Foreign Ownership and the Cost of Equity Capital: Evidence from Korea

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ABSTRACT

We investigate how the level, and changes in the level of foreign ownership affect the cost of equity capital. We measure the implied cost of equity capital using two residual income valuation (RIV) models that assume a clean surplus relation, and two abnormal earnings growth (AEG) models that do not. Controlling for a comprehensive set of risk proxies, we find that foreign ownership and implied costs of equity capital are inversely related. Past changes in the level of foreign ownership negatively affect the changes in the cost of capital. This is a novel finding to the literature, as the effect of foreign ownership on the cost of equity has not been extensively researched in the Korean setting.

Moreover, the empirical question of whether foreign ownership affects KOSPI or KOSDAQ firms more extensively is answered – the changes in foreign ownership has more economic impact and stronger statistical significance in the subset of KOSPI firms, suggesting that higher levels of information asymmetry in KOSDAQ firms still lead to higher required rates of return for investors.

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I. INTRODUCTION

As long as humans are self-interested, corporate governance has a profound impact on the value of the firm (Jensen and Meckling, 1976). The separation of ownership and control necessarily brings about conflicts of interest, and agency problems may lead to decreases in corporate value. Shareholders, the ultimate owners of the firm, have incentives to monitor management in order to preserve shareholder wealth (Shleifer and Vishny, 1986). Consequently, ownership structure itself can act as a governance mechanism (Connelly *et al.*, 2010).

Globalization, the inescapable trend of the global economy, has introduced a new variable to the corporate governance landscape that had been largely domestic – foreign investors. Stulz (1999) states that globalization affects the monitoring of management in 6 important mechanisms – 1) the Board of Directors, 2) the Capital Markets, 3) the Legal System, 4) Active Shareholders, 5) the Market for Corporate Control, and 6) Disclosure.

While factors such as disclosure and board of director composition have been investigated extensively, it is difficult to ascertain if these isolated factors are affected by globalization, or are just evolving in the process of a market's development. We posit that foreigner ownership is a globalization factor that positively affects corporate governance, and investigate the consequences on the cost of equity capital.

We employ *ex ante* cost of equity capital estimation methods, as it has been shown that realized returns can be a noisy proxy for expected rates of return (Fama and French, 1997; Elton, 1999). We employ four models, two belonging to the residual income valuation (RIV) class, and two belonging to the abnormal earnings growth valuation (AEG) class. The AEG models have been used extensively in the Korean setting, especially in empirical research that investigates the link between the cost of equity capital and various factors. However, the RIV class has been mostly ignored except in the few cases where the primary focus of the paper is

on evaluating cost of equity measures (e.g. Ahn *et al*., 2008; Hwang *et al*., 2008).

Using RIVC and RIVI models for the RIV class and OJ and PEG models for the AEG class, we find positive correlations between the measures which confirm earlier results (Ahn *et al*., 2008). On the relationship between foreign ownership and the cost of equity however, we find that the results are mixed. AEG models show negative relationships, but RIV models do not. The picture becomes more meaningful when we take first differences in both variables – regressions show that *changes* in foreign ownership are negatively related with *changes* in the cost of equity capital.

To the best of our knowledge, foreign ownership has been included as a control variable at best in research that aims to find the determinants of the cost of equity capital, but we are the first to look at the relationship between *changes* in the mentioned two variables. The relationship is consistently negative in all cost of capital measures, and statistically significant for most of the specifications we test. We show that the relationship is strong in KOSPI firms, but less evident in KOSDAQ firms.

II. LITERATURE AND HYPOTHESES DEVELOPMENT

Foreign investors are generally thought of having information advantages (Park and Choi, 2003; Li and Kim, 2004; Huang and Shiu, 2009), and associated with superior governance (Baek, Kang and Park, 2004; Park and Lee, 2006; Na and Leem, 2014). Internationally, research focuses mainly on country-level analysis of the effects of foreign investment, as the data is often limited. For example, Bekaert and Harvey (2000) study emerging equity markets for the role of foreign speculative activity. They find that a capital market liberalization event decreases a country's cost of capital (proxied by aggregate dividend yields) between 5~75 basis

points. However, they admit to restrictions in the data as "the only available data are U.S. capital flows to emerging markets since 1985".

In Korea, foreigner ownership data exists at the firm-level. There have been studies that link foreign ownership and corporate governance (Park and Lee, 2006), investigate the stock price lead effect of foreign investors (Park and Choi, 2003), analyze the relationship between foreign ownership and the cost of debt capital (Han, 2014), and relate foreign ownership to firm value (Choi, Park and Yoo, 2007; Jo and Byun, 2009). We posit that not only the level of foreign ownership affect the cost of equity capital, but the changes have meaningful impact. This leads to our first set of hypotheses.

Hypothesis 1-1: Foreign ownership is negatively related to the cost of equity capital.

Hypothesis 1-2: Changes in foreign ownership is negatively related to changes in the cost of equity capital.

To the best of our knowledge, no study yet maps the relationship between foreign ownership and the cost of equity capital on the firm level in Korea. We believe this investigation is meaningful, as increase of firm value can be brought about in largely two channels – through a decrease in the cost of capital or an increase in growth opportunities. This study will help clarify through which channel foreign ownership improves firm value.

There are studies which look at how corporate governance factors affect the cost of equity capital. Ashbaugh-Skaife, Collins and LaFond (2004) examine four dimensions of corporate governance, and their relation with the cost of equity. Hail and Leuz (2006) investigate how legal institutions and the cost of equity capital are related across 40 countries. Chen, Chen and Wei (2009) examine how corporate governance affects a firm's cost of equity

capital, controlling for differences in country-level investor protection.

In the Korean setting, a lower cost of equity capital is linked to better accounting quality (Moon and Kim, 2009; Ahn and Choi, 2015), with better earnings quality (Cho and Jo, 2010), with more CSR activity (Choi, 2013), to earnings transparency (Park, Shin and Ko, 2014), and with higher instances of fair disclosure (Na and Leem, 2014). Buyn, Kwak and Hwang (2008) use Korea Corporate Governance Scores (KCGS) to find that good corporate governance and implied cost of equity are negatively related. All the mentioned Korean studies include foreign ownership as a control variable only if at all, and do not look at its direct effects. Moreover, they do not analyze how the *changes* in foreign ownership affect the cost of equity, as our study does.

