoitteita 10/2008

Bill B Francis – Iftekhar Hasan – James R Lothian – Xian Sun
Rahapolitiikka- ja tutkimusosasto

Tiivistelmä

Signalointihypoteesia on pidetty listautumisantien yhteydessä esiintyvän alihinnoitteluongelman yhtenä merkittävänä teoreettisena selityksenä samaan aikaan, kun tutkijat väittelevät sen empiirisestä merkityksestä. Tässä tutkimuksessa kysymystä tarkastellaan empiirisesti Yhdysvaltain osakemarkkinoilta lähes kahden vuosikymmenen ajalta kerättyjen ulkomailta toteutettujen listautumisantien yhteydessä. Listautumisanteihin liittyviä tietoja on kerätty sekä integroituneilla että segmentoiduilla markkinoilla toimivista yrityksistä. Empiirisen näytön mukaan signalointi vaikuttaa listautumisantien yhteydessä havaittavaan alihinnoitteluun erityisesti segmentoiduilla markkinoilla toimivien yritysten tapauksessa. Tästä on seurauksena, että tällaiset yritykset kärsivät informaation epäsymmetrisyydestä ja rajoitetusta pääsystä kansainvälisille pääomamarkkinoille. Tulosten mukaan listautumisannissa havaittavan alihinnoittelun määrän ja segmentoituneilla markkinoilla toimivien yritysten osakemyyntiaktiivisuuden välillä on tilastollisesti merkitsevä ja vankka korrelaatio. Mahdollisuus hankkia asiantuntija-arvioon perustuva ostosuositus sen sijaan selittää integroituneilla osakemarkkinoilla toimivien yritysten listautumisantien alihinnoittelua. Osakkeiden hintojen nousu jälkeenpäin puolestaan selittää näiden yritysten halukkuutta listautumisantien jälkeiseen osakemyyntiin. Tutkimustulosten mukaan jotkin yritykset ovat siis nähtävästi valmiita luopumaan hetkellisistä kurssivoitoista varmistaakseen osakkeilleen paremman hinnan listautumisantien jälkeisissä osakemyynneissä, jolloin näiden yritysten pääomantarve on suurin. Tämä tulkinta on sopusoinnussa signalointihypoteesin kanssa.

Avainsanat: listautumisantien alihinnoittelu, osakemyynti, ristiinlistautuminen, signalointihypoteesi, rahoitusmarkkinoiden integraatio, markkinareaktio

JEL-luokittelu: G14, G15, G30, G32

Contents

1 Introduction

The reasons that initial public offerings (IPOs) of equity are on average underpriced have received substantial attention in the literature since Stoll and Curley (1970), Logue (1973), and Ibbotson (1975) first documented systematic increases from the offer price to the first-day closing price. A number of hypotheses have been proposed to explain this phenomenon. For instance, Welch (1989) proposes a signalling model in which 'high-quality' firms underprice their IPOs to credibly separate themselves from 'low-quality' firms and then recoup benefits from seasoned equity offerings (SEOs) thereafter.[1] The important underlying assumptions in his model, as well as others, are that issuing firms have superior information to outside investors and/or underwriters and these firms are so wealth-constrained that they explicitly consider the possibility of future equity offerings in deciding on the prices of their IPOs.

The existing evidence with regard to signalling theories, however, is at best mixed. Jegadeesh, Weinstein and Welch (1993) find that, although there is a positive relationship between the degree of IPO underpricing and the probability and size of subsequent SEOs, the economic significance of these relationships is weak. Instead, they find that an alternative hypothesis, which they term the 'market-feedback hypothesis', has a stronger explanatory power for firms' subsequent equity issuing activities. Michaely and Shaw (1994), for their part, reject the signalling hypothesis completely.

We believe, however, that the signalling hypothesis is worthy of being revisited before it is written off entirely. According to Welch (1989), it is not necessary that all issuers be willing to apply the signalling strategy. In models like his, high-quality firms that choose the strategy of leaving more money on the table at their IPO to signal their true quality are subject to several conditions. One important condition is that there is an ongoing need for these firms to raise funds, thus making it more likely that they will raise external capital (issue equity) in the future. As such, high-quality firms that really want to raise external capital may apply a signalling strategy to reduce as much as possible the total cost of capital raised. This conjecture is consistent with Ibbotson (1975) who proposes that new issues may be underpriced because issuers want to leave a 'good taste in investors' mouths' so that they could sell their future offerings at more attractive

[1] There were other signalling models proposed around the same time as Welch's. Allen and Faulhaber (1989) assume good managers underprice to distinguish themselves from bad managers because subsequent cash flows reveal the firm's type. Grinblatt and Hwang (1989) develop a model in which the fraction of retained new issue by the issuer and the issuing price signal the true value of the firm. Nanda (1988) assumes firms with high-mean returns and low variances issue equity and underprice more to deter mimicking by low-mean return firms. Although these signalling models are interesting and important in the IPO literature, because we test the signalling hypothesis in which high quality firms recoup money left on the table through SEOs, we focus our discussion on Welch's (1989) signalling model.

prices. In this vein, Ritter and Welch (2002) point out that the most appealing feature of the signalling hypothesis is that there are some issuers that voluntarily leave money on the table at IPOs to entice investors to pay higher prices at subsequent offerings.

To maximize the benefits of applying such a strategy, firms must issue equity multiple times.[2] Therefore, it is not necessary for all high-quality firms to apply this strategy, if they are not 'so wealth constrained that they must raise the capital necessary to fund their operations.'[3] We conjecture that the problem underlying the very weak support empirically is the inability of researchers to identify firms that actually value underpricing as a signalling device and hence are willing to apply this time-intensive strategy.

We revisit the signalling hypothesis by studying a group of foreign-firm IPOs in US capital markets. We believe that this choice of data serves our objective for several reasons. First, foreign IPOs, in general, face higher information asymmetries than domestic IPOs. In this regard, Bruner, Chaplinsky and Ramchand (1999) suggest that foreign IPOs face a sizable challenge in making themselves known to the US investor community and hence incur much higher costs when they put on the required 'road shows'. Everything else equal, foreign firms are, therefore, more likely to engage in a signalling strategy.

Second, in our sample, we have both foreign firms from financially integrated and segmented markets.[4] Firms from segmented markets arguably face particularly great difficulty in raising external capital and usually have less access to foreign capital.[5] For instance, Lins, Strickland, and Zenner (2005) document that those firms from emerging markets that issue American Depository Receipts (ADRs) express the need for access to external capital markets in their filing documents more frequently than their integrated-markets counterparts do.[6] To alleviate the direct (ownership restrictions, taxes) and indirect (information-production and liquidity) barriers to the free flow of capital, firms from financially segmented markets can list in financially integrated markets. Doing so enables

[2] The decision makers of the issuing firms, of course, could also enjoy the benefits by the open market trading of the insider shares when the true value is revealed to the investors. We consider it as a further incentive for the decision makers to signal via underpricing.

[3] Welch (1989, p. 424).

[4] To ensure that our results are not dependent on the method of the classification, we also split the IPOs by whether they are from emerging or developed markets and obtained qualitatively similar results. These results are available upon request.

[5] Another strand of studies in testing international capital-market integration, focus on the commonality in nominal returns or cost of capital across markets. This literature jointly tests the chosen asset-pricing model (eg CAPM) and the integration hypothesis. In this study, we focus on a more general concept of market segmentation from which average firms face limited access to foreign capital.

[6] ADRs are securities of foreign firms that list their securities on US capital markets as Depository Receipts normally as a multiple of domestic ordinary shares (such as 10 to 1) in order to bring the price into a more common US form. These receipts, which register with the SEC, trade like any other US security. For more details on the structure and costs of ADRs, see Miller (1999).

them to increase liquidity and to raise capital more easily. Therefore, although the process of integration is gradual at the market level, liberalization at the firm level should have a relatively faster pace due to the possibilities of cross-listing in developed markets. In short, if there is an incentive for some firms to apply a signalling strategy when issuing IPOs, this incentive should be significantly stronger for firms from segmented markets than those from integrated markets.

In this study, we examine the relationship between the initial returns of foreign IPOs that list on US capital markets and their subsequent decision to raise additional capital through a seasoned equity offering (SEO) in US capital markets. We focus on US markets primarily because collectively they represent the largest equity market in the world, thereby providing firms that choose to list in the US access to the largest pool of funds. Hence, by studying foreign IPOs affiliated with US capital markets, we are able to provide a much more powerful test of the signalling hypothesis.

We conduct our analyses using a sample of 413 foreign IPOs from 1985 to 2000 and 70 follow-up SEOs issued within three years of the IPO date. These analyses reveal that the initial returns of foreign IPOs are significantly different between firms from financially integrated markets and firms from segmented markets. Firms from financially segmented markets experience initial returns of 12.2%, while those from integrated markets experience initial returns of only 7.8%, a difference that is statistically significant at the 1% level. Moreover, this difference, which is economically meaningful, remains after we control for other factors suggested in the literature as potentially important, such as analyst coverage. We find that, compared to firms from segmented markets, firms from integrated markets underprice more to purchase lead underwriters' analyst coverage, a result consistent with the findings of Cliff and Denis (2004) for US domestic IPOs, but not the momentum hypothesis of Aggarwal, Krigman, and Womack (2002). For segmented-market firms, the level of underpricing is neither well explained by the analyst-coverage purchase hypothesis nor by the momentum hypothesis.

More importantly, consistent with the predictions of the signalling hypothesis, we find that firms from segmented markets that leave more money on the table at the IPO and therefore experience a higher level of underpricing are significantly more likely to: a) issue seasoned equity; b) raise a larger proportion of their capital requirements through SEOs; c) issue seasoned equity more quickly subsequent to the IPO; and d) experience a smaller price drop when the SEO is announced. Specifically, we find that a one percent increase in underpricing at their IPOs increases segmented-market firms' likelihood of a seasoned equity offering by 32.3% (significant at the 1% level) and the average cumulative abnormal return by 0.156% (significant at the 1% level). The estimated coefficients (p-value) between underpricing and SEO size, and the time lag between the IPO and SEO are 1.032 (0.003) and -2.158 (0.001).

