Under-pricing of South and East Asian IPOs: An Investigation of the Relevance of Governance Quality in Closely Controlled Companies.

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Abstract

In this paper, we investigate the impact of national governance quality on the under-pricing of new equity issues in South and East Asian equity markets. A significant feature of these markets is the dominant control position of individual shareholders or family groups in many listed companies. We explore the issue of concentrated control when assessing returns to IPO investors. Our results indicate that governance quality indicators are positively related to the level of under-pricing of new issues, consistent with the 'governance quality hypothesis' of Boulton, Smart and Zutter (2010). This relationship is restricted to companies not associated with concentrated control. We find that control concentration, as proxied by company size, is a better indicator of post-IPO shareholder distribution, than is concentration of share ownership. These results provide evidence in support of the 'reduced monitoring hypothesis' of Brennan and Franks (1997), in the developing markets of South and East Asia.

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1. Introduction

Under-pricing is a widely identified phenomenon that occurs when shares are initially listed on an exchange, and are offered to potential investors. It implies that shares are offered at a price which is below true market value, offering profit to an investor who successfully subscribes for an Initial Public Offering (IPO) and immediately sells their investment to others. This profit is at the expense of an issuing company that receives less than full value for the shares they have sold as a source of new equity capital. Under-pricing has been identified and empirically examined in a wide range of equity markets throughout the world. Reported findings demonstrate that it occurs in practically all markets, both those considered as developed and those considered as developing. Average initial returns on newly listed shares are between six and eight percent, in the case of Austrian, Canadian, and Danish IPOs, whereas average initial returns in Italy, the U.K., and the U.S. range between fifteen and seventeen percent. In contrast, average initial returns in Malaysia, Korea, and India are between fifty percent and ninety percent[1]. Although not definitive, these results indicate that very high levels of under-pricing are typically associated with the developing markets, and that although still positive, under-pricing in the developed markets is somewhat lower.

In this paper, we explore the issue of under-pricing in the developing markets of South and East Asia. Our focus is on the relationship between quality of governance and the extent of under-pricing. There are several reasons to suspect that quality of the national institutional environment is associated with under-pricing. A strong governance environment will improve the ability of companies to raise external capital, but it will also strengthen the ability of new external investors to protect their interests, impacting on management and insider ability to maintain the benefits of control. As a result, there is an incentive to under-price new issues, as it will encourage greater demand by potential new investors. In the event of an excess demand for new shares, management can ensure a wide distribution that excludes large blocks of new investors and favours many small investors, as they are less likely to be able

[1] Source is Loughran, Ritter, and Rydqvist (1994), updated on site.warrington.ufl.edu/ritter/, 2016.

to exercise control on management and insiders. Although there is no widely agreed definition of the difference between a developing and a developed national equity market, this difference is frequently interpreted as indicating the level and quality of national governance. Using national governance indicators, we examine the evidence on whether governance quality at the national level has had an impact on the extent of under-pricing in developing markets. We believe that these markets are of particular interest, as they are characterised by many companies in which control is concentrated within a small group, commonly an individual or group of shareholders, or a family group. This control is unrelated to the extent of shareholding. For example, Claessens Djankov and Lang (2000) demonstrate that the typical South and East Asian company will feature a significant deviation of ownership from control, considering the very sizable number of firms controlled by a single shareholder, the large number of family controlled firms, and the number of examples in which senior management are related to controlling family shareholders. We expect that, in this environment, the impact of governance quality on under-pricing will differ from that reported from studies of IPOs in developed markets, as external regulation should be less effective when there is concentrated control. There will be less incentive for insiders to under-price an IPO in a good quality governance environment, as they can expect to maintain control, regardless of the potential impact of any groups of new shareholders.

There is a growing literature that identifies various forms of national governance structure, and that offers measures of governance quality for each of them. Good governance structure is required to protect investor interests, and to ensure that they will be prepared to commit investment capital to companies. Individual shareholders will require protection against expropriation by insiders or informed outsiders. A good governance system should ensure that either managers or controlling shareholders will not be able to take advantage of their position, at the expense of other shareholders. La Porta et al (1997, 1998, and 2002) propose that a country's legal structure and framework do explain differences in the extent of development of financial markets, and in the responses of both companies and individual

investors. A good system of investor protection will assist companies wishing to raise either equity or debt capital, it may also impact on the scale of development in financial markets. This literature also proposes that cross-country differences in the quality of governance will impact on the spread of ownership in equity and also in debt capital. It may also impact on capital structure, on dividend policy, and potentially also on individual company value. La Porta et al. (1997) show that the number of IPOs is directly related to investor rights, the legal origin and the traditions of law and order in a country. They find that larger amounts of IPOs occur in countries that provide greater legal protection, but they do not offer evidence on the relationship between degree of protection and the extent of under-pricing.

In this paper, we explore whether National Governance Indicators have explanatory power for the level of under-pricing in South and East Asian equity markets. We have gathered a sample of IPOs in India, Korea, Malaysia, Pakistan, Sri Lanka, and Thailand[2]. Our sample consists of 881 separate Initial Public Offerings, covering the period from 2010 to 2018, and we search for evidence of a relationship between levels of under-pricing of IPOs and national governance indicators. These indicators capture a number of broad measures of governance quality at national level. We use Worldwide Governance Indicators, prepared annually by the World Bank. Six indicators are available, offering measures of 'Voice and Accountability, 'Political Stability', 'Government Effectiveness', Regulatory Quality', 'Rule of Law', and 'Control of Corruption'. An attractive feature is that they are updated annually, unlike the governance quality indicators normally employed in empirical investigations of this type. In our tests, we include the company-level factors commonly identified as having a potential impact on the extent of under-pricing. We explore the issue of concentration of ownership, and we examine whether it has an impact on the relationship between IPO under-pricing and quality of governance. Following Claessens et al.(2000), in a separate investigation, we offer proxies for concentration of control rather than concentration of

[2] We exclude the Taiwan Stock Exchange from our study, as it is the only market requiring that all IPOs trade in a pre-issue market for at least six months prior to issue, as a solution to determining the appropriate issue price. Details and analysis are presented in Chang, Chiang, Qian, and Ritter (2017).

ownership, and we again test for potential impact on the relationship between under-pricing and governance quality. We conclude by directly examining the relationship between the extent of under-pricing of IPOs and the subsequent distribution in share ownership. This is not a direct test of the proposal that under-pricing is motivated by a desire to ensure a widely dispersed share ownership in a strong governance environment, but it is related, as we examine the impact of under-pricing on the subsequent distribution of share ownership. Our study offers a number of new contributions to the literature. We concentrate our study on developing markets, and we specifically address the issue of concentration of control, rather than concentration of ownership. Our choice of governance indicator facilitates an adjustment for changes over time in governance quality in each national environment. We also gather individual data on IPOs, rather sourcing our information from a database. We believe that this may facilitate the identification of a greater number of IPOs, particularly the smaller new issues, which may impact on our overall conclusions.

When we examine the full study population if IPOs in South and East Asian markets, we find no significant relationship between governance quality and the levels of under-pricing at IPO. In further testing, we address the issue of concentration of shareholding, and we find weak evidence of the expected positive relationship between governance quality and the amount of under-pricing. This result is confined to IPO companies in which subsequent ownership is not concentrated in a small group of insiders. We do not expect this relationship when we examine IPOs that subsequently have concentrated ownership, as management and insiders probably will be the dominant group, and will therefore have maintained control. However, when we use a proxy for family or insider related control as opposed to ownership, we find strong evidence that under-pricing does encourage a wider distribution of shareholdings only in companies that are not subject to family or insider related control. We propose that this result is strongly supportive of our proposition that concentration of control in companies listed on developing markets will impact on the influence of good quality governance, and therefore on the motivation of insiders to under-price new issues.