We make another valuable addition to the literature by including KOSDAQ firms in our analysis. Most studies in the Korean market look at KOSPI firms only, which are inarguably larger, older, and have lower levels of information asymmetry. Information asymmetry may affect the consequences of foreign ownership in both directions – foreigners may require additional return for investing in more opaque firms, or foreign ownership may improve corporate governance practices and decrease the cost of capital. Thus, the effect of foreign ownership on KOSDAQ firms remains a question for empirical investigation, which we undertake.

Hypothesis 2-a: (Changes in) Foreign ownership affect (changes in) the cost of equity capital more in KOSPI firms than in KOSDAQ firms.

Hypothesis 2-b: (Changes in) Foreign ownership affect (changes in) the cost of equity capital more in KOSDAQ firms than in KOSPI firms.

III. DATA AND METHODOLOGY

Early studies have measured the cost of equity capital as an *ex post* measure – as realized returns or other measures of return on equity, such as dividend yields. However, using *ex post* returns as appropriate measures of the cost of equity is debatable (Fama and French, 1997; Elton, 1999). Such measures may not only account for differences in the cost of capital but also in growth opportunities (Stulz, 1999), and differences in expected growth rates (Bekaert and Harvey, 2000). In contrast, more recent studies focus on using *ex ante* measures of the cost of equity.

We follow two simultaneously published papers in estimating the implied cost of equity capital in Korea (Ahn *et al*., 2008; Hwang *et al*., 2008). Both papers use four earnings based estimation models, 2 of which are based on the residual income valuation (RIV) model by Ohlson (1995), and 2 of which are based on the abnormal earnings growth (AEG) model by Ohlson and Juettner-Nauroth (2005). Ahn *et al*. (2008) find that RIV models seem to outperform AEG models in the Korean market, but do not rule out the usefulness of the latter. We thus implement all four models in estimating the cost of equity capital in this study.

A. Data and Variable Measurement

We use fiscal and market data and earnings forecasts from FN Guide for all stocks listed in the KOSPI and KOSDAQ markets for the sample period of 2000~2015. Our sample period begins in 2000 because this is the year from which EPS forecast data is available. We exclude financial firms, and firms with fiscal closing months other than December. 3-year Korea Treasury Bond (KTB) rates which are used as the risk-free proxy, and annual inflation rates are obtained from the Korean Statistical Information Service (KOSIS).

To be included in the sample, a firm needs to have positive one- and two-year EPS forecasts (which are necessary to compute OJ and PEG implied costs of equity), and three-year EPS forecasts available (needed for implementation of RIV models). Industry identification codes (KSIC), stock price data, and financial statement data must be available, and the book value of equity must be positive.

Our main variable, foreign ownership (FOR), is the reported rate of foreign ownership on stock level. This data is available on a daily basis, and is retrieved from FN Guide. To control for the effects of risk, we employ the following well-known risk proxies in the regression analyses. They are beta, size, book-to-market ratio, leverage, idiosyncratic risk, operating income volatility, and dispersion of analysts' earnings forecasts. We also include a dummy variable *Chaebol*, to indicate if a firm belongs to a corporate group as identified by the Korea Fair Trade Commission (KFTC) each year.

FOR: Fraction of shares owned by foreigners.

BETA: Systematic risk of individual stock (firm), estimated using at least 30 months of returns data (optimally 60 months) regressed against the relevant market index (KOSPI or KOSDAQ).

SIZE: The log of market capitalization of a firm. Market capitalization is calculated as the share price times the number of shares outstanding, in '000 KRW.

BM: The book-to-market ratio of a firm, which is the book value of equity scaled by market capitalization.

LEV: Leverage ratio calculated as Total Liabilities / Total Assets.

IDRISK: The idiosyncratic risk of a firm, which is measured from the variance of residuals from BETA estimation regressions.

OI_VOL: Volatility of operating income, measured with at least 2 years of data (optimally 5). It is the standard deviation of operating income, scaled by mean total assets during the respective period.

DISP: Dispersion of analysts' earnings forecasts. Measured as the standard deviation of one-year EPS forecasts, scaled by the absolute mean.

Chaebol: A dummy variable that equals 1 if the firm belongs to a corporate group as defined by the KFTC, and 0 otherwise.

KSIC: 2-digit industry classification codes, as defined by the Korean Standard Industrial Classification.

B. Implied Cost of Equity Measures

We employ four measures of the implied cost of equity capital – two from the residual income valuation model, and two from the abnormal earnings growth model. Both RIV and AEG models are derived from the dividend discount model, with some differences in underlying assumptions. The RIV model assumes a clean surplus relation (CSR) – that is, the change in book value of equity is equal to total income minus dividends. On the other hand, the AEG model allows for deviations in the CSR relation, and uses dividend forecasts to calculate the cost of equity.

1) RIVC Model

This is a special form of the residual income valuation model that assumes constant residual income after 3 years. It follows the methodology of Claus and Thomas (2001), who use forecasted earnings up to five years, and assume constant growth of residual income

thereafter. Since Korean data affords earnings forecasts up to three years only, we adapt the equation to allow for such limitations, following Ahn et al. (2008).

$$P_t = bv_t + \sum_{s-1}^{3}\left(\frac{E_t(eps_{t+s} - r_t \times bv_{t+s-1})}{(1+r_t)^s}\right) + \frac{E_t(eps_{t+3} - r_t \times bv_{t+2})}{r_t \times (1+r_t)^3}$$

2) RIVI Model

This is a special form of the residual income valuation model that assumes that a firm's return on equity (ROE) trends to the industry mean by the 12th year, after an initial earnings forecasting period of 3 years. After year 12, residual income is assumed to remain constant. KSIC 2-digit codes are used for industry classification, and we use the median of previous five years' industry ROE. Only firms with positive ROE are included in calculating industry ROE (Gebhardt et al., 2001).