To test the economic significance of these relations, we follow the same quintile analysis as Jegadeesh, Weinstein, and Welch (1993) and find that for firms from segmented markets, there is a strong monotonic relation between IPO underpricing and their decision to issue an SEO within three years of going public. For firms from integrated markets, however, it is the stock price appreciation subsequent to the initial trading day (aftermarket price appreciation) that shows a significant relationship with their SEO decision.

The remainder of the paper is organized as follows. Section 2 introduces the hypotheses. Section 3 discusses the data. Section 4 presents the empirical tests of IPO underpricing. Section 5 examines the relationship between the level of IPO underpricing and SEO activities. Section 6 contains concluding remarks.

2 Hypotheses

We suspect that the lack of empirical support for the IPO signalling hypothesis stems from the difficulty that researchers face in identifying the group of firms that actually are likely to value underpricing as a signalling device and that as a result are willing to apply this lengthy and otherwise costly strategy. The reasons advanced in the literature why firms might engage in signalling of this sort, center around information costs and capital constraints. Foreign firms that issue equity in US capital markets and are from countries with segmented capital markets are much more likely to satisfy these criteria than US firms do. There is some existing evidence consistent with this conjecture. For example, Hargis (2000) reports that international share offerings, usually in the form of ADRs, become a major source of equity funding for firms from emerging markets subsequent to cross-listing. Miller (1999) and Foerster and Karolyi (1999) argue further that cross-listing reduces the effects of market segmentation, while Errunza and Miller (2000) document a decline in the cost of capital domestically for ADR-issuing firms. Lins, Strickland, and Zenner (2005) provide the first direct test of the importance of access to external capital markets for firms from segmented markets and find that this is one of the more important factors in determining a firm's decision to cross-list in the US.

We, therefore, expect that if firms, in fact, willingly leave money on the table at their IPO in an effort to get a more favorable price for seasoned equity offerings, it will be firms from segmented markets since they have the strongest incentive to adopt a signalling strategy. Specifically, we expect that firms from segmented markets with higher IPO underpricing are more likely to: 1) issue seasoned equity; 2) raise a larger proportion of capital requirements through SEOs; 3) issue seasoned equity more quickly subsequent to the IPO; and 4) receive less unfavorable stock-price responses following the announcements of

SEOs. In contrast, we expect these relationships to be weak to non-existent for firms from integrated markets.

We also test the alternative 'market-feedback' hypothesis as a potential explanation of their seasoned equity issuing activities. In addition, we examine the question of whether they underprice more to purchase lead underwriters' analyst coverage (Cliff and Denis, 2004) and/or if they underprice more to create momentum (Aggarwal, Krigman and Womack, 2002).

3 Data and summary statistics

3.1 Data construction

We obtain our sample of foreign IPOs and SEOs in the US markets from the Securities Data Corporation Worldwide New Issues Data Bases (SDC). This database provides country origin, offer price, offering type (IPO/SEO and ADRs), proceeds in the US market, firms primary SIC code, book-runner and all managers of the issues, venture-backed IPO flags, and the issuer's exchange listing. Only issues by firms domiciled outside the US are included in our sample. The IPO sample covers the period 1985 through 2000, and the SEO sample includes issues within three years of the IPO date. We only include the first SEO of the firms in our IPO sample. We obtain data on stock prices and returns from CRSP and exclude offerings for which the stock data are incomplete. Our final data set consists of 413 foreign IPOs and 70 SEOs.[7] We obtain information on the number of analysts providing recommendations from the Institutional Broker Estimate System (I/B/E/S). I/B/E/S only started tracking information on analyst recommendations in 1993, thus tests that require these data use a reduced sample.

3.2 Measurement of financial market integration

It is well known that measuring capital account liberalization is difficult. Some researchers conduct studies focusing on dating financial liberalizations and treat them as one-time events or structural breaks (see eg Bekaert and Harvey, 1995). In this study, we use the Bekaert and Harvey's procedure to identify whether the IPOs are from segmented or integrated financial markets. Specifically, if the country has a fully integrated financial market, we define it as *Integrated*; we

[7] SDC provides about 1,000 listings of foreign IPOs from 1985 to 2000. However, a closer examination indicates that only 429 of the offerings listed on major US stock exchange (NYSE and AMEX) or NASDAQ.

define all other markets as *Segmented*. In order to provide a more complete list of emerging markets, we complement the list of countries identified in Bekaert and Harvey with countries identified in Edison and Warnock (2001). These latter authors, however, use a continuous measure for determining financial integration. To maintain consistency with the dichotomous Bekaert and Harvey measure, we define countries that Edison and Warnock designate as fully integrated as *Integrated* and the rest as *Segmented*.[8] Based on these definitions, we separate our sample of IPOs into two groups, the first consisting of firms from fully financially integrated markets, the other consisting of firms from segmented markets.[9]

Several countries are not identified in either of the studies mentioned above. Some of these are developing countries, which based on the criteria used by Bekaert and Harvey (1995) and/or Edison and Warnock (2003), fall into the segmented-market group. Others appear to experience a transformation from segmented to integrated, during our sample period and their official openness dates are not clear. For example, neither study identifies Israel. According to various documents released by the Israeli-press, however, Israel appears to have started the process of financial market liberalization in 1996 and achieved complete capital market integration by 2000. Because most of the transactions involving Israeli-targets are before 1997, we consider Israel to be a segmented market in our sample.[10]

3.3 Summary statistics

Table 1 presents the distributions of foreign IPOs and SEOs by the type of financial market (integrated vs segmented) and by country origin. Of the 413 foreign IPOs, 209 (50.6%) are from financially segmented markets and 204 (49.4%) from integrated markets. There are 70 SEOs issued by our IPO firms within 3 years of the IPO date, of which 37 are by firms from segmented markets and 33 by firms from integrated markets. The IPOs raised about 36.9 billion US dollars over the sample period, of which $20.3 billion (or 55%) was raised by

[8] Edison and Warnock (2003) construct an index of financial-market openness with values ranging from 0 to 1 depending upon the degree of openness with 0 denoting a closed market and 1 denoting a fully integrated market. Bekaert and Harvey (1995) and Edison and Warnock (2003) classify the same countries as having fully integrated markets. Edison and Warnock, however, cover more countries with segmented markets than do Bekaert and Harvey.

[9] We choose the dichotomous variable because it provides a greater coverage of countries. We also conducted our analyses using the continuous variable and our main results remain qualitatively the same.

[10] In our sample, there are 81 IPOs from Israel and of these 51 were issued between 1985 and 1996 and 30 were between 1997 and 2000. If we classify those that were issued before 1997 as from a segmented market and those after 1996 as from an integrated market, our results remain qualitatively the same. Similar results were also obtained if we include a dummy variable for IPOS from Israel.

segmented-market firms and $16.6 billion (45%) by integrated-market firms, while SEOs raised about $10 billion, of which $5.9 billion (59% of the total) was raised by segmented-market firms and $4.1 billion (the remaining 41%) by integrated-market firms.

Table 1 also shows summary statistics of IPO underpricing and SEO announcement effects. UP is our measure of IPO underpricing and is calculated as [(P1–P0)/P0]*100, where P1 is the first day closing price and P0 is the initial offer price. CARs is the three-day cumulative abnormal returns around the SEO announcement date. Firms from India experience the highest level of underpricing (53.4%), while firms from Belgium experience the most negative CARs (-0.197%).

4 Underpricing of foreign IPOs

Panel A of Table 2 presents additional summary statistics for the IPOs contained in the sample. Among the 413 IPOs, 151 are identified by the SDC database as ADRs, of which 85 are from integrated markets and 66 from segmented markets. The average underpricing for the IPO sample firms is 10.1%. IPOs from segmented markets experience about 12.2% average underpricing, while those from integrated markets experience about 7.8%.[11] The difference between these two average initial returns is significant at the 1% level.[12] Our measure of underwriter rank (UWrank) is from Loughran and Ritter (2004). NYSE is a dummy variable that takes the value 1, if an IPO is listed on the NYSE and 0 otherwise. ADR is a dummy variable taking the value 1 if the issue is an ADR and 0 otherwise. Finally, Hi-tech is a dummy for IPOs issued by firms from high technology industries.[13] Surprisingly, segmented-market IPOs tend to be listed

[11] We also separated the sample into ADR and non-ADR IPOs; we found that the signalling hypothesis was noticeably stronger for the non-ADR IPOs. We then partitioned the non-ADR sample into firms from integrated and segmented markets, the results were even stronger for firms from segmented markets than for the non-ADR sample as a whole. These results for the non-ADR sample are consistent with the theoretical arguments of the signalling hypothesis addressed in this paper. That is, firms from segmented markets that issue non-ADR IPOs are probably those that would have the most difficulties raising funds domestically and who, going forward, would benefit the most from signalling. This is the case because it has been shown that, on average, non-ADR firms that cross-list in the US tend to be smaller and younger than ADR firms.

[12] During the 1999–2000, bubble period, 50 out of the 413 IPOs in our sample came to the US market. Although we find that IPOs during the bubble period are more underpriced than those before the bubble period, the difference in the underpricing of integrated-market IPOs and segmented-market IPOs is in the same direction and significance before and during the bubble period. Specifically, segmented-market IPOs underprice 26.8% during the bubble period, which is significantly higher than the 11.6% of the integrated-market IPOs. Before the bubble period, segmented-market IPOs underprice 9.66%, which is significantly higher than the 7.45% of the integrated-market IPOs.

[13] We obtain high technology SIC codes from Loughran and Ritter (2004).

more frequently on the NYSE compared to those from integrated markets. In addition, segmented-market firms are more likely to be in the hi-tech industry. On the other hand, integrated-market firms are more likely to enter the US capital markets as ADRs.

