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# Stock Market Opening and the Cost of Capital

## The Case of Korea

Inseok Shin and Chang-Gyun Park

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### 12.1 Introduction

Literature on emerging capital markets is growing rapidly. While the literature covers diverse topics (see Bekaert and Harvey 2002 for a recent review), one of the key issues that constantly draws researchers' attention is effect of stock market openings on the cost of capital. The prediction of theories is well known. In a standard international asset pricing model, a stock market opening reduces the opening economy's cost of capital by allowing risk sharing between domestic and foreign agents (Bekaert and Harvey 1995; Eun and Janakiramanan 1986; Errunza and Losq 1989; Errunza, Senbet, and Hogan 1998). Several studies have tested the theoretical prediction using cross-country data from emerging markets, and report the cross-country data indeed confirms the prediction (Bekaert and Harvey 2000; Henry 2000; Kim and Singal 2000). It is important to note that empirical studies find desirable effects of market openings on the cost of capital, while empirical evidence for impacts on market volatility of opening produces ambiguous results (Bekaert and Harvey 2000; Aggarwal, Inclan, and Leal 1999).

In this chapter, we follow previous research and study changes in the cost of capital after a stock market opening. The difference between this chapter and existing works is that we focus on the Korean experience. By restricting the scope of research to a single country, this chapter takes the risk of lower empirical power than previous works, which utilize cross-country data sets. Despite the potential caveat, we seek to complement existing studies in the following manner. First, we take a longer-term perspective in

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examining effects of Korean stock market opening on the cost of capital. A stock market opening is a gradual process. When we measure the progress of openings by regulatory liberalization, emerging economies' experiences show liberalization processes usually take several years to be completed. In Korea, for example, the first deregulation that allowed foreign investment in the Korean stock market occurred in 1992. But, final elimination of regulatory restrictions on foreign investment did not take place until 1998. Partly because completion of market opening is a relatively recent event in most emerging economies, existing studies focus on initial opening dates when examining the effect of market openings on the cost of capital. Also their windows of examination are limited to two or three years around initial opening dates. As for Korea, Henry's (2000) sample covers only up to the end of 1994, and Bekaert and Harvey (2000) stop at the end of 1995. As a result, existing works are vulnerable to the *hot money* problem. They may find a decrease in the cost of capital not because the stock market is opened to foreign investors, but because horizons of their analysis are confined to when markets are doing well. In this chapter, we examine changes in the cost of capital of the Korea stock market for the past thirteen years, from 1992 to 2004. We compare the cost of capital during the liberalization era with the post-liberalization era, with each era including about six years. Following Bekaert and Harvey's (2000) argument, we employ the dividend yield as a measure of the cost of capital. We find that the dividend yield is larger in the post-liberalization era when the Korean stock market is fully opened. In fact, the dividend yield appears to have decreased only around 1992, the initial opening year, and then continued to rise as liberalization of the Korean stock market advanced.

Using firm level panel data we analyze, in detail, what effects greater foreign presence in the Korean stock market has brought on the dividend yield. We examine what trends emerge when controlling other factors and regressing the dividend yield on degrees of foreign ownership. We obtain an interesting result. The higher the degree of foreign ownership in a firm, the lower the dividend yield is. Notably, the negative relationship between foreign ownership and the dividend yield is only significant during recent years when the Korea stock market has been fully opened.

The results of this chapter are in contrast to the existing studies based on cross-country data sets that find most of the effects of market opening on the cost of capital tend to appear around the initial liberalization dates (Bekaert and Harvey 2000; Henry 2000; Kim and Singal 2000). According to the existing studies, the cost of capital goes down, responding to the initial market opening as further risk sharing becomes feasible. If this risk sharing story is correct, revaluation of stocks triggered by the market opening is likely to be concentrated in those stocks that attract foreign investment. This likely because foreign ownership of a stock indicates the

stock now belongs to the global portfolio.<sup>1</sup> The conclusion of this chapter—that higher foreign ownership produces lower dividend yield—is consistent with the hypothesis that market opening decreases the cost of capital. However, our finding that the negative relationship between foreign ownership and dividend yield is only visible after the liberalization process is completed suggests that the mere beginning of a liberalization process may not be enough to produce the negative effect of market opening on the cost of capital.

The rest of the chapter is structured as follows. In section 12.2, we briefly describe the stock market opening process in Korea and examine the trend in the cost of capital. In section 12.3, we present the analysis based on the panel data set. Section 12.4 contains concluding remarks.

## 12.2 Descriptive Findings

### 12.2.1 Regulatory Changes

Foreign investor's direct access to the Korean stock market<sup>2</sup> was prohibited until January 1992. At that time, the Korean government began allowing foreign participation in the Korean stock market, but with ceiling regulations. Foreign ownership was limited to 10 percent in, so-called, ordinary companies and 8 percent in public interest companies that were deemed of national interest, such as defense and communications. The 10 percent ceiling was subsequently raised to 12 percent in December 1994 and to 15 percent in July 1995 (see table 12.1). The pace of deregulation was accelerated during 1996 and 1997 when the Korean economy was under foreign liquidity problems. The foreign investment restriction was relaxed six times over the two years, raising the ceiling to 55 percent for ordinary companies. Toward the end of 1997 the Korean economy fell victim to a currency crisis. To deal with the currency crisis, the ceiling regulation for ordinary companies finally was eliminated in May 1998.

Another notable deregulation measure taken during the currency crisis period was the relaxation of the limit on foreign individual ownership. Initially the individual ownership ceiling was set at 3 percent in 1992. Although there were subsequent moderations, it still stood at 7 percent as of November 1997, rendering foreign controlling ownership in Korean companies impossible. In December 1997 when the Korean currency crisis erupted, the individual ceiling was raised to 50 percent. The individual ceil-

1. For a detailed explanation on stock revaluation due to risk sharing, see Chari and Henry (2005).

2. There are two stock exchanges in Korea: the Korea Stock Exchange and the Kosdaq Market. The former is a main board and traditional market, while the latter is a Korean version of the Nasdaq. In the paper, we focus on the Korea Stock Exchange.