$$P_t = bv_t + \sum_{s-1}^{3}\left(\frac{E_t(eps_{t+s} - r_t \times bv_{t+s-1})}{(1+r_t)^s}\right) + \sum_{s-4}^{11}\frac{[E_t(ROE_{t+s} - r_t)] \times bv_{t+s-1}}{(1+r_t)^s} + \frac{[E_t(ROE_{t+12} - r_t)] \times bv_{t+11}}{r_t \times (1+r_t)^{11}}$$

3) OJ Model

In the OJ model, γ-1 is used as the perpetual abnormal earnings growth rate after 2 years. This is equal to the risk-free rate less the long-term inflation rate. The long-term inflation rate is calculated as the moving average of previous ten years' annual inflation rates.

$$r_t = A + \sqrt{A^2 + \frac{eps_{t+1}}{P_t}\left(\frac{(eps_{t+2} - eps_{t+1})}{eps_{t+1}} - (\gamma - 1)\right)}$$, where $$A \equiv \frac{1}{2}\left(\gamma - 1 + \frac{dps_{t+1}}{P_t}\right)$$

4) PEG Model

This is a special case of the OJ model, where we assume γ equals 1 and dps_{t+1} equals 0 (Easton, 2004). When the earnings forecast of year t+1 is greater than the earnings forecast of year t+2, the cost of capital derived from the OJ model is used instead.

$$P_t = \frac{eps_{t+2} - eps_{t+1}}{r_t^2}$$

P_t: Stock price per share at period t

dps_t: dividends per share during period t

r_t: firm's cost of equity capital at period t

bv_t: book value of equity per share at period t

eps_t: earnings per share during period t

ROE_t: return on equity during period t

γ-1: perpetual growth rate of capitalized abnormal earnings

Analysts' earnings forecasts proxy for the market's earnings expectations.

Future dividends are estimated by scaling the dividends in the most recent year with the earnings over the same year.

RESULTS

A. Descriptive Statistics

Figure 1 plots the implied cost of equity capital estimations for the sample period

(2000~2015). The bold line indicates the mean of the four measures, which is also used in the regressions that follow. The estimates peak during the financial crisis, then drops gradually reflecting the cyclical downtrend in the central bank's target base rate.

The measures shown in Table 1 are the premiums calculated from the implied cost of equity measures – i.e. they are the returns required by investors (*ex-ante*) in excess of the risk-free rate. The risk-free rate is proxied as the 3-year government bond yield.

Insert Figure 1 and Table 1 about here

Estimates from AEG models are higher than from those from RIV models, which is in line with previous studies (e.g. Ahn *et al*., 2008). During our sample period, the average interest rate premium for firms is roughly 9.7%. The average percentage of shares held by foreigners for sample firms is around 15%. The mean BETA is close to 1, showing that the sample of firms is not skewed unproportionately toward very high-risk or low-risk firms in terms of systematic risk.

B. Correlations

Table 2 shows Pearson correlations for the variables included in our study. All four measures of the interest rate premium (OJRF, PEGRF, RIVCRF, RIVIRF) are negatively correlated with the level of foreign ownership – that is, higher levels of foreign ownership indicate lower costs of equity capital. The correlations among the four measures of the implied cost of equity are positive, and also resemble the results of Ahn *et al*. (2008).

Insert Table 2 about here

Higher systematic risk (*BETA*) is positively associated with the cost of equity, which is as expected. The log of market capitalization (*SIZE*) is negatively associated with cost of equity measures, which indicates larger firms have lower costs of capital. Other factors which indicate higher perceived risk of a firm's stock (*BM, LEV, IDRISK, OI_Vol, DISP*) all show the expected positive correlation coefficients. The exception is the correlation between *DISP* and RIVIRF, which is negative but lacks statistical significance.

C. Regression Analyses

Table 3 shows OLS regression results with the various interest rate premiums estimated from the four models and their averages as the dependent variables for the entire dataset. Panel A shows the regressions of OJRF, PEGRF, RIVCRF, RIVIRF and their averages (AVG) regressed on the level of foreign ownership (FOR) and other risk proxies. The results are mixed and inconsistent with our expectation that a higher level of foreign ownership is related with a lower cost of equity capital. The AEG models (OJ and PEG) show a negative relationship between the implied cost of equity and the level of foreign ownership, but lacks statistical significance. While the RIV models (RIVC and RIVI) show statistically meaningful coefficients for *FOR*, the economic explanation is the opposite of what we expect. The mean interest rate premium (AVG), is not meaningfully related to foreign ownership.

We turn to analyze the relationship between *changes* in foreign ownership and *changes* in the interest rate premiums. While the relationship between the absolute level of foreign ownership and the cost of capital is not so clear, we posit that increased foreign ownership will bring better visibility and better corporate governance practices. This line of reasoning is supported by the results shown in Panel B of Table 3, which show consistently negative relationships between changes in foreign ownership and the changes in implied cost of equity

premiums. For the average, RIVC and RIVI models, the results are highly significant. We find little evidence to support Hypothesis 1-1, but find support for Hypothesis 1-2.

Insert Table 3 about here

We continue to search for empirical results for the subsets of KOSPI and KOSDAQ firms. Due to their qualitative differences in firm characteristics and most notably information asymmetry levels, we posit that foreign ownership will have differing effects on the cost of capital in different markets. Table 4 shows the regression results for KOSPI firms, while Table 5 shows results for KOSDAQ firms.

For KOSPI firms, the results are repetitive of the results for the entire dataset. This is probably only natural, as KOSPI firms constitute for most of the sample, and are likely to influence the overall results. As in the main regressions, the results are mixed on the relationship between foreign ownership and the cost of equity, but the relationship in their changes are stronger – they are consistently negative and statistically significant for the all equity capital cost estimation measures.

We turn to analysis of the KOSDAQ firms, which may have been rendered invisible in regressions of the entire dataset. There are less firms covered by analysts in the smaller set of KOSDAQ firms, and thus they are outnumbered in the sample dataset by KOSPI firms. Interestingly, the link between foreign ownership and the cost of equity capital is weaker in KOSDAQ firms – statistical significance is only found between the change in foreign ownership and the change in the cost of equity capital as measured by the RIVC and RIVI measures only. The results suggest that for KOSDAQ firms, the positive effects brought by increased levels of foreign ownership are not enough to negate the additional risk premium required by investors.