Panel B of table 2 reports summary statistics for the SEOs. Consistent with the literature on domestic SEOs, SEOs by foreign issuers also experience a negative average abnormal return. Somewhat surprisingly, we observe no significant difference for announcement effects between segmented- and integrated-market firms in the SEO sample.

Table 3 presents results from the cross-sectional analyses of the underpricing of the sample IPO firms. In addition to the dummy variable for financial market integration, we regress underpricing against the following variables:

Income level (GDP), a variable that ranges in value from 1 to 4 and represents low income, lower-middle income, higher-middle income and high income.

Legal system (Legal), a variable that ranges in value from 1 to 3 and represents the French system, the German and Scandinavian systems, and the English system.

The natural logarithm of the size of the initial offering (Lnsize).

Venture capital funding (Venture), a dummy variable that takes the value 1 if the IPO is venture capitalist backed and 0 otherwise.

The standard deviation of returns (STDV) estimated over days 1 to 100 after the IPO, which is our proxy for the risk of the underlying stock.

Managers (CoMgrs), a variable that refers to the number of co-managers in the IPO syndicate.

UWrank, Hi-tech, NYSE and ADR, all of which we defined earlier.

We include four governance indicators as control variables. This is motivated by the work of Lothian (2006), Bekaert and Harvey (2002), Henry (2000), among others, that show that institutional factors affect financial behavior. The variables taken from Kaufmann, Kraay, and Zoido-Lobaton (1999) are measured in units ranging -2.5 to 2.5, with higher values corresponding to better governance outcomes.[14] They are:

[14] For detailed explanation of these variables, see Kaufmann, Kraay and Zoido-Lobaton (1999).

Voice accountability (VoiceAcc), which measures freedom of speech, freedom of association, freedom of the media, and the extent to which a country's citizens are able to participate in selecting their government.

Political stability (PolStab), which is the perceived likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including political violence and terrorism.

Government effectiveness (GovEff), which aggregates the quality of public service provisions, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies into a single grouping and thus focuses on the inputs required for the government to be able to produce and implement good policies.

Corruption controls (CrptnCntl), which measures the success of controlling the exercise of public power for private gain.

Table 3 contains our first set of regression results. Models 1 to 7 include all observations in the sample with the available requisite data. In Models 8 and 9, we separate the sample of IPOs into those from integrated markets and those from segmented markets. Results of Model 1 show that financial market integration has a negative and significant relationship with underpricing. Specifically, issuing firms from financially integrated markets experience a 4.3% lower level of underpricing compared to their segmented-market counterparts. This difference is both economically large and statistically significant. Importantly, this result remains after we control for other possible effects as shown in Models 2 through 7. Consistent with prior studies of IPO underpricing in domestic markets (see eg Michaely and Shaw, 1994, among others), we find that foreign IPOs managed by underwriters that are more reputable are associated with less underpricing. Specifically, the use of prestigious underwriters significantly reduces the level of underpricing by about 1%. The location that the foreign IPOs list also has a significant relation with underpricing. We find that foreign IPOs listed on the NYSE exchange experience significantly lower underpricing. Finally, consistent with the existing literature (eg Jegadeesh, Weinstein, and Welch, 1993) our results from Models 1 to 7 show that the standard deviation of returns of IPOs over days 1 to 100 has a significant and positive relation with underpricing.

Models 8 and 9 of Table 3, report results based on data sorted by financial market integration status. We find that for IPOs from integrated markets, issue size has a positive and significant effect on underpricing. In contrast, the ranking of underwriters and NYSE listing have a negative and significant effect. Note that except for the standard deviation of returns, our proxy for the riskiness of equity,

none of the firm- and/or deal- specific factors contributes in explaining the underpricing of segmented-market IPOs.

The recent IPO literature contends that firms underprice more to purchase analyst coverage.[15] Cliff and Denis (2004)'s paper is one of the first to examine the relation between IPO underpricing and post-analyst coverage. They find that there is a positive and significant relation between underpricing and analyst coverage by the lead underwriter. They argue that if firms value analyst coverage, they will allocate resources to acquire this coverage by leaving money on the table. The lead underwriter, who can serve as the primary market maker, can benefit from underpricing by allocating IPOs to preferred clients. Lang, Lins and Miller (2003) provide evidence consistent with the notion that foreign firms that cross-list in the US value analyst coverage because of the resultant increase in valuation and forecast accuracy.

Chemmanur (1993) and Aggarwal, Krigman and Womack (2002) examine an alternative hypothesis that also relates IPO underpricing to analyst coverage. They hypothesize that firms underprice more to attract attention from the market and to create 'momentum.' The 'hot' IPO, they claim, will have more analysts following it, thereby enhancing liquidity.

Before testing the signalling hypothesis, we provide evidence on both of these hypotheses. Specifically, we examine i) whether the purchase of lead analysts' coverage explains foreign IPO underpricing; and ii) whether there is a relation between the number of recommendations by non-lead analysts and underpricing.

Table 4 presents summary statistics for the sample of analysts' recommendations that we were able to match with our IPO sample firms sorted by IPO underpricing quintiles. Because analysts' recommendations are only available in I/B/E/S starting in 1993, the number of observations is reduced from 413 to 335. Of these, 162 are from integrated markets and 173 from segmented markets. The variables shown in Table 4 are as follows.

The percentage of recommendations offered by the lead underwriters (LeadMgr Recom) within one year of the IPO date.

The number of analysts providing recommendations to the firms within one year of the IPO date (No Analysts1).

Average recommendation for the firm within one year of going public (AvgRecom1), and it ranges from 1 to 5, where 5 refers to 'Strong Buy' and 1 refers to 'Strong Sell'.

[15] Analyst coverage here refers to earnings forecasts and/or recommendations made by analysts.

The total number of recommendations offered within one year of the IPO date (No Recom1).

The number of analysts following the firm within three years of the IPO date (No Analysts3).

The average recommendation for the firms within three years of the IPO (AvgRecom3) and ranges from 1 to 5, where 5 refers to 'Strong Buy' and 1 refers to 'Strong Sell'.

The total number of recommendations offered by analysts following the firm within three years of its IPO (No Recom3).

Although the relationship is not monotonic, the results in Table 4 indicate that, in general, segmented-market IPOs do not leave more money on the table for analyst coverage from lead underwriters, a finding that is not consistent with the analyst – coverage purchase hypothesis of Cliff and Denis (2004). Interestingly, when these firms are more underpriced they tend to have a higher level of recommendation at both the one-year and three-year time horizons following the IPO. In contrast to the IPOs from segmented markets, IPOs from integrated markets appear to leave more money on the table for analyst coverage from lead underwriters. Thus, there appears to be some support for the analyst-coverage purchase hypothesis for integrated-market IPOs. A more important finding from the standpoint of this paper is the positive relation between the level of analyst recommendations and the degree of underpricing of segmented-market IPOs in that it provides support for the signalling hypothesis as an explanation for segmented-market IPOs pricing strategy.

To see how robust these results are we use cross-sectional regression analysis and include controls for other factors known to have an impact on analyst coverage. Additionally, we present evidence on the momentum hypothesis of Aggarwal, Krigman, and Womack (2002). Because we can only test the hypotheses with firms that receive analyst recommendations, the results would be biased if firms that did not receive analyst recommendations are significantly different from those that did. To correct for the possible self-selection bias we use the Heckman two-stage procedure. In the first stage, we estimate a probit model where we set the dependent variable, Recommendation, equal to 1 if the firm receives at least one recommendation in the first year subsequent to the IPO, 0 otherwise. In the second stage, we use OLS corrected for self-selection bias to examine the relationship between underpricing and the number of recommendations from the lead underwriters (the analyst-coverage purchase hypothesis), and from the non-lead underwriters (the momentum hypothesis) in the year after the IPO.

The estimated models have the following specification

Stage 1:

$$\text{Recommendation} = \alpha + \beta_1(\text{GDP}) + \beta_2(\text{LnSize}) + \beta_3(\text{UWrank}) + \beta_4(\text{Hitech}) + \beta_5(\text{Venture}) + \beta_6(\text{NYSE}) + \varepsilon \quad (4.1)$$

Stage 2:

$$\text{No Recom} = \alpha + \beta_1(\text{LnSize}) + \beta_2(\text{UWrank}) + \beta_3(\text{Hitech}) + \beta_4(\text{CoMgrs}) + \beta_5(\text{Turnover}) + \beta_6(\text{UP}) + \beta_7(\text{Lambda}) + \varepsilon \quad (4.2)$$

In (4.2), the dependent variable, No Recom, refers to the number of recommendations from the lead underwriters when we test the analyst-coverage purchase hypothesis and it refers to the number of recommendations from the non-lead underwriters when we test the momentum hypothesis. We use Turnover, measured as the average amount of trading volume in the first year as a percentage of the shares offered at the IPO to control for the impact of trading volume. Lambda is the inverse of Mills ratio obtained from the probit equation and is used to correct for self-selectivity bias. All other variables including those in equation (4.1) are as defined earlier.

Table 5 contains results of equation (4.2), where for comparison purposes we also present OLS results uncorrected for self-selection bias. To conserve space we do not report the results of the probit model (the first stage). In Models 1 to 4 we test the analyst-coverage hypothesis of Cliff and Denis (2004) and in Models 5 to 8 we test the momentum hypothesis of Aggarwal, Krigman, and Womack (2002).

The results from Models 1 to 4 indicate that there is a positive and significant relation between underpricing and the number of recommendations made by analysts from lead underwriters for integrated-market IPOs,[16] irrespective of whether or not we correct for self-selection bias. The results for integrated-market IPOs support the analyst-coverage purchase hypothesis of Cliff and Denis (2004), indicating that integrated-market firms use underpricing, at least in part, to compensate for expected analyst recommendations from lead underwriters. The same pattern does not exist in the group of segmented-market IPOs. In Models 5 through 8 in which we test the momentum hypothesis, we obtain different results. Only in the case of Model 8 (which is uncorrected for self-selection bias and

[16] Based on the suggestion of the referee we also examined whether recommendations from lead underwriters are positively biased compared to the consensus (in this case, the consensus is analyst coverage from the investment banks other than the lead). In results not reported, we find that the average recommendation by analysts of the lead underwriter is 4.4 (5 denotes strong buy and 1 denotes strong sell) and is significantly higher than the average recommendation by analysts of non-lead underwriters, which is 4.1. Furthermore, the lead underwriters do not offer more biased recommendations for integrated-market IPOs than for segmented-market IPOs. Similar results hold for ADRs and non-ADRs.

hence questionable) is the underpricing variable significant. Thus, these results do not provide support for the hypothesis that foreign IPOs strategically underprice to attract investor attention.

