

Committing to protect investors in emerging markets: Can local exchanges substitute for cross-listing in the US?

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October 28, 2004

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Abstract

In the last two decades, the number of foreign firms cross listing their shares in the US has significantly increased. Facing this competitive pressure, some stock exchanges in countries with weak protection of minority shareholders have offered listed firms the option of adhering to exchange rules with stricter disclosure and delisting requirements. Using data from two exchanges in Korea, we show that Tobin's Q values are higher and IPO initial returns are lower at the exchange with stricter delisting requirements. These results are consistent with the hypothesis that stricter exchange rules can substitute for cross-listing as a value-enhancing bonding device.

JEL: G15, G38

Key words: Bonding, Emerging markets, Cross-listing

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Abstract

In the last two decades, the number of foreign firms cross listing their shares in the US has significantly increased. Facing this competitive pressure, some stock exchanges in countries with weak protection of minority shareholders have offered listed firms the option of adhering to exchange rules with stricter disclosure and delisting requirements. Using data from two exchanges in Korea, we show that Tobin's Q values are higher and IPO initial returns are lower at the exchange with stricter delisting requirements. These results are consistent with the hypothesis that stricter exchange rules can substitute for cross-listing as a value-enhancing bonding device.

I. Motivation

In the last two decades, the number of firms cross listing their shares in other countries has risen dramatically. In particular, the number of foreign companies listed on the NYSE or NASDAQ rose from just over 300 in 1986 to over 600 in 1995, while, from the beginning of 2000 to October 2003, almost 600 foreign firms issued depository receipts (ADR's).¹

Reese and Weisbach (2002, p. 66) argue that by listing in a well developed market such as the US, a firm commits "to conform to generally accepted accounting principles (US GAAP), to file reports with the US Securities and Exchange Commission (SEC), to comply with the requirements of the exchange on which it lists, and at least to some extent conform to US securities laws." The firm thus voluntarily substitutes relatively weak local governance rules, regulations, and norms, for the stricter US system. The reward is greater access to capital and a lower cost of capital, which, ultimately, are according to Reese and Weisbach the main reasons for cross listing in the US.²

¹ Source: Karolyi (1998) and Bank of New York website: <http://www.adrbny.com>. Karolyi (2004) notes that the rapid growth in cross listing and trading in cross listed shares slowed in the last few years.

² Other motives for cross listing include access to capital via better investor recognition or the ability to avoid barriers to investment (See Alexander et al 1987, 1988, 1997, Errunza and Miller 2000, Kadlec and McConnell 1994, Karolyi 1998, Merton 1987, Foerster and Karolyi 1993, 1999,2000, Saudagaran 1988, Switzer 1986, Jayaraman et al 1993, Miller 1999, Lins et al 1999, Pagano et al 2001a, 2001b) and

While cross listing in the U.S. may help the cross listing firm and the U.S. exchanges, it weakens local exchange markets by shifting trading abroad. A World Bank study of transition economy stock exchanges in 2000 notes that the number of shares traded abroad is twice as high as the number traded locally (Claessens et al 2000).

The loss of trading creates an incentive for local exchanges to offer mechanisms that assure investors that the firm will perform as promised or else managers and controlling shareholders will be subject to costs and liabilities. Following Coffee (2002), we call these mechanisms bonding.³

Two notable examples of local exchanges attempting to offer bonding mechanisms are the Neuer Markt in Germany and the special corporate governance levels at Bovespa (Brazil's stock exchange). Germany's Neuer Markt, established in 1997, advertised itself as the "most regulated market in Europe,"⁴ while Bovespa touted the listing firm's ability to "better advertise the efforts of the company to improve the relations with its investors."⁵ Both systems offer local firms the opportunity to select a listing regime with more stringent governance and reporting practices than the original local exchange. While strict governance practices (e.g., rules that assure a more independent board) aim to enhance shareholders' value by improving internal monitoring, stringent reporting requirements improve external monitoring by making it easier for investors to detect management decisions that are driven by opportunistic behavior and to punish the firm accordingly through lower stock prices.

It is not obvious, however, that local exchanges can effectively protect investors in countries that provide weak legal protection to minority shareholders. For instance, any exchange regulation that forces listed firms to disclose more detailed information on corporate decisions might be mute simply because neither the exchange nor the minority shareholders can sue firm officials for breaching contracts. Indeed, a *Wall Street Journal*

improved liquidity (See Tinic and West 1974, Foerster and Karolyi 1998, Domowitz et al 1998, Kadlec and McConnell 1994, Sanger and McConneell 1986, Smith and Sofianos 1997).

³ Some researchers use the term bonding relatively narrowly to refer primarily to the impact of the threat of legal action, while others define the term more broadly. Karolyi (2004) uses the term "legal bonding," while many papers cite Stulz's 1999 broad discussion of globalization's impact on the cost of capital as a description of bonding, even though he never actually uses the term.

⁴ Fuhrmans, "Playing by the rules: how Neuer market gets respect," WSJ August 21, 2000 at C-1.

⁵ The quote is from Bovespa's web site <http://www.bovespa.com.br/indexi.htm>. As of August 2004, 38 of 452 companies listed at Bovespa (8.41 percent) adhered to one of the special corporate governance levels.

article notes that some of the scandals plaguing the Neuer Markt in Germany may have been due to lax enforcement of insider trading restrictions in Germany.⁶ Coffee (2002) and Harvey, Lins and Roper (2003) both argue that legal enforcement is a critical component of minority investors' protection.

The purpose of this paper is to see whether exchange regulations can protect minority shareholders in countries that offer relatively weak legal protection to investors. Our experiment is a comparison of Tobin's Q values for firms at the two stock exchanges in Korea, the Korean Stock Exchange (KSE) and the Korea Securities Dealers Automated Quotation System (KOSDAQ). While a review of the listing requirements shows that KSE has higher thresholds in terms of size and equity, the ongoing performance thresholds (or, "delisting criteria") are stricter at KOSDAQ than at KSE.⁷ Delisting criteria include categories such as minority share ownership, trading volume, minimum stock price, auditor's opinion, and governance structure. Later, we shall argue that KOSDAQ's delisting rules were more stringent and its enforcement efforts more active than KSE's over the sample period, 1999-2002.⁸ Assuming effective protection makes it more difficult for controlling groups to extract private benefits at the cost of firm value, we test whether stricter delisting criteria at KOSDAQ are associated with higher Q's for the firms listed on KOSDAQ than for the firms listed on KSE.

This experiment has several advantages with respect to measuring the impact of different exchange requirements on firm value. First, looking within one country controls for other factors that complicate interpretation of results in cross-country studies (e.g., legal origin or macroeconomic effects). Second, Korea is a civil law (German-origin) country with an Antidirector Rights index of 2 compared to the average of 4 for common-law countries and 5 for the U.S. Its Rule of Law and Efficiency of Judicial System rankings are 5.35 and 6.00, compared to the common law averages of 6.46 and 8.15, and U.S. rankings of 10.00 and 10.00, respectively (LaPorta et al 1998). Korea's poor protection of minority shareholders and weak legal system provide ideal conditions to test

⁶ Kueppers "A busy bidder in Germany highlights flaws in Neuer Markt's efforts to challenge Nasdaq," Wall Street Journal 8/6/01, C-11.

⁷ The ongoing reporting rules are essentially similar.