Insert Tables 4 & 5 about here

CONCLUSION

We investigate how the level, and changes in the level of foreign ownership affect the cost of equity capital. We measure the implied cost of equity capital using two residual income valuation (RIV) models that assume a clean surplus relation, and two abnormal earnings growth (AEG) models that do not. Controlling for a comprehensive set of risk proxies, we find mixed results in the relationship between the absolute level of foreign ownership and the implied costs of equity capital. However, when we look at the changes in the level of foreign ownership, we find that it negatively affects the changes in the cost of capital. This is a novel finding to the literature, as the effect of foreign ownership on the cost of equity has not been extensively researched in the Korean setting.

Moreover, the empirical question of whether foreign ownership affects KOSPI or KOSDAQ firms more extensively is answered – the changes in foreign ownership has more economic impact and stronger statistical significance in the subset of KOSPI firms, suggesting that higher levels of information asymmetry in KOSDAQ firms still lead to higher required rates of return for investors.

REFERENCES

Ahn, Hee-Young and Sungho Choi. “The effect of accounting information quality on cost of equity.” *Asia Review of Financial Research* 28.1 (2015): 37-69.

Ahn, Sung Yoon, *et al*. "Implied cost of equity capital in earnings-based valuation model: Evidence from Korea." *Asia-Pacific Journal of Financial Studies* 37.4 (2008): 599-626.

Ashbaugh-Skaife, Hollis and Daniel W. Collins, and Ryan LaFond. “Corporate Governance and the Cost of Equity Capital.” Working Paper (2004).

Baek, Jae-Seung, Jun-Koo Kang, and Kyung Suh Park. "Corporate governance and firm value: Evidence from the Korean financial crisis." *Journal of Financial Economics* 71.2 (2004): 265-313.

Bekaert, Geert, and Campbell R. Harvey. "Foreign speculators and emerging equity markets." *Journal of Finance* 55.2 (2000): 565-613.

Byun, Hae-Young, Su-Keun Kwak, and Lee-Seok Hwang. "The implied cost of equity capital and corporate governance practices." *Asia-Pacific Journal of Financial Studies* 37.1 (2008): 139-184.

Chen, Kevin CW, Zhihong Chen, and KC John Wei. "Legal protection of investors, corporate governance, and the cost of equity capital." *Journal of Corporate Finance* 15.3 (2009): 273-289.

Cho, Joong Seok, and Mun Hee Jo. “The effect of accrual volatility on the firms’ information asymmetry, forecast error, and cost of capital.” *Korean Accounting Journal* 19.3 (2010): 175-199.

Choi, Mi Wha. “The moderating effect of corporate governance on the relations between corporate social responsibility and cost of capital.” *Korean International Accounting Review* 51 (2013): 335-356

Claus, James, and Jacob Thomas. "Equity premia as low as three percent? Evidence from analysts' earnings forecasts for domestic and international stock markets." *Journal of Finance* 56.5 (2001): 1629-1666.

Connelly, Brian L., et al. "Ownership as a form of corporate governance." *Journal of Management Studies* 47.8 (2010): 1561-1589.

Easton, Peter D. "PE ratios, PEG ratios, and estimating the implied expected rate of return on equity capital." *The Accounting Review* 79.1 (2004): 73-95.

Elton, Edwin J. "Expected return, realized return, and asset pricing tests." *Journal of Finance* 54.4 (1999): 1199-1220.

Fama, Eugene F., and Kenneth R. French. "Industry costs of equity." *Journal of Financial Economics* 43.2 (1997): 153-193.

Gebhardt, William R., Charles Lee, and Bhaskaran Swaminathan. "Toward an implied cost of capital." *Journal of Accounting Research* 39.1 (2001): 135-176.

Gode, Dan, and Partha Mohanram. "Inferring the cost of capital using the Ohlson–Juettner model." *Review of Accounting Studies* 8.4 (2003): 399-431.

Hail, Luzi, and Christian Leuz. "International differences in the cost of equity capital: Do legal institutions and securities regulation matter?" *Journal of Accounting Research* 44.3 (2006): 485-531.

Han, Jung Hee. “Agency problems and Dividend Policy: Foreign Ownership and Cost of Debt Capital.” 경영교육연구 29.4 (2014): 459-478.

Huang, Roger D., and Cheng-Yi Shiu. "Local effects of foreign ownership in an emerging financial market: Evidence from qualified foreign institutional investors in Taiwan." *Financial Management* 38.3 (2009): 567-602.

Hwang, Lee-Seok, Woo-Jong Lee, and Seung-Yeon Lim. "Korean evidence on the implied cost of equity." *Korean Accounting Review* 33 (2008): 97-125.

Jensen, Michael C., and William H. Meckling. "Theory of the firm: Managerial behavior, agency costs and ownership structure." *Journal of Financial Economics* 3.4 (1976): 305-360.

Jiang, Li, and Jeong-Bon Kim. "Foreign equity ownership and information asymmetry: Evidence from Japan." *Journal of International Financial Management & Accounting* 15.3 (2004): 185-211.

Jo, Jeong Il, and Jong Cook Byun. "The Relationship between Foreign Ownership and Firm Value in Korea." *Korean Academic Society of Business Administration* 20.1 (2009): 1-26.

Moon, Jong Yul, and Moon Chul Kim. "An Empirical Study on the Effects of Accounting Quality and Corporate Governance on the Cost of Equity Capital." *Journal of Taxation and Accounting* 10.3 (2009): 33-72.

Na, Young, and Wook Bin Leem. "An Empirical Analysis on Association between Fair Disclosure." *Korean Accounting Review* 39.1 (2014): 1-42.

Ohlson, James A. "Earnings, book values, and dividends in equity valuation." *Contemporary Accounting Research* 11.2 (1995): 661-687.

Ohlson, James A., and Beate E. Juettner-Nauroth. "Expected EPS and EPS growth as determinants of value." *Review of Accounting Studies* 10.2-3 (2005): 349-365.