In sum, the results presented so far indicate that firms from segmented markets that issue IPOs, underprice more than firms from integrated markets. However, none of the alternative hypotheses is successful in explaining the greater degree of underpricing that characterizes segmented-market firms. Accordingly, in the following sections, we test the signalling explanation of IPO underpricing for the full sample and for firms from segmented markets and integrated markets.

5 Relation between IPO Underpricing and SEOs

As specified above, the signalling hypothesis predicts that firms with higher underpricing are more likely to 1) issue SEOs; 2) issue a larger proportion of their capital requirements through SEOs; 3) issue SEOs more quickly after the IPO; and 4) experience less unfavorable announcement effects (see Jegadeesh, Weinstein, and Welch, 1993). We test each of these hypotheses in order. Viewed from the standpoint of the strictest version of the signalling theory, we should find support for these hypotheses in the full sample. However, as we argued above, we believe that firms from segmented markets are much more likely to provide support for these hypotheses. For firms from integrated markets, we expect that the market-feedback hypothesis (Jegadeesh, Weinstein, and Welch, 1993) better explains the decision to issue SEO subsequent to the IPO, along with the size of the issue and the speed with which these firms return to the market.

Although not an integral part of the signalling model of Welch (1989), an implication of signalling models is that if firms choose the signalling strategy, then these firms should sell a smaller fraction of their shares at the IPO when a substantial amount of underpricing is expected.[17] To test this conjecture, we add a variable (FractionSold) that measures the proportion of the firm sold at the IPO.[18] Following Leland and Pyle (1977), we define the percentage of a firm sold as the number of shares sold at the IPO divided by the total number of shares outstanding following the IPO. This information is not available for a significant number of IPOs in our sample. Consequently, the sample size reduces to 162 when we include this variable in our regressions. The average fraction sold by IPOs in our sample is 29%. There is, however, no significant difference between firms from integrated markets and those from segmented markets.

[17] We thank the referee for this suggestion.

[18] Note that FractionSold is not included in estimating the announcement effects of SEO issuers because it reduces the sample size to 25.

5.1 The probability of SEO and IPO underpricing

We test the first hypothesis, that the probability of a foreign firm issuing seasoned equity is related to its IPO underpricing, by estimating the following logit model

$$P_i = e^{\alpha + x\beta + \mu} / (1 + e^{\alpha + x\beta + \mu}) \quad (5.1)$$

where, P_i is the probability that the ith firm issues seasoned equity, and X is a column vector of independent variables. The independent variable of primary interest is IPO underpricing. In addition to the signalling hypotheses, Jegadeesh, Weinstein, and Welch (1993) propose an 'aftermarket-return' hypothesis, in which the market feedback following the IPO explains the probability of issuing SEOs better than does the degree of IPO underpricing. As pointed out earlier, underlying the market-feedback hypothesis is the notion that the market is better informed than are issuers. A high return on the IPO date, according to this view, indicates that the issuer has underestimated the marginal return to the project. Since the market-feedback hypothesis predicts that issuers do not deliberately leave money on the table but rather use aftermarket information in their decision to issue seasoned equity, it is important to control for market feedback in our regressions.

Following Jegadeesh, Weinstein, and Welch (1993), we define the variable AFTRET1 as the abnormal returns over the period from trading day 1 to trading day 20 following the IPO date.[19] We estimate abnormal return as the difference between the actual return and the predicted return, which in turn is measured as beta times the market return. We use the CRSP equal-weighted index as the market proxy and estimate beta from a market model regression fitted over days 41 to 140 following the IPO date. We calculate AFTRET2 in a similar fashion to AFTRET1 except that it covers the period from trading day 21 to trading day 40 after the IPO date. We include ADR, LnSize, and FractionSold as control variables. We also include year and industry dummies to allow for potential differences in SEO activities across years and industries.[20]

[19] One could argue that to better define foreign stocks' abnormal returns the local market index should be added in the market model. Instead of predicting the foreign IPO's returns by adding a local market index for the 413 firms from 47 different markets, we rely on previous studies which show that cross-listing could reduce firms' exposure to the local market risk (see eg Errunza and Losq, 1985, Alexander, Eun and Janakiramanan, 1987, and Foerster and Karolyi, 1999) and apply a single index market model when calculating the aftermarket abnormal returns.

[20] Year dummies and industry dummies are not included in the models that include FractionSold. Given the substantial reduction in the sample when we include this variable in the regression along with the large number of dummy variables, the model becomes unstable, thus rendering the results unreliable.

Table 6 presents results of the logit regression estimations.[21] We report full sample results in columns 1 through 4. In all cases, there is a positive and significant relationship between the variable UP and the probability of a SEO. We report marginal effects in brackets below the p-values where they indicate that the effect is economically important. For the aftermarket return variables AFTRET1 and AFTRET2 there is no evidence of a relationship between them and the likelihood of an SEO. However, consistent with our conjecture there is a negative and significant relationship between FractionSold and the likelihood of firms issuing SEOs subsequent to the IPO.

When we separate the full sample into integrated- and segmented-market groups, we gain important insights into the determinants of SEOs following IPOs. For integrated-market IPOs we obtain a coefficient (p-value) for UP of -0.258 (0.877), while for segmented-market firms we obtain a coefficient of 2.524 (0.003). The marginal effects indicate that for segmented-market firms, a one percent increase in underpricing at their IPO increases the likelihood of a seasoned equity offering by 32.3%. As is apparent from the coefficients, p-values and marginal effects, the strong positive relationship between the likelihood of a SEO and the degree of IPO underpricing shown by the IPOs from segmented markets does not exist for the group of integrated-market IPOs. Instead, for this group of firms, aftermarket price appreciation significantly explains the likelihood of a SEO.[22] Specifically, a one percent increase in the first 20 days' aftermarket abnormal return increases integrated market firms' likelihood of a SEO by 38.3%. The results remain qualitatively the same after we control for the year and industry dummies in Models 3, 6 and 9.

Models 7 and 10 show that for segmented-markets IPOs, FractionSold is negative and significant at the 1% level, and insignificant for IPOs from integrated markets. This indicates that the negative relationship between FractionSold and the likelihood of an SEO subsequent to an IPO found for the full sample is driven by segmented-market IPOs. This result suggests that along with the level of underpricing the percentage of the firm sold at the IPO can and is being used as a signal by the segmented-market firms that plan follow-on SEOs.

The results contained in Table 6 provide strong support for the signalling hypothesis in that they suggest that firms from segmented markets are willing to leave more money on the table at their IPO to recoup benefits from seasoned equity issuances to meet their capital requirements. As we argued earlier, it is not necessary for all firms to apply a signalling strategy by underpricing more at the IPO, only those firms with high information asymmetry and with a strong need to access external capital markets. Firms from segmented markets fall into this

[21] For the sake of brevity, we do not report the estimates of the coefficients of year and industry dummy variables.

[22] We also estimated separate regressions within and before the bubble period of 1999 to 2000. The results remained qualitatively the same.

category. In segmented markets, the average firm faces a relatively high cost of capital. In this regard, Lins, Strickland, and Zenner (2005) show that following a US listing, the sensitivity of investment to free cash flow decreases significantly for firms from emerging capital markets. They report further that these firms mention the need for access to external capital markets in their filing documents more frequently than their developed-market counterparts do.

Therefore, as we predict, consistent with the signalling hypothesis the more underpriced are the IPOs from these markets, the more likely they are to issue seasoned equity. In accord with our priors, we find no similar relationship for integrated-market firms. For these firms, aftermarket price appreciation explains the likelihood of SEO issuing – a result that is repeated consistently below.

In results not reported, we used a Tobit model to test the hypothesis that the size of a firm's seasoned equity issue, measured as the size of the SEO as a proportion of the amount of capital raised by the firm at its IPO plus SEO. Using the same vector of independent variables as that used in the previous logit regressions, we find similar to the results of the probability of the follow-on SEO that for segmented-market firms, the variable UP has a positive and significant effect. For integrated-market firms, IPO underpricing has an insignificant effect. For this group of firms, aftermarket price appreciation is again the key explanatory variable where we find AFTRET1 to be both economically and statistically significant.

In sum, the results for both the likelihood of a follow-on SEO and the size of the SEO issue indicate that IPOs from segmented markets are supportive of predictions 1 and 2 of the signalling hypothesis, while the results for IPOs from integrated markets are supportive of the market feedback hypothesis.

5.2 Time lag between foreign IPO and the first SEO

In this subsection, we examine the relation between IPO underpricing and the time lag between the IPO and the first SEO. We contend that if firms voluntarily leave more money on the table because they plan to return to the equity market to raise capital at a more favorable price, the time lag between the IPO and the first SEO should be shorter for firms following this strategy than for other firms.

Welch (1996) develops a model in which the 'timing' of the offering becomes endogenous. He contends that it is more realistic to assume that issuers decide when to issue and that high-quality firms in general underprice more and wait longer for their follow-up SEOs in an effort to increase the possibility that low-quality firms will be revealed. We would argue, however, that foreign IPOs – especially those from segmented capital markets – unlike US domestic IPOs, may not have the luxury of waiting for an extended period of time because, as Welch

notes, such firms by waiting too long may lose the benefit of timely funding and as a result experience a reduction in value.[23] We suspect, moreover, that timely funding is especially crucial for IPOs from segmented markets given that they are more likely to be financially constrained than IPOs from integrated markets (Lins, Strickland, and Zenner, 2005). Welch (1996) also points out that models such as those by Welch (1989), and Allen and Faulhaber (1989), which treat the timing of SEOs as exogenous, apply to firms that do not have internal funds or access to risk-free borrowing. This in turn is more likely to be the case for foreign IPOs, again particularly those from segmented markets. We, therefore, treat the 'timing' of an issue as exogenous in our analysis.

