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ESSAYS ON INTERNATIONAL FINANCIAL MARKETS

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Nanyang Business School

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in fulfillment of the requirement for the degree of
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I dedicate this dissertation to my parents for their endless encouragement and invaluable support and to my wife, Stefanie, for her patience and understanding throughout the process.

ABSTRACT

This dissertation consists of three essays. The first essay explores the underlying economic forces that drive the variation in risk premia around the world. It examines whether and how differences in the investors' information environment affect cross-country differences in the volatility of equity risk premia. We use the variance-decomposition approach and implied cost of capital method to estimate time variation in risk premia for 40 developed and developing countries worldwide. Consistent with theoretical predictions, countries with better information environments tend to experience a lower risk premium volatility, even after controlling for various country variables that are previously found to be good predictors of risk premia. Our further analysis of an exogenous event, specifically the 1997 Asian financial crisis, corroborates our finding that a country's information environment plays an important role in explaining the volatility of its market risk premium.

The second essay provides an extensive analysis of the trading strategies of 19,639 domestic mutual funds from 28 countries worldwide and of their 125,357 foreign counterparts that invest in their home markets for the period 1999 to 2005. Results show strong evidence that information environments matter for fund investment decisions. We show worldwide evidence that domestic mutual funds and especially foreign funds act as momentum traders when they buy stocks and as contrarians when they sell. A closer analysis indicates that foreign funds tend to actively pursue more momentum investing than domestic funds when buying stocks in firms and countries with low information environments, suggesting asymmetric information between the two groups of funds. Furthermore, the trading strategies of domestic funds have stronger predictive power for future returns than the strategies of foreign funds. The overall evidence clearly suggests that foreign funds are at an informational disadvantage.

In third essay, we study the world price of home bias. Theoretical arguments suggest that as the degree of a country's home bias (investors' portfolios are weighted heavily towards

domestic equity) increases, its cost of capital increases. Consistent with this prediction, we find international differences in the cost of capital to be strongly and positively related to varying degrees of home bias across our sample of 38 countries. This finding is robust to the level of controlled ownership, foreign investment costs, and alternative home-bias proxies, even after controlling for traditional risk proxies and country-specific variables. Using different proxies for the cost of capital, we find that a decrease in a country's home bias measure (defined as the log deviation of the domestic investors' portfolio weight in the domestic market from the country's market capitalization share in the float-adjusted world portfolio) can help to significantly reduce the aggregate cost of capital of the country.

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1 WHAT DRIVES THE VARIATION IN EQUITY RISK PREMIA AROUND THE WORLD?

1.1 Introduction

In his seminal work, Shiller (1981) argues that the variability of stock market prices is too large relative to the ex post variability of dividends. Based on Shiller's present value models, a change in stock return volatility is caused by a change in the volatility of either expected cash flows (i.e., cash flow news) or discount rates (i.e., expected return news) or both. Subsequent studies such as Campbell (1991) and Campbell and Ammer (1993) show that the variability of US stock market prices is driven largely by the volatility of equity risk premia.¹ Ammer and Mei (1996) also find similar evidence when examining both US and UK stock market portfolios. A natural question that arises is what economic forces drive these persistent changes in risk premia. Existing literature argues that changes in market risk premia are driven by time variation in stock market volatility,² or by the quality of the investors' information environment that contributes to information uncertainty. Given extant evidence that stock market volatility only explains a small fraction of the expected return variation,³ the goal of our study is to focus on the role of information in time-varying risk premia.

Motivated by existing theoretical and empirical evidence, our study examines whether the investors' information environment plays a role in the variation of market risk premia and whether varying investors' information environments explain differences in the volatility of risk premia for a wide range of countries. Theoretical research has long recognized the role of information in asset pricing. Models developed earlier by Grossman and Stiglitz (1980) and subsequently extended by studies such as Admati (1985), Easley and O'Hara (2004), and Hughes, Liu, and Liu (2006) assume that agents acquire different information sets about the underlying risky asset and show how such information asymmetries among investors affect the equity risk premium.

¹Throughout this study, our focus is on equity risk premia, and the expression "risk premia" strictly refers to equity risk premia, unless otherwise stated.

²See, for example, Merton (1980), Schwert (1989), among others.

³See the references in Guo and Whitelaw (2006).

Other models such as Barry and Brown (1985), Coles, Loewenstein, and Suay (1995), and Merton (1987) contend that uncertainty, arising from incomplete information, affects asset pricing. They show that effects of uncertainty and estimation risk influence the asset's equilibrium risk premia. On the other hand, research by Anderson, Ghysels, and Juergens (2007), Veronesi (1999, 2000), and Wang (1993, 1994) consider a dynamic asset pricing model to examine the role of information in asset pricing. With information asymmetry or market incompleteness, their models show that the conditional risk premia is not only intertemporally determined by the conditional market variance, but also affected by investors' estimation errors or degrees of uncertainty.

Empirical research has further shown that the quality and precision of information influence the equity risk premium. Botosan (1997) and Francis et al. (2004) provide evidence that firms with high level of voluntary disclosures and favorable accounting earnings attributes experience low cost of capital. Easley, Hvidkjaer, and O'Hara (2002) show that investors require a higher risk premium on stocks with a larger probability of information-based trading, implying that public information disclosures may help reduce information asymmetry and, in turn, lower the risk premium. Other studies such as Bhattacharya and Daouk (2002), Bhattacharya, Daouk, and Welker (2003), Daouk, Lee, and Ng (2006), and Hail and Leuz (2006) extend this evidence of information effects on asset pricing to the country level.

These theoretical and empirical studies prompt our current research to further show how information uncertainty, arising from the quality of the investors' information environment, explains the variation in risk premia.⁴ Specifically, Wang's (1994) dynamic model of competitive trading offers a theoretical link between information environments and changes in risk premia. His model implies that the volatility of risk premia is determined by the proportion of uninformed investors in an economy and the noisy public signals they receive. More importantly, it gives rise to our testable hypothesis that stronger investors' information environments facilitate more accurate public signals and hence investors would face a lower information uncertainty.

⁴Baker and Wurgler (2006) offer an extensive discussion of sentiment-driven mispricing.

We begin our analysis by determining whether and to what extent movements in stock market prices are attributable to changes in risk premia. We employ two vastly different approaches to estimate variation of the risk premium. The first approach is the variance decomposition of Campbell (1991), Ammer and Mei (1996), and Vuolteenaho (2002). Using a vector autoregressive (VAR) model to implement the variance decomposition, the first two studies show that changes in risk premia have a significantly large impact on unexpected equity returns. In the spirit of these studies, we use their methodology to extract changes in country risk premia and also to facilitate the comparison of our results with theirs. The second approach employs the implied cost of capital (ICOC), computed using earnings forecasts, to capture time variation in risk premia. In the accounting literature, numerous studies have shown that the ICOC serves as a good proxy for the expected stock return (see, for example, Botosan and Plumlee, 2005; and Lee, Ng, and Swaminathan, 2003). Recently, financial economic researchers such as Pastor, Sinha, and Swaminathan (2007) find that the ICOC has the ability to capture the intertemporal risk-return relationship.

The VAR and ICOC approaches yield consistent results. Using a sample of 40 developed and developing countries across the world for the period 1988 to 2005, we find evidence that variation in stock market prices is strongly driven by movements in equity risk premia. For instance, using the VAR approach, the variation of risk premia contributes to 67% of the variation of aggregate excess returns. Our results not only further reinforce earlier US studies suggesting that a large proportion of movements in stock market prices is attributable to variation in risk premia, but also suggest that this evidence is robust across developed and developing countries.

We next test whether and how cross-country variations in risk premia are related to international differences in investors' information environments. We employ a country's mandatory information environment and the degree of analyst uncertainty as proxies for quality of the investors' information environment. The mandatory information environment is measured by disclosure requirements, together with securities regulation and legal institutions mandating and enforcing these requirements. These measures determine how well information is disclosed

to market participants, the effectiveness of securities laws, and how disclosure requirements or securities regulation are efficiently executed through legal mechanisms around the world. On the other hand, analyst uncertainty is measured by analysts' earnings forecast dispersion and forecast errors. The lower the analyst uncertainty, the stronger is the investors' information environment. In countries with stronger investors' information environments, more precise information could be readily incorporated into investors' expectations, thereby reducing their estimation errors and uncertainty.

Consistent with theoretical predictions, countries with better investors' information environments tend to experience less volatile risk premia. This finding implies that lowering uncertainty and information asymmetries between a firm and its investors or between informed and uninformed investors helps reduce the risk premium volatility. Both the coefficients of disclosure requirements and legal system variables are mainly statistically and economically significant, even after controlling for various country and macroeconomic variables that are previously found to predict the level of the risk premium. For example, based on the estimates of our models, Argentina can reduce the (log) volatility of its equity risk premia by about 24.8% if its disclosure quality rating improves from 0.50 to 1.0.⁵ Overall, our findings are also robust to various alternative proxies for a country's information environment.

Our study contributes to several strands of literature. First, our research expands the empirical asset pricing literature in a number of ways. It shows that changes in risk premia contribute substantially to the volatility of unexpected stock market returns, and that the finding is pervasive across developed and developing markets. Further, we also show that the intertemporal risk-return tradeoff shown in Pastor, Sinha, and Swaminathan (2007) extends beyond their sample of G-7 countries. Consistent with Merton's (1973) intertemporal CAPM, we show that the relationship between equity risk premium and its conditional variance is positively significant for almost all of our sample of developed and developing countries worldwide.

Second, it adds to the growing literature on the relationship between securities regulation

⁵The disclosure requirements index is obtained from a recent study by La Porta et al. (2006).

and financial market development. La Porta et al. (1997) show that securities regulation and supporting legal institutions can improve the development of equity markets. More recently, La Porta et al. (2006) find that laws mandating and enforcing disclosure benefit stock market development in 49 countries around the world. La Porta et al. (1998) provide evidence that countries with better property rights and rules of law are associated with better financial market development. Our study extends this strand of literature by showing that countries with high quality information environments, as measured by the countries' disclosure requirements and securities regulation, tend to have lower variations in equity risk premia, compared with their counterparts with low quality information environments. This evidence is further reinforced by our analysis of a natural event – the 1997 Asian financial crisis. During this crisis, the Asian countries with poor information environments did experience larger movements in their market risk premia than those with quality information environments. Our result therefore offers important implications for regulatory authorities as well as for domestic and foreign investors.

Third, our focus on market-wide return variation further complements recent work on firm-specific return variation. The volatility of individual stock returns is attributable to both systematic and firm-specific return variations. Many existing studies have investigated the underlying drivers behind firm-specific return variation. For example, a high R^2 from the market model can be due to either poor investors protection and lack of transparency (Morck, Yeung, and Yu, 2002; Jin and Myers, 2006; among others) or noise and investors' behavioral biases (Teoh, Yang, and Zhang, 2006; and Hou, Peng, and Xiong, 2006). We, however, shed new light on the systematic variation of stock returns by determining the economic sources of this variation. Our findings suggest that improving a country's information environment would reduce the variation in market risk premia and hence a stock's R^2 . Lowering market-wide return variation, in turn, increases firm-specific return variation and individual stock price informativeness.

Finally, our work advances the finance and accounting literature that shows the usefulness of the ICOC as a proxy for the expected stock return. Hail and Leuz (2006) find that international differences in firms' cost of equity capital, as proxied by the ICOC, are strongly related to the

effectiveness of legal institutions and securities regulation across 40 countries. Pastor, Sinha, and Swaminathan (2007) show that the ICOC outperforms realized returns at detecting the international risk-return relationship in the G-7 countries. Lau, Ng, and Zhang (2007) show that countries' varying degrees of equity home bias are systematically related to cross-country differences in the ICOC. We provide further evidence that the implied risk premium (*IRP*) (defined as the ICOC in excess of a risk free rate) is able to capture variation in the equity risk premium, and that cross-country differences in the *IRP* volatility are significantly related to varying information environments for our sample of countries.

The remainder of this paper proceeds as follows. Section 1.2 presents the theoretical analysis between the information environment and risk premium. Section 1.3 describes our data sources and sample construction. Section 1.4 estimates time variation in equity risk premia using the VAR and implied cost of capital approaches. Section 1.5 examines whether the investors' information environment matters for the variation in risk premia. Section 1.6 performs a number of robustness tests, followed by conclusions in the final section.

1.2 Theoretical Discussion

We build our empirical analysis on Wang's (1994) dynamic model of competitive trading. In his model, investors are heterogeneous in terms of asymmetric information and heterogeneous investment opportunities, and they rationally trade for informational and non-informational motives. Under asymmetric information, investors have different private information and therefore respond differently to the same public information about future dividends. As information asymmetry increases, abnormal trading increases in the magnitude of changes of investors' return expectations. In this section, we discuss the empirical implication of Wang's dynamic model for the relation between information asymmetry and investors' changing expectations.

Wang's (1994) model assumes an economy with a single consumable or investable good and that there are two types of investors who differ in their information about the state of the economy and their private investment opportunities. Informed investors can invest in a

risk-free bond, risky stock, or private investment opportunity and they know the state of the stock's dividend process and the payoff rate of the private investment opportunity.⁶ Uninformed investors, on the other hand, can only invest in the bond and stock, and they infer the current dividend process and payoff rate of informed investors' private investment opportunity from past dividend payments, stock prices, and public signals. Both the proportion of uninformed investors and the precision of public signals determine the degree of information asymmetry between informed and uninformed investors.

Both informed and uninformed investors have the same utility function of the form,

$$E_t\left\{-\sum_{s=0}^{\infty}\rho^se^{-\gamma C_{t+s}}\right\}, \quad (1)$$

where E_t is the expectations operator conditional on the investors' information at time t , and C_{t+s} is the consumption at time $t+s$. Model (1) assumes that all investors have the same relative risk aversion parameter γ and time discount factor ρ .

There are two publicly tradable assets: a risk-free asset and a risky stock. Dividends associated with holding the risky stock are paid at time t , and the dividend D_t assumes the process,

$$D_t = F_t + \varepsilon_{D,t}, \quad (2)$$

where F_t is the persistent dividend component that follows an AR(1) process,

$$F_t = a_FF_{t-1} + \varepsilon_{F,t}. \quad (3)$$

In (2) and (3), $\varepsilon_{D,t}$ and $\varepsilon_{F,t}$ are *i.i.d* shocks to D_t and F_t , respectively. In addition to stock, there is the private investment opportunity that is available only to informed investors, and its excess rate of return q_{t+1} is given by

$$q_{t+1} = Z_t + \varepsilon_{q,t}, \quad (4)$$

where Z_t is its risk premium, which assumes an AR(1) process,

$$Z_t = a_ZZ_{t-1} + \varepsilon_{Z,t}. \quad (5)$$

⁶Here the private investment opportunity is introduced as a reason for non-informational trading by informed investors to balance their portfolios, so it can be interpreted as another hedging demand, except bonds.