In Section 2, we briefly review both theory and available evidence regarding the relationship between governance quality and the extent of under-pricing. We also develop a justification for our proposal that the concentrated control of companies listed in developing markets will impact on the relationship between strength of governance and the motivation to under-price new issues. Section 3 provides descriptions of the quality of governance measures we employ in this study. Section 4 presents details of our study population, including estimated levels of under-pricing. We outline the company-specific factors we include as a control when assessing the relationship between governance quality and under-pricing. We also include numerical details of the governance quality measures we use in this paper. Section 5 presents our main empirical findings. In an initial section we include individual company-level factors when regressing IPO under-pricing on national governance quality indicators. In a further section, we explore the issue of concentration of shareholding, and its likely impact on the relationship between governance quality and the extent under-pricing. We believe that the significant separation between ownership and control of South and East Asian companies is particularly relevant to our investigation. In a final empirical section, we therefore use alternative indicators of concentration of control when exploring the relationship between governance and under-pricing of IPOs. We also offer a direct assessment of the impact of under-pricing on the distribution of post-IPO shareholdings. Section 6 summarises and concludes our paper.

2. Under-pricing and governance quality

Our paper offers an investigation of the proposition that under-pricing is a feature of an environment in which there is strong protection of individual investors. Whereas a stronger governance environment is attractive as it will give firms easier access to external capital, management and inside investors however will face a conundrum, as listing requirements will typically weaken their rights, relative to the rights of new outside investors. In other words, an environment that ensures better governance will limit the potential extraction of

private benefits by management and inside investors. An example is the consumption of perquisites by management. A more subtle example would relate to private information that is only available to insiders, allowing them to enjoy an excessive proportion of any potential benefits. Brennan and Franks (1997) provide a theoretical link between insiders' private control benefits and IPO under-pricing. They propose a “reduced monitoring hypothesis", suggesting a link between insiders' private control benefits and IPO under-pricing. They suggest that under-pricing will actually be a feature of environments with strong protection of outside investors. Assuming that insiders will value control and the related potential to extract private benefits, there is an incentive for greater under-pricing, as it will lead to an increased subscription for the new issue. Oversubscription will enable insiders and managers to discriminate against potential investors who subscribe for large blocks of shares. They will wish to ensure a very wide distribution in the ownership of newly issued shares. The result will be new outside investors who hold relatively small stakes, and will either not have the incentive to or the ability to monitor and control management. In support of this proposal, Brennan and Franks (1997) report that oversubscribed U.K. issuing firms allocate a disproportionately large proportion of shares to small investors. Smart and Zutter (2003) offer further support for this explanation, as they identify evidence of lower under-pricing in dual-class IPOs, when compared with single-class issues. Hopp and Dreher (2013) provide stronger direct confirmation, as they find evidence that under-pricing is larger in countries with a stronger protection of outside investors.

Boulton, Smart, and Zutter (2010) find direct evidence in support of ‘reduced monitoring’, in their study of IPOs in a wide range of national markets. They suggest that insiders and managers tend to use under-pricing to create excess demand for IPO shares in countries that offer outside shareholders stronger protection from expropriation, and they report regression evidence of a significant positive relationship with the extent of under-pricing. This evidence supports their proposal that excess under-pricing provides a more dispersed ownership structure and strengthens insider’s post-IPO control. Autore, Boulton, Smart, and

Zutter (2014) extend the direct empirical examination of this theoretical explanation, as they separately explore the relationship between governance quality and extent of IPO under-pricing, using samples both in developed and in developing markets. They propose that whereas there are likely to be exceptions, quality of governance and therefore quality of protection against expropriation will be considerably greater in a population of new listings on developed markets, when compared with IPOs on developing markets. They suggest that the quality of governance in developing markets will typically be weaker, therefore reducing the protection of new outside investors, so that management and insiders will be able to continue to extract private benefits. In this environment, there is less incentive to under-price, as management and insiders will not fear loss of control benefits. They report empirical results supportive of this proposition, as they only find a significant positive relationship between under-pricing and governance quality in developed markets. They report no significant relationship, following their examination of IPOs in developing markets. They offer further related evidence, as they find that stronger financial reporting standards, greater quality of law enforcement, and enhanced public trust, all are associated with markets in which there is a significant positive relationship between under-pricing and quality of governance. They infer that, as these aspects of governance quality are less likely to be present in developing markets, there is less incentive on insiders to under-price in the event of a higher quality governance environment, thereby explaining the lack of a relationship between governance quality and the extent of under-pricing in developing markets.

In our study, we offer a further exploration of the relationship between governance quality and the extent of under-pricing in developing markets. We restrict our study to a sample of developing markets, where we examine governance quality and its impact on the motivation of insiders to under-price. We also believe that a study restricted to IPOs in developing markets is appropriate, as good quality governance also is a feature of many of these markets, as well as most developed markets. As we report in Section 3, regardless of the fact they are designated as developing, we find that a sizable number of these markets are

associated with strong measures of governance quality, whereas others clearly operate in an environment of low quality governance. We believe that other influences, more typically associated with developing markets, will impact on the decision to under-price, potentially as a means of maintaining management and insider control.

Following Claessens Djankov and Lang (2000), our study is motivated by the finding that concentration of ownership may not offer an indication of concentration of control. Arguably, there is no incentive to under-price new issues in order to ensure a wide distribution of small shareholdings in circumstances where control is unrelated to share ownership. Claessens et al. (2000) find evidence of a significant deviation between ownership and the control of very many companies, in their comprehensive study of those companies listed on South and East Asian equity markets. We therefore believe that insiders will be motivated to under-price new issues in circumstances of good quality governance, only if share ownership is related to control. New investors would be able to take advantage of the protections associated with a good governance environment, only if they can expect to exercise some control as shareholders. Claessens et al. (2000) find that closely held firms and family firms will maintain control through a network of connections and holding companies, regardless of the potential impact of external governance on new outside investors and on their wish to protect themselves from expropriation by insiders. We propose therefore that the relationship between under-pricing and governance quality may be influenced by whether or not control is maintained through a network of connections or relationships. We expect a significant positive relationship only in those IPOs that are not characterised by closed insider relationships. We investigate whether the lack of a relationship between governance quality and under-pricing of IPOs in developing markets may be due to a deviation between ownership and control in many of these companies, rather than due to a poor governance environment. We explore this issue in our empirical tests on IPOs in the developing markets of South and East Asia.

3. Quality of governance indicators

Following La Porta et al (1997, 1998), differences in national regulatory system have been identified as influencing company management. A number of proxies commonly are applied to represent relevant aspects of a legal regulatory framework. They typically include a measure of quality of investor protection, a proxy for the quality of a national legal system (i.e. the relevant statutes enacted by a national parliament), a proxy for judicial efficiency (i.e. the law in practice), and a proxy representing origin of the legal system. Quality of investor protection is represented by a measure of the extent to which outside investors are protected against expropriation by insiders (Djankov et al., 2008). Quality of the legal system and institutions is captured by estimates of the extent to which individuals and groups have confidence in societal rules and regulations (Kaufmann et al., 2005). Legal efficiency is represented by the strength and efficiency of legal enforcement, this can potentially compensate for a relatively poor quality legal system. Origin of legal system requires classification as deriving from a particular legal background. National legal systems are categorised as coming from English Common Law, French Civil Law, German Legal Origin, or Scandinavian Legal Origin.

We apply World Bank Governance Indicators, to capture all aspects of regulatory quality in each of the national markets in our study. Six aggregate indicators are prepared annually, for a very wide range of countries, using a large number of data sources[3]. The World Bank states 'The Worldwide Governance Indicators are a research dataset summarizing views on the quality of governance provided by a large number of enterprise, citizen and expert survey respondents in industrial and developing countries. These data are gathered from a number of survey institutes, think tanks, non-governmental organisations, international organisations, and private sector firms'. Aggregate indicators for each country are:

[3] Details on the construction of these indicators are available in Kaufmann, Kraay and Mastruzzi (2010).