Because we truncate the sample used above by only selecting SEOs within 3 years of the IPO date, we apply Tobit regression analysis in studying the time lag between IPOs and SEOs.[24] The dependent variable is the natural logarithm of the time (measured in days) between the IPO and the SEO (LnGap). If there is no SEO within three years following the IPO, the dependent variable equals the natural logarithm of the maximum value of 1095 days (three years). For regressions using the full sample, there are 70 uncensored observations and 343 right-censored observations.

The Tobit regression that we estimate has the following specification

$$\text{LnGap}_i = \begin{cases} A + x_i\beta + \mu_i \text{ if } LHS < \text{Ln}(1{,}095) \\ \text{Ln } (1.095) \text{ otherwise} \end{cases} \tag{5.2}$$

The vector of explanatory variables (x_i) is the same as that used in the previous logit regressions.

Table 7 presents the regression estimates. For the full sample, the slope coefficient estimate (p-value) of UP is -1.865 (0.001). This indicates that firms that underprice more at their IPO tend to return to capital markets quicker than other firms do. When we separate the sample into firms from segmented and integrated markets, the negative and significant relationship between underpricing and the time lag between the IPO and the first SEO is only found for the sub-sample of segmented-market IPOs. For firms from integrated markets (Model 5), the slope coefficient (p-value) for UP is an insignificant -0.366 (0.766). However,

[23] If firms do actually manipulate the timing of the disclosure, we should find that more underpriced firms wait longer to issue seasoned equity. To test the endogenous timing hypothesis, we collected all first SEOs of foreign IPOs without invoking the cutoff point of 3 years. Among the 101 SEOs collected, the longest waiting time between IPO and the first SEO is 9.59 years. In OLS analysis, the underpricing variable still has a negative and significant relationship with the length of time it takes the firm to return to the capital market. This result is consistent with our conjectures but opposite to the findings of Welch (1996).

[24] The results remain qualitatively the same if the SEO sample includes issues within two years (53 SEOs) or within five years of the IPO date (89 SEOs).

for both AFTRET1 and AFRET2, the coefficients are both negative and significant (-2.792 (0.005) and -1.694 (0.050)).

These results are consistent with our previous results for segmented-market firms, in that only the degree of underpricing significantly reduces the time lag. Consistent with our expectations the coefficient on FractionSold is positive and significant, indicating that firms that sell more of their shares at the IPO wait significantly longer to issue SEOs. Similar to our earlier results, segmented-market firms drive this finding, as only in the segmented-market sample (Model 10) is the variable significant.

5.3 Quintile analysis

To provide additional evidence, we follow Jegadeesh, Weinstein, and Welch (1993) and partition the firms on the ranking of underpricing and aftermarket-return. An advantage of this procedure, as Jegadeesh, Weinstein, and Welch (1993) and Warner, Watts, and Wruck (1988) point out, is that it enables us to evaluate the economic significance of the results from the logit/Tobit regressions. For brevity, we only report results for the segmented-market sample.

Panel A of Table 8 presents the actual and predicted percentage of firms issuing SEOs within each quintile of underpricing and aftermarket-return. There is a clear monotonic relation between the likelihood of issuing SEOs and the degree of underpricing. In this group, about 9% of the firms in the lowest quintile issue SEOs and about 27% of the firms in the highest IPO underpricing quintile issue SEOs. The likelihood of issuing SEOs increases monotonically as the degree of underpricing increases. Consistent with the previous cross-sectional analysis, there is no relationship between the likelihood of issuing SEOs and the after-market returns for segmented-market IPOs.

Panel B reports the actual and predicted mean SEO size (SeoSize) sorted by quintile of IPO underpricing and aftermarket–return. SeoSize is defined as the SEO issue size as a percentage of capital raised in both the IPO and SEO (SEO/(SEO+IPO)). For the segmented-market group, we find a clear monotonic relation between the IPO rankings based on underpricing and the mean SeoSize. The mean proportions of SeoSize for the lowest and largest IPO underpricing quintiles are 4.4% and 16.4%, respectively and the mean SeoSize is monotonically increasing across the three intermediate underpricing quintiles.

Panel C presents quintile analysis where we sort on time between the IPO and SEO. The results here are largely consistent with our Tobit regression results. Except for the lowest two quintiles, there appears to be a monotonic relation between quintile mean underpricing and average time between IPO and SEO for firms from segmented markets.

To summarize, the results for the segmented-market IPOs contained in Table 8 strongly support the signalling hypotheses. In additional results not reported, we find that for the sub-sample of firms from integrated markets, it is the after-market return variable AFRET1, that increases monotonically with the likelihood of issuing SEOs and is related to the size of the SEO.

5.4 Market anticipation of SEOs

Finally, in this subsection we examine the relation between the stock-price response to the announcement of SEOs and IPO underpricing. We contend that for segmented-market firms that underprice more at the IPO, the market should be less surprised by their SEO announcements and consequently the price decline normally associated with SEO announcements to be less severe than for IPOs from integrated markets. To test this implication of the signalling hypothesis, we regress the abnormal three-day returns due to the SEO announcement against the independent variables used in the previous regressions along with the following additional variables:

LnGap	=	the natural logarithm of the number of days between the IPO and the SEO.
LnSEOSZ	=	the natural logarithm of the issue size of the SEO.
SeoSize	=	the size of the SEO as a proportion of the total of the size of the IPO and the SEO.
PrestigUW	=	the rank of underwriters used in the SEO.
Hitech	=	Dummy variable if the issuing firms are from the hi-tech industry.

The dependent variable is the three-day (-1, 1) abnormal returns of firms that announce SEOs. We obtain abnormal returns using standard event study methodology (Brown and Warner, 1985). We use the CRSP equally weighted index returns as the market index in the event study and the parameters for the market model are estimated over the (-266, -11) interval. To be included in the event study, issuing firms must have at least 100 days' stock returns for the estimation period. This data requirement reduces the number of observations from 70 to 61.[25]

Table 9 presents the OLS estimates of the regression model. The estimate of the slope coefficient on the underpricing variable is positive and significant at the

[25] This decline in the size of the sample is because there are several SEOs that are within three months of the IPO and that, therefore, do not meet the number of trading days' requirement for the event study. If this requirement is relaxed, we obtain qualitatively similar results.

one percent level. This indicates, consistent with our conjecture, that the stock market reacts less unfavorably to SEO announcements by firms that had higher levels of underpricing at their IPO. Again, we find that segment-market firms determine this relationship. For firms from integrated markets, the slope coefficient on the IPO-underpricing variable is not significantly different from zero; for these firms, aftermarket price appreciation is once again the statistically important variable.

6 Conclusion

Welch (1989), among others, proposes a signalling model in which issuers convey their private information about the value of their firms by underpricing their IPOs. Empirical studies, however, have come up with at best weak support for the signalling hypothesis (see eg Jegadeesh, Weinstein and Welch, 1993). Using a sample of foreign firms coming to the US financial markets to issue IPOs, we re-visit the signalling hypothesis as developed by Welch (1989) and find strong support for the signalling hypotheses for IPOs of firms from financially segmented countries.

We find that firms from segmented markets that experience relatively larger underpricing at IPOs are: a) subsequently more likely to issue seasoned equity; b) likely to raise larger amounts of capital in their seasoned offerings; c) likely to issue seasoned equity more quickly after their initial public offerings; and d) likely to experience a smaller price drop on the date of the SEO announcement. However, we do not find similar results for the group of firms from integrated markets. Firms from integrated markets, in contrast, tend to underprice at IPOs to purchase lead underwriter's analyst coverage. For such firms, returns in the immediate post-IPO period are a better predictor of their SEO activities. Therefore, we conclude that the signalling hypothesis is a major determinant of IPO underpricing for firms from segmented markets, a group of firms that face higher information asymmetry and have a greater need to access external capital markets.

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Table 1 **Distribution of foreign IPOs and SEOs by market segmentation and country**

This table presents the distribution of foreign IPOs in the US market from 1985 to 2000 and SEOs issued within three years of the IPO. We follow Bekaert and Harvey (1995) in identifying the issuing countries' financial market integration status. We then augmented this sample with countries from Edison and Warnock (2003). The proceeds are in million US dollars. UP is the IPO underpricing and it is calculated as $(P_1-P_0)/P_0*100$ in percentage terms, where P_1 is the first day closing price; P_0 is the initial offering price. All the SEOs are issued three years subsequent to the IPO. CARs is defined as the three-day cumulative abnormal returns around the SEO announcement date.