At time t , informed investors have private information about the stock's future dividend F_t and the private investment opportunity's risk premium Z_t , but uninformed investors can only infer them from the stock's realized dividend D_s , price P_s , and public or noisy signals S_t , where S_t is given by

$$S_t = F_t + \varepsilon_{S,t}. \quad (6)$$

Wang (1994) shows that, under information asymmetry, the intertemporal equilibrium stock price at time t is given by

$$P_t = -p_0 + (a - p_F)\hat{F}_t + p_F F_t - p_Z Z_t, \quad (7)$$

where F_t and $\hat{F}_t$ are, respectively, the informed and uninformed investors' conditional expectations of future dividends. As $p_0, p_Z > 0$ and $(a - p_F) > 0$, the equilibrium stock price will increase if uninformed investors believe there is a high current level of persistent dividend component, or if informed investors know a good state of the true dividend payment or a low expected rate of return from the private investment opportunity. Wang further shows that the informed investors' expectation of the stock excess return μ_t can be expressed as

$$\mu_t = e_0 + e_Z Z_t - e_\Theta \Theta_t, \quad (8)$$

where e_0 denotes the unconditional risk premium,⁷ a fundamental risk reward associated with future cash flows, e_Z is the coefficient of Z_t , Θ_t is equal to $\hat{F}_t - F_t$, which denotes the uninformed investors' estimation error of the dividend process at time t , and e_Θ is the coefficient of Θ_t . Given that the risk premium of the private investment opportunity Z_t is uncorrelated with uninformed investors' estimation error Θ , the variance of the risk premium can be written as

$$Var(\mu_t) = e_Z^2 Var(Z_t) + e_\Theta^2 Var(\Theta_t). \quad (9)$$

Equation (9) shows that the variance of the risk premium is determined by both the variance of the expected return of private investment opportunity and of the estimation error. e_Θ^2 monotonically increases with the degree of information asymmetry associated with the proportion of

⁷Expression (8) can also be viewed from the perspective of an econometrician.

uninformed investors, while $Var(\Theta_t)$ reflects the quality of information governed by the precision of public signals. The variation of the risk premium would decrease when the public signals investors receive are less noisy, or when there is a smaller proportion of uninformed investors.⁸ Such similar implications can be drawn from other dynamic asset pricing model such as Wang (1993), Veronesi (1999, 2000), and Anderson, Ghysels, and Juergens (2007). These models, however, argue that when investors become more uncertain about the future growth rate of the economy, they expect to be compensated for this uncertainty.

These conditional dynamic models give rise to our testable hypothesis that in a market with better investors' information environment, we expect a lower degree of information asymmetry between investors and a firm, thereby reducing the risk premium volatility. Here we argue that better information environments help facilitate more precise public signals incorporated into investors' expectations, hence reducing the investors' estimation errors and uncertainty. In this environment, $Var(\Theta)$ and e_{Θ}^2 in Equation (9) should be small. Our following empirical design employs a country's mandatory information environment and degree of analyst uncertainty as measures of its investors' information environment.⁹

1.3 Data and Variable Construction

Our sample comes from the following key data sources: (i) national market total return indices together with price-earnings ratios and dividend yields from Datastream; (ii) analyst forecasts and share price information from I/B/E/S; (iii) firm-specific accounting information from the Worldscope; (iv) country-specific macroeconomic variables from World Development Indicators (WDI) and International Financial Statistics (IFS); and (v) US Treasury bill rates and US bond returns from CRSP. Because stock market information for most of the countries became available in 1988, our sample period is from January 1988 to December 2005.

⁸Under symmetric information, public signals are perfectly precise or all investors are informed. In this case, $Var(\Theta) = 0$ or $e_{\Theta}^2 = 0$, thus resulting in a constant risk premium under the assumption of no impact from the variation of private investment opportunities.

⁹See Frankel and Li (2004), Bushman, Piotroski, and Smith (2004), and Hail and Leuz (2006).

1.3.1 Proxies for the Investors' Information Environment

1.3.1.1 Mandatory Information Environment

We construct several measures of a country's mandatory information environment, with a particular focus on the quality of disclosures as well as the enforcement of disclosure rules, as a proxy for investors' information environment. Existing literature has suggested that a country's disclosure requirements, together with its legal system and securities regulation mandating and enforcing such disclosures, determine the level of information environment. Healy and Palepu (2001) argue that disclosure regulations are motivated by regulators' desire to reduce uncertainty and information asymmetries between the firm and its investors and between informed and uninformed investors. Healy, Hutton, and Palepu (1999), Heflin, Shaw, and Wild (2005), and Brown and Hillegeist (2007) show that information asymmetry is negatively related to disclosure quality. Further, Verrecchia (2001) argues that while disclosures reduce information asymmetries, disclosures must be credible or committed. Without commitment, firms may choose to disclose only self-serving information. His theoretical arguments therefore imply that, without commitment, disclosures do not necessarily help improve the quality of a country's information environment. Bushee and Leuz (2005) contend that effective securities regulations enforce firms' commitment to high quality disclosures, thereby leading to a reduction in information asymmetries.

Drawn from existing theoretical and empirical evidence, we employ a country's disclosure requirements in combination with its legal system and securities regulation, mandating and enforcing disclosures, as proxies for a country's information environment. A country's disclosure requirements provide a means for evaluating how well information is distributed to various groups of investors. Our study considers a country's regulatory system that mandates firms' information disclosure requirements. We employ the following four proxies for disclosure measures:

- (i) Disclosure requirements index, *DReq*, the average score of six sub-indexes: prospectus delivering, insider compensations, large shareholder ownership, insider ownership, contracts outside the normal course of business, and related parties' transactions. All these sub-

indexes are dummy variables, and for each sub-index, the value of one is assigned to the index if it signifies high quality disclosure and zero if otherwise.¹⁰

- (ii) Securities regulation variable, *SReg*, the average score of the disclosure requirements index, liability standard index and public enforcement index.¹¹ This combined index emphasizes the importance of disclosure rule enforcement. The liability standard index measures procedural difficulty in recovering losses from issuers, directors, distributors, and accountants in civil liability cases due to misleading statements in a prospectus. The public enforcement index measures how effective a main government or official authority can monitor its securities markets.
- (iii) Accounting standards index, *AcStd*, an index that examines and rates companies' 1990 annual reports on 90 items for 36 countries. The 90 items cover general information, income statements, balance sheets, fund flow statements, accounting standards, stock data, and other special items. The *AcStd* index for a country increases as its firms disclose more of these items in their annual reports. The maximum score for *AcStd* is 90, and for convenience, our analysis divides this index by 100.
- (iv) Anti-self-dealing index, *AntSel*, based on a collection of designed surveys answered by attorneys from Lex Mundi Law firms across 72 countries, based on 2003 legal rules. *AntSel* focuses on a country's disclosure quality, approval, and litigation governing self-dealing transactions. Djankov et al. (2006) show that *AntSel* is strongly correlated with disclosure requirements, with a correlation coefficient of about 67%.

The first three indexes are obtained from La Porta et al. (1998, 2006), and the fourth index is from Djankov et al. (2006).

As discussed above, a country's legal system is another determinant of its information environment. The differences in the effectiveness of disclosure regulation should be reflected by

¹⁰ A detailed description of these sub-indexes is contained in Table 1 of La Porta et al. (2006).

¹¹ The approach follows Hail and Leuz (2006).

legal rules and the quality of their enforcement. Following Hail and Leuz (2006), we include two indexes that capture legal institutions. The first index is the rule of law index, *Law*, from La Porta et al. (1998). To assess the law and order tradition of a country, this index is constructed by averaging the monthly International Country Risk index between 1982 and 1995. A score of 10 indicates a good tradition of legal rules. We construct an alternative similar enforcement index, *Enf*, as the average of the rule of law index and efficiency of the judicial system index from La Porta et al. (1998). The latter measures efficiency and integrity of the legal environment and is produced by Business International Corporation. To be consistent with securities and disclosure indexes, *Law* and *Enf* are also re-scaled to take rating values between 0 and 1. Countries with better information environments typically have effective legal systems, characterized by good traditions of legal rules and powerful supporting enforcement mechanisms. Both *Law* and *Enf* reflect the efficacy of a country's legal system and are strongly correlated, with Pearson's correlation coefficient of 0.94. Thus, throughout this study, our model specifications only include either variable but not both.

Panel A of Table 1.1 presents the distribution of mandatory information environment measures across our sample of 40 countries. The statistics show that developed countries score better on disclosure and legal system measures than do developing countries. For instance, Singapore and the United States have the highest *DReq* score of 1.00, whereas Austria and Brazil have the lowest score of 0.25. On the other hand, Austria has the lowest *SReg* of 0.18, compared with 0.97 for the United States. Developed countries generally have a higher standard of accounting practices than those of developing countries. For example, the *AcStd* index varies from 0.36 (Portugal) to 0.83 (Sweden). *AntSel* shows that Singapore has the highest anti-self-dealing index of 1.00, followed by Hong Kong (0.96), Malaysia (0.95), New Zealand (0.95), and the U.K. (0.95). For legal system ratings, we observe that developed markets generally have a maximum score of 1.00, whereas developing markets have lower scores of 0.21 for *Law* (Colombia) and of 0.32 for *Enf* (Indonesia).

1.3.1.2 Analyst Uncertainty

If investors become more uncertain about a firm's future earnings, then the conditional variance of their estimation error would increase, thereby inducing a rise in the variance of risk premia, as implied by Equation (9). One approach to measure the investors' information environment is to use analyst uncertainty, as in Barron, Kim, Lim, and Stevens (BKLS, 1998). As shown in BKLS, an analyst i 's uncertainty at t is defined as

$$Var_t(\Theta_t^i) = E_t(\hat{F}_t^i - F_t)^2 = \frac{1}{PubInf_t + PteInf_t^i}, \quad (10)$$

where Θ_t^i denotes analyst i 's estimation error at t , $\hat{F}_t^i$ denotes analyst i 's earnings forecasts, F_t reflects the true earnings, $PubInf_t$ is the precision of public information, and $PteInf_t^i$ is the precision of analyst i 's private information.

Assuming the precision of private information is equal across all analysts, the average analyst uncertainty is given by

$$Var_t(\Theta_t) = \frac{1}{PubInf_t + PteInf_t}. \quad (11)$$

The precision of public and private information in (11) can be calculated using analyst earnings forecasts and actual earnings in the I/B/E/S database, as follows.

$$PubInf_t = \frac{FError_t - \frac{1}{N_t}Disp_t}{(FError_t + (1 - \frac{1}{N_t})Disp_t)^2}, \quad (12)$$

and

$$PteInf_t = \frac{Disp_t}{(FError_t + (1 - \frac{1}{N_t})Disp_t)^2}, \quad (13)$$

where $FError_t$ is the absolute value of analyst forecast error (the difference between the mean of one-year forward earnings forecasts and actual earnings), $Disp_t$ is the standard deviation of analyst forecasts,¹² and N_t denotes the number of analysts following a firm.¹³

For each month, we estimate every sample firm's monthly analyst uncertainty, $Var_t(\Theta_t)$. To reduce extreme outliers, for each country, we take the median of its firms' analyst uncertainty

¹²Both $FError_t$ and $Disp_t$ are scaled by the mean of earning forecasts at t .

¹³In our robustness check, we also tried two-year forward or three-year forward earnings forecasts and the results were similar to those reported in the paper.

as a proxy for the country's level of investors' information environment, and then compute this measure for each year. Panel A of Table 1.1 provides the time-series average of analyst uncertainty and of the precision of public and private information. All the three investors' information environment measures show a wide cross-country variation. For example, Brazil has the highest analyst uncertainty ($Uncertainty = 0.746$) due to its lowest precision of public information ($PubInf = 0.562$). As expected, countries with stringent securities law also establish good investors' information environments. The United Kingdom has the lowest analyst uncertainty ($Uncertainty = 0.167$), owing to its highest precision of private information ($PteInf = 2.542$). The results show that the precisions of public and private information are positively correlated, with a correlation coefficient of 0.175, an indication that investors' information environments can be enhanced by simultaneously improving the quality of analysts' common and idiosyncratic information used to forecast earnings.

1.3.2 Control Variables

Our analysis controls for several variables that previous studies have shown to affect expected returns. The first is a country's economic development, measured by the gross domestic product (GDP) per-capita denominated in US dollars, $GDPC$.¹⁴ It is plausible that richer countries may enjoy other macroeconomic advantages that help stabilize the volatility of the risk premium. Another control variable is the standard deviation of annual GDP growth rates, σ_{GDP} , which serves as a proxy for macroeconomic volatility.¹⁵ With a large macroeconomic risk, investors may change their expectations of future returns frequently.

As our analysis is at the market level, we assume that the firm-level changes in risk premia may be diversified away in aggregate portfolios containing a large number of stocks. One may argue that the cross-country differences in risk premium volatility are due to the number of stocks in the market index or in the I/B/E/S database. Therefore, we include the number

¹⁴The log of per-capital GDP is highly correlated with the legal system variables. To avoid multicollinearity problems, we do not use the log transformation

¹⁵We also used the volatilities of inflation rates and exchange rates as alternative proxies of macroeconomic risk, and the results remained substantially similar to those reported here.

of listed firms, $NFirms$, or the number of firms with analysts' forecasts recorded in I/B/E/S, $NFIBES$, as control variables. Additionally, we employ the overall stock market turnover ratio, $Turn$, defined as the ratio of the total value of stocks traded to total stock market capitalization, as a control for the possible impact of liquidity on the discount-rate variation. Following Hail and Leuz (2006) and Lau, Ng, and Zhang (2007) and to facilitate comparisons with their findings, our analysis also employs the log of country-year median value of firm market capitalization at the end of each June, $MCap$, as a control for size effects.¹⁶ Firm and industry Herfindahl indexes, $Firm_HI$ and Ind_HI , measured as the sum of squares of firms' market shares and industries' market shares in a country, respectively, are included to control for the dominant effects of large firms or industries in a country. Lastly, our analysis also incorporates the volatile changes in risk premia during the 1997-1999 Asian financial crisis by introducing an East Asian dummy variable, $EAsia$.