Park, Young Kyu, and Young Mok Choi. “Stock Price Lead Effect by the Level of Foreign Investor Ownership.” *International Business Journal* 14.1 (2003): 27-45.

Park, Kyung Suh, and Eung Jung Lee. “The Role of Foreign Investors on the Management and Corporate Governance of Korean Companies.” *Journal of Money and Finance* 20 (2006): 73-113.

Shleifer, Andrei, and Robert W. Vishny. "Large shareholders and corporate control." *Journal of Political Economy* 94.3, Part 1 (1986): 461-488.

Stulz, René M. "Globalization, corporate finance, and the cost of capital." *Journal of Applied Corporate Finance* 12.3 (1999): 8-25.

Figure 1

Implied Costs of Equity Capital for the Sample Period (2000~2015)

This figure shows the four measures of the implied cost of equity capital (OJ, PEG, RICV, RIVI) minus the risk-free rate, which is the proxied by the 3-year KTB yield. In line with prior literature, OJ and PEG estimates tend to be higher than RIVC and RIVI estimates. AVG (in bold) is the mean of the four interest rate premiums.

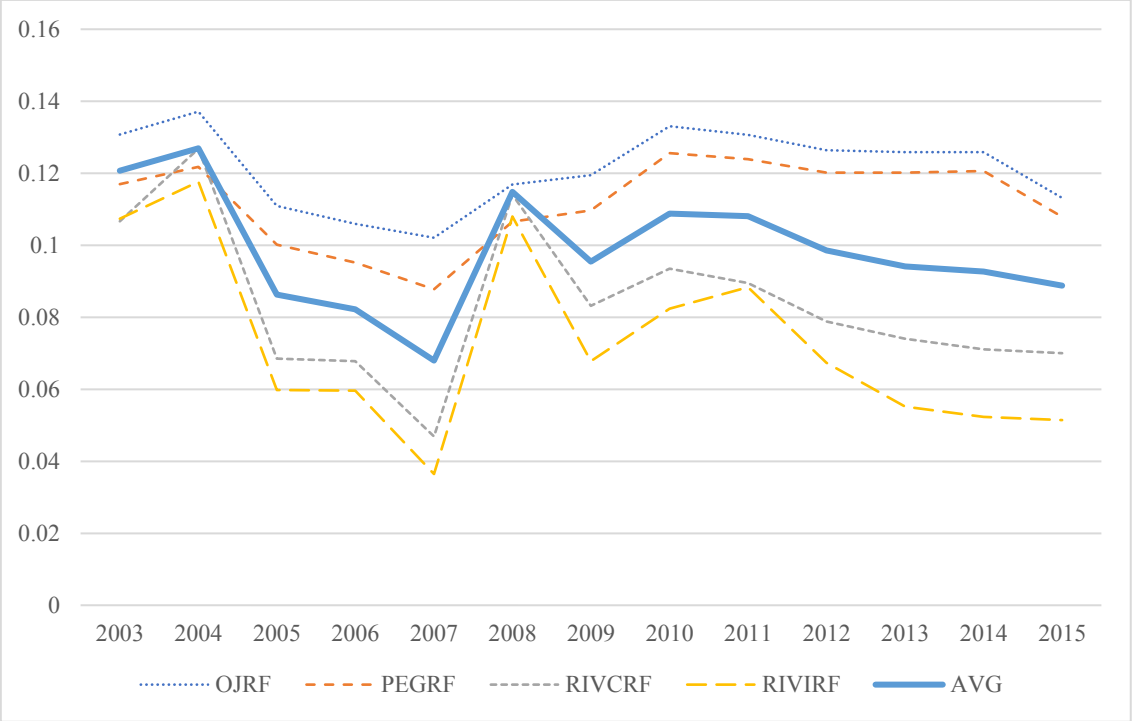

Table 1

Descriptive Statistics

This table shows the descriptive statistics for the variables in the sample. OJRF is the interest rate premium that is the implied cost of equity capital estimated from the OJ model minus the risk-free rate proxy (3-year KTB yield). PEGRF, RIVCRF, and RIVIRF are analogous measures from the PEG, RIVC, and RIVI models respectively. AVG is the average interest rate premium calculated from the four models. FOR is the fraction of shares owned by foreigners, BETA is the systematic risk estimated by regressing past 60 months of stock returns data on the market index, SIZE is the log of market capitalization, BM is the ratio of book value of equity to the market value of equity. LEV is the leverage ratio calculated as total liabilities scaled by total assets, IDRISK is the idiosyncratic risk of a firm estimated from the residuals in the BETA regressions, OI_Vol is the volatility of past 5 years' operating income scaled by total assets. DISP is the standard deviation of one-year ahead analysts' earnings forecasts scaled by the absolute mean.

Variable	N	Mean	Median	Min	Max	Q1	Q3	STD
OJRF	4048	0.1207	0.1164	-0.0376	0.3645	0.0681	0.1708	0.0847
PEGRF	4048	0.1116	0.1065	-0.0374	0.3531	0.0574	0.1603	0.0828
RIVCRF	4047	0.0819	0.0758	-0.0081	0.2460	0.0450	0.1097	0.0503
RIVIRF	4046	0.0706	0.0696	-0.0409	0.2318	0.0330	0.1044	0.0540
AVG	4046	0.0973	0.0906	-0.0424	1.4203	0.0553	0.1305	0.0634
FOR	4048	0.1500	0.1037	0.0000	0.6142	0.0314	0.2296	0.1473
Beta	4048	0.9767	0.9723	0.0510	1.9227	0.7054	1.2489	0.3990
SIZE	4048	19.8030	19.5182	16.8351	23.9780	18.6220	20.8625	1.6117
BM	4048	0.1262	0.0702	0.0026	0.8929	0.0318	0.1493	0.1594
LEV	4048	0.4578	0.4710	0.0772	0.8780	0.3006	0.6112	0.1946
IDRISK	4048	0.1186	0.1148	0.0581	0.2098	0.0942	0.1397	0.0327
OI_Vol	4048	0.0439	0.0326	0.0032	0.2031	0.0181	0.0574	0.0377
DISP	3783	0.0928	0.0430	0.0000	1.2518	0.0000	0.0988	0.1772