**Table 12.1** Stock market opening in Korea: Changes in foreign investment ceilings

	1992	1994	1995	1996		1997				1998	2000
	1	12	7	4	10	5	11	12.11	12.30	5	11
Company-level ceiling											
Ordinary companies	10	12	15	18	20	23	26	50	55	—	—
Public interest companies	8	8	10	12	15	18	21	25	25	30	40
Individual-level ceiling											
Ordinary companies	3	3	3	4	5	6	7	50	50	—	—
Public interest companies	1	1	1	1	1	1	1	1	1	3	3

Source: Financial Supervisory Service.

ing regulation was finally abolished in May 1998, together with the company level ceiling regulation.

Though the ceiling regulation for public interest companies still remains, the Korean stock market has been practically fully opened since May 1998. The ceiling on public interest companies was raised to 30 percent in May 1998 and to 40 percent in November 2000. As of 2005, the ratio of noninvestible stocks for foreigners is 5.3 percent (see table 12.2).

#### *Foreign Investment Flows into the Korean Stock Market*

Since the implementation of the initial opening measure in January 1992, there has been a steady flow of foreign capital into the Korean stock market (see figures 12.1, 12.2). When the market was fully opened in May 1998, the pace of capital inflow accelerated significantly. As a result, the foreign participation ratio has continued to be on an upward trend since 1992. The pace of the trend stayed mild until 1997, as the ratio rose to 12.9 percent over the six years from 1992 to 1997 (see figure 12.3). After the full opening in 1998, the slope of the upward trend became steep. The foreign participation rate jumped to 21.9 percent in 1999, and then continued to increase, reaching 30 percent in 2000. The rate remained on an upward trend, except for a slight setback in 2002. At the end of 2005 foreign investors claim around 40 percent of the Korean stock market capitalization.

#### 12.2.2 Change in the Dividend Yield

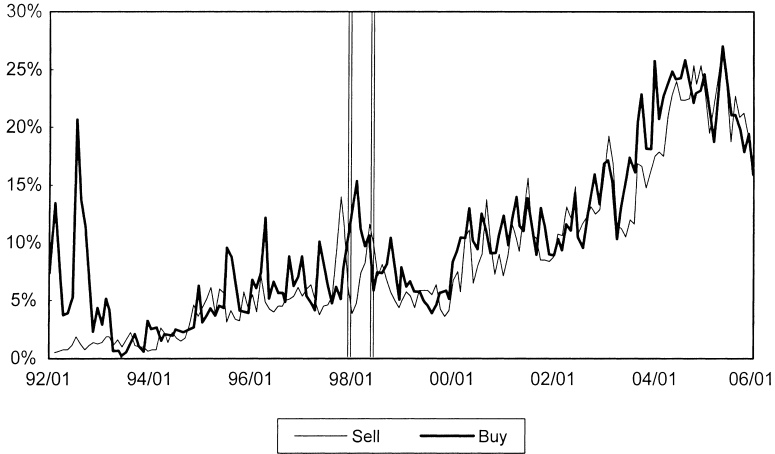
Bekaert and Harvey (2000) argue that the dividend yield is a better measure of the capital of cost than expected returns. Following their argument, we examine the trend in the dividend yield during the stock market opening and the post-opening years in Korea.

Figure 12.4 shows the trend in the dividend yield of listed companies in the Korean stock market for the past sixteen years starting from 1990. Each year's dividend yield is computed as a ratio of the total value of dividends paid by listed companies during the year to the market capitalization

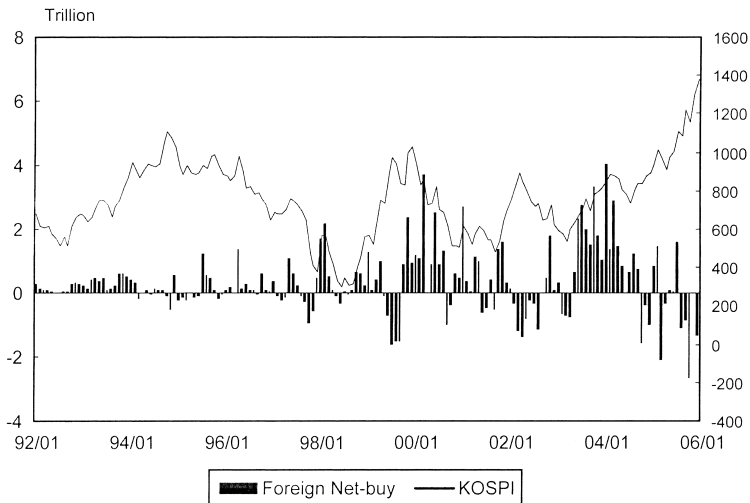
**Table 12.2** Stock market opening in Korea: Trend in share of noninvestible stocks by foreigners

	2000	2001	2002	2003	2004	2005
Number of companies under restriction	10	8	7	7	8	8
Value of stocks under restriction <sup>a</sup>	23.5	12.6	10.5	7.2	7.4	5.3

<sup>a</sup>Ratio to Market Capitalization.



**Fig. 12.1** Trend in foreign investors' trading in the Korea stock exchange: Ratio to the total



**Fig. 12.2** Trend in net-buy by foreign investors in the Korea stock exchange: Trend

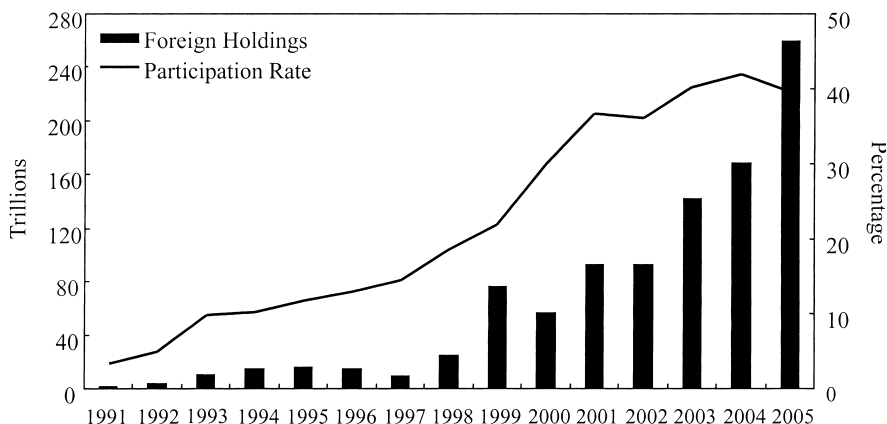


Fig. 12.3 Trend in foreign investors' participation rate in the Korea stock exchange