Panel B of Table 1.1 shows significant cross-sectional variations in the control variables. Compared with developing economies, the developed countries experience more advanced economic development, as measured by their GDP per capita, $GDPC$, and exhibit lower macroeconomic variability in terms of the variability of GDP growth rates, σ_{GDP} . For example, the values of $GDPC$ for Japan, Switzerland, and the United States are US\$35,840, US\$32,855, and US\$31,698, respectively, with σ_{GDP} 's between 1.3% to 2.1%. On the other hand, the $GDPC$'s for China, India, and Indonesia are the lowest with corresponding values of US\$783, US\$408, and US\$773; their σ_{GDP} 's are between 2.2% and 5.0%. The stock market development variables also vary largely across the 40 countries, with turnover ratio ($Turn$) ranging from 8.0% in Colombia to 275.1% in Taiwan, and with number of listed firms ($NFirms$) varying from 71 in Ireland to 6,929 in the United States. Furthermore, developed countries tend to have larger median-firm market capitalization $MCap$ than do developing countries. In terms of $Firm_HI$ and Ind_HI , the United States offers the best diversification benefits with values of 0.007 and 0.047, while Peru offers the worst with $Firm_HI = 0.319$ and $Ind_HI = 0.347$.

¹⁶Voulteena (2002) shows that small firms have greater variation in expected returns news than large firms.

1.4 Estimating the Variation of Risk Premia

We employ two approaches to estimating the variation in risk premia. One approach is the VAR of Campbell (1991), Ammer and Mei (1996), and Vuolteenaho (2002), and the other is the ICOC method based on the average of four different implied cost of capital models following the approach in Hail and Leuz (2006). While the two methodologies are quite extensively employed in their respective finance and accounting literatures, neither of them is ideal. Estimates of the VAR approach is sensitive to the selection of forecasting variables and to the specification of its linear dynamics. It is also possible that the commonly employed forecasting variables might not capture all the information available to investors. Furthermore, Elton (1999) argues that realized returns are noisy estimates of expected returns, and Lundblad (2005) shows that using realized returns requires a very long sample to obtain stable expected return estimates. While the ICOC method circumvents the problems associated with the VAR approach, the former can only be applicable to firms that have earnings forecasts information, and hence its reliability depends on the quality of such information. Additionally, the accuracy of the ICOC method also depends on the firm's long-term growth rate beyond the analysts' forecast period. Nevertheless, any consistent results generated by these two different methodologies would suggest robustness of our findings.

1.4.1 The Variance-Decomposition Approach

Based on a variant of Campbell's (1991) model, Ammer and Mei (1996) show that an innovation in the domestic stock return can be decomposed into news about future dividends, interest rates, and excess stock returns:

$$\tilde{e}_{t+1} = (E_{t+1} - E_t) \left\{ \sum_{j=0}^{\infty} \rho^j \Delta d_{t+1+j} - \sum_{j=0}^{\infty} \rho^j r_{t+1+j} - \sum_{j=1}^{\infty} \rho^j e_{t+1+j} \right\}, \quad (14)$$

where the symbol $\tilde{\cdot}$ denotes an innovation in a variable, Δd_{t+1} denotes the log change in real dividends at $t+1$, r_{t+1} represents the log real interest rate at $t+1$, e_{t+1} denotes the log excess stock return at $t+1$, and $(E_{t+1} - E_t)$ represents a revision in expectations between t and $t+1$.

The constant discount rate ρ is set equal to a value less than one.¹⁷ The simplified version of the domestic unexpected excess return can be rewritten as

$$\tilde{e} = \tilde{e}_d - \tilde{e}_r - \tilde{e}_e, \quad (15)$$

where $\tilde{e}_d$ denotes news about future dividends, $\tilde{e}_r$ denotes news about future real interest rates, and $\tilde{e}_e$ denotes news about future expected excess returns. Equation (15) indicates that any adjustment in the stock price reflects the changes in expectations about both future cash flows and expected excess returns. For example, a drop in the current stock price can be attributable to bad news about a low future cash flow growth or an upward revision in expectations about future excess stock returns or future interest rates.

Our analysis considers the US stock market as the domestic market benchmark and the rest of the markets as foreign markets. Hence, in a slightly different way, the innovation in the foreign stock return can be expressed as:

$$\tilde{f}_{t+1} = (E_{t+1} - E_t) \left\{ \sum_{j=0}^{\infty} (\rho^*)^j \Delta d_{t+1+j}^* - \sum_{j=0}^{\infty} (\rho^*)^j r_{t+1+j} - \sum_{j=0}^{\infty} (\rho^*)^j \Delta q_{t+1+j} - \sum_{j=1}^{\infty} (\rho^*)^j f_{t+1+j} \right\}, \quad (16)$$

where the symbol $*$ denotes a foreign variable, Δq_{t+1} denotes the log change in real exchange rate of the US dollar during period $t + 1$, and f_{t+1} denotes the log foreign stock excess return during period $t + 1$. The unexpected foreign stock return can be simplified as

$$\tilde{f} = \tilde{f}_d - \tilde{f}_r - \tilde{f}_q - \tilde{f}_f, \quad (17)$$

where $\tilde{f}_d$ denotes news about future foreign dividends, $\tilde{f}_r$ denotes news about future real foreign interest rates, $\tilde{f}_q$ denotes news about future real exchange rates of the US dollar, and $\tilde{f}_f$ denotes news about future foreign expected excess returns. All things being equal, news about the dollar expected to depreciate in the future will increase expected dollar returns on foreign stocks and hence generate a capital gain today.

We estimate the components of excess domestic and foreign stock returns in Equations (15) and (17) by using a VAR approach. Assume that z_t represents a vector of state variables at

¹⁷We tried a range of ρ values from 0.9950 to 0.9980, and our results remain substantially unchanged.

time t and that it follows a first-order VAR process,

$$z_{t+1} = Az_t + w_{t+1}, \quad (18)$$

where A denotes the coefficient matrix of the VAR system and w_{t+1} denotes the vector of forecasting errors at time $t + 1$. Given the VAR structure, the revision in expectations of z_{t+j} at time $t + 1$ is given by

$$(E_{t+1} - E_t)z_{t+j} = A^{j-1}w_{t+1}. \quad (19)$$

To extract the risk premium news from Equation (19), we multiply the state vector z by a column vector ι_1 , whose first element is one and whose other elements are zero, yielding

$$\tilde{e}_{e,t+1} = \iota_1' \rho A (I - \rho A)^{-1} w_{t+1}, \quad (20)$$

$$\tilde{f}_{f,t+1} = \iota_1' \rho^* A (I - \rho^* A)^{-1} w_{t+1}. \quad (21)$$

We use the same approach to extract the remaining components of domestic and foreign excess stock returns in (15) and (17).¹⁸

Drawn from the existing literature, the state variables employed in estimating the VAR system of Equations (20)-(21) are: world excess stock returns; domestic (foreign) excess stock returns measured in US dollars relative to the one-month US Treasury bill rate; world price-to-earnings ratios; domestic (foreign) price-to-earnings ratios defined as the current aggregate stock price index divided by the anticipated aggregate earnings over the following 12 months; the real interest rate, defined as the one-month US Treasury bill rate deflated by the US consumer price index; the relative bill rate is the real interest rate detrended by its one-year backward moving average; the default spread is the difference between US Baa and Aaa bond yields; the term spread is the difference between a 30-year US Treasury bond yield and the one-month US Treasury bill rate; the excess bond return is a 30-year US Treasury bond return relative to the one-month US Treasury bill rate; and lastly, the real exchange rate of the US dollar is the value of one US dollar with respect to the local currency deflated by the US and local

¹⁸See Ammer and Mei (1996) for a detailed description of the approach.

consumer price indexes. The price-to-earnings ratio and relative bill rate are found to be good stock-returns predictors. The default spread, term spread, and excess bond return capture alternative investment opportunities and also forecast future stock returns. The inclusion of world variables assumes that local stock markets are integrated with the world stock market. In an integrated global market, shocks to the world stock returns will also affect local stock returns.¹⁹ All variables are measured in logs.

Table 1.2 provides results of the variance decomposition for country excess stock returns over the entire sample period January 1988 to December 2005 for 28 countries and for varying shorter sample periods for the remaining countries, whose stock returns became available only after 1988. Specifically, it shows the proportion of the variance of each VAR component of excess stock returns to total excess stock return variance. For each country, the 10 components of total excess stock return variance must sum to one. For example, in the United States, the variance of the equity risk premium contributes to 38.2% of the total excess stock return variance, and in the U.K., it is about 67.3%. These findings are comparable with those reported by Ammer and Mei (1996); they show that the proportion of the risk premium variance to total stock return variance is 42.2% for the U.S. and 72.9% for the U.K. for the sample period 1979 to 1989. As seen in Table 1.2, the variance of risk premium and that of expected future cash flows are the two largest components of excess stock return variance. The former is greater than the latter in 22 countries; their ratios vary from 13.4% (France) to 508% (Colombia), with mean and median of about 98% and 67%, respectively.

1.4.2 The Implied Cost of Capital Method

We employ the average of four different ICOC estimates as the proxy of expected returns. The four approaches include (i) Gebhardt, Lee, and Swaminathan's (2001, GLS) residual income valuation model; (ii) Claus and Thomas's (2001, CT) residual income valuation model; (iii) Ohlson and Juettner-Nauroth's (2005, OJ) abnormal earnings growth valuation model; and finally (iv)

¹⁹See Bekaert and Harvey (1995, 1997).

Easton's (2004) MPEG ratio (Price-to-Earnings ratios divided by Growth rate) model. The spirit of these models is to compute the ICOC as the internal rate of return that equates the current stock price to the present value of expected future sequence of abnormal earnings. Our estimation of these models strictly follows Hail and Leuz (2006)'s method and data requirements. We provide the specifications of the four ICOC models in Appendix A.

To back out the implied cost of capitals, we download all information on firms' earnings forecasts, stock prices, and numbers of shares outstanding for all countries from the I/B/E/S database and their accounting information from the Worldscope. All items are denominated in local currency. For the period January 1988 to December 2005, the firms with available earnings forecast and accounting information are from 49 different countries worldwide. This sample contains nine additional countries compared with the preceding sample of 40 countries that have return information from Datastream. We test our hypothesis using this larger sample as well as our smaller sample of 40 countries. Given that the results are qualitatively similar, we report those using the larger sample of countries to show the robustness of our findings.

For each firm-month calculation, we require the data satisfying the constraints that earnings forecasts are nonnegative. Note that I/B/E/S updates monthly one- and two-year-ahead earnings forecasts in the middle of each month. we use an iterative algorithm to back out the value of each ICOC from the model, and the ICOC is constrained to be positive or missing otherwise. The iterative procedure stops when the imputed price is within a 0.001 difference of its actual price. We use the equal-weighted average of the firms' implied cost of capital in excess of a risk free rate as a measure of the market *IRP*.

Table 1.3 presents summary statistics of average *IRPs* and of excess returns of MSCI country stock indexes across 49 countries. The United States has the largest average number of firms recorded in I/B/E/S (i.e., $N = 3296$), while Colombia, Egypt, and Venezuela have the smallest (i.e., $N = 12$). μ_{IRP} and μ_{MKT} are equally-weighted averages of firms' *IRPs* and excess returns of the country's stock index over the entire sample period. Turkey has the largest μ_{IRP} of

25.20%, compared with only 0.75% for Japan. For most countries, the magnitudes for both μ_{IRP} and μ_{MKT} are almost of the same order. For example, Finland has a μ_{IRP} of 7.96% and μ_{MKT} of 7.30%, and the United Kingdom's corresponding values are 5.86% and 5.13%.

The table shows that the volatility of IRP , σ_{IRP} , is small relative to the volatility of excess stock market returns, σ_{MKT} . From Equation (14) above, news of future expected returns is the sum of discounted future expected return differences, implying that the latter can cause large fluctuations in stock market prices. We demonstrate this implication by using simulation results from a Monte Carlo method. Based on the Gordon model with constant dividend growth rate and time-varying expected excess returns,²⁰ we generate 5,000 observations of each country's realized excess returns with the volatility of risk premia equals to σ_{IRP} . Then we compute the proportion of the variance of simulated time series of excess returns to the variance of excess market returns, *Ratio*, which is reported in the last column of Table 1.3. Interestingly, our simulation approach yields results broadly consistent with those of Table 1.2. The mean (median) value of the *Ratio* is 1.19 (0.45), compared with its counterpart mean (median) of 0.98 (0.67) in Table 1.2.

In general, results from both VAR and ICOC approaches suggest that the risk premium variance component contributes substantially to the variability of stock market prices.

1.4.3 Computing the Risk-Premium Volatility

In the section, we show that both the variance of the VAR-based risk premium and of the IRP produce consistent estimates of the variance of the risk premium. From Equation (14), a change in the expectation of future excess returns is given by

$$\tilde{e}_e = (E_{t+1} - E_t) \left\{ \sum_{j=1}^{\infty} \rho^j e_{t+1+j} \right\}. \quad (22)$$

Assuming the conditional expectation at t is the same for the future excess return (e_{t+1+j}) in each period t , then $E_t\{e_{t+2}\} = E_t\{e_{t+3}\} = \dots = E_t\{e_{t+1+j}\} = \dots$. Given that this is also the

²⁰We use a country's average annual inflation rate as a proxy for dividend growth rate.

basic assumption of IRP in the implied cost of capital model, the implied market risk premium can be expressed as $IRP_t = E_t\{e_{t+2}\} = E_t\{e_{t+3}\} = \dots = E_t\{e_{t+1+j}\} = \dots$. Substituting this expression into (22) yields

$$\tilde{e}_e = \frac{\rho}{1-\rho}(IRP_{t+1} - IRP_t). \quad (23)$$

Equation (23) provides a direct link between the change in the expectation of future excess returns extracted from the VAR approach and the change in the risk premium, as proxied by the IRP .