Table 2

Pearson Correlations

This table shows the Pearson correlations of the variables used in this study. OJRF is the interest rate premium that is the implied cost of equity capital estimated from the OJ model minus the risk-free rate proxy (3-year KTB yield). PEGRF, RIVCRF, and RIVIRF are analogous measures from the PEG, RIVC, and RIVI models respectively. AVG is the average interest rate premium calculated from the four models. FOR is the fraction of shares owned by foreigners, BETA is the systematic risk estimated by regressing past 60 months of stock returns data on the market index, SIZE is the log of market capitalization, BM is the ratio of book value of equity to the market value of equity. LEV is the leverage ratio calculated as total liabilities scaled by total assets, IDRISK is the idiosyncratic risk of a firm estimated from the residuals in the BETA regressions, OI_Vol is the volatility of past 5 years' operating income scaled by total assets. DISP is the standard deviation of one-year ahead analysts' earnings forecasts scaled by the absolute mean.

	PEGRF	RIVCRF	RIVIRF	AVG	FOR	BETA	SIZE	BM	LEV	IDRISK	OI_Vol	DISP
OJRF	0.993 ***	0.435 ***	0.358 ***	0.858 ***	-0.255 ***	0.098 ***	-0.313 ***	0.154 ***	0.108 ***	0.217 ***	0.118 ***	0.157 ***
PEGRF	1	0.415 ***	0.338 ***	0.850 ***	-0.263 ***	0.115 ***	-0.300 ***	0.132 ***	0.114 ***	0.236 ***	0.137 ***	0.171 ***
RIVCRF		1	0.854 ***	0.705 ***	-0.250 ***	0.085 ***	-0.449 ***	0.339 ***	0.147 ***	0.151 ***	0.056 ***	-0.107 ***
RIVIRF			1	0.660 ***	-0.237 ***	0.101 ***	-0.446 ***	0.405 ***	0.120 ***	0.108 ***	0.023	-0.023
AVG				1	-0.282 ***	0.116 ***	-0.400 ***	0.269 ***	0.132 ***	0.223 ***	0.103 ***	0.085 ***
FOR					1	-0.147 ***	0.573 ***	-0.173 ***	-0.052 ***	-0.343 ***	-0.070 ***	0.001
BETA						1	-0.033 **	0.064 ***	0.187 ***	0.287 ***	0.103 ***	0.098 ***
SIZE							1	-0.231 ***	0.160 ***	-0.421 ***	-0.178 ***	0.112 ***
BM								1	0.281 ***	0.111 ***	-0.148 ***	0.123 ***
LEV									1	0.112 ***	-0.238 ***	0.142 ***
IDRISK										1	0.393 ***	0.001
OI_Vol											1	-0.024
DISP												1

***, **, and * indicate significance levels of 1%, 5%, and 10% respectively.

Table 3

OLS Regression Results for Implied Cost of Equity Premiums

This table shows the regression results for the various measures of the implied cost of capital and the fraction of foreign ownership (*FOR*). OJRF is the interest rate premium that is the implied cost of equity capital estimated from the OJ model minus the risk-free rate proxy (3-year KTB yield). PEGRF, RIVCRF, and RIVIRF are analogous measures from the PEG, RIVC, and RIVI models respectively. AVG is the average interest rate premium calculated from the four models. *BETA* is the systematic risk estimated by regressing past 60 months of stock returns data on the market index, *SIZE* is the log of market capitalization, *BM* is the ratio of book value of equity to the market value of equity. *LEV* is the leverage ratio calculated as total liabilities scaled by total assets, *IDRISK* is the idiosyncratic risk of a firm estimated from the residuals in the *BETA* regressions, *OI_Vol* is the volatility of past 5 years' operating income scaled by total assets. *DISP* is the standard deviation of one-year ahead analysts' earnings forecasts scaled by the absolute mean. *Chaebol* is a dummy variable that equals 1 if a firm belongs to a corporate group as defined by the KFTC, and 0 otherwise. Panel A shows regression results with OJRF, PEGRF, RIVCRF, RIVIRF and their averages (AVG) as dependent variables, and Panel B shows regression results with ΔOJRF, ΔPEGRF, ΔRIVCRF, ΔRIVIRF and ΔAVG as dependent variables, regressed with Δ*FOR* instead of *FOR* as the independent variable.

Panel A	N	FOR	BETA	SIZE	BM	LEV	IDRISK	OI_Vol	DISP	Chaebol
AVG	3,767	0.0102	0.0059	-0.0169	0.0710	0.0532	0.0175	0.1733	0.0328	0.0066
		(1.26)	(2.44)**	(-19.83)***	(10.87)***	(9.84)***	(0.48)	(6.17)***	(6.29)***	(2.78)***
OJRF	3,767	-0.0045	0.0026	-0.0170	0.0406	0.0635	0.1296	0.2163	0.0823	0.0000
		(-0.40)	(0.77)	(-14.42)***	(4.48)***	(8.46)***	(2.56)**	(5.56)***	(11.37)***	(-0.00)
PEGRF	3,767	-0.0070	0.0039	-0.0158	0.0335	0.0644	0.2012	0.2368	0.0867	0.0012
		(-0.65)	(1.19)	(-13.88)***	(3.83)***	(8.88)***	(4.11)***	(6.29)***	(12.39)***	(0.37)
RIVCRF	3,767	0.0257	0.0057	-0.0159	0.0762	0.0545	-0.1690	0.1338	-0.0316	0.0055
		(4.23)***	(3.14)***	(-24.94)***	(15.56)***	(13.42)***	(-6.17)***	(6.35)***	(-8.08)***	(3.05)***
RIVIRF	3,767	0.0226	0.0109	-0.0171	0.0987	0.0384	-0.2836	0.1201	-0.0099	0.0107
		(3.53)***	(5.68)***	(-25.49)***	(19.12)***	(8.97)***	(-9.82)***	(5.41)***	(-2.41)**	(5.68)***