⁸ For example, in 2002, bankruptcy would result in immediate delisting on KOSDAQ but not on KSE unless the firm failed to resolve bankruptcy within one year. In 2002, almost 5% of KOSDAQ firms were under special supervision compared to less than 1% for KSE.

whether local stock exchange regulations can provide an effective bonding service. Third, Korean firms have a big cross sectional variation in transparency. Firms associated with business groups, chaebol, are more opaque to outside investors. As we shall argue, stricter delisting requirements should have a relatively larger impact on the chaebol firms. Finally, the Korean exchanges were adjusting the intensity of their delisting rules over the period, providing an opportunity to test for time series as well as cross-exchange and cross-firm variation in firm value, with no need to reconcile different laws and accounting systems, as happens with cross-country analyses.

We find that different exchange rules were associated with a value impact. Controlling for other factors that affect measures of Tobin's Q, and for the endogeneity of exchange choice, we find that firms listing on KOSDAQ, the exchange with stricter bonding mechanisms, had higher Tobin's Q values. We interpret this finding as evidence that emerging markets can offer a bonding mechanism to local firms.

But can we be sure that the effect we measure is due to bonding? Although our estimates of the KOSDAQ-listing premium for q are consistent with the interpretation that stringent exchanges rules work as a bonding device, the estimates constitute only indirect evidence that the effect we measure is due to bonding.

To get more direct evidence that the value impact is in fact due to some aspect of the bonding process, we do a second series of tests on IPO initial returns at the two exchanges. A key mechanism of the bonding process is external monitoring. The exchanges provide guidelines on the type and frequency of disclosure, set minimum governance standards, and actively monitor their firms. All of these practices should reduce information asymmetries between managers and outside investors at the time of listing and over the life of the firm. The IPO literature suggests that initial IPO returns should be lower for firms with relatively less information asymmetry (See Rock 1986, and Benveniste and Spindt 1989). According to the models, if KOSDAQ's stricter external monitoring provisions lower information asymmetries, then the IPO initial returns should be lower on KOSDAQ than on KSE. This effect should be greatest for the chaebol firms, those with the most opacity, and largest in the periods with the biggest differences in the two exchanges rules.

Controlling for other factors that affect initial IPO returns and for the endogeneity of the exchange choice, we find that IPO initial returns were lower at KOSDAQ, with the difference concentrated in chaebol firms. Average initial returns for chaebol firms were 0.21 at KOSDAQ and 1.46 at KSE. In addition, the differences were largest when KOSDAQ's rules were most different from KSE's rules.

With the results of both tests, we conclude that stricter exchange rules can be value enhancing in countries with a relatively weak legal environment. Our evidence suggests that local exchanges can offer an alternative bonding mechanism to cross listing on the US exchanges, even in countries that provide weak legal protection to minority shareholders

The paper proceeds as follows. Section II describes capital markets in Korea, the chaebol system, the sources of our data, and provides summary statistics. Section III describes the hypotheses and tests, and provides results based Tobin's Q values. Section IV uses IPO returns to provide more direct evidence that exchange rules can substitute for cross-listing in the US as a bonding device. Section V concludes.

II. Capital Markets in Korea and the Data

II. A. KSE and KOSDAQ

Table 1 provides some descriptive information about Korea's two stock exchanges. The KSE opened in 1956 while KOSDAQ opened in 1997. Since 1997, both exchanges trade electronically, without specialists. As of March 2003, 3 months after the end of our study, KOSDAQ had more firms than KSE, 867 compared to 685, but KSE's trading volume and value were more than twice as large as at KOSDAQ.

Initial listing requirements at KOSDAQ are less stringent than at KSE. These criteria are summarized in Table 2, Panel A. A firm listing at KOSDAQ can be smaller, has no restrictions on returns (other than the need for positive ordinary income) or sales volume, and can have higher leverage than a firm listing at KSE.

The information we could find on disclosure suggests that reporting requirements at the two exchanges are quite similar (Table 2, Panel B). Both require audited annual,

semi-annual, and quarterly reports, and timely notification of special events such as mergers, stock options, new share issues, changes in major shareholders, etc.

The biggest distinction between the two exchanges is in delisting criteria. Table 3 lays out the different requirements along 11 categories. For each category, the table identifies the changes that occurred over our sample period. We break out 4 periods during 1999 through 2002: Period 1 goes from the beginning of the sample until KOSDAQ substantially strengthened its criteria on 1/28/00. Period 2 goes from then until KSE increased its requirements, matching KOSDAQ on several dimensions, on 6/23/00. Period 3 goes from 6/24/00 until 12/31/01 when KOSDAQ again substantially increased its requirements. Period 4 includes the rest of the sample period.⁹ In Table 3, for each period in each criterion, we put in bold the exchange that had a clearly stricter set of requirements. If the rules were similar, neither exchange has bold characters. A visual inspection of the chart indicates that KOSDAQ had stricter criteria along most categories during periods 2 and 4. In period 1, KSE has more bold boxes, but this is primarily because the KOSDAQ requirements were vague. In period 3, the two exchanges had equivalent requirements along most criteria, with KOSDAQ stronger in minority share ownership.

Another way to compare the exchanges, and one that might shed more light on the early period, is with enforcement and monitoring actions. Table 4 breaks out enforcement actions across the two exchanges over 1998 through 2002. The table identifies the number of firms delisted, under special supervision (in danger of being delisted), and under special attention (for excessive stock price increase). In every year through 2001 KOSDAQ had a higher share of firms delisted and under special supervision than at KSE. Unfortunately, we cannot get data to adjust these numbers for relative performance, so the higher numbers at KOSDAQ might reflect relatively poorer performance of KOSDAQ companies as well as more vigilant enforcement by KOSDAQ authorities. Over the 4 year period of our study (1999-2002), the average annual share of firms either delisted or under special supervision was 6.15% at KSE and 17.6% at KOSDAQ, consistent with more active enforcement and monitoring at KOSDAQ.

⁹ KSE substantially increased its criteria on 2/21/99, 6/23/00, and 12/31/01. KOSDAQ strengthened its criteria on 1/28/00 and again on 11/23/01, effective for 2002.

A final piece of evidence that the delisting thresholds were higher at KOSDAQ comes from Money Today, a news magazine in Korea. A November 20, 2002 editorial titled “Why does the Korean Stock Exchange Strengthen the Delisting Criteria?” stated:

“The Korea Securities and Exchange Commission and the Korea Stock Exchange (hereafter KSE) are planning to strengthen the KSE delisting criteria up to the level of the Korea Securities Dealers Automated Quotation System (hereafter KOSDAQ) market. It is because market participants have continuously raised the issue of weaker KSE delisting criteria compared to the KOSDAQ criteria...”

We conclude that, in general, KOSDAQ had stricter delisting requirements and monitoring over the sample period. The differences were greatest during Periods 2 (1/29/00-6/23/00) and 4 (1/1/02 – 12/31/02).

II.B. Chaebol

In order to achieve quick economic growth in the 1960s, the Korean government established several policies that facilitated and encouraged the establishment of business groups. Initially, the Korean government strongly supported several export-oriented firms with favorable tax treatment and financial support. This support led to the formation of several big firms. Later on, these firms developed into business groups called chaebol.

The Korean Fair Trade Commission (KFTC) defines a business group as a group of firms of which more than 30 percent of the shares are owned by the group’s controlling shareholder and its affiliated companies. Until 2002, the KFTC ranked business groups according to the size of their total assets and explicitly identified the 30 largest business groups for special supervision and regulation.¹⁰ Since the beginning of 2002, the KFTC formally identifies all groups that satisfy certain criteria as subject to special supervision and regulation. The number of such groups was 43 in year 2002.

As of 1997, the top 30 chaebols represented only 24.2 percent of all firms listed in the Korean Stock Exchange (KSE), but they accounted for as much as 45.8 percent of the

¹⁰ As far as we can ascertain, prior academic studies of chaebol have focused on these 30 chaebol groups.