Further, assuming that the risk premium follows a stationary AR(1) process,

$$\mu_{t+1} = a + b\mu_t + v_{t+1}, \quad (24)$$

where $\mu_t = E_t\{e_{t+1}\}$ and $0 < b < 1$. The derivation in Pastor, Sinha, and Swaminathan (2007) implies that

$$IRP_t = \frac{a}{1-b} + (\mu_t - \frac{a}{1-b})\frac{1-\rho}{1-b\rho}. \quad (25)$$

Substituting Equation (25) into Equation (23) yields

$$\tilde{e}_e = \frac{\rho}{1-b\rho}(\mu_{t+1} - \mu_t). \quad (26)$$

By taking the unconditional variance of the change in expectations about future expected excess returns, the variance of the VAR-based risk premium is given by

$$Var(\tilde{e}_e) = \frac{\rho^2}{(1-b\rho)^2}Var(\mu_{t+1} - \mu_t) \quad (27)$$

$$= \frac{\rho^2}{(1-b\rho)^2}(Var(\mu_{t+1}) + Var(\mu_t) - 2Cov(\mu_{t+1}, \mu_t)). \quad (28)$$

Substituting Equation (24) into the above expression (28), we have

$$Var(\tilde{e}_e) = \frac{2(1-b)\rho^2}{(1-b\rho)^2}Var(\mu_t). \quad (29)$$

Equation (29) therefore gives a direct relationship between the variance of the VAR-based risk premium and that of the risk premium. In our cross-country regressions, ignoring international

differences in b and ρ , the variance of the VAR-based risk premium provides an unbiased proxy for the variance of the risk premium.

For the variance of the IRP , we obtain the result based on Equation (25),

$$Var(IRP_t) = \frac{(1 - \rho)^2}{(1 - b\rho)^2} Var(\mu_t). \quad (30)$$

Similarly, Equation (30) shows that the variance of the IRP yields a consistent estimate of the variance of the risk premium. Therefore, in our subsequent cross-country tests, we predict that the two measures should generate consistent results. We now turn to computing the volatility of risk premia estimated in the preceding subsections.

We employ four different approaches to calculate the standard deviation of the risk premium.

(i) For each year, we compute the standard deviation of the risk premium by using the 12 monthly risk premia estimated during the year. This approach assumes no structural change in the risk premium, nor any permanent movements of the price (quantity) of risk during the entire sample period. (ii) We compute the risk premium volatility over the past 12 months and move the window forward by a month for each computation. The time-series average of this rolling-window standard deviation helps smooth out any big structural shifts. (iii) We compute the standard deviation using the detrended series of risk premia over the entire sample period. We detrend the series by subtracting each observation of the risk premium from its twelve-month moving average. (iv) Finally, we calculate the standard deviation of the monthly residuals extracted from the intertemporal risk-return model.²¹

All these four volatility measures yield substantially similar results. To conserve space,²² for subsequent analyses, we only report results based on the risk premium volatility calculated in (i) above.

²¹In this model, we regress the stock market risk premium on its conditional variance, and the resulting residuals are used for computing the volatility of risk premia.

²²An earlier version of this study reports results of all approaches and is available upon request.

1.5 Investors' Information Environment and Variation in Risk Premia

This section tests whether and how a country's investors' information environment, as measured by its mandatory information environment and also degree of analyst uncertainty, drives the risk premium volatility. Throughout this study, we employ both the VAR-based risk premium volatility, σ_{VAR} , and the *IRP* volatility, σ_{IRP} , as proxies for the volatility of risk premia for a wide spectrum of developed and developing countries. The section further tests whether the finding still holds up in exogenous events. As an example, we look at the 1997 Asian financial crisis, a natural event that offers us an excellent opportunity to study how changes in investors' expectations arising from the crisis affect countries with different information environments.

1.5.1 Mandatory Information Environment and Analyst Uncertainty

Table 1.4 reports cross-sectional regression results of the impact of a country's information environment on the risk premium volatility with various controls for country-level economic and stock market characteristics. All t -statistics are based on Newey-West heteroskedasticity and autocorrelation corrected standard errors. The dependent variable is the risk premium volatility. Panel A presents results using σ_{VAR} as the dependent variable, and Panel B shows its σ_{IRP} counterparts.

The table reveals several interesting results. First, consistent with the theoretical prediction, our measures of the mandatory information environment are strongly related to the risk premium volatility. Both the coefficients of disclosure requirements and legal system variables, *DReq* and *SReg*, are negative and economically significant. Based on the estimated *DReq* coefficient of -0.495 (Model (1) of Panel A), it implies that increasing the level of disclosure requirements from 0.25 (i.e. Brazil) to 1 (i.e. the U.S.) can reduce σ_{VAR} by about 37.1 percent. On the other hand, the coefficients of *AcStd* and *AntSel* are significantly negative and significant only when σ_{IRP} is the dependent variable. For example, Models (3) and (4) of Panel B show that the coefficients of *AcStd* and *AntSel* are -1.526 ($t=-3.87$) and -0.655 ($t=-4.67$), respectively.

Law and *Enf* that measure the legal enforcement of disclosure regulation also exhibit a significant impact on the volatility of risk premia. From Panel A, the coefficient of *Law* is between -0.605 ($t=-3.26$) and -1.028 ($t=-7.37$), and that of *Enf* is between -1.067 ($t=-4.06$) and -1.334 ($t=-4.95$). It is evident that the enforcement of disclosure regulation is also important to help reduce either proxies of the risk premium volatility. Therefore, countries with good tradition of law and efficient judicial systems would enjoy relatively less volatile risk premia. The adjusted R^2 values suggest that these information environment measures, combined with control variables, on average, explain about 65.8% and 50.9% of the cross-country variation in σ_{VAR} and σ_{IRP} , respectively.

Second, when analyst uncertainty, *Uncertainty*, is employed as another measure of the investors' information environment in Model (12) of both panels, the coefficient of *Uncertainty*, is positive and statistically significant at the 5% level. The estimate of *Uncertainty* coefficient is 0.349 (t -statistic = 3.12) in Panel A and 0.535 (t -statistic = 3.21) in Panel B. A larger degree of *Uncertainty* suggests less precision in the information available to investors and thus increases the investors' estimation error, resulting in a greater risk premium volatility. When *Uncertainty* is considered jointly with *DReq* and *Law*, the coefficients of three information measures remain statistically significant at the 5% level. This finding suggests that the effect of analyst uncertainty on the risk premium volatility is not subsumed by the effects of disclosure requirement and law.

Last, but not least, only a few of the control variables exhibit significant impacts on the volatility of risk premia, and they do not necessarily produce the same impact on the two risk premium volatility measures. Notably, the coefficient of σ_{GDP} is consistently positive and statistically significant, suggesting that investors' expectations of future excess returns are also affected by macroeconomic conditions. Uncertainty in the future economic growth rate would likely cause a rise in the risk premium volatility. The economic development of a country, as measured by per capita *GDP*, has significant, while inconsistent, effects on the risk premium volatility. It is puzzling that the coefficient of *GDPC* has a negative impact on σ_{VAR} , whereas

a positive impact on σ_{IRP} . The firm Herfindahl index, $Firm_HI$, has a consistently positive effect on the risk premium volatility, but its coefficient is only mainly statistically significant in explaining σ_{IRP} . The remaining control variables, such as aggregate turnover ratio, the number of listed firms, and the country firm-median market capitalization, are generally statistically insignificant at conventional levels.

We incorporate the East Asian dummy variable ($EAsia$) in Model (10) to control for the possible impact of the 1997 Asian financial crisis on the risk premium volatility. The results show that the coefficient of the $EAsia$ dummy is positive and statistically significant, implying that East Asian countries did experience large swings in their risk premium volatilities during the financial crisis. A more detailed analysis of this particular event is shown below.

We also add the standard deviation of cash-flow news extracted from the VAR approach, σ_{CF} , to Model (11) of Panel A. Prior studies have shown that cash-flow news is correlated with expected-return news, and it can be argued that the expected-return volatility may be associated with cash-flow volatility. While the effects of $DReq$ and Law on σ_{VAR} are partly subsumed by the effect of σ_{CF} , the coefficients on $DReq$ and Law still remain statistically significant at the 5% level. This result therefore suggests a strong economic role of information in the volatility of the risk premium and not of cash-flow news.

Furthermore, we replicate the analysis of Table 1.4 using the Fama-Macbeth approach, and for brevity, we report only estimates of the key variables of the models in Table 1.5. It is evident that countries with better disclosures, supported by effective legal systems and stringent securities laws, are associated with significantly lower risk premium volatility. The estimate of *Uncertainty* coefficient is positive and also mainly statistically significant. Table 1.5 not only reinforces the findings of Table 1.4, but also shows generally more pronounced results in terms of the magnitude of the coefficients and level of statistical significance.

Overall, we show that the investors' information environment of a country plays a crucial role in explaining the cross-country variation in the risk premium volatility. Countries with

lower degrees of analyst uncertainty and with stringent disclosures and supporting enforcement mechanisms tend to experience less volatile market risk premia.

1.5.2 Evidence from the Asian Financial Crisis

This section further substantiates the above cross-country evidence that the volatility of the risk premium is strongly associated with the investors' information environment by examining its robustness in a natural event – the 1997 Asian financial crisis.

The Asian financial crisis started in Thailand in July 1997, causing crashes in foreign exchange and stock markets of most East Asian countries and ending with rippled effects on other emerging markets such as Brazil in the mid 1999. Previous studies have shown substantial evidence that corporate governance mechanisms explain the extent of the financial crisis. For example, Johnson et al. (2000) provide country-specific evidence that countries with poor protection of minority shareholder rights experience serious exchange rate depreciations and stock market declines during the crisis. Mitton (2002) finds that stocks of firms with higher standard of disclosures, greater outside ownership concentration, or more focused organization perform better during the crisis.

We therefore repeat our above analysis by focusing only on the period in which the 1997 financial crisis occurred. To facilitate the comparison of our results with those of Johnson et al. (2000), we focus on their sample of countries, except Russia,²³ and also employ a similar dependent variable, measured by the change in the implied risk premium, IRP_{Δ} , from December 1996 to the highest value of 1998. Table 1.6 shows, by country, how the IRP changes during the crisis and also reports summary statistics of two additional macroeconomic control variables employed (i.e., a country's government budget balance and central bank's total reserves).²⁴ Columns (2) and (3) show the IRP as of December 1996 and the highest IRP during 1998, with their difference shown in Column (4). Among the five Southeast Asian countries in our sample,

²³We exclude Russia because it does not have any analysts forecast information prior to 1997.

²⁴The two macroeconomic variables are obtained from Johnson et al.

Indonesia experiences the largest increase in *IRP* with a magnitude of 21.89%, while Singapore has the lowest increase of 7.67%. During the crisis, 22 of the 24 countries experience an increase in the *IRP*. Column (5) shows the government budget balance, measured by the country's central government's budget deficit as a percent of its *GDP* in 1996 (*GBudget*), and Column (6) reports the country's central bank's total reserves in billions of US dollars as of the end of 1996 (*Reserves*). *GBudget* varies from 7% (Singapore) to -8.7% (Taiwan), while the *Reserves* level ranges from US\$107 billion (China) to US\$0.9 billion (South Africa). To distinguish East Asian countries from other emerging markets, we define a dummy variable *EAsiaDummy* to equal 1 for China, Hong Kong, Indonesia, Korea, Malaysia, Philippines, Singapore, Thailand, and Taiwan and zero otherwise.

Table 1.7 highlights only estimates of the key variables together with *GBudget* and *Reserves*; estimates of the other control variables are not reported. Results of Table 1.7 confirm our earlier finding that countries with stronger investors' information environments would be less susceptible to large changes in risk premia. First, we show whether the two additional macroeconomic variables, *GBudget* and *Reserves*, affect IRP_{Δ} . Estimates of Models (1) and (2) suggest that either a country's total reserves or budget deficit can not help reduce its IRP_{Δ} . Models (3)-(8) only select *Reserves* as control. While *Law* has no significant effect on these countries, *DReq* and *SReg* still yield statistically significant impacts on the change in the risk premium. In Model (3), we find that increasing a unit of a country's disclosure index *DReq* can reduce the change of the risk premium by 19.8% (t -statistic = -2.99). This reduction is much more pronounced for countries with even stronger securities law *SReg*; its coefficient of -0.283 (t -statistic = -2.74) in Model (4) is larger and statistically more significant.

In summary, our analysis of the 1997 Asian financial crisis lends further support to our earlier evidence – countries with low quality disclosures and weaker enforcement of securities regulation would suffer a more severe increase of risk premia during the crisis.

1.6 Robustness Tests

1.6.1 Alternative Proxies for the Information Environment

Thus far, our measures of the information environment mainly stem from mandatory disclosures enforced by securities regulation and legal institutions. However, firms may have motivations to complement a weak information system through voluntary corporate disclosures. Voluntary and mandatory disclosures can vary across countries. To further evaluate a country's information environment, we employ alternative transparency measures employed in Bhattacharya, Daouk, and Welker (2003), Bushman et al. (2004), Gelos and Wei (2005), and Jin and Myers (2006).

The first alternative information environment variable is the financial disclosure index, *DScore*, employed in Gelos and Wei (2005). This index is based on survey results about the level and availability of financial disclosure in the annual Global Competitiveness Report issued by the World Economic Forum. In this survey, over 3,000 executives around 53 countries are required to answer two questions: "the level of financial disclosure required is extensive and detailed" and "availability of information". *DScore* is the average of disclosure scores for 1999 and 2000 divided by 10 such that the score falls with the range of 0 to 1.

Second, we use two distinct variables that Bushman et al. (2004) generate using a factor analysis; they are the financial transparency factor, *FTrans*, and governance transparency factor, *GTrans*. *FTrans* gauges the intensity and timeliness of financial disclosures by firms and coverage by analysts and media, while *GTrans* measures the intensity of governance disclosure on shareholdings and remuneration of firms' insiders and major shareholders. The third proxy is the composite opacity index, *Opacity*, from Gelos and Wei (2005). *Opacity* is based on PricewaterhouseCoopers' survey result of CFOs, bankers, equity analysts, and their in-country staff across 35 countries in year 2000. The survey reflects a country's opacity from corruption in government, legal system, macroeconomics policies, accounting standards, and regulatory regime. We divide the opacity index by 100 to scale it to a value of 0–1.

Finally, we use a variable constructed in a similar manner as that of Bhattacharya, Daouk,

and Welker (2003). We rank each country into deciles on the basis of its earnings aggressiveness, loss avoidance, and earnings smoothing and then calculate the earnings transparency index, *ETrans*, as the average ranking of the three earnings measures. We rescale this index to a range of values between 0 and 1. Larger *ETrans*, *DScore*, *FTrans*, and *GTrans* but lower *Opacity* suggest that a country has a better quality information environment.