	IPO			SEO		
Nation	No. of Obs.	Proceeds ($ mil.)	UP	No. of Obs.	Proceeds ($ mil.)	CARs
Segmented Markets						
Argentina	7	2,101.9	19.240	1	152.8	-0.062
Bahamas	2	154.4	5.993	2	174.7	0.010
Bermuda	29	5,234.9	12.950	8	1,931.4	-0.034
Brazil	2	117.8	5.472	0	0	N/A
British Virgin	2	20.0	2.432	0	0	N/A
Cayman Islands	3	94.1	52.620	1	68.0	0.093
Chile	15	888.8	9.096	4	739.7	-0.026
China	12	2,133.0	1.643	0	0	N/A
Cyprus	1	12	1.875	0	0	N/A
Greece	4	376.3	5.336	0	0	N/A
Hungary	2	319	36.598	0	0	N/A
India	2	182.1	53.458	0	0	N/A
Indonesia	3	443.2	-2.683	0	0	N/A
Israel	81	1,990.3	16.325	10	701.5	-0.051
Jordan	1	7.0	12.500	1	13.1	0.000
Mexico	17	2,231.8	1.520	3	260.5	-0.041
Monaco	1	31.5	0.000	0	0	N/A
Neth. Antilles	3	213.6	-7.600	0	0	N/A
Panama	3	90.3	-0.328	1	75.0	-0.005
Peru	3	707.4	11.399	0	0	N/A
Philippines	1	56.0	32.031	0	0	N/A
Portugal	1	114.9	1.133	1	274.4	0.021
Puerto Rico	6	183.5	10.254	0	0	N/A
Russian Fed	1	136.7	4.070	0	0	N/A
South Korea	3	1,324.3	4.144	3	1,421.1	-0.074
Taiwan	3	606.8	2.814	1	75.7	-0.091
Venezuela	1	534.4	12.500	1	53	-0.029
Subtotal	209	20,306.0	12.204	37	5,940.9	-0.033
Integrated Markets						
Australia	3	108.8	-0.686	0	0	N/A
Belgium	3	121.2	18.183	1	73.3	-0.0197
Canada	51	2,999.9	6.510	9	419.6	-0.022
Denmark	3	1,302.1	12.197	0	0	N/A
France	9	1,222.9	0.762	2	595.6	0.060
Germany	3	442.7	5.362	0	0	N/A
Hong Kong	27	1,759.4	10.984	2	219.2	0.013
Ireland-Rep	10	407.8	19.070	2	69.1	-0.102
Italy	9	1,429.3	4.744	2	805.1	0.017
Japan	1	133.6	36.143	0	0	N/A
Luxembourg	4	191.3	3.200	2	102.2	-0.019

Nation	IPO			SEO		
	No. of Obs.	Proceeds ($ mil.)	UP	No. of Obs.	Proceeds ($ mil.)	CARs
Netherlands	18	1,842.6	6.343	3	257.8	-0.114
New Zealand	4	388.2	13.210	1	50.2	-0.011
Norway	4	273.3	-2.021	1	206.5	-0.012
Singapore	5	431.7	-3.679	2	591.7	-0.100
South Africa	1	81.7	11.111	0	0	N/A
Spain	2	360.7	14.947	0	0	N/A
Sweden	4	266.5	7.105	1	141.5	-0.090
Switzerland	4	260.8	17.681	0	0	N/A
United Kingdom	39	2,539.3	7.602	5	551.7	0.004
Sub Total	204	16563.8	7.843	33	4,083.5	-0.031
Grand Total	413	36869,8	10.050	70	10,024.4	-0.032

Table 2 **Descriptive statistics of the foreign IPOs and SEOs**

Panel A presents the descriptive statistics for the 413 foreign IPOs issued from 1985–2000 in the US capital markets by issuing countries' financial market integration status. Integrated refers to IPOs from countries with fully integrated financial markets. Segmented denotes IPOs from countries whose capital markets are not fully integrated. UP (Underpricing) = $(P_1-P_0)/P_0*100$, where P_1 is the first day closing price and P_0 is the initial offering price. IPOSZ is size of the initial offerings in millions of US dollars. UWrank is a continuous measure of the underwriter rank from Loughran and Ritter (2004). NYSE is a dummy variable if the IPO is listed on the NYSE. ADR is a dummy variable when the IPO is identified as an ADR in the SDC database. Hitech refers to those IPOs issued by firms from hi-tech industries. Panel B presents the descriptive statistics for IPOs and SEOs by issuing countries' financial-market integration status. CARs is defined as the three-day cumulative abnormal returns around the SEO announcement date. SEOSZ is the size of the seasoned equity offerings in millions of US dollars. GAP is the number of days between an IPO and its first SEO. The t-statistics are from the tests of the differences in mean between the integrated IPOs (SEOs) and the segmented IPOs (SEOs). Figures in parentheses are standard deviations.

Panel A. IPOs

	All (n = 413)		Integrated (n = 204)	Segmented (n = 209)	Diff.
	Mean	Std.	Mean	Mean	t-statistics
UP	10.050	18.530	7.844 (13.968)	12.204 (21.915)	-2.405***
IPOSZ	89.000	164.000	81.000 (9.356)	97.000 (13.112)	0.987
UWrank	7.017	2.774	6.937 (0.198)	7.095 (0.189)	0.579
NYSE	0.305	0.461	0.240 (0.428)	0.368 (0.484)	-2.850***
ADR	0.366	0.482	0.417 (0.035)	0.316 (0.032)	2.135**
Hitech	0.383	0.487	0.343 (0.033)	0.421 (0.034)	1.630*

Panel B. SEOs

	All (n = 70)		Integrated (n = 33)	Segmented (n = 37)	Diff.
	Mean	Std.	Mean	Mean	t-statistics
CARs	-0.024	0.063	-0.031 (0.014)	-0.033 (0.009)	0.128
SEOSZ	141.000	224.000	123 (27.217)	157 (45.464)	0.621
UWrank	7.886	2.077	7.949 (0.343)	7.830 (0.361)	0.237
NYSE	0.386	0.490	0.333 (0.083)	0.432 (0.083)	0.842
GAP	492	270	474 (47.341)	510 (45.704)	0.537
Hitech	0.414	0.496	0.364 (0.085)	0.460 (0.083)	0.805

The symbols *, **, *** denote statistical significance at the 10%, 5%, and 1% respectively.

Table 3 **Cross-section analysis of the underpricings of the foreign IPOs**

This table displays the results from the regression analysis. The dependent variable is the initial returns of foreign IPOs defined as $(P_1-P_0)/P_0*100$. Integrated is a dummy variable if the IPO comes from a fully integrated capital market. GDP is a variable that ranges from 1 to 4, and represents low income, lower-middle income, higher-middle income and high income. Legal is a variable that ranges from 1 to 3 and represents the French system, the German and Scandinavian system, and the English system. LnSize is the natural log of the initial offering size. UWrank is a continuous measure of the underwriter rank. Venture is a dummy variable if the IPO is venture-capital backed. NYSE is a dummy variable if the foreign IPO is listed on the NYSE. Hitech is a dummy variable for firms from hi-tech industries. ADR is a dummy variable when the IPO is identified as an ADR in the SDC database. STDV is the standard deviation of returns for days 1 to 100 after the IPO. CoMgrs is the number of co-managers in the IPO syndicate. The four governance indicators, VoiceAcc(Voice Accountability), PolStab(Political Stability), GovEff(Government Effectiveness), and CrptnCntl(Corruption Control) are measured in units ranging from -2.5 to 2.5, with higher values corresponding to better governance outcomes. Coefficients are reported with heteroscadasticity consistent t-statistics; p-values are reported in parentheses below the estimated coefficients.

	Model 1 All	Model 2 All	Model 3 All	Model 4 All	Model 5 All	Model 6 All	Model 7 All	Model 8 Integrated	Model 9 Segmented
Constant	12.204***	-15.533	-25.294	-23.623	-31.193*	-30.787	-29.046	-35.326*	-19.602
	(0.000)	(0.340)	(0.150)	(0.247)	(0.099)	(0.108)	(0.128)	(0.087)	(0.622)
Integrated			-4.949**	-8.054***	-11.636***	-10.113***	-8.377***		
			(0.012)	(0.001)	(0.009)	(0.0001)	(0.006)		
GDP		0.824	1.295	-3.824*	0.899	-0.268	-0.707	-0.429	-6.264**
		(0.424)	(0.237)	(0.090)	(0.583)	(0.879)	(0.712)	(0.786)	(0.022)
Legal		0.042	1.016	1.140	1.856**	0.705	0.328	0.680	0.894
		(0.969)	(0.387)	(0.332)	(0.046)	(0.519)	(0.757)	(0.541)	(0.766)
LnSize		1.469	2.019**	2.714***	2.385**	2.582**	2.587**	2.462**	2.908
		(0.115)	(0.041)	(0.009)	(0.020)	(0.012)	(0.012)	(0.020)	(0.192)
UWrank		-0.977**	-0.981**	-1.170***	-1.162***	-1.277**	-1.265***	-1.257**	-1.081
		(0.014)	(0.012)	(0.007)	(0.006)	(0.003)	(0.004)	(0.013)	(0.174)
Venture		3.425	3.705	7.356	6.933	6.494	6.370	1.222	14.766
		(0.528)	(0.471)	(0.151)	(0.181)	(0.212)	(0.220)	(0.727)	(0.169)
NYSE		-5.600***	-6.549***	-5.878**	-6.629	-6.756***	-6.694***	-4.641*	-7.635
		(0.009)	(0.003)	(0.021)	(0.011)	(0.008)	(0.006)	(0.056)	(0.101)
Hitech		2.934	1.726	2.393	2.510	2.481	2.341	0.226	5.365
		(0.177)	(0.433)	(0.249)	(0.236)	(0.250)	(0.286)	(0.923)	(0.224)

	Model 1 All	Model 2 All	Model 3 All	Model 4 All	Model 5 All	Model 6 All	Model 7 All	Model 8 Integrated	Model 9 Segmented
ADR		-2.788*	-2.115	-1.792	-1.769	-1.931	-1.091	-0.056	-2.225
		(0.099)	(0.202)	(0.351)	(0.348)	(0.304)	(0.614)	(0.978)	(0.631)
STDV		1.856***	1.815***	1.734***	1.868***	1.934***	1.921***	1.605***	1.622***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)	(0.000)
CoMgrs		0.353	0.251	0.279	0.314	0.326	0.317	0.220	0.199
		(0.195)	(0.349)	(0.364)	(0.309)	(0.292)	(0.305)	(0.457)	(0.691)
VoiceAcc				6.097***				3.780*	7.084**
				(0.003)				(0.082)	(0.033)
PolStab					4.337				
					(0.161)				
GovEff						4.373**			
						(0.043)			
CrptnCntl							3.485		
							(0.191)		
No. of Obs.	413	397	397	309	315	315	315	159	150
Adj. R^2	0.014	0.150	0.163	0.237	0.254	0.255	0.227	0.127	0.274
F Statistics	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

The symbols *, **, *** denote statistical significance at the 10%, 5%, and 1% respectively.