KSE's total market capitalization. As of 2002, the top 5 chaebols accounted for 21%, and the top 30 chaebols for 34%, of total corporate sector assets.¹¹

Several studies have found that firms in business groups are more opaque to outside investors than independent firms. Becht and Boehmer (2003) argue that gaps in disclosure regulations reduce the transparency of business groups in Germany. Dewenter, Novaes, and Pettway (2001) show that initial IPO returns for keiretsu-linked firms are higher than for independent firms in Japan. They interpret this result as evidence that group firms are more opaque to outside investors. Khanna and Yafeh (2000) and Walker (no date) provide evidence that business groups actively reallocate money among member firms, suggesting that outsiders will not be able to discern individual firm cash flow constraints.

Several Korean studies have found similar evidence. Kang, Baek, and Park (2003) argue that agency problems are more severe at chaebol firms. They show the link between firm value and firm specific governance measures is consistent with greater conflicts of interest at chaebol firms. Bae, Kang and Kim (2002) provide evidence of agency conflicts at chaebol firms via tunneling in acquisitions. Ferris, Kim and Kitsabunnarat (2003) argue that chaebol pursue profit stability rather than profit maximization, over-invest in low performing industries and cross-subsidize weaker members. This behavior would make it difficult for outside investors to infer firm-specific strategies. Finally, Lee, Lee, and Lee (2000) suggest that the government has an implicit risk sharing deal with the chaebols that creates severe moral hazard problems leading to high debt and reckless investment behavior. Pressure from the IMF after the 1997-98 Asia financial crisis to break up the chaebol no doubt clouded the public's perception of this implicit guaranty and the possibility of government support should things go wrong. All of these arguments suggest that outside investors find it more difficult to discern the strategies and potentially opportunistic actions of managers at chaebol firms than at independent firms. (To date, we are not aware of any papers that compare Tobin's Q values for chaebol versus independent firms.)

¹¹ Source: Bae et al (2002), The Business Surveys, Bank of Korea (2003), and KIS-Line, Korea Investor Service, Inc.

If the chaebol firms are indeed more opaque, then they have relatively more to gain by voluntarily bonding themselves to better governance practices. If true, the impact of bonding should be greater for chaebol firms than for independent firms.

II.C. Data and Sample Statistics

Financial data are from TS2000 which is the data set provided by the Korean Association of Listed Firms. Other data are hand picked from various sources such as annual reports and documents reported to KSEC for security issues. Data definitions are provided in Appendix A.

Table 5 provides some sample statistics for the sample of firms at KSE and KOSDAQ over the period 1999-2002. Each observation is for a firm year end, so one firm could provide 4 different observations. (Note, data limitations result in different numbers of observations for each variable.) The table reports means, medians, and standard deviations for KSE and KOSDAQ firms and for the subsets of chaebol and independent firms at both exchanges. The far right column provides the p-values for a test of difference in means between KSE and KOSDAQ firms.

The first two rows indicate that KSE firms, overall and across both subsets, are older and larger than the KOSDAQ firms. On average, the KSE sample firms are 32 years old, compared to almost 15 for KOSDAQ firms. Log of assets equals 19.4 versus 17.6, respectively. Sales growth is higher for KOSDAQ firms, but the difference is not always significant due to high variation among the KOSDAQ firms. Average industry Q is higher at KOSDAQ and more KOSDAQ firms are from high technology industries (52% versus 17%). Firm level Q's are significantly higher for the KOSDAQ overall sample and independent firm sub-sample only. All in all, these patterns are consistent with the perception that young, fast growing, high technology firms tend to list on KOSDAQ.

III. Tobin's Q Tests

As we explained in the introduction, the threat of lost trading volume posed by cross listing may prompt local exchanges to offer firms a lower cost bonding mechanism. It is not clear, though, that the bonding mechanism will be effective if the country's legal

system is weak. In this section, we argue that an effective bonding mechanism should be associated with higher firm value, measured with Tobin's Q. We then develop and test hypotheses to see whether Tobin's Q values are higher at KOSDAQ than at KSE.

III.A. The main hypotheses

As noted in the introduction, stock exchanges may impose stringent governance and reporting practices that work as bonding devices. While strict governance practices (e.g., rules that assure a more independent board) aim to enhance shareholders' value by improving internal monitoring, stringent reporting improves external monitoring by making it easier for investors to detect management decisions that are driven by opportunistic behavior and to punish the firm accordingly through lower stock prices. As such, one would expect higher ratios of market to book values (Tobin's Q's) for firms listed in stock exchanges, like KOSDAQ, with rules that impose stricter corporate governance practices.¹²

Despite their positive impact on firms' internal and external monitoring, stringent governance and reporting practices set by local exchanges will fail to imply enhanced firm value if neither the exchange nor the minority shareholders can sue firm officials for breaching contracts. As, Coffee (2002) and Harvey, Lins and Roper (2003) argue, legal enforcement may be a critical component of minority investors' protection. We thus have two main hypotheses:

$H1_N$: Tobin's Q values for firms listed on KSE and KOSDAQ stock exchanges are equal.

$H1_A$: Tobin's Q values for firms listed on KOSDAQ are higher than for firms listed on KSE.

III.B. Testing the hypotheses

To test whether listing at KOSDAQ does increase firm value, we regress the firm's Tobin's Q value on the average Tobin Q's value in the firm's industry (IndustryQ),

¹² Doidge et al (2004) build a simple model of the tradeoff faced by a foreign firm contemplating cross listing in the US. The model predicts that Tobin's Q will be higher for firms cross-listing in the US than for those that do not.

the firm's level of sales growth (Salesgrowth), a dummy set equal to one if the firm belongs to a KFTC formally designated business group (Chaebol), a dummy set equal to 1 if the firm has an ADR in the US (ADR), a dummy set equal to 1 for firms listed at KOSDAQ, and dummies for each year that aim to capture a potential time-series variation of rules at both KOSDAQ and KSE.

$$Q = \text{const.} + a_1\text{IndustryQ} + a_2\text{Salesgrowth} + a_3\text{Chaebol} + a_4\text{ADR} + a_5\text{Kosdaq} + \sum_{i=2000}^{2002} a_i\text{Yeardummies} + e \quad (1)$$

Firms with a history of high growth are likely to have large future profits. All else equal, these profits increase stock prices, creating a wedge between the stock price and book value (high Tobin's Q), regardless of the exchange rules. As such, we include firms' growth of sales in the previous 2 years as an independent variable. In the same spirit, we include the average Q of the industry as an independent variable to control for general industry effects. Average industry Q's are determined across 12 industries, consistent with Ken French's breakdown.¹³ To control for the cross listing premium documented in Doige et al (2004), we include a dummy variable set equal to 1 for the 32 firms that have ADRs in the US.

The dummy for belonging to a business group, Chaebol, captures conflicting effects on firm value that are unrelated to whether the firm lists at KOSDAQ or KSE. On the one hand, there is evidence that belonging to a business group gives easier access to credit, reducing the probability of financial distress and agency costs of debt. As such, one would expect that, other things equal, firms belonging to business groups have larger Tobin's Q. On the other hand, Dewenter, Novaes and Pettway (2001) give evidence that business groups are more opaque, with stronger incentives for agency costs on minority shareholders. This second effect suggests that business groups have lower Tobin's Q values. The dummy for business group, therefore, captures these two effects on firm value.

¹³ See his website: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

Our hypotheses are tested with the coefficient estimate for KOSDAQ. If it is significantly positive, the data would be consistent with more stringent stock exchanges being able to offer a substitute for cross-listing in the US.