Panel B	N	ΔFOR	BETA	SIZE	BM	LEV	IDRISK	OI_Vol	DISP	Chaebol
ΔAVG	2,982	-0.07432	0.00643	-0.00224	0.02583	-0.02327	-0.07118	0.06082	0.04142	0.00804
		(-3.62)***	(2.01)**	(-2.36)**	(2.76)***	(-3.25)***	(-1.42)	(1.56)	(5.99)***	(2.68)***
ΔOJRF	2,982	-0.04239	0.00142	-0.00003	0.01442	-0.02559	-0.01337	0.09121	0.07702	0.00466
		(-1.43)	(0.31)	(-0.02)	(1.07)	(-2.48)**	(-0.18)	(1.62)	(7.72)***	(1.08)
ΔPEGRF	2,982	-0.04149	0.00078	-0.00048	0.01355	-0.02182	-0.02825	0.08891	0.07712	0.00484
		(-1.44)	(0.17)	(-0.36)	(1.03)	(-2.18)**	(-0.40)	(1.63)	(7.96)***	(1.15)
ΔRIVCRF	2,982	-0.08505	0.00817	-0.00229	0.05097	-0.01343	-0.0694	0.0298	-0.00626	0.00384
		(-5.63)***	(3.47)***	(-3.27)***	(7.40)***	(-2.55)**	(-1.87)*	(1.04)	(-1.23)	(1.74)*
ΔRIVIRF	2,982	-0.121	0.01045	-0.00308	0.04472	-0.01827	-0.14016	0.03853	0.00254	0.00723
		(-7.75)***	(4.30)***	(-4.26)***	(6.28)***	(-3.35)***	(-3.66)***	(1.30)	(0.48)	(3.16)***

T-Values are in parentheses. ***, **, and * indicate significance levels of 1%, 5%, and 10% respectively.

Table 4

OLS Regression Results for Implied Cost of Equity Premiums – KOSPI Firms

This table shows the regression results for the various measures of the implied cost of capital and the fraction of foreign ownership (*FOR*) for KOSPI firms in the sample. OJRF is the interest rate premium that is the implied cost of equity capital estimated from the OJ model minus the risk-free rate proxy (3-year KTB yield). PEGRF, RIVCRF, and RIVIRF are analogous measures from the PEG, RIVC, and RIVI models respectively. AVG is the average interest rate premium calculated from the four models. *BETA* is the systematic risk estimated by regressing past 60 months of stock returns data on the market index, *SIZE* is the log of market capitalization, *BM* is the ratio of book value of equity to the market value of equity. *LEV* is the leverage ratio calculated as total liabilities scaled by total assets, *IDRISK* is the idiosyncratic risk of a firm estimated from the residuals in the *BETA* regressions, *OI_Vol* is the volatility of past 5 years' operating income scaled by total assets. *DISP* is the standard deviation of one-year ahead analysts' earnings forecasts scaled by the absolute mean. *Chaebol* is a dummy variable that equals 1 if a firm belongs to a corporate group as defined by the KFTC, and 0 otherwise. Panel A shows regression results with OJRF, PEGRF, RIVCRF, RIVIRF and their averages (AVG) as dependent variables, and Panel B shows regression results with ΔOJRF, ΔPEGRF, ΔRIVCRF, ΔRIVIRF and ΔAVG as dependent variables, regressed with Δ*FOR* instead of *FOR* as the independent variable.

Panel A	N	FOR	BETA	SIZE	BM	LEV	IDRISK	OI_Vol	DISP	Chaebol
AVG	2,318	0.0159	0.0057	-0.0141	0.0900	0.0476	-0.0104	0.2338	0.0381	0.0052
		(1.63257)	(1.92744)*	(-13.4007)***	(11.4726)***	(6.27539)***	(-0.20197)	(5.09241)***	(5.8051)***	(1.9476)*
OJRF	2,318	-0.0030	-0.0040	-0.0122	0.0793	0.0665	-0.0289	0.2709	0.0923	-0.0021
		(-0.23179)	(-0.99324)	(-8.5516)***	(7.4937)***	(6.50435)***	(-0.41577)	(4.37405)***	(10.4135)***	(-0.59136)
PEGRF	2,318	-0.0045	-0.0027	-0.0112	0.0692	0.0664	0.0432	0.2906	0.0969	-0.0007
		(-0.36223)	(-0.69713)	(-8.2043)***	(6.8291)***	(6.77972)***	(0.6502)	(4.89943)***	(11.4178)***	(-0.20471)
RIVCRF	2,318	0.0309	0.0088	-0.0146	0.0829	0.0480	-0.1056	0.1906	-0.0348	0.0038
		(4.2739)***	(3.98783)***	(-18.6141)***	(14.1683)***	(8.50056)***	(-2.75303)***	(5.56678)***	(-7.1151)***	(1.90671)*
RIVIRF	2,318	0.0288	0.0179	-0.0163	0.1041	0.0198	-0.2410	0.1405	-0.0078	0.0092
		(3.71125)***	(7.52519)***	(-19.2863)***	(16.5944)***	(3.27234)***	(-5.8566)***	(3.825)***	(-1.4903)	(4.33944)***

Panel B	N	ΔFOR	BETA	SIZE	BM	LEV	IDRISK	OI_Vol	DISP	Chaebol
ΔAVG	1,934	-0.08563	0.01006	-0.00179	0.02516	-0.03834	-0.09261	0.0642	0.04646	0.00855
		(-3.27655)***	(2.62018)***	(-1.48097)	(2.24723)**	(-3.90812)***	(-1.32783)	(1.04625)	(5.39967)***	(2.55353)**
ΔOJRF	1,934	-0.06125	0.00368	-0.00002	0.01289	-0.04109	-0.03796	0.10498	0.0934	0.00522
		(-1.68203)*	(0.68707)	(-0.01025)	(0.82605)	(-3.0059)***	(-0.39062)	(1.22798)	(7.79096)***	(1.11817)
ΔPEGRF	1,934	-0.0598	0.00269	-0.0005	0.01249	-0.03662	-0.05737	0.10684	0.09401	0.00545
		(-1.69799)*	(0.52019)	(-0.31048)	-0.82763	(-2.76996)***	(-0.61041)	(1.29215)	(8.10809)***	(1.20867)
ΔRIVCRF	1,934	-0.09096	0.01126	-0.00088	0.05519	-0.0238	-0.09934	0.01475	-0.01096	0.0031
		(-4.93553)***	(4.15809)***	(-1.02977)	(6.99009)***	(-3.43964)***	(-2.01962)**	(0.34091)	(-1.80652)*	(1.31251)
ΔRIVIRF	1,934	-0.12364	0.01364	-0.00184	0.04646	-0.02457	-0.17827	0.04658	-0.00011	0.00678
		(-6.38648)***	(4.79618)***	(-2.05714)**	(5.6018)***	(-3.38083)***	(-3.45055)***	(1.02489)	(-0.01714)	(2.73419)***

T-Values are in parentheses. ***, **, and * indicate significance levels of 1%, 5%, and 10% respectively.