Table 4 **Analyst coverage: sorted by financial market integration and quintiles of underpricing**

This table presents analysts' recommendations sorted by quintiles of underpricing. LeadMgr Recom is the percentage of recommendations offered by the lead underwriters within one year of the IPO date. No. Analysts1 is the average number of analysts providing recommendations to firms within one year of the IPO date. Avg. Recom1 is the average recommendation for the IPO firms within one year of going public, and it ranges from 1 to 5, where 5 refers to 'Strong Buy' and 1 refers to 'Strong Sell'. No. Recom1 is the average number of recommendations offered to the issuing firms within one year of the IPO. No. Analysts3 is the number of analysts providing recommendations to the issuing firms within three years after the IPO. Avg. Recom3, is the average recommendation for the IPO firms within three years of going public, and it ranges from 1 to 5, where 5 refers to 'Strong Buy' and 1 refers to 'Strong Sell'. No. Recom3 is the average number of recommendations offered to the issuing firms within three years after the IPO. Integrated IPOs are IPOs by firms from fully integrated markets and Segmented IPOs are other issuing firms.

	UP	LeadMgr Recom	No. Analysts1	Avg. Recom1	No. Recom1	No. Analysts3	Avg. Recom3	No. of Recom3
All IPOs with analyst recommendation available (n = 335)								
Low	-2.31	58.7	3.15	4.11	4.41	5.58	3.92	12.18
Q2	1.01	68.2	2.72	3.99	3.65	5.05	3.82	9.75
Q3	4.65	60.9	3.94	4.10	5.58	7.57	3.92	16.93
Q4	12.36	50.0	4.19	4.10	5.75	7.10	3.88	14.64
High	42.58	65.3	3.68	4.31	5.17	6.81	4.10	14.59
Segmented IPOs (n = 162)								
Q2	-2.45	60.0	3.07	4.06	4.10	5.94	3.86	10.77
Q3	1.3	50.0	2.86	4.08	3.89	5.67	3.85	11.83
Q4	6.08	52.2	4.44	4.02	6.00	8.43	3.78	18.83
High	13.58	62.5	4.42	4.20	6.29	7.45	3.97	14.96
Q2	50.69	45.8	4.45	4.32	5.75	7.65	4.05	17.13
Integrated IPOs (n = 173)								
Q2	-2.20	68.3	2.69	4.09	4.63	4.61	3.96	13.22
Q3	0.85	Na	2.60	3.56	3.50	3.50	3.53	7.50
Q4	3.08	66.7	3.65	4.31	3.43	7.15	4.10	9.00
High	10.74	76.2	3.05	3.94	6.00	5.95	3.84	17.38
Q2	33.38	72.7	3.18	4.30	5.14	6.04	4.13	13.05

Table 5 **Estimates of the alternative hypotheses for IPO underpricing**

We test the alternative hypotheses for IPO underpricing by using both Heckman two-stage models and OLS models. In Models 1 to 4 where we test the 'analyst-coverage-purchase' hypothesis, the dependent variable is the number of recommendations from lead analysts within the first year after the IPO. In Models 5 to 8 where we test the 'momentum' hypothesis the dependent variable is the number of recommendations from non-lead analysts within the first year after IPO. Model 1, 3, 5 and 7 include IPOs by firms from integrated markets and model 2, 4, 6, and 8 include IPOs by firms from segmented markets. GDP is a variable that ranges from 1 to 4, and represents low income, lower-middle income, higher-middle income and high income. LnSize is the natural logarithm of the initial offering size. UWrank is a continuous measure of the underwriter rank. Hitech is a dummy variable for firms from hi-tech industries. Venture is a dummy variable if the IPO is venture-capital backed. NYSE is a dummy variable if the foreign IPO is listed on the NYSE. CoMgrs is the number of co-managers in the IPO syndicate. Turnover is defined as the daily average trading volume in the first year of trading as a percent of shares offered in the IPO. UP is the degree of underpricing measured as $(P_1-P_0)/P_0*100$. p-values are reported in parentheses below the coefficients.

	Lead Recommendations				Non-Lead Recommendations			
	Heckman		OLS		Heckman		OLS	
	Integrated	Segmented	Integrated	Segmented	Integrated	Segmented	Integrated	Segmented
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Constant	1.952	-0.754	0.424	0.065	-22.712**	-23.876**	-23.716**	-21.310***
	(0.197)	(0.666)	(0.573)	(0.934)	(0.019)	(0.015)	(0.026)	(0.007)
LnSize	-0.107	0.018	-0.053	-0.009	1.465***	1.489***	1.500**	1.403***
	(0.158)	(0.817)	(0.257)	(0.846)	(0.003)	(0.001)	(0.032)	(0.003)
UWrank	0.083**	0.089*	0.122***	0.067**	-0.165	-0.129	-0.140	-0.198
	(0.046)	(0.068)	(0.000)	(0.013)	(0.527)	(0.634)	(0.492)	(0.290)
Hitech	0.049	0.228	0.143	0.163	-0.549	0.851	-0.487	0.648
	(0.740)	(0.185)	(0.302)	(0.202)	(0.554)	(0.373)	(0.557)	(0.475)
CoMgrs	0.007	0.014	0.004	0.014	0.161	0.130	0.159	0.129*
	(0.698)	(0.353)	(0.819)	(0.407)	(0.139)	(0.122)	(0.148)	(0.074)
Turnover	2.128**	0.330	2.131*	0.287	5.458	-3.769	5.459	-3.901
	(0.014)	(0.799)	(0.100)	(0.842)	(0.317)	(0.602)	(0.316)	(0.470)
UP	1.038**	-0.188	0.011*	-0.002	0.486	2.095	0.005	0.022*
	(0.016)	(0.490)	(0.077)	(0.593)	(0.858)	(0.167)	(0.822)	(0.081)
Inverse Mills	-0.463	0.281			-0.304	0.881		
Ratio	(0.170)	(0.571)			(0.886)	(0.750)		
n	162	173	162	173	162	173	162	172
Adj. R^2	0.186	0.034	0.212	0.072	0.110	0.116	0.148	0.152

The symbols *, **, *** denote statistical significance at the 10%, 5%, and 1% levels respectively.

Table 6 **Logit regression estimates of the probability of SEO**

This table presents the logit regression estimates of the relation between stock returns at the time of the IPO and the probability of a subsequent seasoned equity offering (SEO) for the foreign IPOs in the 1985 to 2000 period. The dependent variable is a dummy variable taking the value one if a firm issues seasoned equity in the US within three years of its IPO, and zero otherwise. The independent variables are UP which is the degree of underpricing and is measured as $(P_1-P_0)/P_0*100$, AFTRET1 and AFTRET2 is the abnormal after market returns in the two 20-day periods after the IPO. LnSize is the natural logarithm of the IPO size and ADR is a dummy variable when the IPO is identified as an ADR in the SDC database. FractionSold measures the proportion of the firm that the issuer sells at the IPO and is calculated as number of shares sold at the IPO divided by the total number of shares outstanding following the IPO. Integrated refers to firms that are from fully integrated markets and Segmented includes other firms. p-values are reported in parentheses and marginal effects are reported in the brackets. Coefficients are reported with heteroscadasticity consistent t-statistics.

	Full sample Model 1	Full sample Model 2	Full sample Model 3	Full sample Model 4	Integrated Model 5	Integrated Model 6	Integrated Model 7	Segmented Model 8	Segmented Model 9	Segmented Model 10
Constant	-1.808***	-10.387***	-13.552***	-3.568	-11.517***	-21.230***	-8.232*	-8.955***	-11.835***	-1.088
	(0.000)	(0.000)	(0.000)	(0.275)	(0.000)	(0.000)	(0.077)	(0.000)	(0.004)	(0.807)
UP	1.821***	1.749***	2.233***	2.286***	-0.258	-1.794	1.499	2.524***	3.531***	3.919***
	(0.002)	(0.006)	(0.003)	(0.003)	(0.877)	(0.436)	(0.435)	(0.003)	(0.001)	(0.002)
	[0.250]	[0.221]	[0.240]	[0.275]	[-0.028]	[-0.080]	[0.140]	[0.323]	[0.374]	[0.363]
AFTRET1		0.840	0.577	0.974	3.547***	4.237***	5.832**	-0.898	-1.180	-0.430
		(0.219)	(0.434)	(0.301)	(0.009)	(0.002)	(0.019)	(0.304)	(0.258)	(0.710)
		[0.106]	[0.062]	[0.301]	[0.383]	[0.187]	[0.544]	[-0.115]	[-0.125]	[-0.040]
AFTRET2		-0.232	-0.022	-1.135	1.328	1.424	2.108	-1.906*	-2.196*	-3.750
		(0.774)	(0.979)	(0.447)	(0.299)	(0.246)	(0.184)	(0.071)	(0.080)	(0.019)
		[-0.029]	[-0.002]	[-0.136]	[0.143]	[0.063]	[0.197]	[-0.244]	[-0.233]	[-0.347]
LnSize		0.493***	0.567***	0.164	0.563***	0.916***	0.389	0.399***	0.456**	0.009
		(0.000)	(0.000)	(0.361)	(0.000)	(0.000)	(0.145)	(0.000)	(0.030)	(0.972)
		[0.062]	[0.061]	[0.020]	[0.061]	[0.040]	[0.036]	[0.051]	[0.048]	[0.001]
ADR		-0.452	-0.626*	-0.708	-0.439	-0.880	-1.053	-0.098	-0.421	0.151
		(0.152)	(0.065)	(0.179)	(0.326)	(0.110)	(0.318)	(0.842)	(0.392)	(0.845)
		[0.055]	[-0.063]	[-0.077]	[0.061]	[-0.037]	[-0.087]	[-0.012]	[-0.042]	[0.014]
FractionSold				-4.442***			-1.250			-7.005***
				(0.002)			(0.466)			(0.001)
				[-0.534]			[0.117]			[-0.649]

	Full sample Model 1	Full sample Model 2	Full sample Model 3	Full sample Model 4	Integrated Model 5	Integrated Model 6	Integrated Model 7	Segmented Model 8	Segmented Model 9	Segmented Model 10
Year Dummy	No	No	Yes	No	No	Yes	No	No	Yes	No
Ind. Dummy	No	No	Yes	No	No	Yes	No	No	Yes	No
n	413	402	402	162	197	197	70	205	205	92
Pseudo R^2	0.023	0.076	0.155	0.140	0.139	0.337	0.252	0.108	0.202	0.262
p-value	0.002	0.000	0.000	0.004	0.001	0.004	0.147	0.003	0.019	0.011

The symbols *, **, *** denote statistical significance at the 10%, 5%, and 1% levels respectively.