Even if equation (1) is correctly specified, OLS regressions typically will not yield consistent estimates of the impact of KOSDAQ rules on firm value, because it does not account for the choice of which exchange to list on. Following Doidge et al (2004), therefore, we use Heckman's (1979) endogenous self selection model to correct for the selection bias. This model simultaneously estimates the determinants of Tobin's Q values and the probability of a firm's listing at KOSDAQ:

$$Q = \text{const.} + a_1\text{IndustryQ} + a_2\text{salesgrowth} + a_3\text{Chaebol} + a_4\text{ADR} + a_5\text{Kosdaq} + \sum_{i=2000}^{2002} a_i\text{Yeardummies} + e \quad (2)$$

$$\text{Kosdaq} = 1 \text{ if } \text{const.} + b_1\text{Age} + b_2\text{LogAssets} + b_3\text{DummyHighTechfirm} + u > 0, \quad (3)$$

where: $e \sim N(0, \sigma)$, $u \sim N(0, 1)$, and $\text{corr}(e, u) = \rho$.

Equation (2) is our basic regression, which has Tobin's Q as the dependent variable and, as independent variables: a constant, the average Q of the industry, the firm's growth of sales, a dummy for chaebol firms, a dummy for firms listed at KOSDAQ, and year dummies. OLS estimates will be biased, though, if determinants of the choice of listing at KOSDAQ are correlated with the residual e , which is assumed to be normally distributed with mean zero and standard deviation σ .

To avoid the selection bias, the Heckman approach models the decision to list at KOSDAQ as a latent variable that takes the value 1 if the fitted value of a PROBIT is positive (equation 3). To implement the Heckman's approach, we assume that the independent variables of the PROBIT are the age of the firm, the log of assets, and a dummy for firms in the high tech industry. Older and larger firms are expected to list at KSE, which is the older and more traditional stock exchange in Korea. Firms in trendy high-tech industries, however, tend to list at KSE. The Heckman approach assumes that the residual of the PROBIT, u , is normally distributed with mean zero and standard deviation 1.

We estimate the coefficients of equations (2) and (3), the standard deviation (σ) of the residual of the Tobin's Q equation, e , and the correlation (ρ) of the two residuals using Heckman's two step estimator and by Maximum Likelihood. In the Heckman's two step estimator, we estimate the Probit in the first step and use the estimated coefficients to derive the inverse of the Mill's ratio, λ . By adding the inverse Mills ratio in equation 2 (not shown), we use OLS to estimate the impact of listing at KOSDAQ on Tobin's Q without implying a selection bias. As in Heckman's two step estimator, Maximum likelihood gives us estimates of the coefficients of equations (2) and (3) that correct for the selection bias, and estimates the inverse Mills ratio as well. Moreover, MLE allows us to use the Huber-White standard errors that are robust to heteroskedasticity

The test of the hypothesis that stringent exchange rules work as a bonding device can thus be restated as testing whether the coefficient a_5 in equation (2) is significantly different from zero. We report results of this test for OLS estimates, Heckman's two step estimator and MLE. We rely most strongly on the MLE results.

IV.C. Empirical Results

Table 6 reports the regression results. Model I reports estimates of equations 2 and 3, our base specification. The OLS estimate in the far left column has only two significant coefficient estimates. Firm specific Tobin's Q's are positively related to their respective industry average Q's. In addition, the KOSDAQ coefficient estimate is positive and significant, indicating Tobin's Q's are higher for firms listing on KOSDAQ. The size of this coefficient estimate (0.173), is similar in magnitude to the cross listing premium found in Doidge et al's (2004) OLS estimates (0.16 in their Table 2).

In an OLS estimate, higher Tobin's Q's at KOSDAQ could be due to bonding or could simply reflect that fact that relatively high Q firms tend to list on KOSDAQ. The two-step and MLE procedures attempt to control for this selection bias. These estimates predict the choice of exchange using a Probit model, which, in the MLE procedure is jointly estimated with the determinants of Tobin Q's values. (In the two-step approach, the Probit is estimated first and is used to compute the inverse Mills ratio.) Both Probit estimates indicate that younger and smaller firms tend to list on KOSDAQ. Controlling

for age and size, the dummy variable identifying high technology firms is not significantly different from zero.

At the bottom of the regression results, the F-tests of all models show us that the estimated coefficients are jointly different from zero. As in Doidge et al (2004), we find a significantly negative lambda in the two-step approach which, along with the significantly negative correlation of residuals in the MLE approach, suggests that the correction of the self-selection bias is not irrelevant for the estimations.

The MLE regression results also suggest that more rapid recent sales growth is associated with significantly lower Tobin's Qs, contrary to expectations. The SalesGrowth coefficient estimates are negative but insignificant with the two-step procedure. The average industry Q coefficient estimates are positive and significant with both the two-step and MLE procedures. The ADR coefficient estimates are positive and significant at the 5% level with the MLE procedure. This result is contrary to Doidge et al who find no cross listing premium for their Korea subsample.¹⁴ The Chaebol coefficient estimates are positive with the two-step and MLE procedures, but never significantly different from zero, suggesting that neither the lower bankruptcy cost, nor the reduced transparency effects, dominate in a chaebol versus independent firm comparison.

With both the two-step and MLE procedures, the KOSDAQ coefficient estimates are positive and significantly different from zero at the 1 percent level. The MLE coefficient estimate of 0.621 compares to 0.34 in Doidge et al Table 3. Controlling for firm specific factors and the endogeneity of exchange selection, these data suggest that Q's are higher at KOSDAQ, a result that is consistent with effective bonding there.

Model II adds two coefficients to examine whether the bonding effect is stronger for chaebol firms and during periods when the exchange rules were most different. The Chaebol*KOS coefficient estimates are positive, with p-values of .277 with the two-step and .220 with the MLE procedure. The sign is consistent with a relatively stronger effect for chaebol firms, but the estimates are not quite significant.

Our ability to test for a time series effect on Q is severely hampered. The two periods with stronger KOSDAQ rules are, Period 2 from 1/29/00 - 6/23/00 and Period 4

¹⁴ There are several differences between our work and that in Doige et al (2004). Their sample uses only firms from 1997 while we cover 1999-2002. Their control for industry q is a worldwide measure while ours is based only on Korean firms.

from 1/1/02 – 12/31/02. Our Q values are measured at calendar year end, so we cannot separately measure Period 2 Q's. Model II in Table 6 includes the coefficient 2002*KOS which separately breaks out an effect for 2002 (Period 4) KOSDAQ firms. Its coefficient estimate, with all three procedures, is negative and significant. This is inconsistent with the idea that KOSDAQ Q's were relatively large in Period 4, when the KOSDAQ rules were the most different from KSE rules.

One possible explanation for this result is that the dot com bust began on KOSDAQ earlier than on KSE. Correlation of returns for the major market indices at the two exchanges was 0.730 over our whole sample period, but returns at the individual exchanges were -29.8% at KOSDAQ and 4.8% at KSE in 2002. The negative coefficient estimate for 2002*KOS might just be picking up a broader exchange-wide high technology downturn. (Remember that 52% of the KOSDAQ firms are high technology compared to 17% for KSE.)

In sum, the table 6 results strongly suggest that KOSDAQ Q's were higher than KSE Q's, consistent with more effective bonding at KOSDAQ over the sample period. The results are mixed on whether the effect was stronger for chaebol firms or in the periods when KOSDAQ rules were most different.

V. Evidence from IPO initial returns

The above results are consistent with more effective bonding at KOSDAQ than at KSE. But can we be sure that the effect we measure is due to bonding? Although our estimates of the KOSDAQ-listing premium for q are consistent with the interpretation that stringent exchanges rules work as a bonding device, the estimates constitute only indirect evidence that the effect we measure is due to bonding. To get more direct evidence that the value impact is in fact due to some aspect of the bonding process, this section develops and test hypotheses that compare IPO initial returns at the two exchanges.