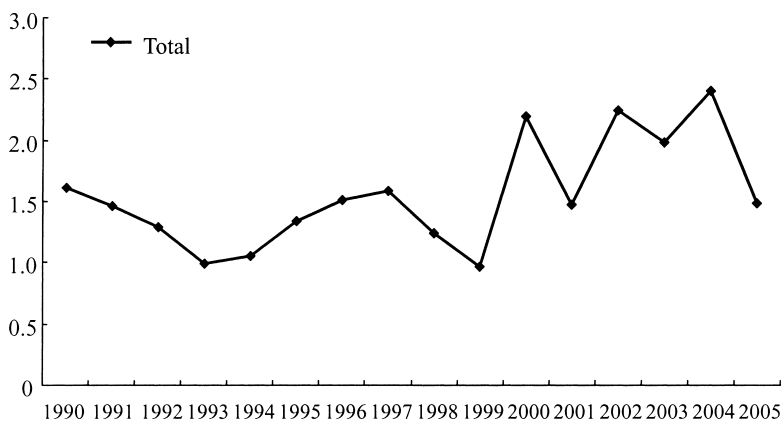


Fig. 12.4 Trend in the cost of capital: Dividend yield (1990-2005)

measured at the end of the year. The presented figure illustrates that the dividend yield was on a downward trend before the initial market opening in 1992. After the implementation of the partial opening measure in 1992, the decreasing trend lasted one more year, but was overturned in 1994. For the following years until the eruption of the currency crisis of 1997, it appears that the dividend yield remained on an upward trend.

Descriptive statistics of the dividend yield are reported in table 12.3. Dividing the sixteen years into the precrisis and the postcrisis period, means and standard deviations of the dividend yield for each period are computed. A simple test comparing mean-differences between the precrisis and postcrisis period is conducted. The result shows that the mean of the dividend yield for the postcrisis period is significantly larger.

**Table 12.3** Difference in the dividend yield: During and after the market opening

	1992–1998(A)	1999–2005(B)	B – A
Mean	1.29	1.82	0.48
Standard deviation	0.22	0.52	(4.07)

Note: ( ) is a *t*-statistic for the hypothesis 'B – A = 0.'

## 12.3 Regression Strategy and Data

### 12.3.1 Question and Potential Explanations

The inspection of the trend in the dividend yield gives rise to a natural question: why have dividend yields increased after the economic crisis of 1997 when the Korean stock market is fully opened and foreign investor participation in the market is rising?

In measuring the effect of market opening on the cost of capital through the dividend yield, some factors may blur the relationships between the two need to be considered. The dividend yield is a function of not only the cost of capital but also future dividend flows. Hence, negative relationship of the market opening on the dividend yield holds when the future dividend flows remain constant. Any factor that changes future dividend flows may hinder one from observing the negative effect of the market opening on the dividend yield. Indeed, Henry (2000) reports that macroeconomic reform measures, other than capital market openings, also make significant impacts on the cost of capital in emerging economies, presumably by changing their growth prospects.

Even if one can hold future dividend flows constant, it still may not be easy to identify the impact of market opening on the dividend yield process. A standard theory predicts the effect of market opening on the cost of capital and the dividend yield to be negative because market opening changes marginal investor groups from domestic investors to foreign. But, it is not clear at which level of foreign ownership the change in the marginal investor group occurs.

Taking these factors into account, four possible explanations arise regarding the effect of the market opening and interpretation of the observed trend in the dividend yield of the Korean stock market. Based on his cross-country examination, Henry (2000) argues that the impact of market opening on the cost of capital is visible only around the first opening years. Though the market opening-process is always gradual in emerging economies, later opening measures in economies of his sample do not produce statistically significant effects on the cost of capital. The Korean experience may be interpreted along this line. One may argue the decreasing effect of the market opening on the cost of capital and the dividend yield



had already been realized around 1992, namely the initial period of the market opening. One can then claim the movement of the dividend yield during the postcrisis period should not be connected to the market opening. Instead, the increase in the dividend yield may be attributed to other changes, such as the lowered growth prospect of the Korean economy after the economic crisis of 1997.

A second and opposing explanation would be that the decreasing effect of the market opening has actually been materializing during the postcrisis years, but disguised by other developments; the decrease in the dividend yield during the precrisis period is then an effect of other factors instead of the initial market opening measures. This hypothesis may be justified on the ground that foreign participation in the Korean stock market had not reached a critical level before the crisis, which would have been necessary for the change in the marginal investor group. Only after the crisis, when foreign ownership in Korean companies rose further, did foreign investors replace domestic investors as the marginal investor group and begin affecting the cost of capital.

The third hypothesis is that the cost of capital has been declining all along the liberalization process since the first opening in 1992. The reason why its effect on the cost of capital is not shown clearly in the movement of the dividend yield in recent years can be attributed to other factors that affect dividend flows.

The final possibility is an outright rejection of the prediction that market opening should lower the cost of capital. For example, in contrast to what the theory predicts, foreign investors may be myopic, so that they seek to maximize short-term returns from their investment in Korean companies. If foreign investors' myopic behavior leads them to demand exploiting dividends from Korean companies that cannot be sustained, one may observe a temporary increase in the dividend yield, as occurred during the post-crisis period.