Government Effectiveness (*GE*) reflects perceptions of the quality of public services, the degree of independence from political pressures, the quality of policy formulation and implementation, and the credibility of government commitment to such policies.

Regulatory Quality (*RQ*) reflects perceptions of government ability to formulate and implement sound policies and regulations that promote private sector development.

Rule of Law (*RL*) reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, in particular the quality of contract enforcement, property rights, the police, and the courts.

Control of Corruption (*CC*) reflects perceptions of the extent to which public power is exercised for private gain, including all forms of corruption, as well as "capture" of the state by elites and private interests.

Voice and Accountability (*VA*) reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.

Political Stability (*PS*) measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism.

Whereas the Worldwide Governance Indicators do not directly align with proxies identified in governance literature, there clearly is a close correspondence between them. Quality of investor protection is captured by Control of Corruption. Overall quality of the legal system is represented by Regulatory Quality and by Government Effectiveness. Legal efficiency is covered by Rule of Law and by Voice and Accountability. Origin of legal system should also be picked up in these national indicators.

4. Input Data

Our dataset consists of all IPOs from six South-East Asian countries, over the period from January 2010 to December 2018. All IPOs were manually identified, using data available through each national market web page. Data collected for each IPO company consists of the date or dates of issue, the initial listing date, the issue or offer price, total proceeds of the new issue, closing price on the first trading day, and total market capitalisation on the first trading day. Data-stream offers an alternative data source, which was used in some cases to provide either closing day price or market value, or to verify the data collected from market web pages. In any case where an item of data is missing and could not be collected elsewhere, this IPO is deleted from our dataset. In common with the standard methodology in this literature, we estimate under-pricing as the percentage change in value from issue price to closing first-day price on the secondary market. Our estimate therefore is:

$$\left((Closing\ Price - Issue\ Price) / Issue\ Price \right) as\ \%$$

We do not adjust for market movements. Realistically, this correction would not have an impact on our results, as average IPO returns are considerably in excess of market returns on any average trading day[4].

We present summary details of our study population in Table 1. We indicate the total number of IPOs in each national market, during our study period from 2010 to 2018, together with the overall totals for our study population. Using all IPOs in each market, we estimate average national levels of under-pricing. We also indicate the distribution of under-pricing estimates across each market, by including the standard deviation, skewness and kurtosis, maximum and minimum values. We include a value weighted estimate of under-pricing in

[4] As an example, Beatty and Ritter (1986) report an average initial return of 14.1%, while the average daily market return was less than 0.1%. We find that national average initial return ranges from 2.74% to 52.42% in our study sample.

each market, by adjusting for the relative size of each new issue, as we note large variations in size of new issues in all markets. To construct this measure, we weight our estimates of under-pricing by total market capitalisation on the first listing date. In each market, we then prepare an annual weighted average estimate, which is subsequently averaged across all years of the study period, to provide an overall weighted average estimate of under-pricing. We believe this measure is more representative of the experience of investors participating in the new issue market, as the amount of capital allocated to an individual new issue may be proportional to relative company size. This has implications for our subsequent analysis.

We find very large differences between markets, as average levels of under-pricing range from 2.74% (Pakistan) to 52.42% (Thailand). We note that our estimates are considerably lower than the Loughran, Ritter, and Rydqvist (1994) estimates for these markets, as their updated estimates range from 22.1% (Pakistan) to 88.5% (India). We do note however that our rankings of average levels of under-pricing in these markets are very similar to those of Loughran et al (1994). We identify the same markets as being associated with relatively higher levels of under-pricing. Measures of distribution demonstrate very wide variations in under-pricing in all markets. Minimum values show that some issues are over-priced, as we record a decline in value in the secondary market. We note a sizable positive skewness in under-pricing estimates across all markets, with the exception of Pakistan, which records only 34 IPOs. An implication is that very high levels of under-pricing are recorded in a proportion of IPOs. Excess kurtosis in the distribution of estimates in most markets also indicates the relatively large number of extreme values. Our weighted average measures of under-pricing imply that, after we allow for relative company size, we continue to find significant under-pricing in all markets. Again, Pakistan is the only an exception, where we record a very small number of new issues. This small number may not be representative of all IPOs in this market, and may therefore distort our results. Weighted estimates mostly are lower, suggesting that very high under-pricing is typically associated with smaller companies. They may attract reasonably low levels of investor interest, so greater under-pricing benefits

may be required to attract potential new investors. India and Korea are exceptions however, indicating that this interpretation is not applicable to all markets. We return to this issue in our subsequent analysis, when we explore the issue of concentration of control in these companies.

In our empirical tests, we also include individual company level data that may have impacted on the level of under-pricing of each new issue. Summary details are in Table 2. Ritter (1984) recommends a control for hot market effects, and we use *ACT* and *ROR* as appropriate measures. *ACT* is an indicator of the extent of new issue activity in the year of IPO. For each new issue, our measure is the number of IPOs in a national market, as a proportion of the number of market listed companies in that year. Our annual estimate of the number of market listed companies is the number of DataStream listed companies. *ROR* is a measure of national market return over the twelve months prior to IPO. Our measure of pre-IPO market return is return on a market index. We use daily observations of the DataStream DS national market indices, as they include an estimate of dividend adjusted returns[5]. Mean values of *ACT* and *ROR* respectively are 0.0136 and 0.0591, indicating that the average annual number of IPOs in South-East Asian markets is 1.36% of the number of listed companies, and that average market return in the year before issue is 5.91%. The former measure is relatively stable, as indicated by a reasonably low standard deviation across all IPOs, whereas a very high standard deviation indicates a wide variation in pre-issue annual market returns across our sample of new issues.

Offer size also is commonly included in empirical investigations of new issues. Our measure is the natural log of the new issue proceeds. To facilitate international comparisons, we convert all values to US$s, using exchange rates at the time. We do not include a control for inflation, as movements in the US$ exchange rate will capture this effect. Any uncaptured

[5] Details on the construction of DS (Data-stream) Indices are available in 'The Data-stream Global Equity Indices User Guide, Thomson Financial Limited 2015.

element will be minimal, considering levels of US inflation during this period. We designate our measure of offer size as '*SIZE*'. Log values imply average, minimum, and maximum proceeds, expressed in US$s, of $61 million, of $0.3 million, and of $636 million respectively. Either offer size or post-IPO value are included in regression tests, as they can capture the level of asymmetric information between an issuing firm and potential investors. Small size may impact on the extent of under-pricing that is required. Both measures of value will relate to the amount and quality of information available to new investors, as greater transparency will be required to attract sizable amounts of investment capital to a larger company. *SIZE* may therefore impact on the extent of under-pricing. Beatty and Ritter (1986), Mauer and Senbet (1992), and others, report evidence of an inverse relationship between issue size and under-pricing. We also include the volatility of share returns in the immediate post-issue period, which we designate as '*VOL*'. Using daily returns data from DataStream, we estimate volatility as the standard deviation of returns over the initial three months of trading. Although an ex-post measure, it should indicate investor uncertainty regarding intrinsic value. This is a further proxy for information asymmetry, and it may therefore impact on the level of under-pricing. Average post-issue volatility of share returns is 0.0332, but a very sizable standard deviation indicates wide variations across our sample of newly issued companies.

We include dummy variables as a control for the nature of arrangement between a new issue company and its banker, as this may be an impact on the extent of under-pricing. One dummy variable (*BK*) takes a value of one in the event of book-built offers, and a value of zero if there is a firm commitment or other method. Ljungqvist, Jenkinson, and Wilhelm (2003) find that book-built offers typically exhibit more under-pricing, although Ritter (1987) reports the opposite result. In Table 2, we show that 72% of our sample firms use a book-built offer. This is a higher proportion than is typically reported in developed markets. A further dummy (*INT*) signifies an integer offer price in the local currency; otherwise it has a zero value. An integer price may signify uncertainty, as more fine increments in value are less likely to be a concern in a less predictable environment. Bradley, Cooney, Jordan, and

Singh (2004) demonstrate that integer priced IPOs are associated with higher under-pricing and also that they are associated with greater levels of post-issue price volatility. A majority of firms in our sample (68%) are offered for sale at an integer price. We include further dummies, to isolate any effect associated with the particular year in which an IPO occurs, and to account for any country fixed effects. A further dummy variable identifies high-tech firms, as they may be associated with very excessive levels of under-pricing.