III.A. Theory, specification, and data

The Rock (1986) and Benveniste and Spindt (1989) IPO models both suggest that as the level of uncertainty about the value of the firm falls, the amount of underpricing

should decrease. Many of the requirements at the two exchanges are designed to improve the overall transparency of the firm through external monitoring. The disclosure and annual report criteria directly address the firm's reporting requirements. More generally, the rules for things like stock price, trading volumes, and minority share ownership set minimum standards of performance for all firms on the exchange. Finally, active exchange monitoring and enforcement assure outside investors that someone external to the firm is now watching what goes on. Explicit rules, minimum standards, and active monitoring reduce the opaqueness of listed firms. More active external monitoring leads to greater transparency that imposes a reputational cost on managers and limits their willingness to expropriate minority shareholders.

If KOSDAQ rules provide for more active external monitoring, and thus a higher level of transparency, then all else equal, the Rock and Benveniste and Spindt models suggest that we should find lower IPO initial returns on KOSDAQ than on KSE. Our IPO return hypotheses are:

$H2_N$: Initial returns for IPOs on KSE and on KOSDAQ are the same.

$H2_A$: Initial returns for IPOs on KOSDAQ are lower than on KSE

We also examine whether these effects are stronger for the chaebol firms and in the periods with the biggest differences in exchange rules, periods 2 and 4.

As with the Q tests, we need to control for other factors that might affect returns. Our specification is:

$$\text{Initial Return} = \text{const.} + a_1 \text{LogSales} + a_2 \text{Underwriter} + a_3 \text{Chaebol} + a_4 \text{Kosdaq} + \sum_{i=2000}^{2002} a_i \text{Yeardummies} + e \quad (4)$$

$$\text{Kosdaq} = 1 \text{ if } \text{const.} + b_1 \text{Age} + b_2 \text{LogAssets} + b_3 \text{DummyHighTechfirm} + u > 0, \quad (5)$$

where: $e \sim N(0, \sigma)$, $u \sim N(0, 1)$, and $\text{corr}(e, u) = \rho$.

We include firm size (log of sales) as a proxy for uncertainty. Prior papers have argued that there is less uncertainty for larger firms since they tend to be older and more frequently followed by analysts (Ritter 1984). We also control for the reputation of the underwriter with a dummy variable set equal to 1 for prestigious underwriters defined as

the four largest underwriters in Korea (Daewoo Securities Co., Hyundai Securities Co., Dongwon Securities Co., and Dongyang Securities Co.). Prior papers have found that the level of uncertainty is lower for IPOs brought to market with well known, more highly regarded investment banks (Carter and Manaster 1990, and Michaely and Shaw 1994). Finally, we include dummy variables for each year to control for any time trends in the general IPO market.

We have an endogeneity concern with these tests as well. What if, for some other reason, the low (or high) information asymmetry firms choose to list on KOSDAQ? For example, what if all of the young firms chose to list on KOSDAQ? Their lack of a track record and smaller size will make them more opaque to outsiders, resulting in relatively higher IPO returns at KOSDAQ.

We control for the endogeneity of the exchange choice with the same methods used in the Q tests above, with the Heckman (1979) correction for exchange choice. Again, we report results with the OLS regressions (with no correction) and with the Heckman two-stage and MLE-robust errors procedures.

We use the same data sources for these tests as well: TS2000 for financial data and various sources (annual reports, etc) for other data. Data definitions are provided in Appendix A.

IV.B. IPO Initial return results

Sample statistics for the IPO sample are reported in Table 7. For each exchange, we report the mean, median, and standard deviation for the full sample, and the chaebol and independent sub-samples. The column on the far right reports the results of difference of means tests across the two exchanges for each set of firms.

Similar to the Q sample, the KOSDAQ IPO firms are younger, smaller, and more likely to be high tech than the KSE IPO firms. The two exceptions to this are with the chaebol firms. The KOSDAQ chaebol firms are smaller than their KSE counterparts but they are not younger or more likely to be high tech. There is no difference between the KSE and KOSDAQ IPO firms in their likelihood to use a reputable underwriter. In both samples, approximately one-third of the firms are brought to market by the 4 largest underwriters. The last row indicates no difference in mean initial returns for the

independent firms, but significantly higher returns for the chaebol firms listed on KSE than those listed on KOSDAQ. It is interesting to note that the chaebol returns are higher than the independent firm returns on KSE, but lower than the independent firm returns on KOSDAQ.

Regression results with IPO initial returns as the dependent variable are reported in Table 8. We follow the same format and procedures as with the Tobin's Q tests. Model I contains the base specification, estimated with OLS, two-step and MLE procedures. Model II examines the impact on chaebol firms and during Periods 2 and 4 when the KOSDAQ rules were most different from the KSE rules. Since returns are as of the issue date, we can precisely control for the different periods.

The results are quite similar across all three procedures. The rho and lambda coefficients are negative but not significant, suggesting that controlling for selection bias is not as critical in these specifications. Still, we will see that it does have an impact on the significance of some of the coefficient estimates.

In Model I the time dummies suggest a general upward trend in IPO initial returns over the sample period. Consistent with other IPO initial return studies, we show that larger firms and firms that use reputable underwriters have relatively lower initial returns. We also show that the chaebol firm returns are relatively higher, the Chaebol coefficient estimate ranges from .420 to .430 in the three specifications. This result is consistent with Dewenter, Novaes, and Pettway (2001) who find that keiretsu-linked IPO initial returns are higher than independent firm returns in Japan.

The KOSDAQ dummy estimates are all negative, consistent with the idea that stricter external monitoring at KOSDAQ will be associated with lower initial returns, but only the OLS estimate is significantly different from zero.

The Model II results suggest that relatively lower IPO returns are concentrated in the KOSDAQ chaebol firms. The Chaebol coefficient estimates are positive and significant, while the Chaebol*KOS coefficient estimates are negative and significant, all at the 1 percent level. The KOSDAQ dummy is not different from zero. These results suggest no difference in the initial returns of independent firms on the two exchanges, but significant premiums for the chaebol firms listing on KSE. This pattern is consistent with

stronger external monitoring at KOSDAQ lowering information asymmetries at the relatively opaque chaebol firms.

The Period2&4*KOS coefficient estimates are all negative and significant at the one percent level. These results indicate that KOSDAQ returns were especially low in the periods when KOSDAQ rules were especially rigorous relative to the KSE rules.

We also estimate Model I and II removing 4 outliers with initial returns above 200%.¹⁵ The basic results hold. In Model I the Chaebol coefficient estimate is positive and significant, although the Chaebol coefficient is about one-half the size of the one reported in table 8. The KOSDAQ coefficient estimate is always insignificant. In Model II, the Chaebol coefficient estimates are still positive and significant, while the Chaebol*KOS and Period2&4*KOS coefficient estimates are still negative and significant (with all coefficients slightly smaller). Interestingly, the KOSDAQ coefficient estimate in Model II is positive, contrary to the idea of lower returns at KOSDAQ, but not significant with the MLE procedure. (It is significant at the 1 percent level with OLS and 5 percent with two-step.)

We interpret the results as indicating the higher level of external monitoring at KOSDAQ had a significant impact on the firms that most critically need monitoring, the opaque group firms. Across all firms, the result is strongest when the rules are most different. The results suggest that exchanges in emerging markets with relatively weak legal regimes can implement rules and procedures that lower information asymmetries with outside investors

V. Conclusion

This paper provides evidence on whether local exchanges in an emerging market can provide value-enhancing bonding services. We show that over 1999-2002 firm value, measured with Tobin's Q, was higher on KOSDAQ, and IPO initial returns were lower for chaebol firms on KOSDAQ than for chaebol firms on KSE. The results suggest that a cheaper method than cross listing exists for firms from countries with weak shareholder protection and legal regimes to bond themselves to better corporate governance practices and thereby increase firm value.