### 12.3.2 Regression Strategy

#### *Strategy*

To identify the impact of market opening on the cost of capital, existing studies such as Bekaert and Harvey (2000) and Henry (2000) employ cross-country regressions. Their strategy is to control the effects of other factors on the cost of capital by considering differences among emerging economies. As long as macroeconomic profiles and histories of economic reforms are different among emerging economies, it may be argued that cross-country regressions will correctly identify impacts of stock market openings.<sup>3</sup>

3. Henry (2000) includes some dummy variables for macroeconomic reforms in his regression as an additional attempt to control their effects on measures of the cost of capital. But,

Our approach is different. We employ a one-country, firm level panel regression approach instead of a cross-country panel regression. While the dependent variable in the existing studies is dividend yields of emerging economies, the dependent variable in our regression is firm level dividend yields of the Korean stock market. In our regression, macroeconomic events, including economic reforms that may affect the dividend yield, will be controlled by time effects. We seek to identify the effect of market opening on the cost of capital and the dividend yield through foreign participation rates in each company. Our identifying assumption is that if market opening decreases the cost of capital as foreign investors become marginal investors, the impact of market opening will be more visible in firms with higher foreign participation rates. The following is the basic form of the regression equation we run:

$$(1) \quad DY_{it} = \alpha + \beta' X_{it} + \gamma FS_{it-1} + \delta T_t + \mu_i + \varepsilon_{it}$$

In the equation,  $X_{it}$  stands for firm level characteristics that may affect each firm's dividend yield. Changes in economic environment such as reforms and global market conditions will be controlled by a time-dummy variable  $T_t$ . The variable  $\mu_i$  is to allow individual fixed effect. The parameter of key interest is  $\gamma$  that is the coefficient to the foreign participation rate denoted by  $FS_{it}$ .

#### *Control Variables*

It has been suggested by many studies in the field of corporate finance that irrelevance of dividend policy à la Modigliani-Miller does not hold, and so a firm's dividend policy is influenced by a variety of variables. Following the literature, we include five variables to control possible variation in dividend yields due to corporate financial policy: change in investment, return on asset, change in fixed debt, cash flow, and size of the firm.<sup>4</sup>

Change in investment (Investment) is defined as the ratio of the change in investment in fixed assets to the total asset. Inclusion of the variable as an explanatory variable is primarily based on the theory that regards dividends as a signaling device for a firm's future profitability. One may presume that if the prospect of future profitability improves, managers would increase investment and concurrently increase dividend payout as an attempt to signal their private information to the outside investors.

On the contrary, one can deduce the opposite implication from the signaling motivation on the relationship between investment activities and dividend policy. Since it is possible for investors to observe the investment activities of a firm, increase in investment itself may contain rich enough

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identifying economic reforms that may have taken effects on measures of the cost of capital is hard. It seems that his main strategy to control other variables' effects on measures of the cost of capital may exploit cross-country differences.

4. For a standard reference, see Frankfurter, Wood, and Wansley (2003).

information on a firm's future growth prospect for the outside investors. In that case, it is unnecessary for managers to employ dividend policy as an additional signaling device. This is so because dividends are a relatively costly signal device due to tax treatment on dividend income. Hence, any sign of the coefficient to the change in investment would be consistent with the signaling theory of dividends.

Return on asset (ROA) is the ratio of earnings net of dividend distribution to preferred stocks to total asset. Earning is the most frequently used variable in empirical study to explain dividend decisions ever since Lintner's seminal work (1956). Earnings net of dividend distributed to preferred stocks constitute the source of funds for either retained earnings or dividends to common stocks. Therefore, the presumption is that better earning performance in general leads to higher dividends if liquidity constraint is present for some reason.

Both change in fixed debt (Fixed debt) and "cash flow" are variables included to take into account cash flow hypothesis (Eckbo and Verma 1994). Change in fixed debt is normalized by total assets to neutralize scale effect, and cash flow is defined as operating profit less corporate income tax and total dividends, which are also normalized by total assets. Cash flow hypothesis argues that investors use dividends as a discipline device for managers by minimizing free cash flow that can be arbitrarily disposed of by managers. Less dependence on internal sources of funding, in general, bring in lower monitoring cost through wider exposure to capital markets.

Finally, "size" is measured as the log of real assets and is included to capture the empirical regularity that larger firms tend to pay out more dividends. It is also possible to justify the inclusion of size variables in terms of the agency cost argument. Larger firms are more likely to be subject to negative effects of asymmetric information and have stronger incentive to use dividends as a signaling device for future profitability.

### 12.3.3 Data

#### *Sample Selection*

In principle, we want to construct a sample consisting of all nonfinancial firms that have been continuously listed at the Korea Stock Market during the period 1992–2004. One potential problem with this sampling approach is survival bias. The dividend yield process of the sample of surviving firms may be different from the total sample. To see whether there are any tangible differences in the dividend yield, we present two dividend yield processes in figure 12.5. As shown, the two processes have moved closely together since 1994. But, there appears a visible gap between the two in 1992 and 1993. We take two remedies. First, we restrict our sample period to 1994–2004 when the sample of surviving firms closely represent the total

sample, as far as movement in the dividend yield is concerned. Second, we repeat the same regression analysis with the total sample, which includes delisted firms.

We exclude those firms for which crucial information such as foreign participation rate or dividends is unavailable. By excluding those firms, we end up with 411 nonfinancial firms in the surviving firm sample. Table 12.4 describes the basic features of the panel sample.

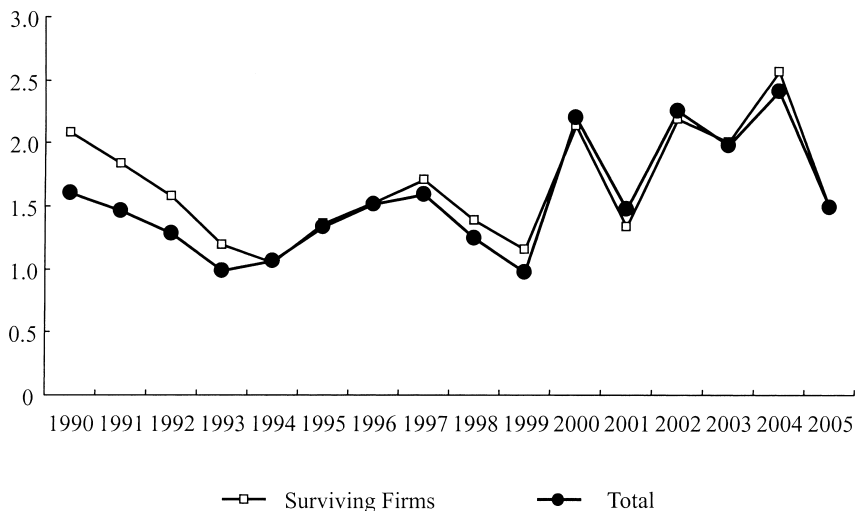


Fig. 12.5 Trends in the dividend yield

Table 12.4 Industry composition and relative size of the panel sample to the market

	Machinery & chemistry	Services	Electronics	Steel & metal	Others	Total
Sample	140	62	49	29	131	411
1996	204	76	85	43	241	649(760)
1997	213	79	90	43	238	663(776)
1998	211	74	91	43	230	649(748)
1999	211	73	89	43	213	629(725)
2000	209	74	88	42	207	620(704)
2001	208	76	88	41	201	614(689)
2002	212	76	81	39	197	605(683)
2003	212	76	79	41	190	598(684)
2004	214	84	73	40	175	586(683)

Note: ( ) denotes the number of all listed companies including finance industry each year.