We present summary details on the governance indicators in Table 3. As previously outlined, each measure summarises a range of opinions regarding quality of governance in each national environment. These views come from a large number of enterprises, of citizen, and expert survey respondents and all measures update annually. Each governance quality measure is indicated numerically, with values ranging from -2.5 (very weak) to 2.5 (very strong). To facilitate comparisons between capital markets, we present the average value of each indicator, for each individual country. This data indicates that although all six markets are categorised as developing, there is a considerable variation in quality of governance. Korea is identified as offering the best quality of governance across all measures, and is closely followed by Malaysia. We also identify Pakistan as offering the weakest governance environment. Correlation measures between the annual national quality measures indicate very high degrees of similarity, as they obviously capture similar related aspects of governance quality. *VA* is an only exception, as the correlations range from 0.682 to 0.431. Although not reported, we note considerable changes in all governance measures throughout the nine year study period, as an overwhelming majority record an improvement. Largest individual improvements over this period are for Sri Lanka (*VA* moves from -0.51 to +0.01), for India (*PS* moves from -1.28 to -0.96), and for Pakistan (*CC* moves from -1.09 to -0.79). Most other individual values also record a sizable improvement over the study period. We also note a small number of declining measures. These reductions are very small. An only exception is Thailand, as *VA* declines from -0.50 to -1.10. In conclusion, we believe that the sizable improvements in most governance quality indicators for each national market

provide a strong justification for their use as the measure of governance in this study. In contrast, governance quality measures used in much of the related literature is fixed in time, and often is based on the laws and institutions that were in place many years before the IPOs that they investigate.

5. Empirical results

5.1 The full study population, governance and under-pricing

We regress under-pricing on the annual governance quality indicators, together with all company-level measures and dummy variables described in Section 4. Our results are in Table 4. Our dependent variable is estimated under-pricing of the IPOs. Models 1 to 6 each contain an individual national governance quality measure for the appropriate year. All governance quality measures are combined in Model 7. Company-level factors added to each regression model are a measure of recent national IPO activity (*ACT*), national market return prior to the new issue (*ROR*), a measure of new issue value (*SIZE*), and return volatility in the period after new issue (*VOL*). Dummy variables indicating a book-built deal (*BK*) and an integer offer price (*INT*) are also included. Further dummy variables relate to year of issue, the national market, and whether a high-tech firm IPO. Although coefficients of some year and national market dummies are significant, we do not report them for reasons of space.

We typically find no significant relationship between a national governance quality indicator and the extent of under-pricing. Models 1 to 6 each contain an individual quality indicator, and with one exception, all coefficients are insignificant. The exception is *VA* (voice and accountability), as the coefficient indicates a significant positive relationship. Although our results are contrary to those reported in most previous studies, they conform with Autore, Boulton, Smart, and Zutter (2014), who find no relationship when they examine IPOs that list in developing markets, although they find a significant positive relationship between governance quality and under-pricing when examining a population of IPOs from both

developed and developing markets. Results for Model 7 are mixed, as we find coefficients on some indicators now carry significant positive coefficients. We also consider the relevance of these company-level factors. Our measure of market IPO activity (*ACT*) is a significant positive explanatory factor in all regression models. We also find that overall market return in the year prior to IPO (*ROR*) has a strongly significant positive predictive power in all models. Both measures imply a hot market effect, as the extent of under-pricing is affected by the frequency of new issues, and probably is motivated by recent market performance. A likely interpretation is that increased competition for new investor capital necessitates more under-pricing. In all regression models, we find a strongly significant inverse relationship between offer size (*SIZE*) and the extent of under-pricing. This also conforms to expectations, as greater transparency associated with larger initial offerings will reduce information asymmetry, resulting in a reduced requirement for under-pricing. In all regression models, we also find a significant positive relationship between post-issue share return volatility (*VOL*) and the extent of under-pricing. Uncertainty regarding intrinsic share value is reflected in return volatility, and is also likely to result in increased under-pricing. This finding also conforms to expectations.

Our dummy variables indicate an integer (*INT*) offer price and a book-built deal (*BK*). Although all coefficients on the integer dummy are positive, none are statistically significant. We cannot confirm that integer prices are associated with under-pricing. Estimated coefficients on the book-built deal dummy all are negative, and strongly significant. This indicates that a book-built offer is associated with lower levels of under-pricing, as reported by Ritter (1987). An examination of goodness of fit measures is of interest. In all models, we find that a combination of individual quality of national governance measures with the individual company level factors will explain between eighteen and nineteen percent of the extent of under-pricing. It is of similar scale to the measures of explanatory power reported in other related investigations.

5.2 Concentration of shareholdings, governance and under-pricing

In further tests, we explore the impact of concentration of ownership on the relationship between under-pricing and the indicators of governance quality. If under-pricing is the result of an attempt by management and insider shareholders to maintain their ability to extract private benefits of control after a public listing, we expect to identify a positive relationship when we focus on those IPOs characterised by a wide dispersion of shareholdings. Under-pricing will be undertaken to ensure excess demand for the new issue, and small investors are the preferred new shareholders, as a wide distribution of new small shareholdings will better facilitate the retention of control by management and insiders in a strong regulatory environment. We expect a positive relationship between under-pricing and the quality of governance, as there will be a greater incentive to under-price in a strong governance environment. We expect to find this relationship in a sample new IPO companies associated with a wide dispersion of shareholdings, rather than in a sample characterised by concentrated shareholdings, as we believe that the latter group are companies in which control by managers and insiders is maintained, regardless of quality of investor protection.

We use free-float data provided by Data-stream, which offers historic information on the distribution of shareholdings of most companies in our dataset. Free-float data represents the percentage of shares held by ordinary investors, defined as those who do not possess a strategic shareholding. Strategic shareholdings are defined as holdings in excess of five percent, holdings by a government or government institution, holdings by one company in another, holdings by employees or by those with a substantial position within a company, holdings by pension funds, and holdings by a foreign institution[6]. Although Data-stream offers very wide coverage of free-float data, a small proportion of IPO companies in our study population are not included. Data for some Pakistani and Sri Lankan IPO companies is missing, so these companies must be excluded from this particular analysis.

[6] Details on free-float data are available in the Data-stream Free-float Calculation Guide, Thomson Financial Limited 2017.

We divide the IPOs into two sub-sections, one in which distribution of ownership is highly concentrated, and one in which there is a very high proportion of flee-float shares. In the event of a widely distributed shareholding, strong regulatory protection will potentially impact on the private benefits of control by management and inside investors, if there are sizable groups of new outside shareholders. We therefore expect a stronger relationship between governance quality and the extent of under-pricing within this group, as insiders will employ under-pricing in order to facilitate discrimination against subscribers for a large shareholding. We use free-float data twenty-four months after IPO, to identify the high- and the low-concentration groups[7]. Using the percentage of free-float shareholdings, we rank all IPO companies, and we allocate them to three groups containing equal numbers of companies. We identify the highest ranked group as low-concentration IPOs and the lowest rank group as high concentration IPOs. We then re-estimate our cross-section regression models, separately using the low concentration group and the high concentration group. We exclude the middle rank group, as we expect it may retain aspects of both groups. To ensure comparability with results in the previous section, we include company-level control variables and all dummy variables in our regression tests. Our results are in Table 5.