¹⁵ The returns of the four excluded IPOs are 278.8%, 317.39%, 431%, and 475%.

Appendix A – Data Definitions

Initial Return = (closing price at the end of day 1 – offer price) / offer price

Tobin's Q = (book value of debt + number of shares outstanding*stock price) / (book value of debt + book value of equity)

Age = the age of the firm in years

Chaebol = 1 if firm is member of top 30 chaebols through 2001 or member of designated chaebol in 2002 and 0 otherwise

IT = 1 if firm is in high technology industry and 0 otherwise

KSE = 1 if firm listed on KSE and 0 otherwise

KOSDAQ or KOS = 1 if firm listed in KOSDAQ and 0 otherwise

LogAssets = log(total asset) as of IPO year

LogSales = log(sales) of the firm as of IPO year

Underwriter = 1 if prestigious underwriter and 0 otherwise. Prestigious defined as one of the largest 4 underwriters in Korea.

2000, 2001, and 2002 = 1 if year of data or listing is 2000, 2001, or 2002, respectively.

Period2&4 = 1 for IPOs issued 1/29/00 – 6/23/00 or 1/1/02-12/31/02.

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Table 1 – Descriptive statistics for the KSE and KOSDAQ

	KSE	KOSDAQ
No. of listed companies	685	867
No. of listed shares	26,981	10,857
Daily avg. trading volume	712	340
Trading volume (sum of the month)	14,942	7,314
Daily avg. trading value	1,861	726
Trading value (sum of the month)	39,091	15,239
Market cap (end of the month)	220,891	33,088
Turnover ratio of listed No. of shares	56.0	65.7
Turnover ratio of market cap	17.0	43.7
Weighted avg. stock price	8,116	3,035
Market PER	14.17	22.30

(Unit: Billion Won, Million Shares, %) Data as of March 2003.

Table 2 – Listing and Disclosure requirements at KSE and KOSDAQ

Panel A: Listing requirements

	KSE	KOSDAQ	
		Type 1	Type 2
Operating History	> = 3 yrs.	> = 3 yrs	---
Paid-in Capital	Capital stock > = 5 b Won	0.5 b Won	---
Equity Capital	10 b Won	---	10 b Won
Size	Sales >=15 b Won (avg last 3 yrs), >= 20 b Won (last year)	---	Total Assets > = 50 b Won
Profitability	Lowest of operating income, ordinary income and net income >= 2.5b Won.	Positive Ordinary Income	---
Debt Ratio	<= 1.5x industry avg.	<= 100-150% of industry avg.	<= 100% industry avg.
Floating Shares	>= 30% of shares offered, and >= 30% of shares to be held by minority holders.	>= 30% of total outstanding shares to be floating	
No. of Independent Directors	---	Beg 2001: >= 1 independent director. Beg 2002: >= 25% total board members.	

Table 2 Panel B: Disclosure requirements

	KSE	KOSDAQ
Required documents to be submitted by the company	Submission of Annual Reports	Public Report Annual Report (Within 90 days of Fiscal Year End) Interim Report (Semi-Annual Report, within 45 days of 1H-FY) Quarterly Report (Within 45 days of each periodic end)
	Submission of Merger Statements, etc.	Special Report Reports of important information regarding the company's managerial matters: e.g., Mergers, splits, option distributions, business line sales/acquisitions, major business issues
	Submission of Stock Option Statements, Prospectus, etc.	Timely Disclosure Important information regarding the listed companies' management/ financial/ investment or credit changes (e.g. Issuing news shares, withdrawing existing stocks, issuing Convertible Bond (CB), Bond with Subscription Warrant (BW), Exchangeable Bond (EB), or Depositary Receipt (DR), re-valuing assets, declaring bankruptcy, suspending bank account).
	Change of largest and main shareholder The documents deemed necessary by the Exchange, from among the documents related to application for initial listing of stocks: Declaration documents related to acquisition and disposal of treasury stock, and the documents of the results: Declaration documents related to tender offers, and the documents of the results; and Manipulation reports and market-making reports. Materials for company presentation: until the time the annual report for the fiscal year concerned is submitted	
	Inquired Disclosure The Exchange may request a listed corporation to make an inquired disclosure to validate the rumors and news on the matters prescribed in the provisions.	Inquired Disclosure Disclosure upon KOSDAQ's request when disclosure update is necessary

Table 2 Panel B Continued

<p>Identification and Punishment for violation of the disclosure requirement</p>	<p>Unfaithful disclosure can be categorized as: Non-compliance; Reversals of Disclosure; Modifications of Disclosure. Possible result from unfaithful disclosure: Rejection of disclosure information; Warning to the listed company; Suspension of trading for the listed company</p>	<p>Listed companies violate KOSDAQ rules and regulations, the violating company is liable accordingly by the Securities Exchange Law and KOSDAQ Marketplace Rules</p>
<p>Disclosure by the exchange</p>	<p>The Exchange may disclose any of the following information, on behalf of a listed corporation concerned, through its disclosure media (hereinafter referred to as “disclosure media”) as prescribed in the Enforcement Rules of this Regulation</p>	<p>KOSDAQ disclosure information is disseminated through the Internet and the information network of securities houses.</p>

Notes: Source: Homepages of KOSDAQ (www.kosdaq.or.kr) and KSE (www.kse.or.kr). Table does not include all categories for listing, nor does it include all requirements within each category. Requirements cover the period of our study.

Table 3 – Delisting criteria at KSE and KOSDAQ

	Periods	KSE	KOSDAQ
Final Bankruptcy	Period 1	Failure to resolve bankruptcy within 3 years	If bankrupt (vague)
	Period 2	Failure to resolve bankruptcy within 3 years	Failure to resolve bankruptcy within 1 year
	Period 3	Failure to resolve bankruptcy within 1 year	Failure to resolve bankruptcy within 1 year
	Period 4	Failure to resolve bankruptcy within 1 year	Instantly
Legal Management	Period 1	Exit when legal management ends	If legal management applied (vague)
	Period 2	Exit when legal management ends	Biannual reappraisal
	Period 3	Biannual reappraisal	Biannual reappraisal
	Period 4	Biannual reappraisal	Annual reappraisal
Main Business Halt	Period 1	Failure in removing the cause of halt within 3 years	If main business halts (vague)
	Period 2	Failure in removing the cause of halt within 3 years	Failure in removing the cause of halt within 1 year
	Period 3	Failure in removing the cause of halt within 1 year	Failure in removing the cause of halt within 1 year
	Period 4	Failure in removing the cause of halt within 1 year	Failure in removing the cause of halt within 1/2 year
Impaired Capital	Period 1	3 consecutive operating years	-
	Period 2	3 consecutive operating years	2 consecutive operating years
	Period 3	2 consecutive operating years	2 consecutive operating years
	Period 4	2 consecutive operating years	Instantly
Minimum Stock Price	Period 1	-	-
	Period 2	-	-
	Period 3	-	-
	Period 4	-	Less than 20% of par value
Annual Report	Period 1	Failure to file annual, semi-annual or quarterly reports for 2 consecutive years	-
	Period 2	Failure to file annual, semi-annual or quarterly reports for 2 consecutive years	Failure to file annual, semi-annual or quarterly reports twice
	Period 3	Failure to file annual, semi-annual or quarterly reports twice	Failure to file annual, semi-annual or quarterly reports twice
	Period 4	Failure to file annual, semi-annual or quarterly reports twice	Failure to file annual, semi-annual or quarterly reports twice