*Data Source*

Stock prices and the share of foreign investors for each listed firm are extracted from a database maintained by the Korea Security Computing Corporation (Koscom). Information on all other variables are obtained from financial statements for listed firms provided by the Korea Information Service (KIS).

**12.4 Result**

## 12.4.1 Basic Model

Main results of the regression analysis are contained in table 12.5 and 12.6. For simplicity, we do not report the coefficients of individual fixed effects and time effects. Table 12.5 reports the result when the dividend yield is regressed on foreign participation rates or the share of foreign investors' holding in a firm. The regression is implemented three times for the changing sample periods: first for the whole sample period, second for the precrisis sample period, and finally for the postcrisis period. This is to

**Table 12.5** Dividend yields and shares of foreign investors: Regression (1)

Variable	Basic Model		
	1994–2004	1994–1998	1999–2004
FS( $t - 1$ )	–0.0114** (0.0052)	0.0020 (0.0086)	–0.0187** (0.0082)
Investment	0.0030 (0.0032)	0.0023 (0.0030)	0.0040 (0.0073)
ROA	0.0027** (0.0013)	0.0087*** (0.0034)	0.0022 (0.0015)
Fixed debt	0.0028** (0.0014)	–0.0043 (0.0027)	0.0024 (0.0016)
Cash flow	0.0008 (0.0045)	–0.0025 (0.0098)	–0.0044 (0.0056)
Size	0.5533*** (0.0956)	0.1387 (0.1795)	0.4911** (0.1943)
Number of observations	4,521	2,055	2,466
$R^2$	0.0437	0.0505	0.0274
Wald test	352.48***(16)	111.4***(10)	69.63***(11)

*Notes:* Dependent variable = dividend yield. Standard errors are in parentheses. Wald is the test statistic for the null hypothesis that all coefficients except for constant term are jointly zero and degrees of freedom are in the parentheses.

\*\*Statistically significant at 5%

\*\*\*Statistically significant at 1%

see if the trend in the dividend yield observed in figure 12.4 can be confirmed by the regression analysis.

For the whole sample period of 1994–2004, the estimate of the coefficient to the foreign participation rate is negative and significant, which is encouraging since it implies that the stock market opening and the increase in foreign participation in the domestic stock market indeed reduces the cost of capital.

When the whole sample is divided into the two subperiods, an interesting finding emerges. The estimate of the coefficient to the foreign participation rate remains negative and significant for the postcrisis sample. However, for the precrisis sample it is estimated positive and insignificant. The result is a contrast to Henry (2000) and Bekaert and Harvey (2000), as they report the decreasing effect of market opening on the cost of capital appears in the early stages of market opening.

#### 12.4.2 Alternative Model

We repeat the regression analysis now allowing for serial correlation in the dividend yield. Studies exist on dividend policy that emphasize the presence of inertia in the dividend process (Lintner 1956; Waud 1966). These studies suggest various empirical specifications based on partial adjustment model for dividend change. Allowing for the possibility of inertia in dividend adjustment, we estimate the following dynamic panel model:

$$(2) \quad DY_{it} = \alpha + \beta'x_{it} + \gamma FS_{it-1} + \delta DY_{it-1} + \mu_i + \varepsilon_{it}$$

It is well-known that a typical estimation strategy for a static panel like equation (1) leads to an inconsistent estimator. Therefore, we resort to an Arellano and Bond (1988) style GMM estimation procedure in estimating the dynamic panel model.

The result is presented in table 12.6. The coefficient to the lagged dividend yield is estimated to be positive and significant, indicating the existence of persistence in the each year process. But, focusing on the coefficient to the foreign participation rate, we report that the result is qualitatively unchanged from the basic regression model. Before ending this section, we redo the regression analyses with the unbalanced panel including delisted companies sometime during the sample period. Results are contained in table 12.7 and 12.8. Significance of the coefficient to the foreign participation rate becomes marginal in the basic model regression. The result for the dynamic model remains qualitatively same.

#### 12.4.3 Causality Check

In this section, we conduct a supplementary analysis on the effect of foreign investors on dividend yield. We test the existence of a causal relationship in the Granger sense between share of foreign investors and dividend

**Table 12.6** Dividend yields and shares of foreign investors: Regression (2)

Variable	Dynamic Model		
	1995–2004	1995–1998	1999–2004
FS( $t-1$ )	-0.0246*** (0.0090)	-0.0141 (0.0224)	-0.0381** (0.0130)
Investment	0.0015 (0.0032)	0.0055 (0.0053)	-0.0041 (0.0083)
ROA	0.0015 (0.0014)	0.0026 (0.0071)	0.0025 (0.0019)
Fixed debt	0.0012 (0.0014)	-0.0155*** (0.0059)	0.0026 (0.0021)
Cash flow	-0.0083 (0.0055)	-0.0299 (0.0210)	-0.0102 (0.0075)
Size	0.3004* (0.1798)	-0.0080 (0.4435)	0.2273 (0.3339)
DY( $t-1$ )	0.1383*** (0.0260)	0.6823*** (0.2429)	0.2706*** (0.0486)
Number of observations	3,699	1,233	1,644
Sargan test	256.76***(44)	9.66**(5)	96.33**(9)

Notes: Dependent variable = dividend yield. Standard errors are in parentheses. Sargan is the test statistic for overidentifying restrictions and degrees of freedom are in the parentheses.

\*Statistically significant at 10%

\*\*\*Statistically significant at 1%

\*\*Statistically significant at 5%

yield by taking advantage of the panel vector autoregression (VAR) technique suggested by Holtz-Eakin, Newey, and Rosen (1988), which has been recently developed and applied by Grinstein and Michaely (2005) for investigating firms' payout policy.