Panel A contains regression estimates for the highly concentrated group of IPOs. Results for the low concentration group are in Panel B. Our estimates largely conform to expectations, as we find little evidence of a relationship between under-pricing and the governance quality indicators in IPOs that subsequently record highly concentrated ownership. Only in Model 6, when Voice and Accountability (*VA*) is regressed on under-pricing, is there evidence of a significant positive relationship. This is similar to our findings reported in Table 4, when the full population of IPO companies is tested. Further, in Model 7, when all quality indicators are combined, only the coefficient on *VA* again carries a significant positive coefficient. Results

[7] As a control, we also use free-float data six months after IPO, when identifying high and low concentration groups of IPO companies. This alternative specification has little impact on our results.

for all other model estimates indicate no significant relationship, and estimated coefficients all are negative. Results for the company-specific explanatory variables typically are as expected, all are significant, with the exception of INT, and all show the expected relationship. Regression tests of the low concentration group also are as expected, as we note that all coefficients on the governance quality measures are positive, only *VA* again is an exception. We cannot however confirm an expected positive relationship between governance quality and under-pricing, as no coefficient estimates differ significantly from zero. When all measures are combined in Model 7, only the coefficient on *RQ* suggests a significant positive relationship. Results for company-specific explanatory variables also are mixed, although coefficients for *ACT*, *SIZE* and *VOL* mainly are significant and carry the expected signs. We note that goodness of fit measures are similar for both the low and high concentration groups, indicating that the combination all independent variables and dummy variable explain approximately twenty-four percent of variability in under-pricing.

Our test results, based on a segregation of IPOs that is dependent of concentration of share ownership, do not offer therefore strong support for reduced monitoring. In the case of IPOs listing on this group of South and East Asian markets, we cannot confirm evidence in support of the proposition that IPO firms with dispersed ownership have engaged in greater amounts of under-pricing when listing on a national market associated with a strong regulatory environment. We believe however that this finding is due to a conflict between concentration of share ownership and concentration of control. Claessens Djankov and Lang (2000) demonstrate that the typical South and East Asian company will feature a significant deviation of ownership from control, considering the domination of firms controlled by a single shareholder, the very large number of family controlled firms, and the number of examples in which senior management are relatives of the controlling family shareholders. We therefore undertake an alternative test in which we use a proxy for concentration of control, and we segregate our population of IPOs on the basis of concentration of control, rather than concentration of ownership.

5.3 Concentration of control, governance and under-pricing

In this section we offer an alternative examination of the proposal that concentration of control will impact on the incentives for management and insider shareholders to under-price an IPO in circumstances where they face the prospect of a strong regulatory environment. We re-test the proposition that management and insiders will respond by under-pricing, to ensure that control will not be shared with new investors after an IPO. Following Claessens, Djankov, and Lang (2000), we propose that concentration of shareholdings may not be a good indicator of concentration of control. Using companies listed on South-East Asian equity markets, they offer compelling evidence that ownership is not always associated with control. They demonstrate many examples of a considerable deviation between share ownership and actual concentration of control. They identify size and age as company-level indicators of when control typically is more concentrated than as indicated by ownership. As our study is of new IPO companies, we cannot use company age, so we use company size as an indicator of concentration of control. We therefore repeat the methodology employed in the previous section, except that we now rank all companies by size rather than by free-float shareholding. We again separate into three groups of equal numbers. We identify the group of smallest companies as having most concentrated control, and we designate the group of largest companies as having dispersed control. We again exclude the middle ranking group, as anticipate they may retain characteristics of each. We re-estimate our cross-section regressions, separately using the low concentration and the high concentration groups. Our results are in Table 6.

Panel A contains estimates for the group of larger IPO companies. We anticipate less concentrated control in this group of companies, so insiders and managers will be motivated to under-price an IPO if they operate in a strong regulatory environment. Our results strongly support this proposition. We find that when governance quality indicators are regressed on IPO under-pricing, all carry strongly significant positive coefficients. This result supports the

proposition that under-pricing is positively related to governance quality, in circumstances of less concentrated control. We also note that these results are clearly stronger than when we use post-IPO free-float data as a measure of concentration of control. We now find that all governance quality measures have strongly significant explanatory power for under-pricing, whereas our alternative tests typically only positive but insignificant coefficients for the individual governance quality measures. In Panel B, we consider the concentrated control group, as indicated by small company size. In Models 1 to 6, coefficients on the individual governance quality measures all are negative and significant. This result implies that under-pricing of smaller IPO companies with concentrated control is greater in a less regulated environment. We propose that this result can be expected, as the extent of under-pricing will be influenced by issues previously specified in the under-pricing literature, rather than issues relating to insider advantage and control (examples include Rock 1986, Welch 1989, Chemmanur 1993, North 1991, Claessens and Laeven 2003, Johnson et al. 2000, Giannetti and Simonov 2006, Chiou et al. 2010). If we consider the company-level measures, we note an unusually strong explanatory power for under-pricing in the group of small companies. In contrast, only ACT retains significant explanatory power for the extent of under-pricing of larger IPOs, and in all cases it suggests an unexpected negative relationship. An implication is that higher levels of under-pricing are associated with periods of less overall new issue activity, if larger companies alone are considered. We interpret this result as supportive of the proposal that under-pricing is largely a response to the need to ensure a wide distribution of new small shareholders in less concentrated firms, and that other firm related characteristics are less relevant in these circumstances.

5.4 Distribution of shareholdings and under-pricing, a direct test

We include a further exploration of the reduced monitoring hypothesis, by assessing the relationship between the post-IPO distribution in share ownership and under-pricing. We directly test for the proposition that under-pricing is undertaken to ensure an increased distribution in share ownership. Although we do not include governance quality in this test,

we believe it offers a good assessment of elements of a reduced monitoring hypothesis, as it assesses the actual relationship between under-pricing on the distribution of shareholdings after IPO. Reduced monitoring implies that under-pricing is motivated by the desire to ensure a widely distributed shareholding in environments of good quality governance. We conduct this test on the full population of IPOs, and separately on low and high concentration of control IPOs, as identified in the large and small company groups. Folowing Claessens, et al.(2000), and the relatively stronger test results we report in Table 6, we believe this to be the more appropriate method of identification of low and high concentration of control IPOs[8].

Using Data-stream, we form two measures of post-IPO ownership distribution. They are a shareholding Herfindahl Index and an alternative index indicating the percentage of shares held in blocks of five percent or more. We calculate our Herfindahl Index using percentage holdings by a government institution, the percentage of shares held by another company, the percentage of shares held by pension or endowment funds, the percentage of shares held as a strategic holding by investment banks, any other strategic holdings in excess of five percent, and the percentage of shares carrying significant voting power that are held by employees or others (usually family) with a substantial position within a company. Our alternative index includes these categories, but with the exception of employee and other internal holdings that have significant voting power, as we believe this group is particularly relevant. We exclude this group when constructing an alternative measure of ownership distribution, as it arguably represents the group of insiders and management wishing to maintain control benefits. Under-pricing is undertaken to reduce shareholdings by outside strategic groups, so we now exclude employee and other internal holdings with strategic voting power. We estimate both measures using shareholding data six months after IPO, and again using this data twenty-four months after IPO. All shareholding data comes from DataStream. Higher index values indicate larger percentage shareholdings in the specified

[8] In a further test, we explore the relationship between distribution in share ownership and IPO under-pricing in the high and low shareholder concentration groups of IPO companies. We find little difference between these groups, so for reasons of space, we do not report these results.

strategic categories, and therefore lower holdings by non-strategic small shareholders. Each index will have values ranging from zero to one, causing a potential problem with regression estimation, as the dependent variable is limited to an interval of one. We therefore transform them, taking the natural log of a ratio of the concentration index to one minus the concentration index. In cross-section regressions, our transformed measures of ownership distribution are dependent variables, the independent variables are estimates of under-pricing, and company-level control variables which we included in previous regression estimates. We also include a further variable entitled *OWN*, representing the strategic shareholding by insiders and family members. As lower values of our transformed concentration measures will imply wider share ownership, a negative coefficient on estimated under-pricing would support the proposal that it is undertaken to ensure shareholdings are well distributed. Our results are in Table 7. Separate panels present results for the full population of IPOs, for low concentration of control IPOs (larger companies), and for high concentration of control IPOs (smaller companies).