	Periods	KSE	KOSDAQ
Auditor's Opinion	Period 1	Adverse or disclaimed audit opinions for 2 consecutive years	-
	Period 2	Adverse or disclaimed audit opinions for 2 consecutive years	Adverse or disclaimed audit opinions twice
	Period 3	Adverse or disclaimed audit opinions twice	Adverse or disclaimed audit opinions twice
	Period 4	Adverse or disclaimed or qualified (due to the limited audit) CPA audit opinions for the latest fiscal year	Adverse or disclaimed or qualified (due to the limited audit) CPA audit opinions for the latest fiscal year
Minority Share Ownership	Period 1	Falling short of the minority share ownership requiring 20% or more of the floating shares for 3 years	Falling short of the minority share ownership requiring 20% or more of the floating shares for 1 year
	Period 2	Falling short of the minority share ownership requiring 20% or more of the floating shares for 3 years	Falling short of the minority share ownership requiring 20% or more of the floating shares for 1 year
	Period 3	Falling short of the minority share ownership requiring 10% or more of the floating shares for 1 year	Falling short of the minority share ownership requiring 20% or more of the floating shares for 1 year
	Period 4	Falling short of the minority share ownership requiring 10% or more of the floating shares for 1 year	Falling short of the minority share ownership requiring 20% or more of the floating shares for 1 year
Governance Structure	Period 1	Failure to meet requirements on non-executive directors and audit committee for 2 consecutive years	-
	Period 2	Failure to meet requirements on non-executive directors and audit committee for 2 consecutive years	Failure to meet requirements on non-executive directors and audit committee for 1 year
	Period 3	Failure to meet requirements on non-executive directors and audit committee for 1 year	Failure to meet requirements on non-executive directors and audit committee for 1 year
	Period 4	Failure to meet requirements on non-executive directors and audit committee for 1 year	Failure to meet requirements on non-executive directors and audit committee for 1 year
Disclosure	Period 1	Breaching disclosure obligation often	-
	Period 2	Breaching disclosure obligation often	Breaching disclosure obligation 3 times within 1.5 years
	Period 3	Breaching disclosure obligation 3 times within 1.5 years	Breaching disclosure obligation 3 times within 1.5 years
	Period 4	Breaching disclosure obligation 3 times within 1.5 years	Breaching disclosure obligation 3 times within 2 years
Trading Volume	Period 1	-	Failure to satisfying the average monthly trading volume of 1,000 or more of listed shares for 1 year
	Period 2	-	Failure to satisfying the average monthly trading volume of 1,000 or more of listed shares for 1 year
	Period 3	Failure to satisfying the average monthly trading volume of 1% or more of listed shares for 1 year	Failure to satisfying the average monthly trading volume of 1,000 or more of listed shares for 1 year
	Period 4	Failure to satisfying the average monthly trading volume of 1% or more of listed shares for 1 year	Failure to satisfying the minimum average monthly trading volume of listed shares for 9 months

Notes: Period 1: 2/21/1999 – 1/28/2000, Period 2: 1/29/2000 – 6/23/2000, Period 3: 6/24/2000 – 12/31/2001, Period 4: 1/1/2002 – 12/31/2002. Source: Homepages of KOSDAQ (www.kosdaq.or.kr) and KSE (www.kse.or.kr).

Table 4 – Enforcement actions at KSE and KOSDAQ

	Total number of firms		Number of firms delisted		Firms under special supervision ^a		Firms under special attention ^b	
	KSE	KOS	KSE ^c	KOS	KSE	KOS	KSE	KOS
1998	748	331	31(4.1)	36(10.9)	11(1.5)	57(17.2)	-	-
1999	725	457	56(7.7)	38(8.3)	3(0.4)	95(20.8)	-	-
2000	704	608	29(4.1)	99(16.3)	3(0.4)	29(4.8)	21(3.0)	-
2001	689	721	33(4.8)	64(8.9)	8(1.2)	18(2.5)	10(1.5)	55(7.6)
2002	683	843	39(5.7)	35(4.2)	5(0.7)	39(4.6)	29(4.2)	26(3.1)
03/2003	685	867	4(0.6)	6(0.7)	3(0.4)	14(1.6)	3(0.4)	6(0.7)

Notes:

^a Firms under special attention because they are in danger of being delisted due to bad performance, lower liquidity, negative equity value, bad corporate governance, etc.

^b Firms under special attention due to an excessive stock price increase.

^c The numbers in the parentheses are percentages out of the total number of firms.

Source: Homepages of KOSDAQ (www.kosdaq.or.kr) and KSE (www.kse.or.kr).

Table 5 - Sample Statistics for the Tobin's Q Sample

	KSE			KOSDAQ			KSE- KOSDAQ Difference of means (P- Values)
	Total	Chaebol	Independent	Total	Chaebol	Independent	
	(A)	(B)	(C)	(D)	(E)	(F)	
Age	32.14 [31] (14.40) N=3557	33.89 [32.5] (13.61) N=570	31.80 [30] (14.52) N=2987	14.71 [12] (10.18) N=3236	14.98 [13] (9.36) N=92	14.70 [12] (10.21) N=3144	(A) - (D): .00 (B) - (E): .00 (C) - (F): .00
LogAssets	19.37 [19.15] (1.62) N=2814	20.89 [20.96] (1.36) N=528	19.01 [18.83] (1.46) N=2286	17.60 [17.47] (1.00) N=2190	19.32 [19.15] (1.39) N=68	17.54 [17.43] (.94) N=2122	(A) - (D): .00 (B) - (E): .00 (C) - (F): .00
SalesGrowth	.22 [.09] (1.83) N=2626	.27 [.14] (1.36) N=504	.21 [.08] (2.01) N=2122	3.21 [.14] (98.19) N=1194	1.85 [.23] (1.39) N=26	3.24 [.13] (99.27) 1168	(A) - (D): .12 (B) - (E): .00 (C) - (F): .16
IndustryQ	1.10 [1.07] (.24) N=3557	1.14 [1.10] (.28) N=570	1.09 [1.07] (.23) N=2987	1.22 [1.14] (.30) N=3232	1.26 [1.16] (.31) N=92	1.22 [1.14] (.30) N=3140	(A) - (D): .00 (B) - (E): .00 (C) - (F): .00
IT	.17 [.83] (.37) N=3557	.14 [0] (.35) N=570	.17 [0] (.37) N=2987	.52 [1] (.50) N=3236	.42 [0] (.50) N=92	.53 [1] (.50) N=3144	(A) - (D): .00 (B) - (E): .00 (C) - (F): .00
Q	.99 [.83] (1.05) N=2777	.97 [.85] (.65) N=526	1.00 [.83] (1.13) N=2251	1.29 [.98] (1.35) N=2179	1.06 [.91] (.54) N=68	1.30 [.99] (1.37) N=2111	(A) - (D): .00 (B) - (E): .24 (C) - (F): .00