Suppose the following bivariate panel VAR, allowing for time varying coefficients and individual fixed effect, such that:

$$(3) \quad \begin{aligned} DY_{it} &= \alpha_{0t} + \sum_{l=1}^m \alpha_{lt} DY_{it-l} + \sum_{l=1}^m \beta_{lt} FS_{it-l} + \varphi_i f_i + \varepsilon_{it} \\ FS_{it} &= \gamma_{0t} + \sum_{l=1}^m \gamma_{lt} DY_{it-l} + \sum_{l=1}^m \delta_{lt} FS_{it-l} + \omega_i g_i + \eta_{it}, \end{aligned}$$

where  $i = 1, 2, \dots, N$  is the number of firms and  $t = 1, 2, \dots, T$  is the number of years in the sample. The variable  $l$  is the number of time lags included for estimation and  $f_i$  and  $g_i$  are individual fixed effects allowed for dividend yield and share of foreign investors, respectively. The variables  $(\alpha, \beta, \varphi, \gamma, \delta, \omega)$  are the vector of parameters to be estimated and  $(\varepsilon_{it}, \eta_{it})$  is a sequence of serially independent stochastic error terms with a well-defined joint distribution.

**Table 12.7** Dividend yields and shares of foreign investors: Regression (3)

Variable	Basic model: Total listed companies		
	1992–2004	1992–1998	1999–2004
FS( <i>t</i> – 1)	–0.0015 (0.0057)	0.0021 (0.0106)	–0.0093 (0.0064) (p-value 14.5%)
Investment	0.0002 (0.0011)	–0.0004 (0.0023)	–0.0002 (0.0011)
ROA	0.0009 (0.0009)	0.0152*** (0.0049)	0.0003 (0.0006)
Fixed debt	0.0018 (0.0236)	–0.0012 (0.0321)	–0.0028 (0.0417)
Cash flow	0.0035 (0.0043)	–0.0183* (0.0107)	0.0001 (0.0040)
Size	0.5141*** (0.1093)	–0.2668 (0.2504)	0.5382*** (0.1488)
number of observations.	7,873	4,156	3,717
R <sup>2</sup>	0.0143	0.0037	0.0171
Wald test	173.12***(16)	34.56***(9)	92.5***(10)

*Notes:* Dependent variable = dividend yield. Standard errors are in parentheses. Wald is the test statistic for the null hypothesis that all coefficients except for constant term are jointly zero and degrees of freedom are in the parentheses. The sample includes all firms both listed and delisted for each period.

\*Statistically significant at 10%

\*\*Statistically significant at 5%

\*\*\*Statistically significant at 1%

Following Holtz-Eakin, Newey, and Rosen (1988), one can transform equation (3) into a set of two estimating functions without individual fixed effect:

$$(4) \quad \begin{aligned} DY_{it} &= \alpha_{0t} + \sum_{l=1}^{m+1} \alpha_{lt} DY_{it-l} + \sum_{l=1}^{m+1} b_{lt} FS_{it-l} + u_{it} \\ FS_{it} &= c_{0t} + \sum_{l=1}^{m+1} c_{lt} DY_{it-l} + \sum_{l=1}^{m+1} d_{lt} FS_{it-l} + v_{it} \end{aligned}$$

GMM with the following orthogonality conditions bring us a consistent estimator:

$$\begin{aligned} E[DY_{is} u_{it}] &= E[FS_{is} u_{it}] = 0 \text{ for } s < (t - 1) \\ E[DY_{is} v_{it}] &= E[FS_{is} v_{it}] = 0 \text{ for } s < (t - 1) \end{aligned}$$

The null hypotheses of the traditional Granger causality test are given as:

$$(5) \quad \begin{aligned} H_0 : \beta_{1t} &= \beta_{2t} = \dots = \beta_{mt} = 0 \quad \forall t \\ H_0 : \gamma_{1t} &= \gamma_{2t} = \dots = \gamma_{mt} = 0 \quad \forall t \end{aligned}$$



**Table 12.8** Dividend yields and shares of foreign investors: Regression (4)

Variable	Dynamic Model		
	1994–2004	1994–1998	1999–2004
FS( $t-1$ )	-0.0044 (0.0083)	0.0049 (0.0135)	-0.0331*** (0.0105)
Investment	-0.0015 (0.0040)	-0.0006 (0.0053)	-0.0043 (0.0067)
ROA	0.0006 (0.0010)	0.0163 (0.0058)	0.0005 (0.0011)
Fixed debt	0.0004 (0.0011)	0.0005 (0.0034)	0.0005 (0.0013)
Cash flow	-0.0117*** (0.0048)	-0.0331*** (0.0120)	-0.0006 (0.0051)
Size	0.1889 (0.1781)	-0.7420** (0.3448)	0.0740 (0.2438)
DY( $t-1$ )	0.5262*** (0.0130)	-0.0081 (0.0323)	0.2838*** (0.0410)
Number of observations	6,387	2,832	2,339
Sargan test	4,227.5***(65)	2,467.06***(14)	111.89***(9)

*Notes:* Dependent variable = dividend yield. Standard errors are in parentheses. Sargan is the test statistic for overidentifying restrictions and degrees of freedom are in the parentheses. The sample includes all firms both listed and de-listed for each period.

\*Statistically significant at 10%

\*\*Statistically significant at 5%

\*\*\*Statistically significant at 1%

Holtz-Eakin, Newey, and Rosen (1988) show that testing equation (5) in (3) is equivalent to testing the following null hypotheses in (4):

$$(6) \quad H_0 : b_{1t} = b_{2t} = \dots = b_{mt} = b_{(m+1),t} = 0 \quad \forall t$$

$$H_0 : c_{1t} = c_{2t} = \dots = c_{mt} = c_{(m+1),t} = 0 \quad \forall t$$

Holtz-Eakin, Newey, and Rosen (1988) also suggest a Wald-type test statistic based on the difference between the residuals of a restricted and unrestricted model.

The test statistics are reported in table 12.9. We reject the null hypothesis that share of foreign investors does not Granger-cause dividend yield for the period from 1994 to 2004. However, we cannot reject the null hypothesis that dividend yield does not Granger-cause share of foreign investors for the same period. Second, for the precrisis period, we do not obtain a consistent conclusion on the interaction between share of foreign investors and dividend yield. Third, for the postcrisis period, share of foreign investors help explain dividend yield, but not vice versa.