Results for the full population of IPOs are not supportive of reduced monitoring, as we find a significant positive relationship between under-pricing and both indices of shareholder distribution, regardless of whether constructed six or twenty-four months after IPO. An inverse relationship would have indicated that under-pricing has facilitated an increased holding by the smaller non-strategic shareholders, and therefore a reduced holding by larger investors. This result is not surprising, as it follows from the regression test results we report in Table 4, where the lack of a relationship between extent of under-pricing and national governance quality for the full population of IPOs in developing markets also is not supportive of the reduced monitoring hypothesis.

We do however find contrasting results when we separately examine low concentration of control and high concentration of control IPOs. Results for low concentration of control companies show the expected negative relationship between under-pricing and shareholder

distribution. We find significant negative coefficients on under-pricing, when regressed on the adjusted Herfindahl Index values, both six and twenty-four months after IPO. We find negative but insignificant coefficients on under-pricing, when regressed on the alternative index of shareholder distribution. These findings are supportive of a reduced monitoring hypothesis. We propose that these results offer further support to our analysis of the regression results in Table 6, Panel A, where we find a significant relationship between under-pricing and governance quality, if we restrict our study to larger companies that are less likely to be associated with concentrated control. The results we report in Table 7 show that when this group is separately investigated, we confirm that under-pricing does positively impact on the spread of ownership. In contrast, if we consider high concentration of control companies, we find significant positive coefficients on under-pricing. An implication is that under-pricing results in an increased holding by strategic groups of shareholders, regardless of whether or not they include insiders. We expect that smaller companies will typically be closely controlled by management and insider groups, so they are indifferent as to whether or not other potentially strategic groups acquire a shareholding as a result of IPO. We note significant coefficients on *OWN.* It represents the percentage of shares held by employees or other insiders. Positive coefficients can be expected when it is regressed on adjusted Herfindahl Index values, as they include this category of shareholder. When we regress on the alternative index of ownership distribution, we find significant negative coefficients. This is because a sizable proportion of insider shareholders imply reduced amounts of other concentrated shareholdings. A lower number of observations in regression tests on smaller company IPOs is due to the fact that shareholding data from DataStream is missing for a number of smaller companies in our study population.

6. Summary and conclusions

We find evidence that indicators of governance are significantly related to estimated levels of under-pricing of new issues in South and East Asian equity markets, when we allow for concentration of control. Using documentation from these markets, we identify all initial

public offerings of new equity over the period from January 2010 to December 2018. After excluding examples in which some information is missing, we identify a population of 881 new issues. World Bank Governance Indicators capture national governance quality. There is a concern regarding the reliability and comparability of information in less developed nations, as they will be less attractive and therefore of less interest to international investors. Methodology employed by the World Bank should ensure reasonably consistent quality of information, and therefore less concern regarding comparability across markets.

We find evidence of a significant positive relationship between quality of governance and estimated levels of under-pricing of IPOs in South and East Asian equity markets, if we exclude closely controlled companies. Our findings are unaffected by the inclusion of company-specific factors previously identified as impacting on the level under-pricing. In a comprehensive study that includes a range of developed and developing markets, Boulton, Smart, and Zutter (2010) find the same positive relationship. This finding is supportive of a "reduced monitoring hypothesis", which implies that under-pricing is motivated by a desire by insiders to maintain control benefits after public listing, through ensuring a wide distribution of new investors who are unable to maintain influence, regardless of the extent of regulatory control. Autore, Boulton, Smart, and Zutter (2014) find that evidence of reduced monitoring is absent when IPOs in developing markets are separately examined. We further explore reduced monitoring in developing market IPOs, by dividing our population of South and East Asian IPOs into a concentrated control group and a less concentrated control group. We separately identify the latter group of IPOs with less concentrated control, as they are examples in which new investors could potentially take control from managers and insiders. Only insiders in this group of IPOs should be motivated to under-price when there is good quality governance, to ensure new investors are widely dispersed and are unable to exert control. As well as using the proportion of free-float shares to identify IPOs with less concentrated control, we also follow Claessens, Djankov, and Lang (2000), who suggest that ownership is not always a good indicator of control in companies listed on developing South

and East Asian equity markets. We therefore also use company size as an alternative method of identification of less concentrated control IPOs. Our findings support reduced monitoring, as we find a positive relationship between governance quality and under-pricing only in less concentrated IPOs. We have stronger results when we use size to indicate concentration of control. We believe this implies support for the proposal that extent of share ownership is not the best indicator of control in these companies. In a final series of empirical tests, we assess the relationship between under-pricing and measures of post-IPO concentration in share ownership. Regardless of regulatory environment, this offers a direct test of whether under-pricing has resulted in a wider distribution in share ownership. We note our finding that under-pricing results in a widely dispersed share ownership applies only to companies with less concentrated control. We believe that this previously untested result offers further evidence in support of a reduced monitoring hypothesis.

References

Autore, D., Boulton, T., Smart, S., Zutter, C., 2014. The impact of institutional quality on initial public offerings. Journal of Economics and Business 73, 65-96. https://doi.org/10.1016/j.jeconbus.2014.01.002

Beatty, R., Ritter, J., 1986. Investment banking, reputation, and the under-pricing of initial public offerings. Journal of Financial Economics 15, 212-232. https://doi.org/10.1016/0304-405X(86)90055-3

Boulton, T., Smart, S., Zutter, C., 2010. IPO under-pricing and international corporate governance. Journal of International Business Studies 41, 206-222. https://doi.org/10.1057/jibs.2009.38

Bradley, D., Cooney, J., Jordan, B., Singh, A., 2004. Negotiation and the IPO offer price: A comparison of integer vs non-integer IPOs. Journal of Financial and Quantitative Analysis 39, 517-540. https://doi.org/10.1017/S0022109000004014

Brennan, M., Franks, J., 1997. Under-pricing, ownership and control in initial public offerings of equity securities in the UK. Journal of Financial Economics 45, 391-413. https://doi.org/10.1016/S0304-405X(97)00022-6

Chang, C., Chiang, Y., Qian, Y., Ritter, J., 2017. Pre-market trading and IPO pricing. The Review of Financial Studies 30, 835-865. https://doi.org/10.1093/rfs/hhw032

Chemmanur, T., 1993. The pricing of initial public offerings: A dynamic model with information production. Journal of Finance 48, 285-304. https://doi.org/10.1111/j.1540-6261.1993.tb04710.x

Chiou, W., Lee, A., Lee, C., 2010. Stock return, risk, and legal environment around the world. International Review of Economics and Finance 19, 95–105. https://doi.org/10.1016/j.iref.2009.05.001

Claessens, S., Djankov, S., Lang, L., 2000. The separation of ownership and control in East Asian corporations. Journal of Financial Economics 58, 81-112. https://doi.org/10.1016/S0304-405X(00)00067-2

Claessens, S., Laeven, L., 2003. Financial development, property rights and growth. Journal of Finance 58, 2401–2436. https://doi.org/10.1046/j.1540-6261.2003.00610.x

Djankov, S., La Porta, R., Lopez-De-Silanes, F., Shleifer, A., 2008. The law and economics of self-dealing", Journal of Financial Economics 88, 430–465. https://doi.org/10.1016/j.jfineco.2007.02.007

Giannetti, M., Simonov, A., 2006. Which investors fear expropriation? Evidence from investors' portfolio choices. Journal of Finance 61, 1507–1547. https://doi.org/10.1111/j.1540-6261.2006.00879.x

Hopp, C., Dreher, A., 2013. Do differences in institutional and legal environments explain cross-country variations in IPO under-pricing? Applied Economics 45, 435-454. https://doi.org/10.1080/00036846.2011.605760