Table 6 - Tobin's Q regressions

	Model I			Model II		
	OLS	TwoStep	MLE	OLS	Two Step	MLE
Probit model:						
Y = 1 if						
KOSDAQ						
Age	---	-.054 (.000)	-.053 (.000)	---	-.054 (.000)	-.053 (.000)
LogAssets	---	-.498 (.000)	-.490 (.000)	---	-.498 (.000)	-.489 (.000)
IT	---	.043 (.473)	.074 (.202)	---	.043 (.473)	.076 (.187)
Constant	---	10.222 (.000)	10.064 (.000)	---	10.222 (.000)	10.047 (.000)
Regression:						
Y = Q						
Constant	.186 (.109)	.080 (.487)	.111 (.545)	.181 (.120)	.074 (.520)	.106 (.564)
2000	.002 (.959)	.005 (.925)	.000 (.990)	.000 (.989)	.001 (.973)	-.002 (.962)
2001	-.018 (.732)	-.005 (.917)	-.013 (.823)	-.022 (.680)	-.011 (.837)	-.019 (.751)
2002	-.044 (.448)	-.067 (.244)	-.067 (.199)	.019 (.771)	-.016 (.803)	.014 (.807)
SalesGrowth	-.000 (.557)	-.000 (.711)	-.0001 (.000)	-.000 (.532)	-.000 (.674)	-.0001 (.000)
IndustryQ	.739 (.000)	.648 (.000)	.669 (.000)	.731 (.000)	.635 (.000)	.657 (.000)
ADR	.076 (.521)	.184 (.130)	.157 (.018)	.074 (.533)	.184 (.129)	.156 (.019)
KOSDAQ	.173 (.000)	.769 (.000)	.621 (.000)	.234 (.000)	.861 (.000)	.705 (.000)
Chaebol	-.055 (.314)	.080 (.156)	.047 (.293)	-.056 (.327)	.072 (.217)	.040 (.346)
Chaebol*KOS	---	---	---	.059 (.798)	.277 (.209)	.220 (.139)
2002*KOS	---	---	---	-.183 (.032)	-.246 (.003)	-.234 (.001)
F Test/Chi 2	16.24 (.000)	239.74 (.000)	84.08 (.000)	13.47 (.000)	250.82 (.000)	86.25 (.000)
Rho	---	---	-.352 (.005)	---	---	-.361 (.005)
Lambda	---	-.536 (.000)	---	---	-.549 (.000)	---

Notes: Table reports regression results for all firms with sufficient financial data listed on KSE and KOSDAQ over 1999-2002. Age is age of firm in years. IT equals 1 for firms in high technology industries, SaleGrowth is sales growth over last 2 years. IndustryQ equals the average Q for that firm's industry in that year. Chaebol equals 1 for firms in KFTC formally designated chaebol groups. 2000, 2001, 2002 equal one for their respective years. P-values in parentheses.

Table 7 - Sample Statistics for the IPO Initial Return Sample

	KSE			KOSDAQ			Test: KSE=KOSDAQ
	Total	Chaebol	Independent	Total	Chaebol	Independent	
	(A)	(B)	(C)	(D)	(E)	(F)	
N	51	11	40	523	21	502	
Age	20.53 [17.00] (20.77)	21.36 [21.00] (16.68)	20.30 [17.00] (21.94)	12.48 [9.00] (9.61)	13.67 [11.00] (11.72)	12.43 [9.00] (9.52)	(A)-(D):2.73*** (B)-(E):1.52 (C)-(F):2.25**
LogAssets	12.94 [12.49] (2.00)	13.76 [13.38] (1.94)	12.72 [12.40] (1.98)	10.31 [10.17] (0.95)	12.11 [11.97] (1.43)	10.24 [10.14] (0.85)	(A)-(D):9.28*** (B)-(E):2.74** (C)-(F):7.86***
LogSales	12.43 [12.18] (2.00)	13.79 [13.63] (1.74)	12.05 [11.85] (1.91)	10.04 [9.96] (1.14)	11.93 [12.21] (1.61)	9.96 [9.93] (1.05)	(A)-(D):8.40*** (B)-(E):3.02*** (C)-(F):6.83***
IT	0.12 [0.00] (0.33)	0.18 [0.00] (0.40)	0.10 [0.00] (0.30)	0.53 [1.00] (0.50)	0.48 [0.00] (0.51)	0.53 [1.00] (0.50)	(A)-(D):-8.02*** (B)-(E):-1.69 (C)-(F):-8.20***
Under-writer	0.31 [0.00] (0.47)	0.45 [0.00] (0.52)	0.28 [0.00] (0.45)	0.36 [0.00] (0.48)	0.43 [0.00] (0.51)	0.35 [0.00] (0.48)	(A)-(D):-0.72 (B)-(E):0.10 (C)-(F):-0.94
Initial Return	0.53 [0.26] (1.06)	1.46 [1.30] (1.35)	0.27 [0.09] (0.82)	0.42 [0.15] (0.44)	0.21 [0.12] (0.44)	0.43 [0.17] (0.44)	(A)-(D):0.73 (B)-(E):3.91*** (C)-(F):-1.22

Note: Table reports mean, [median] and (standard deviation) for sample of firms offering IPOs on Korea's two stock exchanges from 1999 to 2002. Test statistic is t-stat for test of equal means. Number of observations is one lower than reported at top for KOSDAQ LogSales, total and independent, and for KOSDAQ IT, total and independent.

Table 8 - IPO Initial Return Regressions

	Model I			Model II		
	OLS	Two Step	MLE	OLS	Two Step	MLE
Probit model:						
Y = 1 if KOSDAQ						
Age	---	-.010 (.207)	-.009 (.257)	---	-.010 (.207)	-.009 (.274)
LogAssets	---	-.604 (.000)	-.608 (.000)	---	-.604 (.000)	-.609 (.000)
IT	---	.752 (.002)	.747 (.004)	---	.752 (.002)	.747 (.004)
Intercept	---	8.006 (.000)	8.044 (.000)	---	8.006 (.000)	8.047 (.000)
Regression:						
Y = Initial Return						
Constant	1.288 (.000)	1.004 (.000)	1.223 (.003)	.972 (.000)	.664 (.000)	.896 (.010)
2000	.134 (.023)	.133 (.022)	.134 (.007)	.258 (.000)	.257 (.000)	.258 (.000)
2001	.397 (.000)	.402 (.000)	.398 (.000)	.374 (.000)	.380 (.000)	.376 (.000)
2002	.529 (.000)	.523 (.000)	.525 (.000)	.761 (.000)	.755 (.000)	.757 (.000)
Log sale	-.090 (.000)	-.076 (.000)	-.087 (.002)	-.086 (.000)	-.070 (.001)	-.082 (.001)
Underwriter	-.076 (.069)	-.075 (.069)	-.076 (.057)	-.094 (.018)	-.093 (.017)	-.094 (.015)
KOSDAQ	-.222 (.006)	-.073 (.644)	-.188 (.241)	.096 (.257)	.258 (.095)	.135 (.332)
Chaebol	.420 (.000)	.430 (.000)	.423 (.023)	1.268 (.000)	1.281 (.000)	1.272 (.003)
Chaebol*KOS	---	---	---	-1.276 (.000)	-1.278 (.000)	-1.277 (.003)
Period2&4*KOS	---	---	---	-.306 (.000)	-.307 (.000)	-.307 (.000)
F test/Chi 2:	21.06 (.000)	137.91 (.000)	209.75 (.000)	26.38 (.000)	231.02 (.000)	267.85 (.000)
Lambda	---	-.102 (.273)	---	---	-.110 (.207)	---
Rho	---	---	-.051 (.389)	---	---	-.062 (.299)

Notes: Table reports regression results for all firms with sufficient financial data listed on KSE and KOSDAQ over 1999-2002. Age is age of firm in years. IT equals 1 for firms in high technology industries. Initial Return is percentage change from offer price to price at close of first day of trading. Underwriter = 1 for the 4 largest underwriters. Chaebol equals 1 for firms in KFTC formally designated chaebol groups. 2000, 2001, 2002 equal one for their respective years. Period2&4 equals 1 for IPOs issued during Period 2 (1/29/00 - 6/23/00) and Period 4 (1/1/02 - 12/31/02). P-values in parentheses.