In sum, Granger causality tests in this section confirm that the effect of foreign investors on the cost of capital (dividend yield) unfolded its poten-

**Table 12.9** Granger causality test

# of lags	FS → DY			DY → FS		
	$\chi^2$ -statistics	d.f.	<i>p</i> -value	$\chi^2$ -statistics	d.f.	<i>p</i> -value
1994–2004						
1	43.2231	16	0.0003	22.1696	16	0.1378
2	47.3938	21	0.0008	28.5234	21	0.1259
1994–1998						
1	8.0402	4	0.0901	15.5057	4	0.0038
2	3.5896	3	0.3093	5.1844	3	0.1578
1999–2004						
1	15.3385	6	0.0178	9.6124	6	0.1646
2	20.4021	6	0.0023	10.085	6	0.1211

tial in full scale after 1999, when capital market liberalization was completed and the foreign participation rate rose.

### 12.5 Conclusion

We have examined the effect of market opening on the dividend yield based on the Korean data. We employed firm level panel regression approaches, focusing on relationships between foreign participation rates and dividend yields. We found that the larger the foreign participation rate is, the lower the dividend yield is. But, the relationship is only significant in the postcrisis period when the Korean stock market was fully opened and foreign participation rate was relatively higher. The results are different from the existing studies based on cross-country data that find the effect of market opening realizes in the early stage of opening.

The purpose of this chapter is focused on testing the prediction of a standard asset-pricing model that market opening allows further risk sharing and so reduces the cost of capital. Hence, we intentionally interpreted results of the chapter in view of the risk-sharing story. However, a number of alternative interpretations are possible. Specifically, the negative relationship between foreign participation rates and dividend yields may be due to some other factors. Shleifer’s (1986) price pressure is one candidate. Foreign investors’ trading advantage as argued by Froot, O’Connell, and Seasholes (2001) is another. In addition, if foreign shareholders can induce better management of firms by improving corporate governance, the governance channel can make a third factor.

Given these alternative interpretations, we have no intention to conclude that an increase in foreign participation indicates expanded risk-sharing opportunities. Rather, by showing that the negative relationship between foreign participation and the cost of capital exists in the postliberalization

period, in contrast to the existing works on the effect of market opening on the cost of capital, this chapter cautions that market opening may not automatically induce foreign investors to exploit expanded risk-sharing opportunities. At the minimum, this chapter suggests we need more work to understand why market opening leads to revaluation of stocks.

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**Comment** Yuko Hashimoto

The purpose of this chapter is to investigate the impacts of the liberalization of the Korea stock market on the cost of capital. The research covers a decade, from 1994 to 2005, of the liberalization process of the Korean stock market. The authors estimate the effect of foreign participation rate on dividend yield and consider causality between the two. There is literature that focuses on the Korean stock market from the cost of capital point of view but this research is perhaps the first to expand the sample period to the post-currency crisis period. By dividing the sample period into two, a partially regulated period from 1994 to 1997 and a deregulated period from and after 1998, the authors try to compare the performance of the surviving firms and all (dead + listed) firms.

The authors find that foreign participation significantly reduced the dividend yield for the period 1999–2004, while it significantly increased the dividend yield for the period 1995–98, regardless of the estimation methodology. These results are opposite to the existing literature in that the effect of deregulation appears at the early stage of liberalization. It is also found that during the partial deregulation period, the dividend yield granger-caused foreign participation, while the foreign participation granger-caused the dividend yield during the deregulated period.

These findings are interpreted as the fact that it takes some time before the liberalization effect (reduction of cost of capital) emerges in the process, and the negative relationship between foreign ownership and the dividend yield became significant only recent years.

The chapter is well summarized, the objective is clear, and the findings are interesting. This is a very good chapter. Still, I would like to make three comments.

The first comment is about the story. This chapter confirms previous studies that liberalization does reduce the cost of capital. That is, this chapter shows that the liberalization effect appears in the latter stages of the liberalization process, whereas existing papers say it appears at the early stage. But it seems that results depend on the choice of variables and sample period. As the liberalization progresses and market becomes much more open to the world, the share of foreign participation rises as well. As is clear from figure 12.3, there is a big jump in the change in the share of foreign participation (slope of the participation) from 1992–1993, when the liberalization started, and 1999–2001, the final stages of the process. The results perhaps only reflect this fact, the endogeneity between the liberalization and the share of foreign participation. As for the sample-period problem, the latter subsample period in the estimation exactly overlaps the post-Asian currency crisis. The reduction of cost of capital is partly due to

a strong stock price recovery after 1997. It would be favorable to separate the Asian crisis factors from the dividend yield.

The second comment relates to the interpretation of the results. The chapter tries to study “the cost of capital after a stock market opening” based on the assumption that “the cost of capital (= dividend yield) decreases in response to market opening because . . . foreigners become marginal investors.” Another interpretation is applicable to this research. Foreign participants are also attracted to a firm with good balance sheets, ROA, cash flow, and high dividends. In this line, a positive relationship between dividend yield and foreign participation is possible. The authors should also take into account the potential investment opportunity, that is, a firm facing good investment opportunities will invest its earnings rather than pay dividends. Include Tobin’s  $q$  or sales growth rate as control variables for potential investment opportunity and see whether the results are robust.

The third comment relates to the deregulation in December of 1997. There were twice relaxations in the foreign investment ceilings in the Korean stock market that month, on December 11 and 30. Foreign investment ceilings for ordinary companies were raised from 26 percent to 50 percent on December 11, and the limit on foreign individual ownership was raised from 7 percent to 50 percent on the same day (and then both ceilings were raised up to 55 percent on December 30). Obviously, this was when the Korean currency crisis was erupting. I am just curious why the ceiling was raised twice at that time. Is it something to do with IMF conditionality, or did the Korean authority intend to invite money from abroad in order to create appreciation pressure on the Korean Won? In any case, the authors should try to devote one or two pages for the background of the Korean stock market at this time, which would improve the contribution of this chapter more and help readers to understand the deregulation process in Korea. The regime change in the foreign exchange rate system must have affected the behavior of foreign investors to some extent, and the cost of capital as well. Therefore, exchange rate regime switch should be controlled for in the estimation. The easiest way is to use a dummy.