Panels A and B of Table 1.8 present panel regression results of σ_{VAR} and σ_{IRP} , respectively, on alternative measures of the information environment. Overall, the findings corroborate our earlier results. *DScore*, *FTrans*, *GTrans*, and *ETrans* exhibit negative and statistically significant effects, while *Opacity* display a positively significant effect, on the risk premium volatility. Even though the sample size is dramatically reduced in Model (3), the positive and significant coefficient of *Opacity* strengthens our evidence that a country with a good information environment enjoys a low variation in market risk premia. Furthermore, a country with less earnings management has a smaller risk premia volatility.

1.6.2 Conditional Market Variance and Hedging Demands

Both the VAR and ICOC methods show a cross-sectional relationship between proxies for the quality of a country's information environment and the volatility of its market risk premium. However, it can be argued that this relationship perhaps captures the intertemporal tradeoff between risk and return found in existing studies. To rule out this possibility, we adjust the risk premia by the conditional variance of stock excess returns and hedging demands.

We therefore regress the monthly $\tilde{e}_{e,t+1}$ from Equation (20) on the monthly change in the conditional stock market variance, as given by Equation (31) below. Similarly, we regress the monthly IRP_{t+1} on the conditional stock market variance, as given by Equation (32) below; the approach follows a similar regression model of Pastor, Sinha, and Swaminathan (2007). The two

models are as follows.

$$\tilde{e}_{e,t+1} = a_1 + b_1 \Delta \sigma_t^2 + e_{1,t+1}, \quad (31)$$

$$IRP_{t+1} = a_2 + b_2 \sigma_t^2 + e_{2,t+1}, \quad (32)$$

where σ_t^2 denotes the conditional stock market variance between time t and $t + 1$, and $\Delta \sigma_t^2 = \sigma_t^2 - \sigma_{t-1}^2$. σ_t^2 is measured with the annualized monthly variance of MSCI daily returns between month t and $t + 1$, and $\Delta \sigma_t^2$ is the monthly difference of annualized variances.

Previous studies, such as Scruggs (1998), Guo and Whitelaw (2006), and Pastor, Sinha, and Swaminathan (2007), show that fluctuations of alternative investment opportunities also affect the required rate of return. To consider this possibility, we extend the above models to account for four hedging demand variables as follows.

$$\tilde{e}_{e,t+1} = a_1 + b_1 \Delta \sigma_t^2 + C'_1 \Delta H_t + e_{1,t+1}, \quad (33)$$

$$IRP_{t+1} = a_2 + b_2 \sigma_t^2 + C'_2 H_t + e_{2,t+1}, \quad (34)$$

where H_t is the vector of hedging demand variables, including one-month US Treasury bill rate, 30-year US Treasury bond excess return, 30-year US Treasury bond yield minus one-month US Treasury bill yield, and US Baa bond yield minus US Aaa bond yield, and $\Delta H_t = H_t - H_{t-1}$. All the hedging demand variables are US variables, based on the assumption of an international integrated market of hedging demands.

Results of regression models (31)-(34) are presented in Panels A and B of the appendix B,²⁵ and more importantly, they show that our empirical design, using both the VAR and ICOC approaches, is successful in capturing time variation in risk premia. We therefore construct a risk-adjusted measure, σ_{AD} , as the log standard deviation of monthly residuals extracted from

²⁵ A few interesting observations emerge from the appendix that are worth mentioning. In Panel A, the risk-return tradeoff is positive for 35 of the 40 countries and is statistically significant for 17 countries. Their counterpart results of model (32) shown in Panel B are consistent with those of Panel A and also confirm the findings of Pastor, Sinha, and Swaminathan (2007). The coefficient of σ_t^2 is positive for 43 of the 49 countries and is statistically significant for 34 countries. The average coefficient of σ_t^2 is 0.124, which is of the same order as that of Panel A. A strikingly stronger result is evident in regression results of models (32) and (34). The average adjusted R^2 increases from 6.8% to 48.8%.

each of the regression models (31)-(34). We replicate the regression results of Table 1.4 using the risk premium volatility, adjusted for conditional variance and hedging demands. Panel A of Table 1.9 shows the results using σ_{VAR} adjusted, separately, for the conditional market variance and for both the conditional market variance and hedging demands. Panel B reports its σ_{IRP} counterparts. The overall results show robustness of our earlier findings. The bottom line is that even after adjusting for the conditional stock market variance and hedging demands, we still find a significantly negative cross-sectional relationship between measures of a country's investors' information environment and the volatility of market risk premia.

1.6.3 Market Segmentation

So far, we discuss the variation of risk premia separately from the perspective of each country. In this subsection, we analyze whether measures of the variation of risk premia can be affected by time variation in the degree of capital market integration. We follow Bekeart, Harvey, Lundblad, and Siegel (2008)'s approach to measure a country's monthly time-varying segmentation using firm-level earnings yield.

The segmentation issue is explored in the following ways. First, we include this segmentation variable into the state variable set to enhance the predicting ability of expected returns in VAR approach. Second, we regress expected return news on monthly changes in a country's segmentation or *IRP* directly on the degree of segmentation, and use the residuals to compute the volatility of risk premia. Last, we control the segmentation variable in the panel regressions. In a sum, as the results are unchanged with the inclusion of segmentation variables, we do not report the tests with the paper.

1.6.4 Various Specifications in VAR and *IRP* Approach

While the VAR and *IRP* methodologies are quite extensively employed in their respective finance and accounting literatures, neither of them is ideal. Model sensitivity can significantly affect the results of the two approaches, therefore we present all kinds of model specifications. Chen

and Zhao (2008) show that the VAR approach is sensitive to the choice of state variables. This approach directly estimates expected returns news through predictive regressions. Since our ability to predict future returns is very small, any state variables misrepresented from the return predictive regressions will affect our estimation of expected return news. Therefore, we show various combinations of state variables to see how much it suffer from this sensitivity.

In Panel A of Table 1.10, we report the proportion of the variance of expected return news to total excess stock return variance, with 10 different combinations of 11 state variables. Even though the component of the variance of expected return news are stable for most specifications, there are still dramatic changes for a few specifications. For example, the average of the proportion of the variance of expected returns news is 1.153 for Argentina, while it has extreme low values in Specification 2 (S2), S4, and S7 (0.309, 0.366, and 0.307), which reflects the expected returns are not well predicted in the above specifications. In Panel B, we repeat our panel regressions of σ_{VAR} , estimated from specifications in Panel A, on mandatory information environment variables. *Law* is statistically significant in all the models at 5% level, while *DReq* is insignificant in S2, S4, S6, and S7.

While the current measure of *IRP* using the average of four ICOC estimates can wash out noises in model sensitivity and errors in analyst forecasts, ICOC approaches are also sensitive to their underlying assumption about long-term growth in residual income or abnormal earnings beyond the explicit forecast horizon (see Easton et al. (2002)). For example, the MPEG model implicitly assumes that the short-term growth forecast also captures the long-term growth. Arguably, such an assumption might be overly simplistic and bias our ICOC estimates. The extent of cross-country growth differential impacts on cost of capital estimates may be further driven by international differences in the accounting system. Therefore, cross-country difference in the variation of *IRP* may be driven by cross-country difference in the variation of long-term growth forecast.

To address the above issue, we first present our main analysis using the four different ICOCs

individually in Models (1)-(4) of Table 1.11, then adopt Easton (2004) and Easton et al. (2002) to estimate implied cost of capitals simultaneously with long-term growth in Models (5) and (6), and last calculate the four different ICOCs with value-weighted method in Models (7)-(10). The overall results show robustness of our findings using *IRP* approach.

1.7 Conclusions

Campbell (1991) finds that the variability of expected stock returns contributes substantially to the variability of stock market returns. Based on Campbell's VAR approach and also the implied cost of capital model, we provide reinforcing evidence the Campbell's evidence prevails across 40 developed and developing countries. For example, based on our VAR results, the variance of the risk premium accounts for about 38.2% of the excess market return variance in the United States and about 119% of that in Mexico.

Theory suggests that investors' estimation errors or degrees of uncertainty, arising from market incompleteness or information asymmetry, affect the conditional market risk premium. Theoretically motivated, our study therefore explores whether the investors' information environment plays a role in explaining the substantial variation in risk premia. Consistent with the theoretical prediction, results show that improving a country's information quality helps reduce the volatility of risk premia, even after controlling for various variables that are previously found to be good return predictors. The results are also robust to alternative measures of a country's information environment. These findings are further confirmed by our analyzing the 1997 Asian financial crisis. Countries with more stringent disclosure requirements and stricter enforcement of securities regulations, as well as lower analyst uncertainty, experience less volatile risk premia during the crisis.

Our results offer several implications. First, our evidence provides important insights into the underlying economic forces that drive market-wide fluctuation of stock prices. Schwert (1989) finds weak evidence that stock market volatility is associated with the volatility of macroeconomic variables. Instead, we show strong evidence that the quality of a country's information

environment has a statistically significant impact on the volatility of its market risk premium, even after controlling for the country's economic development. Thus, improving a country's information environment can help reduce a large component of its stock market volatility, hence decreasing its systematic risk and cost of capital. Second, as implied by theoretical models, the proportion of uninformed investors in a market and the precision of public information determine the quality of the information environment. Policy makers can lower, to a certain extent, the volatility of the market risk premium by promoting firm-level voluntary disclosure and other mechanisms that help improve disclosure standards beyond security regulations and rules of law.

Appendix A: Implied Cost of Capital Models

We follow Hail and Leuz (2006) by employing the average of four different ICOCs as a proxy for each firm's monthly cost of capital. Then, for each country and for each month, our analysis uses the mean of firms' ICOC estimates as a proxy for the country's monthly cost of capital. For consistency and for comparison of results with those of Hail and Leuz, we closely adopt the two authors' specifications and assumptions of the four models, as described below, when estimating the ex ante cost of capital as implied by each model.

1. Gebhardt, Lee, and Swaminathan's (2001) residual income valuation model is given by

$$P_t = bv_t + \sum_{\tau=1}^T \frac{(e\hat{p}s_{t+\tau} - r_{GLS} \cdot bv_{t+\tau-1})}{(1 + r_{GLS})^\tau} + \frac{(e\hat{p}s_{t+T+1} - r_{GLS} \cdot bv_{t+T})}{r_{GLS}(1 + r_{GLS})^T}, \quad (35)$$

where P_t is the market price of a firm's stock at time t , $e\hat{p}s_{t+\tau}$ is the expected future earnings per share for period $(t + \tau - 1, t + \tau)$, and $bv_{t+\tau-1}$ is the book value per share at time $t + \tau - 1$. The model obtains the initial three years of expected future residual income from actual book values per share and forecasted earnings per share up to three years ahead. Assuming clean surplus, future book values are imputed from current book values, forecasted earnings, and dividends; the same assumption is also adopted by Claus and Thomas (2001) below. For each year, dividends are set equal to the average of the past three years of payout ratios. Dividends are defined in the same way for the following three models. Beyond the initial three years, the stream of residual incomes is derived by linearly decreasing the forecasted accounting return on equity over the next nine years to the firm's specific sector's median return on equity determined over the past three years. Following Hail and Leuz (2006), we classify firms into industrial, service, and financial sectors. If a specific sector's median is negative, then we replace it by the country-year median. Residual income is assumed to remain constant beyond 12 years.

2. Claus and Thomas's (2001) residual income valuation model is given by

$$P_t = bv_t + \sum_{\tau=1}^T \frac{(e\hat{p}s_{t+\tau} - r_{CT} \cdot bv_{t+\tau-1})}{(1 + r_{CT})^\tau} + \frac{(e\hat{p}s_{t+T} - r_{CT} \cdot bv_{t+T-1})(1 + g)}{(r_{CT} - g)(1 + r_{CT})^T}. \quad (36)$$

The model obtains the stream of expected future residual income from actual book values per share and forecasted earnings per share up to five years ahead. Beyond year five, nominal residual income is assumed to grow at the rate g equal to the expected inflation (as proxied by the annualized median of a country's one-year ahead realized monthly inflation rates).

3. Easton's (2004) MPEG model is given by

$$P_t = \frac{(e\hat{p}s_{t+2} + r_{MPEG} \cdot \hat{d}_{t+1} - e\hat{p}s_{t+1})}{r_{MPEG}^2}. \quad (37)$$

The model derives a measure of abnormal earnings growth by using one-year and two-year ahead earnings per share forecasts as well as expected dividends per share in period $t + 1$. It assumes perpetual growth in abnormal earnings after the initial period.

4. Ohlson and Juettner-Nauroth's (2005) abnormal earnings growth valuation model is specified as follows.

$$P_t = \frac{e\hat{p}s_{t+1}}{r_{OJ}} \cdot \frac{(g_{st} + r_{OJ} \cdot \frac{\hat{d}_{t+1}}{e\hat{p}s_{t+1}} - g_{lt})}{(r_{OJ} - g_{lt})}. \quad (38)$$

The model uses one-year-ahead forecasted earnings and dividends per share as well as forecasts of short-term and long-term abnormal earnings growths. The short-term growth rate g_{st} is equal to the average of the forecasted percentage change in the first two years of earnings and the five-year growth forecast provided by financial analysts on I/B/E/S. The long-term earnings growth rate g_{lt} is set equal to the annualized country-specific median of one-year-ahead realized monthly inflation rates.

Appendix B
Conditional Variance, Hedging Demands, and Risk Premia

The table reports time-series regressions of the risk premium on conditional variance and hedging demands. b is the coefficient of conditional variance and t is the t -value of the coefficient. $\bar{R}^2$ is adjusted R^2 . NObs is the number of observations in time-series regressions. The dependent variables are the VAR-based equity risk premium in Panel A and implied risk premium in Panel B. Panel A presents regression results of the risk premium on conditional variance (i.e., $\tilde{e}_{e,t+1} = a_1 + b_1\Delta\sigma_t^2 + e_{1,t+1}$) and of the risk premium on the conditional variance and hedging demands, (i.e., $\tilde{e}_{e,t+1} = a_1 + b_1\Delta\sigma_t^2 + C'_1\Delta H_t + e_{1,t+1}$). Their counterpart regression results in Panel B are $IRP_{t+1} = a_2 + b_2\sigma_t^2 + e_{2,t+1}$ and $IRP_{t+1} = a_2 + b_2\sigma_t^2 + C'_2H_t + e_{2,t+1}$.