Johnson, S., La Porta, R., Lopez-de-Silanes, F., Shleifer, A., 2000. Tunneling. American Economic Review 90(2), 22–27. https://doi.org/10.1257/aer.90.2.22

Kaufmann, D., Kraay, A., Mastruzzi, M., 2005. Governance matters III: Updated governance indicators for 1996–04. World Bank, Working Paper, Washington, DC.

https://dx.doi.org/10.2139/ssrn.718081

Kaufmann, D., Kraay, A., Mastruzzi, M., 2010. The worldwide governance indicators: A summary of methodology, data and analytical issues. World Bank Policy Research Working Paper No. 5430. https://ssrn.com/abstract=1682130

La Porta, R., Lopez-De-Silanes, F., Shleifer, A., Vishny, R., 1997. Legal determinants of external finance. Journal of Finance 52, 1131–1150. https://doi.org/10.1111/j.1540-6261.1997.tb02727.x

La Porta, R., Lopez-De-Silanes, F., Shleifer, A., Vishny, R., 1998. Law and Finance. *Journal of Political Economy* 106, pp. 1113–1155. https://doi.org/10.1086/250042

La Porta, R., Lopez-De-Silanes, F., Shleifer, A., Vishny, R., 2002. Investor protection and corporate valuation. Journal of Finance 57, 1147–1170. https://doi.org/10.1111/1540-6261.00457

Ljungqvist, A.,]enkinson, T., Wilhelm, W., 2003. Global integration in primary equity markets: The role of US banks and US investors. Review of Financial Studies 16, 63-99. https://doi.org/10.1093/rfs/16.1.0063

Loughran, T., Ritter J., Rydqvist K., 1994. Initial public offerings: International insights. Pacific Basin Finance Journal 2, 165-199. https://doi.org/10.1016/0927-538X(94)90016-7

Mauer, D., Senbet, L., 1992. The effect of the secondary market on the pricing of initial public offerings: Theory and evidence. Journal of Financial and Quantitative Analysis 27, 55-79. https://doi.org/10.2307/2331298

North, D., 1991. Institutions. Journal of Economic Perspectives 5(1), 97–112. https://doi.org/10.1257/jep.5.1.97

Ritter, J., 1984. The 'hot issue' market of 1980. Journal of Business 57(2), 215-240. http://dx.doi.org/10.1086/296260

Ritter, J., 1987. The costs of going public. Journal of Financial Economics 19, 269-281. https://doi.org/10.1016/0304-405X(87)90005-5

Rock, K., 1986. Why new issues are under-priced. Journal of Financial Economics 15, 187-212. https://doi.org/10.1016/0304-405X(86)90054-1

Smart, S., Zutter, C., 2003. Control as a motivation for under-pricing: A comparison of dual and single-class IPOs. Journal of Financial Economics, 69, 85-110. https://doi.org/10.1016/S0304-405X(03)00109-0

Welch, I., 1989. Seasoned offerings, imitation costs, and the under-pricing of initial public offerings. Journal of Finance 44, 421-449. https://doi.org/10.1111/j.1540-6261.1989.tb05064.x

Table 1
Under-pricing percentages – Summary details

Market	No. of IPOs	Average	Std. Deviation	Skewness	Kurtosis	Minimum	Maximum	Weighted Average
India	209	10.33	36.39	0.98	4.56	-87.02	191.43	18.25
Korea	257	19.29	46.92	1.19	1.54	-82.56	160.00	32.39
Malaysia	136	18.29	43.95	5.69	44.94	-27.00	404.17	14.04
Pakistan	34	2.74	21.54	-0.15	1.32	-46.64	53.57	-0.65
Sri Lanka	40	24.08	40.32	2.16	4.83	-17.14	165.00	9.57
Thailand	205	52.42	58.99	1.18	0.53	-29.33	200.00	18.91
Overall	881	24.30	49.07	0.97	4.55	-87.02	404.17	18.96

Table 2

Individual IPOs – Descriptive statistics

Variable	Number	Average	Median	Std. Deviation	Minimum	Maximum
ACT	881	0.0247	0.0195	0.0181	0.0012	0.0608
ROR	881	0.0636	0.0748	0.1772	-0.3032	0.6334
SIZE	881	4.5265	4.4565	1.8386	-5.8309	10.7491
VOL	881	0.1943	0.0314	0.8741	0	19.653
INT	881	0.6663	1	0.4718	0	1
BK	881	0.6640	1	0.4276	0	1

Notes: *ACT* represents recent IPO activity in the national market, and *ROR* indicates national market return prior to IPO. *SIZE* indicates offer value, and *VOL* is post-issue share return volatility. INT is a dummy variable with a value of one when an offer is at an integer unit value, otherwise it is zero. BK is a dummy variable taking a value of one when an IPO is book-built, otherwise it is zero

Table 3
Governance Indicators – Descriptive Statistics
Panel A – Average Measures

Model	RL	RQ	GE	PS	CC	VA
India	-0.04	-0.36	0.00	-1.08	-0.39	0.42
Korea	1.05	1.04	1.14	0.29	0.51	0.71
Malaysia	0.50	0.67	0.99	0.14	0.20	-0.37
Pakistan	-0.79	-0.65	-0.72	-2.53	-0.92	-0.77
Sri Lanka	-0.06	-0.13	-0.12	-0.39	-0.34	-0.37
Thailand	-0.11	0.20	0.29	-1.05	-0.39	-0.73

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Panel B – Correlations

Model	RL	RQ	GE	PS	CC
RQ	0.926				
GE	0.940	0.960			
PS	0.910	0.844	0.876		
CC	0.967	0.935	0.950	0.905	
VA	0.682	0.431	0.487	0.508	0.616

Notes: RL indicates Rule of Law, RQ indicates Regulatory Quality, and GE refers to Government Effectiveness. PS indicates Political Stability, CC indicates Control of Corruption, and VA refers to Voice and Accountability

Table 4

Regression results – Full population of IPOs

Model	1	2	3	4	5	6	7
Intercept	25.91**	25.92**	25.27**	25.53**	26.26**	29.44**	20.43
RL	0.01						-8.39
RQ		1.48					39.08*
GE			1.75				30.65*
PS				0.24			9.15
CC					1.47		-17.67
VA						4.81*	21.99**
ACT	38.43**	35.58**	35.93**	38.02**	36.89**	35.37**	47.78**
ROR	49.02**	48.47**	48.87**	48.95**	48.69**	49.77**	50.08**
SIZE	-5.04**	-5.07**	-5.12**	-5.05**	-5.07**	-5.13**	-5.63**
VOL	0.66**	0.65**	0.66**	0.66**	0.66**	0.65**	0.65**
INT	3.55	4.02	4.22	3.67	3.86	1.97	5.84
BK	-16.92**	-17.28**	-17.37**	-17..07**	-17.53**	-20.72**	-9.99*
Adj. R^2	0.179	0.179	0.179	0.178	0.179	0.180	0.193
No.	878	878	878	878	878	878	878

Notes: RL indicates Rule of Law, RQ indicates Regulatory Quality, and GE refers to Government Effectiveness. PS indicates Political Stability, CC indicates Control of Corruption, and VA refers to Voice and Accountability. Other measures relate to each individual firm. ACT represents recent IPO activity in the national market, and ROR indicates national market return prior to IPO. SIZE indicates offer value, and VOL is post-issue share return volatility. INT is an integer price dummy, and BK is a book-built deal dummy. Year dummies are included in the regression estimates, although they are not reported. * and ** indicate statistically significant coefficients, at the 5% and 1% levels. Model goodness of fit is indicated by adjusted R^2s. The coefficient of ACT is *1/10.