## **Comment** Chulsoo Kim

In a standard international asset pricing model, stock market opening reduces an opening economy’s cost of capital by allowing for risk sharing between domestic and foreign agents. Using cross-country data, current literature, Bekaert-Harvey (2000), Henry (2000), and Kim-Singal (2000),

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confirms this implication. This chapter examines the cost of capital after the stock market opening in Korea with two distinctive approaches. First, the chapter uses a longer time horizon (fifteen years). Stock market opening is a gradual process, taking several years to be completed. Yet, the literature examines two or three years around the initial opening. It is interesting to see the effects on the cost of capital around and after the initial opening. Second, the chapter uses a firm-level data set. This chapter examines if firms with higher foreign ownership will see more reduction in the cost of capital.

This chapter finds that the higher the degree of foreign ownership in a firm, the lower the dividend yield is. It has been significant, however, only during the recent years when the Korea stock market has been fully opened, which is a contrast to the literature that finds the effects around the initial liberalization dates.

This chapter makes an important contribution to the literature by examining the effects of a stock market opening on individual stocks instead of aggregate cross-country data. The individual-firm data set contains rich information that we cannot get in the aggregate cross-country data set. Therefore, this chapter can shed new light on the effects of a stock market opening. I have several comments that may help to strengthen this chapter's claim.

First, in this chapter, the cost of capital is equal to dividend yield. Yet, we are ultimately interested in how the stock market opening may benefit or hurt a country. When the volatility increases, however, a country may not be better off even if the cost of capital decreases. For example, short-term capital inflow may lead to a sudden withdrawal from the country, which may in turn cause an economic crisis as in Asia in 1997. Hence, the cost of capital would be better examined in terms of volatility as well as dividend yield.

Second, the chapter needs to examine if the foreign participation rate is a good proxy for the stock market opening. The identification assumption of this chapter is that if market opening decreases the cost of capital with more foreign investors, the impact of the market opening would be more visible in firms with higher foreign participation rates. Yet, the foreign participation rate can increase due to several reasons.

The increase in the foreign participation rate could be due to the stock market opening as the chapter claims. This explanation may be important in the initial opening of 1992, but less important after that. Mean and median foreign participation rates have been under a ceiling constraint. For most firms, the ceiling constraint did not bind. Many foreign investors bought less than they were allowed except for a small number of popular stocks. If the stock market opening is the main driving force behind the increase in the foreign participation rate, the foreign investors should be indifferent among stocks and the participation rate should increase for all

stocks. There are, however, some stocks that foreign investors like to buy and other stocks foreign investors do not like to buy, which suggests that the foreign participation rate depends on more than the market opening. Specifically, the foreign participation rate may increase when the foreign investors expect better prospects in the Korean economy or in a particular stock. Hence, foreign participation rate alone may not be a good measure of market opening. This chapter needs a structural model of the foreign participation rate and needs to sort out the market opening effect. Although this paper conducts Granger causality tests between dividend yields and the share of foreign investors, foreign investors may use more information than dividend yields in picking stocks, and hence the foreign participation rate should be explicitly modeled.

Third, this chapter needs to distinguish between the Asian crisis of 1997 and the stock market opening in 1998. Economic reforms after the crisis may have caused higher foreign participation rates. Although economic reforms are controlled by a time-dummy variable in this chapter, some reforms affect individual firms differently. For example, after the fall of Daewoo, the “too big to fail” policy is no longer expected. Foreign banks started to monitor loans more carefully. Some grassroots groups demanded more shareholder rights from certain firms. These changes led to more transparency in certain firms, but the effects were not uniformly distributed across firms. Therefore, a time-dummy would not be able to capture all these effects, and the chapter needs to control for economic reforms after the Asian crisis.

Fourth, do lower dividend yields with higher foreign participations confirm the benefit of the market opening? Maybe, but there exists another possibility. Korean investors often imitate foreign investors, possibly because Koreans may think that foreigners have better skills in picking winning stocks. In this case, Koreans shift their portfolio from the stocks that foreigners do not prefer to the stocks they do. This would lead to lower dividend yields for the stocks that foreigners prefer and higher dividend yields for the stocks which they do not. This can be tested since the chapter has all the individual data. When the foreign participation rates increase, it could be due to the market opening or the higher demand for the stock. When the foreign participation rates decrease, however, it could not be due to the market opening and it must be due to the lower demand for the stock. In other words, when the foreign participation rate decreases, the negative change has nothing to do with the market opening. Therefore, if dividend yields increase when the foreign participation rate has decreased, the dividend yield change is caused by the lower demand for the stock, instead of the market opening.

Fifth, this chapter can try a counterfactual study. Assuming there was no stock market opening in 1992 or 1998, this chapter can examine the dividend yield. Then, the chapter can examine interesting implications, such as

how many firms have benefited or lost from the market opening, how much the cost of capital has decreased, and how many changes in volatilities there have been.

Sixth, this chapter discusses why dividend yields have increased after the economic crisis of 1997, when the Korean stock market was fully opened and foreign participation in the market were increasing. This chapter then provides four possible explanations. The first explanation is that the decreasing effect of the market opening was realized around the initial period of market opening. Other changes, such as the lowered growth prospect of the Korean economy after the Asian crisis of 1997, may be responsible. The second explanation is that the decrease in the dividend yield during the pre-crisis period is an effect of other factors instead of the initial market opening measures. The third explanation is that other factors that affect dividend flows are responsible. The fourth explanation is the rejection of the prediction that the market opening should lower the cost of capital. Foreign investors may be myopic and seek to maximize short-term returns. Yet, these four explanations seem to contradict the findings in the chapter. Therefore, this chapter should attempt to reconcile the increase in dividend yields after 1997 with the results from this chapter.

Seventh, Korea started to open a stock market in 1992 and completed the opening in 1998. Even if the stock market was partially opened in 1992, most of the effect of the opening should have taken place around 1992, since market participants rationally expect the full opening later and incorporate that information in 1992. The expected future increase of the foreign participation rate would be reflected in 1992, while the unexpected increase would be reflected in 1998. This chapter hence needs to discuss when the government announced the market opening, and if the government exactly followed the initial plan for the opening, so that the chapter can test the expected and unexpected effects of the event.

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