Panel A: Using the VAR-Based Equity Risk Premium							
Country	$\tilde{e}_{e,t+1} = a_1 + b_1\Delta\sigma_t^2 + e_{1,t+1}$			$\tilde{e}_{e,t+1} = a_1 + b_1\Delta\sigma_t^2 + C'_1\Delta H_t + e_{1,t+1}$			Nobs
	b_1	t	$\bar{R}^2$ (%)	b_1	t	$\bar{R}^2$ (%)	
Argentina	0.217	2.42	3.2	0.187	2.60	38.4	146
Australia	0.244	1.87	1.1	0.266	2.07	5.2	216
Austria	0.121	0.95	0.0	0.101	0.80	2.5	216
Belgium	0.020	0.28	-0.4	0.023	0.32	1.0	216
Brazil	0.809	2.70	7.6	0.790	2.52	3.9	78
Canada	0.259	2.44	2.2	0.228	2.31	17.7	216
China	0.025	0.24	-0.6	0.001	0.01	14.8	147
Chile	0.081	0.31	-0.5	-0.019	-0.09	25.0	195
Colombia	0.518	1.31	0.5	0.506	1.82	51.0	142
Denmark	0.192	2.27	1.9	0.215	3.20	38.6	216
Ireland	-0.026	-0.33	-0.4	-0.065	-1.00	30.2	216
Finland	0.250	2.91	3.4	0.174	2.51	38.6	211
France	0.086	2.18	1.7	0.092	2.35	4.5	216
Germany	0.098	1.81	1.0	0.095	1.77	2.5	216
Greece	0.153	2.14	1.9	0.168	2.35	5.0	189
Hong Kong	0.092	4.11	6.9	0.092	4.23	11.6	216
Indonesia	0.327	2.72	3.5	0.292	2.83	30.2	178
India	0.027	0.98	0.0	0.010	0.63	64.6	189
Italy	0.027	0.39	-0.4	0.010	0.15	17.1	216
Japan	0.093	1.27	0.3	0.061	0.83	3.0	216
Korea	0.393	4.06	6.7	0.401	4.00	6.1	215
Mexico	0.171	1.29	0.4	0.175	1.39	11.7	184
Malaysia	-0.117	-4.79	9.3	-0.116	-5.32	28.1	216
Netherlands	0.209	4.51	8.3	0.215	5.42	33.5	216
Norway	-0.102	-2.13	1.6	-0.099	-2.16	9.5	216
New Zealand	0.085	1.04	0.0	0.101	1.34	12.9	213
Peru	0.227	0.88	-0.2	0.327	1.53	34.5	141
Poland	0.145	1.71	1.4	0.115	1.45	17.3	139
Portugal	0.423	3.14	4.5	0.182	2.35	69.3	189
Philippines	-0.117	-1.12	0.1	-0.087	-0.85	6.9	216
South Africa	0.095	1.28	0.3	0.090	1.22	0.6	216
Singapore	0.199	2.34	2.0	0.209	2.44	1.6	216
Spain	0.342	3.36	4.6	0.316	3.34	17.9	216
Sweden	0.099	2.98	3.5	0.048	1.84	42.1	216
Switzerland	0.002	0.04	-0.5	-0.006	-0.18	25.6	216
Thailand	0.067	0.75	-0.2	0.048	0.62	25.7	216
Turkey	0.041	0.76	-0.3	0.090	1.82	19.9	167
Taiwan	-0.022	-0.29	-0.4	-0.017	-0.23	6.4	209
U.K.	0.242	2.36	2.1	0.219	2.12	2.8	216
U.S.	0.234	3.32	4.5	0.255	4.01	23.7	216

Appendix B– Continued
Conditional Variance, Hedging Demands, and Risk Premia

Panel B: Using the Implied Risk Premium							
Country	$IRP_{t+1} = a_2 + b_2\sigma_t^2 + e_{2,t+1}$			$IRP_{t+1} = a_2 + b_2\sigma_t^2 + C_2'H_t + e_{2,t+1}$			Nobs
	b_2	t	$\bar{R}^2(\%)$	b_2	t	$\bar{R}^2(\%)$	
Argentina	0.052	2.08	2.0	-0.005	-0.26	57.0	161
Australia	0.047	0.77	-0.2	-0.005	-0.10	31.6	216
Austria	-0.127	-2.02	1.4	-0.014	-0.36	68.5	216
Belgium	0.209	6.28	15.2	0.111	4.50	62.8	216
Brazil	0.005	0.22	-0.6	0.026	1.19	24.0	161
Canada	0.146	5.00	10.0	0.106	4.98	62.2	216
Sri Lanka	0.034	1.23	0.5	-0.013	-0.65	54.3	112
China	0.013	0.57	-0.4	0.008	0.38	4.2	153
Chile	0.103	2.41	3.0	0.127	3.36	26.1	158
Colombia	0.379	3.01	5.9	0.287	2.56	34.7	129
Czech Republic	0.115	2.73	4.9	0.104	2.48	16.6	127
Denmark	0.316	5.99	14.0	0.174	5.31	70.0	216
Egypt	0.060	0.62	-0.8	0.097	1.14	36.3	79
Ireland	0.096	1.35	0.4	0.055	0.75	3.7	216
Finland	0.039	3.18	4.1	0.054	4.65	31.6	214
France	0.252	9.06	27.4	0.124	7.16	77.7	216
Germany	0.288	8.00	22.6	0.145	6.81	79.1	216
Greece	0.032	0.62	-1.2	0.133	2.18	8.0	55
Hong Kong	0.069	6.84	17.5	0.066	6.41	19.7	216
Hungary	0.043	2.30	3.3	0.047	2.50	11.0	127
Indonesia	0.181	9.16	31.2	0.138	8.42	58.5	184
India	0.017	0.41	-0.5	0.019	0.47	9.3	156
Israel	-0.030	-0.79	-0.3	-0.013	-0.52	59.5	124
Italy	0.070	2.20	1.7	0.026	1.01	36.4	216
Japan	0.103	1.85	1.1	0.113	4.88	83.6	216
Korea	0.158	6.80	17.5	0.094	5.26	57.7	214
Morocco	-0.178	-0.56	-1.1	0.024	0.10	47.0	65
Mexico	0.123	3.88	8.0	0.080	2.77	31.7	163
Malaysia	0.037	3.63	5.4	0.031	5.34	69.4	216
Netherlands	0.217	8.99	27.1	0.113	6.18	68.0	216
Norway	0.145	5.05	10.3	0.113	4.85	43.3	215
New Zealand	0.059	2.65	2.7	0.042	2.09	24.6	216
Peru	-0.058	-0.94	-0.1	-0.025	-0.45	21.6	139
Pakistan	0.162	6.27	20.2	0.148	5.97	33.5	152
Poland	0.117	3.88	10.1	0.095	3.27	25.2	127
Portugal	-0.238	-3.13	4.8	-0.197	-3.38	48.6	177
Philippines	0.052	1.33	0.4	0.082	2.43	32.8	208
Russian Federation	0.057	4.40	15.5	0.053	3.81	17.0	101
South Africa	0.261	4.92	13.0	0.141	3.58	55.8	156
Singapore	0.172	3.40	4.7	0.076	2.83	75.5	216
Spain	0.082	3.28	4.4	0.052	2.41	39.3	216
Sweden	0.155	7.09	18.7	0.135	7.23	47.9	216
Switzerland	0.232	5.81	13.2	0.133	5.81	75.2	216
Thailand	0.060	3.58	5.2	0.035	2.95	54.8	216
Turkey	0.063	1.84	1.4	0.040	1.42	37.4	169
Taiwan	-0.041	-1.28	0.3	0.065	3.72	77.0	193
U.K.	0.255	11.69	38.7	0.185	8.95	54.3	216
U.S.	0.167	8.14	23.3	0.110	5.89	48.8	216
Venezuela	0.106	2.75	4.9	0.105	2.65	6.9	129

References

- Admati, Anat, 1985, A noisy rational expectations equilibrium for multi-asset securities markets, *Econometrica* 53, 629-658.
- Ammer, John, and Jianping Mei, 1996, Measuring international economic linkages with stock market data, *Journal of Finance* 51, 1743-1763.
- Anderson, Evan W., Eric Ghysels, and Jennifer L. Juergens, 2007, The impact of risk and uncertainty on expected returns, Working paper, Northern Illinois University.
- Baker, Malcolm, and Jeffrey Wurgler, 2006, Investor Sentiment and the Cross-Section of Stock Returns, *Journal of Finance* 61, 1645-1680.
- Barron, Orie E., Oliver Kim, Steve C. Lim, and Douglas E. Stevens, 1998, Using Analysts' Forecasts to Measure Properties of Analysts' Information Environment, *The Accounting Review* 73, 421-433.
- Barry, Christopher B., and Stephen J. Brown, 1985, Differential information and Security Market Equilibrium, *Journal of Financial and Quantitative Analysis* 20, 407-422.
- Bekaert, Geert, and Campbell Harvey, 1995, Time-varying world market integration, *Journal of Finance* 50, 403-444.
- Bekaert, Geert, and Campbell Harvey, 1997, Emerging equity market volatility, *Journal of Financial Economics* 43, 29-77.
- Bekaert, Geert, Campbell Harvey, Christian Lundblad, and Stephan Siegel, 2008, What segments equity markets?, Working paper at Columbia University.
- Bhattacharya, Utpal, and Hazem Daouk, 2002, The world price of insider trading, *Journal of Finance* 57, 75-107.

- Bhattacharya, Utpal, Hazem Daouk, and Michael Welker, 2003, The world price of earnings opacity, *The Accounting Review* 3, 641-678.
- Botosan, Christine A., 1997, Disclosure level and the cost of equity capital, *The Accounting Review* 72, 323-349.
- Botosan, Christine A., and Marlene A. Plumlee, 2005, Assessing alternative proxies for the expected risk premium, *The Accounting Review* 80, 21-53.
- Brown, Stephen and Stephen A. Hillegeist, 2007, How disclosure quality affects the level of information asymmetry, Forthcoming, *Review of Accounting Studies*.
- Bushee, Brian, and Christian Leuz, 2005, Economic consequences of SEC disclosure regulation: Evidence from the OTC Bulletin Board, *Journal of Accounting and Economics* 39, 233-264.
- Bushman, Robert M., Joseph D. Piotroski, and Abbie J. Smith, 2004, What determines corporate transparency? *Journal of Accounting Research* 42, 207-252.
- Campbell, John Y., 1991, A variance decomposition for stock returns, *Economic Journal* 101, 157-179.
- Campbell, John Y., and John Ammer, 1993, What moves the stock and bond markets? A variance decomposition for long-term asset returns, *Journal of Finance* 48, 3-37.
- Chen, Long, and Xinlei, Zhao, 2007, What drives stock price movement?, Working paper at Michigan State University.
- Chen, Long, and Xinlei, Zhao, 2008, Return decomposition, forthcoming, *Review of Financial Studies*.
- Claus, James, and Jacob Thomas, 2001, The equity risk premium is much lower than you think it is: Empirical estimates from a new approach, *Journal of Finance* 58, 643-684.
- Coles, Jeffrey L., Uri Loewenstein, and Jose Suay, 1995, On equilibrium pricing under parameter uncertainty, *Journal of Financial and Quantitative Analysis* 30, 347-364.

- Daouk, Hazem, Charles M.C. Lee, and David Ng, 2006, Capital market governance: How do security laws affect market performance? *Journal of Corporate Finance* 12, 560-593.
- Djankov, Simeon, Rafael La Porta, F. Lopez-De-Silanes, and Andrei Shleifer, 2006, The law and economics of self-dealing, Forthcoming, *Journal of Financial Economics*.
- Easley, David, Soeren Hvidkjaer, and Maureen O'Hara, 2002, Is information risk a determinant of asset returns, *Journal of Finance* 57, 2185-2222.
- Easley, David, and Maureen O'Hara, 2004, Information and the cost of capital, *Journal of Finance* 59, 1553-1583.
- Easton, Peter, 2004, PE ratios and MPEG ratios, and estimating the implied expected rate of return on equity capital, *The Accounting Review* 80, 501-538.
- Easton, Peter, Gary Taylor, Pervin Shroff, and Theodore Sougiannis, 2002, Using forecasts of earnings to simultaneously estimate growth and the rate of return on equity investment, *Journal of Accounting Research* 40, 657-676.
- Elton, Edwin J., 1999, Expected return, realized return, and asset pricing tests, *Journal of Finance* 54, 1199-1220.
- Fama, Eugene, and James MacBeth, 1973, Risk, return, and equilibrium: Empirical tests, *Journal of Political Economy* 81, 607-636.
- Frankel, Richard, and Xu Li, 2004, Characteristics of a firm's information environment and the information asymmetry between insiders and outsiders, *Journal of Accounting and Economics* 37, 229-259.
- Francis, J, R. LaFond, P. Olsson, and K. Schipper, 2004, Costs of equity and earnings attributes *The Accounting Review* 79, 967-1010.
- Gebhardt, William R., Charles M. Lee, and Bhaskaran Swaminathan, 2001, Toward an implied cost of capital, *Journal of Accounting Research* 39, 135-176.

- Gelos, R. Gaston, and Shang-Jin Wei, 2005, Transparency and international portfolio holdings, *Journal of Finance* 60, 2987-3020.
- Grossman, Sanford, and Joseph Stiglitz, 1980, On the impossibility of informationally efficient markets, *American Economic Review* 70, 393-408.
- Guo, Hui, and Robert F. Whitelaw, 2006, Uncovering the risk-return relation in the stock market, *Journal of Finance* 61, 1433-1463.
- Hail, Luzi, and Christian Leuz, 2006, International differences in the cost of equity capital: do legal institutions and securities regulation matter? *Journal of Accounting Research* 44, 485-531.
- Healy, Paul, Amy Hutton, and Krishna Palepu, 1999, Stock performance and intermediation changes surrounding sustained increases in disclosures, *Contemporary Accounting Research* 16, 485-520.
- Healy, Paul, and Krishna Palepu, 2001, Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature, *Journal of Accounting and Economics* 31, 405-440.
- Heflin, Frank, Kenneth W. Shaw, and John J. Wild, 2005, Disclosure policy and market liquidity: Impact of depth quotes and order sizes, *Contemporary Accounting Research* 22, 829-866.
- Hou, Kewei, Lin Peng, and Wei Xiong, 2006, R^2 and price inefficiency, Working paper, Ohio State University.
- Hughes, John, Jing Liu, and Jun Liu, 2006, Information asymmetry, diversification, and cost of capital, Forthcoming, *The Accounting Review*.
- Jin, Li, and Stewart C. Myers, 2006, R^2 around the world: New theory and new tests, *Journal of Financial Economics* 79, 257-292.