Table 5
Regression results – The impact of shareholder distribution
Panel A – High share concentration IPOs

Model	1	2	3	4	5	6	7
Intercept	37.84*	38.40*	38.69*	35.02*	36.58*	52.03**	41.10
RL	-1.56						-58.09
RQ		-0.60					61.34
GE			-2.42				8.57
PS				-2.46			7.16
CC					-2.82		-56.42
VA						14.71*	39.01*
ACT	60.60**	58.99*	61.51*	62.52*	60.96*	39.19	27.62
ROR	49.07*	48.70*	49.43*	50.45*	49.83*	46.63	47.61
SIZE	-5.01**	-5.04**	-4.96**	-4.92**	-4.97**	-5.36**	-4.95**
VOL	0.50*	0.50*	0.49*	0.49*	0.50*	0.53*	0.53*
INT	-1.45	-1.39	-1.11	-2.14	-1.80	-5.19	-10.34
BK	-29.45**	-30.08**	-29.52**	-28.91**	-28.92**	-42.41**	-30.04*
Adj. R^2	0.233	0.233	0.233	0.234	0.233	0.239	0.256
No.	270	270	270	270	270	270	270

Panel B – Low share concentration IPOs

Model	1	2	3	4	5	6	7
Intercept	24.09*	25.81*	22.24	28.06*	28.26*	19.71	34.68
RL	2.48						-11.96
RQ		6.63					47.27*
GE			7.31				13.51
PS				3.95			-5.22
CC					8.04		76.97
VA						-5.93	1.37
ACT	41.86*	32.02	35.22	38.59*	37.24*	46.75**	66.29**
ROR	6.73	2.08	2.09	3.91	1.93	8.57	-2.64
SIZE	-4.29**	-4.19**	-4.27**	-4.26**	-4.18*	-4.68**	-4.79**
VOL	0.40*	0.39*	0.39*	0.40*	0.39*	0.43*	0.34
INT	15.41*	17.65*	18.31*	17.50*	16.90*	17.18*	26.05**
BK	-21.98*	-22.39**	-22.71**	-23.06**	-23.99**	-15.19*	-8.45
Adj. R^2	0.246	0.250	0.249	0.248	0.249	0.247	0.287
No.	271	271	271	271	271	271	271

Notes: RL indicates Rule of Law, RQ indicates Regulatory Quality, and GE refers to Government Effectiveness. PS indicates Political Stability, CC indicates Control of Corruption, and VA refers to Voice and Accountability. Other measures may be governance proxies at individual firm level. ACT represents recent IPO activity in the national market, and ROR indicates national market return prior to IPO. SIZE indicates offer value, and VOL is post-issue share return volatility. INT is an integer price dummy, and BK is a book-built deal dummy. Year dummies are included in the regression estimates, although they are not reported. * and ** indicate statistically significant coefficients, at the 5% and 1% levels. Model goodness of fit is indicated by adjusted R^2s. The coefficient of ACT is *1/10.

Table 6
Regression results – The impact of shareholder distribution
Panel A – Larger company IPOs

Model	1	2	3	4	5	6	7
Intercept	17.39	14.11	10.70	26.97	23.74	15.77	45.99
RL	12.79**						-2.29
RQ		10.03**					6.42
GE			12.46**				13.91
PS				10.25**			11.91
CC					17.20**		27.13
VA						9.62*	0.17
ACT	-57.05**	-54.25**	-51.56**	-54.91**	-52.93**	-38.43*	-51.35*
ROR	-9.16	-8.87	-9.63	-13.37	-9.87	-4.10	-13.54
SIZE	0.15	0.11	-0.16	-0.06	0.02	0.58	0.12
VOL	0.16	0.16	0.16	0.17	0.15	0.19	0.16
INT	9.32	10.86*	12.38*	12.63*	10.94*	3.54	11.04
BK	-8.87	-4.27	-5.80	-8.83	-10.23	--10.46	-15.88
Adj. R^2	0.084	0.081	0.085	0.089	0.087	0.067	0.091
No.	296	296	296	296	296	296	296

Panel B – Smaller company IPOs

Model	1	2	3	4	5	6	7
Intercept	-1.49	0.73	6.76	-3.41	-5.52	-3.06	-0.60
RL	-20.76**						-160.10**
RQ		-15.27*					62.04*
GE			-14.47*				38.96
PS				-7.78*			29.72*
CC					-21.53**		-29.50
VA						-15.19*	19.52
ACT	124.77**	116.55**	112.13**	102.33**	111.55**	104.68**	148.20**
ROR	75.47**	80.58**	74.73**	75.13**	77.63**	66.90**	71.08**
SIZE	-5.84*	-5.87*	-5.40*	-5.85*	-6.10*	-6.46*	-7.64*
VOL	1.19**	1.18**	1.19**	1.18**	1.19**	1.20**	1.24**
INT	-9.52	-9.76	-10.70	9.78	-9.71	-2.23	2.27
BK	-27.98**	-32.53**	-33.02**	-30.15**	-28.57**	-25.41**	-12.97
Adj. R^2	0.384	0.378	0.379	0.377	0.381	0.377	0.404
No.	291	291	291	291	291	291	291

Notes: RL indicates Rule of Law, RQ indicates Regulatory Quality, and GE refers to Government Effectiveness. PS indicates Political Stability, CC indicates Control of Corruption, and VA refers to Voice and Accountability. Other measures may be governance proxies at individual firm level. ACT represents recent IPO activity in the national market, and ROR indicates national market return prior to IPO. SIZE indicates offer value, and VOL is post-issue share return volatility. INT is an integer price dummy, and BK is a book-built deal dummy. Year dummies are included in the regression estimates, although they are not reported. * and ** indicate statistically significant coefficients, at the 5% and 1% levels. Model goodness of fit is indicated by adjusted R^2s. The coefficient of ACT is *1/10.

Table 7

Regression results – Determinants of shareholder distribution

	All IPOs				*Larger Company IPOs*				*Smaller Company IPOs*			
Dependent	*H6*	*H24*	*OB6*	*OB24*	*H6*	*H24*	*OB6*	*OB24*	*H6*	*H24*	*OB6*	*OB24*
Intercept	-3.42**	-3.43**	-2.24**	-2.24**	-3.40**	-3.94**	-2.47**	-2.78**	-4.69**	-4.35**	-3.18**	-2.70**
UPRICE	0.31**	0.31**	0.34**	0.32*	-0.28*	-0.24*	-0.12	-0.03	0.32**	0.38**	0.41*	0.35*
SIZE	0.27**	0.29**	0.38**	0.39**	0.34**	0.37**	0.41**	0.41**	0.61**	0.55**	0.75**	0.72**
ROR	2.31**	1.90**	1.97*	1.36*	1.69*	2.51**	1.78*	2.41*	2.94**	1.80**	1.59*	-0.25
VOL	-0.40	-0.36*	-0.65	-0.91*	-1.66**	-1.59**	-1.72*	-1.87*	0.58	0.66	1.08	0.79
OWN	0.23**	0.24**	-0.68**	-0.67**	0.12**	0.14**	-0.65**	-0.64**	0.33**	0.36**	-0.68**	-0.67**
Adj. R^2	0.234	0.259	0.506	0.492	0.114	0.153	0.450	0.465	0.507	0.502	0.505	0.477
No.	784	804	784	804	287	289	287	289	230	239	230	239

Notes: Regressions of post-IPO ownership concentration measures on initial return (under-pricing, designated as UPRICE) and other explanatory factors. Each dependent variable is estimated as the natural log of the concentration measure, divided by one minus the concentration measure. H6 and H24 are transformed Herfindahl Indices, six and twenty-four months after IPO date. OB6 and OB24 are transformed percentage measures of distribution, six and twenty-four months after IPO. Other measures may be explanatory. They are SIZE, which indicates IPO offer value, and ROR, which indicates national market return prior to IPO. VOL is post-issue share return volatility, and OWN which is the percentage of shares held by family members of significant employees, either six or twenty-four months after IPO. Year dummies are included in the regression estimates, although the coefficients are not reported. Reported coefficients of UPRICE and VOL are $*10^2$, and coefficients of OWN are *10. * and ** indicate statistically significant coefficients, at the 5% and 1% levels. Model goodness of fit is indicated by adjusted R^2s.