Table 5

OLS Regression Results for Implied Cost of Equity Premiums – KOSDAQ Firms

This table shows the regression results for the various measures of the implied cost of capital and the fraction of foreign ownership (*FOR*) for KOSDAQ firms in the sample. OJRF is the interest rate premium that is the implied cost of equity capital estimated from the OJ model minus the risk-free rate proxy (3-year KTB yield). PEGRF, RIVCRF, and RIVIRF are analogous measures from the PEG, RIVC, and RIVI models respectively. AVG is the average interest rate premium calculated from the four models. *BETA* is the systematic risk estimated by regressing past 60 months of stock returns data on the market index, *SIZE* is the log of market capitalization, *BM* is the ratio of book value of equity to the market value of equity. *LEV* is the leverage ratio calculated as total liabilities scaled by total assets, *IDRISK* is the idiosyncratic risk of a firm estimated from the residuals in the *BETA* regressions, *OI_Vol* is the volatility of past 5 years' operating income scaled by total assets. *DISP* is the standard deviation of one-year ahead analysts' earnings forecasts scaled by the absolute mean. *Chaebol* is a dummy variable that equals 1 if a firm belongs to a corporate group as defined by the KFTC, and 0 otherwise. Panel A shows regression results with OJRF, PEGRF, RIVCRF, RIVIRF and their averages (AVG) as dependent variables, and Panel B shows regression results with ΔOJRF, ΔPEGRF, ΔRIVCRF, ΔRIVIRF and ΔAVG as dependent variables, regressed with Δ*FOR* instead of *FOR* as the independent variable.

Panel A	N	FOR	BETA	SIZE	BM	LEV	IDRISK	OI_Vol	DISP	Chaebol
AVG	1,437	0.0004	0.0014	-0.0259	0.0350	0.0523	0.0896	0.1289	0.0279	0.0048
		(0.02693)	(0.32001)	(-14.6354)***	(2.57014)**	(6.78466)***	(1.70024)*	(3.56014)***	(3.3097)***	(0.84283)
OJRF	1,437	-0.0046	0.0090	-0.0256	-0.0070	0.0591	0.2744	0.1002	0.0695	0.0077
		(-0.21858)	(1.41961)	(-10.0353)***	(-0.35871)	(5.32468)***	(3.61734)***	(1.92299)*	(5.72394)***	(0.92654)
PEGRF	1,437	-0.0107	0.0116	-0.0234	-0.0013	0.0615	0.3443	0.1233	0.0735	0.0087
		(-0.52064)	(1.86072)*	(-9.3876)***	(-0.06625)	(5.66269)***	(4.63107)***	(2.41396)**	(6.18266)***	(1.07121)
RIVCRF	1,437	0.0159	-0.0046	-0.0254	0.0347	0.0515	-0.1526	0.1456	-0.0213	0.0022
		(1.4696)	(-1.41769)	(-19.3462)***	(3.43271)***	(9.011)***	(-3.90495)***	(5.42178)***	(-3.40067)***	(0.52404)
RIVIRF	1,437	0.0086	-0.0057	-0.0269	0.0619	0.0455	-0.2122	0.1693	-0.0096	0.0019
		(0.79155)	(-1.74148)*	(-20.3042)***	(6.08289)***	(7.90536)***	(-5.38671)***	(6.2536)***	(-1.51973)	(0.449)

Panel B	N	ΔFOR	BETA	SIZE	BM	LEV	IDRISK	OI_Vol	DISP	Chaebol
ΔAVG	1,036	-0.04115	-0.00048	-0.00555	0.03625	-0.00881	-0.00107	0.06944	0.03183	-0.00128
		(-1.23401)	(-0.07777)	(-2.54934)**	(1.80078)*	(-0.83438)	(-0.01434)	(1.33256)	(2.73209)***	(-0.17063)
ΔOJRF	1,036	-0.00786	-0.00335	-0.00196	0.02495	-0.00983	0.06001	0.10436	0.04572	-0.00329
		(-0.15224)	(-0.34693)	(-0.58209)	(0.80034)	(-0.60112)	(0.51955)	(1.29319)	(2.53378)**	(-0.28322)
ΔPEGRF	1,036	-0.0091	-0.00327	-0.00227	0.02311	-0.00666	0.04827	0.09793	0.04485	-0.00315
		(-0.18036)	(-0.34655)	(-0.69004)	(0.75849)	(-0.41686)	(0.42762)	(1.24168)	(2.543)**	(-0.2773)
ΔRIVCRF	1,036	-0.05309	0.00304	-0.00754	0.05311	-0.00364	-0.00643	0.03397	0.00342	0.00149
		(-2.01081)**	(0.61637)	(-4.37422)***	(3.33236)***	(-0.43482)	(-0.10892)	(0.82332)	(0.37065)	(0.25101)
ΔRIVIRF	1,036	-0.09526	0.0036	-0.00832	0.05123	-0.01428	-0.0645	0.02521	0.0075	0.00277
		(-3.58134)***	(0.72453)	(-4.79218)***	(3.19071)***	(-1.6951)*	(-1.08419)	(0.6064)	(0.807)	(0.46212)

T-Values are in parentheses. ***, **, and * indicate significance levels of 1%, 5%, and 10% respectively.