- Johnson, Simon, Peter Boone, Alasdair Breach, and Eric Friedman, 2000, Corporate governance in the Asian financial crisis, *Journal of Financial Economics* 58, 141-186.
- La Porta, Rafael, F. Lopez-De-Silanes, Andrei Shleifer, and Robert Vishny, 1997, Legal determinants of external finance, *Journal of Finance* 52, 1131-1155.
- La Porta, Rafael, F. Lopez-De-Silanes, Andrei Shleifer, and Robert Vishny, 1998, Law and finance, *Journal of Political Economy* 106, 1113-1155.
- La Porta, Rafael, F. Lopez-De-Silanes, Andrei Shleifer, 2006, What works in securities laws? *Journal of Finance* 61, 1-32.
- Lau, Sie-Ting, Lilian Ng, and Bohui Zhang, 2007, The world price of home bias, WFA Conference Paper in Montana.
- Lee, Charles, David Ng, Bhaskaran Swaminathan, 2003, International asset pricing: Evidence from the cross section of implied cost of capital, Working paper, Cornell University and University of Chicago.
- Lundblad, Christian, 2005, The risk return tradeoff in the long-run: 1836-2003, Working paper, Indiana University.
- Merton, Robert C., 1973, An intertemporal asset pricing model, *Econometrica* 41, 867-888.
- Merton, Robert C., 1987, A simple model of capital market equilibrium with incomplete information, *Journal of Finance* 42, 483-510.
- Merton, Robert C., 1980, On estimating the expected return on the market: An exploratory investigation, *Journal of Financial Economics* 8, 323-361.
- Mitton, Todd, 2002, A cross-firm analysis of the impact of corporate governance on the East Asian financial crisis, *Journal of Financial Economics* 64, 215-241.

- Morck, Randall, Bernard Yeung, and Wayne Yu, 2000, The information content of stock markets: why do emerging markets have synchronous stock price movements? *Journal of Financial Economics* 58, 215-260.
- Ohlson, James A., and Beate E. Juettner-Nauroth, 2005, Expected EPS and EPS growth as determinants of value, *Review of Accounting Studies* 10, 349-365.
- Pastor, Lubos, Meenakshi Sinha, Bhaskaran Swaminathan, 2006, Estimating the intertemporal risk-return tradeoff using the implied cost of capital, Forthcoming, *Journal of Finance*.
- Schwert, G. William, 1989, Why does stock market volatility change over time? *Journal of Finance* 44, 1115-1153.
- Scruggs, John T., 1998, Resolving the puzzling intertemporal relation between the market risk premium and conditional market variance: A two-factor approach, *Journal of Finance* 53, 575-603.
- Shiller, Robert J., 1981, Do stock prices move too much to be justified by subsequent changes in dividends? *American Economic Review* 71, 421-436.
- Teoh, Siew Hong, Yong Yang, and Yinglei Zhang, 2006, R-square: Noise or price efficiency? Working paper, University of California at Irvine.
- Veronesi, Pietro, 1999, Stock market overreaction to bad news in good times: A rational expectations equilibrium model, *Review of Financial Studies* 12, 976-1007.
- Veronesi, Pietro, 2000, How does information quality affect stock returns? *Journal of Finance* 55, 807-837.
- Verrecchia, Robert E., 2001, Essays on disclosure, *Journal of Accounting and Economics* 32, 91-180.
- Vuolteenaho, Tuomo, 2002, What drives firm-level stock returns? *Journal of Finance* 57, 233-264.

Wang, Jiang, 1993, A model of intertemporal asset prices under asymmetric information, *Review of Economic Studies* 60, 249-282.

Wang, Jiang, 1994, A model of competitive stock trading volume, *Journal of Political Economy* 102, 127-168.

Table 1.1
Summary Statistics

This table provides mean values of disclosure, accounting standard, regulatory indexes, analyst uncertainty, and of control variables for the sample period 1988 to 2005. The disclosure requirements index (*DReq*), securities regulation index (*SReg*), accounting standard index (*AcStd*), and legal-related indexes (*Law* and *Enf*) are from La Porta et al. (1998, 2006). The anti-self-dealing index (*AntSel*) is from Djankov et al. (2006). Analyst uncertainty (*Uncertainty*) is derived from the precision of analysts' public and private information (*PubInf* and *PteInf*), which are implied from analysts' earnings forecasts and actual value in I/B/E/S. The control variables are: σ_{GDP} is the standard deviation of GDP growth rate; *GDPC* is US-denominated GDP per capita; *Turn* is the overall stock market turnover ratio; *NFirms* is the number of listed firms; *MCap* is the log of country-year median value of firm market capitalization at June-end of each year; *Firm.HI* and *Ind.HI* are firm and industry Herfindahl indices.

Panel A: Measures of Information Environments									
Country	Mandatory Information Environment						Analyst Uncertainty		
	<i>DReq</i>	<i>SReg</i>	<i>AcStd</i>	<i>AntSel</i>	<i>Law</i>	<i>Enf</i>	<i>Uncertainty</i>	<i>PubInf</i>	<i>PteInf</i>
Argentina	0.50	0.43	0.45	0.34	0.54	0.57	0.561	0.726	0.855
Australia	0.75	0.77	0.75	0.76	1	1	0.209	1.877	2.330
Austria	0.25	0.18	0.54	0.21	1	0.98	0.351	1.314	1.086
Belgium	0.42	0.34	0.61	0.54	1	0.98	0.313	1.251	1.648
Brazil	0.25	0.39	0.54	0.27	0.63	0.60	0.746	0.562	0.594
Canada	0.92	0.91	0.74	0.64	1	0.96	0.387	1.151	1.057
Chile	0.58	0.50	0.52	0.63	0.70	0.71	0.371	1.189	1.301
China	N.A.	N.A.	N.A.	0.76	N.A.	N.A.	0.414	0.961	1.227
Colombia	0.42	0.37	0.50	0.57	0.21	0.47	0.464	0.802	1.170
Denmark	0.58	0.50	0.62	0.46	1	1	0.418	1.014	1.139
Finland	0.50	0.49	0.77	0.46	1	1	0.485	0.900	0.873
France	0.75	0.58	0.69	0.38	0.90	0.85	0.287	1.436	1.671
Germany	0.42	0.21	0.62	0.28	0.92	0.91	0.340	1.319	1.169
Greece	0.33	0.38	0.55	0.22	0.62	0.66	0.428	0.958	1.030
Hong Kong	0.92	0.81	0.69	0.96	0.82	0.91	0.264	1.611	1.705
India	0.92	0.75	0.57	0.58	0.42	0.61	0.283	1.420	1.753
Indonesia	0.50	0.59	N.A.	0.65	0.40	0.32	0.296	1.509	1.323
Ireland	0.67	0.49	N.A.	0.79	0.78	0.83	0.172	2.888	1.903
Italy	0.67	0.46	0.62	0.42	0.83	0.75	0.441	0.95	1.076
Japan	0.75	0.47	0.65	0.50	0.90	0.95	0.344	1.455	1.005
Korea	0.75	0.55	0.62	0.47	0.54	0.57	0.503	0.83	0.795
Malaysia	0.92	0.78	0.76	0.95	0.68	0.79	0.294	1.454	1.572
Mexico	0.58	0.35	0.60	0.17	0.54	0.57	0.514	0.796	0.929
Netherlands	0.50	0.62	0.64	0.20	1	1	0.196	1.897	2.296
New Zealand	0.67	0.48	0.70	0.95	1	1	0.245	1.753	1.893
Norway	0.58	0.43	0.74	0.42	1	1	0.506	0.765	0.879
Peru	0.33	0.59	0.38	0.45	0.25	0.46	0.683	0.712	0.624
Philippines	0.83	0.89	0.65	0.22	0.27	0.37	0.452	0.917	0.996
Poland	N.A.	N.A.	N.A.	0.29	N.A.	N.A.	0.411	1.056	1.124
Portugal	0.42	0.55	0.36	0.44	0.87	0.71	0.419	0.907	1.205
Singapore	1	0.84	0.78	1	0.86	0.93	0.313	1.361	1.442
South Africa	0.83	0.58	0.70	0.81	0.44	0.52	0.185	2.007	2.405
Spain	0.50	0.50	0.64	0.37	0.78	0.70	0.292	1.247	1.841
Sweden	0.58	0.45	0.83	0.33	1	1	0.384	1.052	1.096
Switzerland	0.67	0.48	0.68	0.27	1	1	0.299	1.321	1.706
Taiwan	0.75	0.64	0.65	0.56	0.85	0.76	0.414	0.888	1.204
Thailand	0.92	0.62	0.64	0.81	0.63	0.48	0.405	1.070	1.107
Turkey	0.5	0.45	0.51	0.43	0.52	0.46	0.670	0.733	0.348
U.K.	0.83	0.73	0.78	0.95	0.86	0.93	0.167	2.561	2.542
U.S.	1	0.97	0.71	0.65	1	1	0.181	2.863	1.786

Table 1.1 - Continued
Summary Statistics

Panel B: Control Variables							
Country	σ_{GDP}	$GDPC$	$Turn$	$NFirms$	$MCap$	$Firm_HI$	Ind_HI
Argentina	0.070	7121	0.239	142	4.552	0.161	0.282
Australia	0.014	18910	0.575	1248	2.599	0.045	0.12
Austria	0.012	22034	0.49	99	4.056	0.066	0.101
Belgium	0.014	20471	0.429	163	4.578	0.082	0.158
Brazil	0.025	3332	0.432	501	3.112	0.295	0.369
Canada	0.020	21235	0.606	1777	3.631	0.025	0.087
Chile	0.032	4346	0.098	253	4.125	0.043	0.122
China	0.028	783	1.511	768	5.23	0.051	0.104
Colombia	0.024	1988	0.08	122	5.082	0.087	0.237
Denmark	0.014	27405	0.624	231	3.584	0.059	0.119
Finland	0.033	21032	0.775	104	4.724	0.188	0.228
France	0.013	20832	0.808	673	4.496	0.028	0.064
Germany	0.017	21489	1.34	655	4.811	0.03	0.076
Greece	0.017	9773	0.431	232	3.78	0.061	0.168
Hong Kong	0.035	23231	0.537	642	4.18	0.053	0.162
India	0.022	408	0.797	4732	4.046	0.073	0.14
Indonesia	0.050	773	0.463	231	3.751	0.055	0.105
Ireland	0.028	19802	0.544	71	4.988	0.122	0.233
Italy	0.012	17526	0.872	248	5.23	0.061	0.134
Japan	0.021	35840	0.642	2457	5.779	0.008	0.049
Korea	0.040	9459	1.809	1054	3.854	0.039	0.08
Malaysia	0.044	3453	0.377	614	4.305	0.02	0.074
Mexico	0.030	5413	0.355	185	4.797	0.112	0.169
Netherlands	0.015	20927	1.012	219	5.181	0.114	0.135
New Zealand	0.022	12852	0.387	155	3.581	0.207	0.224
Norway	0.016	33412	0.81	158	4.385	0.13	0.174
Peru	0.060	1956	0.209	237	2.604	0.319	0.347
Philippines	0.023	956	0.252	201	3.562	0.069	0.156
Poland	0.034	3934	0.665	143	3.892	0.163	0.227
Portugal	0.025	9268	0.53	136	3.617	0.12	0.255
Singapore	0.040	19260	0.511	296	4.562	0.06	0.127
South Africa	0.020	3091	0.314	609	4.448	0.033	0.108
Spain	0.015	13069	1.601	1132	5.778	0.065	0.158
Sweden	0.020	24804	0.86	237	4.421	0.062	0.119
Switzerland	0.016	32855	0.884	226	4.714	0.069	0.114
Taiwan	0.078	12618	2.751	414	5.652	0.029	0.17
Thailand	0.054	1896	0.837	364	3.726	0.036	0.125
Turkey	0.053	2765	1.213	215	3.899	0.061	0.135
U.K.	0.015	22329	0.8	2067	4.18	0.024	0.067
U.S.	0.013	31698	1.29	6929	4.607	0.007	0.047

Table 1.2
Variance Decomposition for Country Excess Stock Returns

This table presents, by country, proportions of stock market excess return variance components estimated using a VAR method for the period 1988 to 2005. For countries whose stock returns became available after 1988, the starting year of their sample periods is shown in the column, Year. The state variables used in estimating the VAR system include the domestic (foreign) excess stock return, world excess stock return, real interest rate, relative bill rate, domestic (foreign) price-to-earnings ratio, world price-to-earnings ratio, default spread, term spread, excess bond return, and real exchange rate of the US dollar for foreign markets. The variance of country excess stock returns is decomposed as follows: $\sigma_{\tilde{f}_f}^2 = \sigma_{\tilde{f}_f}^2 + 2\sigma_{\tilde{f}_f, \tilde{f}_r} + 2\sigma_{\tilde{f}_f, \tilde{f}_q} + \sigma_{\tilde{f}_d}^2 - 2\sigma_{\tilde{f}_d, \tilde{f}_f} - 2\sigma_{\tilde{f}_d, \tilde{f}_r} - 2\sigma_{\tilde{f}_d, \tilde{f}_q} + \sigma_{\tilde{f}_r}^2 + 2\sigma_{\tilde{f}_r, \tilde{f}_q} + \sigma_{\tilde{f}_q}^2$, where $\tilde{f}$ denotes innovation in foreign excess stock returns, $\tilde{f}_d$ denotes news about future foreign dividends, $\tilde{f}_r$ denotes news about future real domestic interest rates, $\tilde{f}_q$ denotes news about future real exchange rates of the domestic currency, and $\tilde{f}_f$ denotes news about future foreign excess returns. As the United States is considered the domestic country, news about its future real exchange rate is zero.