Table 7 **Tobit regression estimates of the time between IPO and SEO**

This table presents the Tobit regression analysis of the relation between stock returns at the time of the IPO and the time between the IPO and the foreign IPOs during the period from 1985 to 2003. The dependent variable is the natural logarithm of the time between the IPO and the SEO (LnGap). When the IPOs do not issue SEOs in three years, the dependant variable equals the natural logarithm of the maximum value of 1095 days (three years). For regressions including the full sample, there are 70 uncensored observations and 343 right-censored observations when the gap is greater than 3 years. The independent variables are UP which is the degree of underpricing and is measured as $(P_1-P_0)/P_0*100$, AFTRET1 and AFTRET2 is the abnormal after market returns in the two 20-day periods after the IPO. LnSize is the natural logarithm of the IPO size and ADR is a dummy variable when the IPO is identified as an ADR in the SDC database. FractionSold measures the proportion of the firm that the issuer sells at the IPO and is calculated as number of shares sold at the IPO divided by the total number of shares outstanding following the IPO. Integrated refers to firms that are from fully integrated markets and Segmented includes other firms. p-values are reported in parentheses.

	Full sample Model 1	Full sample Model 2	Full sample Model 3	Full sample Model 4	Integrated Model 5	Integrated Model 6	Integrated Model 7	Segmented Model 8	Segmented Model 9	Segmented Model 10
Constant	8.747***	16.047***	17.287***	9.627***	16.275***	19.492***	13.194***	14.383***	15.440***	8.249**
	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)	(0.009)	(0.000)	(0.000)	(0.017)
UP	-1.865***	-1.795***	-2.014***	-2.067***	-0.366	0.262	-1.661	-2.158***	-2.656***	-2.362***
	(0.001)	(0.001)	(0.000)	(0.003)	(0.766)	(0.823)	(0.258)	(0.001)	(0.000)	(0.002)
AFTRET1		-0.808	-0.473	-0.764	-2.792***	-2.687***	-3.792***	0.779	0.987	0.535
		(0.207)	(0.447)	(0.345)	(0.005)	(0.006)	(0.010)	(0.359)	(0.254)	(0.571)
AFTRET2		-0.174	-0.281	0.233	-1.694**	-1.709**	-2.367*	1.394*	1.451*	2.173**
		(0.762)	(0.616)	(0.774)	(0.050)	(0.028)	(0.062)	(0.079)	(0.071)	(0.049)
LnSize		-0.422***	-0.435***	-0.116	-0.445***	-0.520***	-0.290	-0.326**	-0.315**	-0.037
		(0.000)	(0.000)	(0.484)	(0.005)	(0.002)	(0.271)	(0.018)	(0.035)	(0.843)
ADR		0.380	0.513*	0.865*	0.384	0.649*	0.943	0.027	0.231	0.233
		(0.146)	(0.058)	(0.080)	(0.271)	(0.061)	(0.198)	(0.941)	(0.549)	(0.678)
FractionSold				3.702**			0.998			4.380**
				(0.016)			(0.615)			(0.028)
Year Dummy	No	No	Yes	No	No	Yes	No	No	Yes	No
Ind. Dummy	No	No	Yes	No	No	Yes	No	No	Yes	No
n	413	402	402	162	197	197	70	205	205	92
Pseudo R^2	0.023	0.062	0.124	0.109	0.116	0.281	0.204	0.092	0.166	0.205
p-value	0.001	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000

The symbols *, **, *** denote statistical significance at the 10%, 5%, and 1% levels respectively.

Table 8 **Quintile distribution analysis for segmented market IPOs**

This table presents the following results sorted by quintiles of IPO and abnormal aftermarket returns for segmented market IPOs during the period from 1985 to 2003 and SEOs are 3 years subsequent to the IPOs. Panel A contains the actual and predicted percentage of firms issuing SEOs. Panel B contains the actual and predicted SEO size defined as the SEO issue size as a percentage of capital raised in both the IPO and SEO. Panel C contains the actual and predicted time (measured in days) between IPO and SEOs. UP is the IPO underpricing UP and is measured as $(P_1-P_0)/P_0*100$. AFTRET1 and AFTRET2 are abnormal aftermarket returns in the two 20 day periods after the IPO. Quintiles are formed based on the variable listed in the first column of each block. Actual refers to the actual values of the variables. Predicted refers to the mean fitted values from the the logit and tobit models.

Panel A. % of firms reissuing

Quintile	UP	Actual	Predicted	AFTRET1	Actual	Predicted	AFTRET2	Actual	Predicted	AFTRET1+2	Actual	Predicted
1	-3.59%	8.62%	12.57%	-23.98%	20.00%	20.21%	-24.90%	32.43%	24.52%	-41.36%	25.81%	24.29%
2	0.84%	10.53%	13.65%	-6.69%	12.20%	19.91%	-7.86%	21.05%	19.75%	-11.02%	25.64%	19.70%
3	4.15%	17.95%	14.04%	0.35%	24.32%	16.65%	0.44%	10.53%	17.16%	1.09%	15.00%	17.32%
4	11.72%	21.95%	19.31%	6.60%	22.73%	14.65%	7.79%	12.24%	13.39%	12.81%	17.39%	13.30%
5	42.79%	27.08%	27.12%	25.22%	10.42%	14.45%	27.21%	13.95%	11.05%	37.29%	8.16%	11.26%

Panel B. SEO size (SEOSZ/(SEOSZ+IPOSZ))

Quintile	UP	Actual	Predicted	AFTRET1	Actual	Predicted	AFTRET2	Actual	Predicted	AFTRET1+2	Actual	Predicted
1	-3.59%	4.44%	5.63%	-23.98%	12.15%	9.76%	-24.90%	19.90%	11.99%	-41.36%	17.53%	11.88%
2	0.84%	8.50%	6.18%	-6.69%	7.98%	9.61%	-7.86%	12.55%	9.46%	-11.02%	12.50%	9.48%
3	4.15%	9.35%	6.32%	0.35%	13.05%	7.63%	0.44%	5.63%	7.87%	1.09%	10.42%	7.98%
4	11.72%	11.56%	9.00%	6.60%	12.82%	6.61%	7.79%	6.50%	5.95%	12.81%	8.58%	5.88%
5	42.79%	16.44%	13.32%	25.22%	5.17%	6.43%	27.21%	7.01%	4.75%	37.29%	4.18%	4.80%

Panel C. The time between IPO and SEO

Quintile	UP	Actual	Predicted	AFTRET1	Actual	Predicted	AFTRET2	Actual	Predicted	AFTRET1+2	Actual	Predicted
1	-3.59%	1,045	993	-23.98%	958	901	-24.90%	885	883	-41.36%	917	883
2	0.84%	1,055	983	-6.69%	1,024	901	-7.86%	961	922	-11.02%	949	922
3	4.15%	986	979	0.35%	937	944	0.44%	1,056	947	1.09%	1,007	945
4	11.72%	964	927	6.60%	957	968	7.79%	1,028	983	12.81%	996	983
5	42.79%	915	846	25.22%	1,048	972	27.21%	996	1,001	37.29%	1,041	1,002

Table 9

The dependent variable is the abnormal SEO three-day announcement price reaction. UP is underpricing defined as $(P_1-P_0)/P_0$. AFTRET1 and AFTRET2 are the abnormal returns in the two 20-day periods after the IPO. LnSize is the natural logarithm of IPO size. LnGap is the natural logarithm of the time between SEO and IPO. LnSEOSZ is the natural logarithm of SEO issue size. Sizeratio is the SEO issue size as a proportion of the SEO issue size plus of the IPO size. PrestigUW is the rank of the SEO lead underwriter. Hitech is a dummy variable for firms from hi-tech industries. Integrated includes firms that are from fully integrated markets and Segmented includes other firms. The sample consists of all SEOs from the 1987 to 2003 period that were issued within 3 years of the IPO. Coefficients are reported with heteroscadasticity consistent t-statistics. p-values are reported in parentheses below the coefficients.

	Full Model 1	Integrated Model 2	Segmented Model 3
Constant	0.944	0.653	0.103
	(0.215)	(0.571)	(0.935)
UP/100	0.116***	-0.034	0.156***
	(0.004)	(0.794)	(0.000)
AFTRET1	-0.070	-0.062	0.067
	(0.185)	(0.303)	(0.365)
AFTRET2	0.099**	0.140**	0.030
	(0.015)	(0.017)	(0.520)
LnSize	-0.062	-0.049	-0.010
	(0.164)	(0.497)	(0.894)
LnGap	0.007	0.010	0.008
	(0.577)	(0.641)	(0.601)
LnSEOSZ	0.069	0.063	0.013
	(0.133)	(0.406)	(0.872)
Sizeratio	-0.392*	-0.322	-0.107
	(0.100)	(0.406)	(0.785)
PrestigUW	0.029	0.074**	0.001
	(0.118)	(0.046)	(0.946)
Hitech	-0.055***	-0.034	-0.062***
	(0.002)	(0.273)	(0.003)
n	61	30	31
Adj. R^2	0.445	0.628	0.657
Prob>F	0.000	0.000	0.000

The symbols *, **, *** denote statistical significance at the 10%, 5%, and 1% respectively.

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