Country	Year	$\sigma_{\tilde{f}_f}^2$	$2\sigma_{\tilde{f}_f, \tilde{f}_r}$	$2\sigma_{\tilde{f}_f, \tilde{f}_q}$	$\sigma_{\tilde{f}_d}^2$	$-2\sigma_{\tilde{f}_d, \tilde{f}_f}$	$-2\sigma_{\tilde{f}_d, \tilde{f}_r}$	$-2\sigma_{\tilde{f}_d, \tilde{f}_q}$	$\sigma_{\tilde{f}_r}^2$	$2\sigma_{\tilde{f}_r, \tilde{f}_q}$	$\sigma_{\tilde{f}_q}^2$
Argentina	93	1.641	-0.170	0.272	1.605	-2.300	0.150	-0.205	0.010	-0.028	0.024
Australia		0.893	0.089	0.146	0.526	-0.576	-0.044	-0.099	0.027	0.024	0.013
Austria		1.221	0.228	0.132	1.665	-1.964	-0.242	-0.083	0.025	0.014	0.004
Belgium		0.377	0.177	0.088	0.854	-0.293	-0.211	-0.102	0.052	0.045	0.013
Brazil	94	1.177	-0.065	-0.004	0.430	-0.543	-0.016	0.015	0.007	-0.001	0.001
Canada		0.457	0.065	0.094	0.733	-0.253	-0.059	-0.096	0.029	0.020	0.010
Chile	89	2.918	-0.344	0.109	2.259	-4.124	0.257	-0.087	0.018	-0.007	0.001
China	93	1.076	-0.076	0.013	0.539	-0.594	0.041	-0.002	0.004	-0.001	0.000
Colombia	92	5.076	-0.390	0.168	4.288	-8.341	0.328	-0.136	0.011	-0.007	0.002
Denmark		0.337	-0.069	-0.050	0.614	0.042	0.042	0.038	0.021	0.018	0.006
Finland		1.408	-0.022	0.040	2.378	-2.708	-0.019	-0.085	0.007	-0.004	0.004
France		0.134	0.044	0.009	0.799	0.137	-0.111	-0.071	0.030	0.023	0.007
Germany		0.340	0.044	0.040	0.713	0.031	-0.165	-0.069	0.035	0.024	0.006
Greece	90	0.791	0.025	-0.035	1.593	-1.380	-0.021	0.022	0.003	0.000	0.001
Hong Kong		0.204	0.005	-0.006	0.499	0.286	0.038	-0.040	0.008	0.003	0.004
India	90	0.336	-0.042	-0.002	1.301	-0.644	0.036	0.010	0.004	0.000	0.000
Indonesia	90	1.292	-0.098	0.004	0.624	-0.893	0.044	0.023	0.003	0.000	0.002
Ireland		0.467	0.005	0.017	0.987	-0.437	-0.047	-0.017	0.017	0.005	0.003
Italy		0.498	0.023	0.019	0.895	-0.334	-0.052	-0.062	0.008	0.001	0.004
Japan		0.400	-0.077	0.072	0.329	0.267	-0.033	0.028	0.014	-0.005	0.005
Korea		1.072	-0.060	0.045	0.579	-0.634	0.020	-0.025	0.003	-0.001	0.001
Malaysia		0.603	-0.088	0.061	0.529	-0.152	-0.008	0.050	0.006	-0.007	0.005
Mexico	89	1.186	-0.111	-0.010	1.373	-1.621	0.132	0.039	0.008	0.003	0.001
Netherlands		0.361	-0.097	-0.064	0.519	0.235	-0.057	-0.003	0.056	0.041	0.010
New Zealand		0.716	-0.058	0.008	0.521	-0.186	0.030	-0.040	0.007	-0.003	0.005
Norway		0.431	-0.033	0.023	1.095	-0.547	0.051	-0.034	0.008	0.004	0.002
Peru	94	3.884	-0.421	0.091	3.005	-5.821	0.310	-0.060	0.014	-0.005	0.001
Philippines		1.372	-0.109	0.093	0.760	-1.119	0.039	-0.039	0.005	-0.005	0.003
Poland	94	1.285	-0.127	-0.042	0.936	-1.184	0.094	0.028	0.007	0.002	0.000
Portugal	90	0.656	-0.058	-0.037	1.189	-0.742	-0.025	0.000	0.011	0.003	0.002
Singapore		0.659	0.001	0.063	0.335	-0.067	0.005	-0.019	0.012	0.006	0.004
South Africa		0.607	0.011	0.092	0.237	0.072	-0.020	-0.029	0.009	0.011	0.011
Spain		0.912	-0.054	-0.045	0.518	-0.334	0.030	-0.042	0.009	0.000	0.005
Sweden		0.148	0.008	0.009	0.683	0.106	0.007	0.010	0.010	0.009	0.010
Switzerland		0.214	0.045	0.007	1.004	-0.164	-0.147	-0.005	0.028	0.012	0.005
Taiwan		0.568	-0.071	0.022	0.321	0.170	-0.027	0.016	0.008	-0.011	0.006
Thailand		1.535	-0.102	0.066	1.122	-1.657	0.052	-0.020	0.004	-0.004	0.003
Turkey		0.848	-0.016	-0.001	0.454	-0.297	0.007	0.002	0.002	0.001	0.000
U.K.		0.673	-0.022	0.063	0.215	0.093	-0.042	-0.017	0.026	0.005	0.006
U.S.		0.382	0.058	N.A.	0.332	0.237	-0.041	N.A.	0.032	N.A.	N.A.

Table 1.3
Summary Statistics of Implied Risk Premia

This table summarizes the statistics of implied risk premia (IRP) estimated monthly for the period 1988 to 2005. N is the number of firms with analysts forecasts recorded in I/B/E/S. μ_{IRP} and μ_{MKT} are the equal-weighted average of firms' IRPs and mean excess return of the country's stock index, respectively. σ_{IRP} is the standard deviation of IRP estimates, and σ_{MKT} is the annualized standard deviation of monthly country's stock returns. *Ratio* is defined as the proportion of the variance of Monte-Carlo simulated expected returns to the variance of excess market returns. The simulation is based on the Gordon model with constant dividend growth rate and time-varying expected excess return with volatility equals to σ_{IRP} .

Country	N	μ_{IRP} (%)	μ_{MKT} (%)	σ_{IRP} (%)	σ_{MKT} (%)	<i>Ratio</i>
Argentina	26	9.86	15.18	2.36	52.69	1.12
Australia	273	5.98	7.22	0.70	18.41	0.35
Austria	45	4.18	6.42	1.10	22.64	0.66
Belgium	63	5.12	8.09	0.90	17.84	0.69
Brazil	88	15.62	16.07	2.63	58.06	0.19
Canada	377	6.00	6.57	0.60	17.63	0.24
Chile	41	6.58	14.83	1.14	24.91	0.50
China	123	7.28	-10.34	1.97	37.87	0.34
Colombia	12	12.86	13.52	3.86	32.77	2.71
Czech Republic	20	8.50	12.65	1.35	29.35	0.59
Denmark	89	5.32	9.79	0.82	18.27	0.74
Egypt	12	11.59	21.20	2.52	30.10	2.22
Finland	69	7.96	7.30	1.45	32.89	0.17
France	320	5.23	7.07	0.78	19.32	0.29
Germany	307	4.08	5.44	0.86	22.21	0.40
Greece	91	6.68	15.26	1.48	25.21	0.59
Hong Kong	193	9.14	8.56	1.22	26.73	0.23
Hungary	19	10.56	17.58	1.60	36.43	0.81
India	185	10.40	5.64	1.68	28.83	0.57
Indonesia	73	11.87	3.97	1.77	50.26	1.98
Ireland	42	7.40	5.72	1.89	19.77	0.45
Israel	20	6.44	3.83	1.13	26.46	1.48
Italy	115	5.45	3.44	1.05	23.02	0.32
Japan	704	0.75	-3.38	0.69	23.10	0.41
Korea	167	9.52	3.49	1.58	38.66	0.19
Malaysia	166	4.51	2.14	0.94	31.29	0.22
Mexico	51	9.36	19.58	1.47	33.73	6.92
Morocco	17	8.01	6.84	1.94	16.75	7.27
Netherlands	124	6.22	7.65	0.85	17.10	0.53
New Zealand	56	6.04	2.47	0.88	22.92	0.41
Norway	76	8.04	7.58	1.18	23.39	0.31
Pakistan	29	12.63	5.43	1.81	39.33	0.34
Peru	17	10.43	10.97	2.87	30.92	0.86
Philippines	42	9.28	0.05	1.88	33.12	0.48
Poland	43	8.79	15.83	1.29	47.96	0.27
Portugal	34	6.92	0.16	1.35	22.29	0.49
Russia	25	14.92	18.04	2.72	65.20	4.82
Singapore	137	4.51	4.20	0.89	24.57	0.23
South Africa	166	9.75	10.00	1.21	27.62	0.28
Spain	94	5.43	6.37	0.79	21.66	0.32
Sri Lanka	45	12.23	1.15	1.61	35.36	0.33
Sweden	122	6.52	9.66	1.06	25.37	0.32
Switzerland	142	4.45	8.46	0.80	17.04	0.46
Taiwan	167	4.18	1.89	1.13	38.99	0.21
Thailand	118	8.64	1.67	1.48	41.01	0.16
Turkey	87	25.20	9.00	4.63	59.69	6.20
U.K.	865	5.86	5.13	0.70	15.53	0.42
U.S.	3296	5.51	7.35	0.60	14.08	0.49
Venezuela	12	16.90	0.98	4.74	50.27	7.57

Table 1.4
Panel Regressions of the Risk Premium Volatility on Investors' Information Environment Measures

This table shows regression results of the risk premium volatility on investors' information environment measures and control variables together with unreported year effects. The dependent variable is σ_{VAR} in Panel A and is σ_{IRP} in Panel B. σ_{VAR} and σ_{IRP} are, respectively, the log of standard deviation of VAR-based risk premia and IRP estimated each year. Mandatory information environment (i.e., $DReq$, $SReq$, $AcStd$, Law and Enf , and $AntSel$) and analyst uncertainty are measures of the investors' information environment. $DReq$, $SReq$, and $AcStd$ are the respective disclosure requirements, securities regulation, and accounting standard indexes, and Law and Enf are legal-related indexes; these indexes are from La Porta et al. (1998, 2006). $AntSel$ is the anti-self-dealing index from Djankov et al. (2006). $Uncertainty$ is the analyst uncertainty implied by analyst earnings forecasts and actual earnings reported in the I/B/E/S database. $DReq$, $SReq$, and $AcStd$ are the respective disclosure requirements, securities regulation, and accounting standard indexes, and Law and Enf are legal-related indexes; these indexes are from La Porta et al. (1998, 2006). $AntSel$ is the anti-self-dealing index from Djankov et al. (2006). σ_{GDP} is the standard deviation of the GDP growth rate. GDP is US-denominated GDP per capita and its coefficient is multiplied by 10^5 . $Turn$ is the overall stock market turnover ratio. $NFirms$ is the log number of listed firms. $MCap$ is the log of country-year median-firm market capitalization at June-end. $Firm.HI$ and $Ind.HI$ are firm and industry Herfindahl indexes. $NFIBES$ is the number of firms with analysts' forecasts recorded in I/B/E/S. The $EAsia$ dummy is equal to 1 for East Asian countries during 1997 and 1998, and zero otherwise. All t -statistics reported in parentheses are based on Newey-West heteroskedasticity and autocorrelation corrected standard errors. $\bar{R}^2$ is the adjusted R^2 . Sample period is from January 1988 to December 2005.

Table 1.4
Panel Regressions of the Risk Premium Volatility on Investors' Information Environment Measures

Panel A: Dependent Variable - σ_{VAR}													
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)	Model (10)	Model (11)	Model (12)	Model (13)
<i>DReq</i>	-0.495 (-3.20)				-0.442 (-2.92)				-0.506 (-3.24)	-0.590 (-4.02)	-0.352 (-2.41)		-0.402 (-2.64)
<i>SReg</i>		-0.591 (-3.59)				-0.528 (-3.14)							
<i>AcStd</i>			-0.033 (-0.16)				0.145 (0.37)						
<i>AntSel</i>				-0.178 (-1.53)				-0.117 (-0.94)					
<i>Law</i>	-0.911 (-4.55)	-0.926 (-4.76)	-1.028 (-7.37)	-0.854 (-3.99)					-0.915 (-4.53)	-0.873 (-4.51)	-0.605 (-3.26)		-0.793 (-4.09)
<i>Enf</i>					-1.088 (-4.65)	-1.094 (-4.73)	-1.334 (-4.95)	-1.067 (-4.06)					
<i>Uncertainty</i>												0.349 (3.12)	0.264 (2.95)
σ_{GDP}	11.911 (7.94)	11.835 (8.22)	10.334 (8.03)	11.366 (7.32)	11.146 (7.64)	11.080 (7.58)	9.909 (7.03)	10.409 (6.60)	12.031 (7.65)	11.261 (7.94)	9.889 (6.75)	9.445 (6.05)	10.611 (7.70)
<i>GDP</i>	-1.280 (-2.65)	-1.316 (-2.88)	-1.104 (-3.36)	-1.466 (-2.97)	-1.202 (-2.50)	-1.248 (-2.68)	-0.932 (-1.88)	-1.322 (-2.61)	-1.263 (-2.62)	-1.315 (-2.76)	-1.153 (-2.59)	-2.979 (-9.31)	-1.440 (-3.16)
<i>Turn</i>	0.051 (1.53)	0.055 (1.62)	0.067 (2.19)	0.053 (1.49)	0.012 (0.35)	0.015 (0.43)	0.018 (0.50)	0.020 (0.56)	0.049 (1.48)	0.033 (0.98)	0.035 (1.12)	0.025 (0.63)	0.043 (1.27)
<i>MCap</i>	-0.049 (-1.48)	-0.072 (-2.21)	-0.024 (-0.96)	-0.051 (-1.48)	-0.038 (-1.18)	-0.059 (-1.83)	-0.015 (-0.45)	-0.039 (-1.16)	-0.050 (-1.52)	-0.036 (-1.17)	-0.042 (-1.46)	-0.011 (-0.31)	-0.030 (-0.94)
<i>NFirms</i>	-0.033 (-1.02)	-0.029 (-0.89)	-0.105 (-5.19)	-0.070 (-2.17)	-0.012 (-0.38)	-0.008 (-0.25)	-0.078 (-2.90)	-0.050 (-1.62)	-0.035 (-1.11)	-0.021 (-0.67)	-0.005 (-0.16)	-0.045 (-1.46)	-0.028 (-0.89)
<i>FirmHI</i>	0.090 (0.15)	0.315 (0.56)	0.351 (1.27)	0.307 (0.56)	0.387 (0.72)	0.591 (1.18)	0.647 (1.32)	0.586 (1.19)		0.154 (0.27)	-0.124 (-0.29)	0.379 (0.79)	0.067 (0.11)
<i>IndHI</i>									-0.034 (-0.07)				
<i>EAsia</i>										0.557 (3.69)			
σ_{CF}											0.336 (5.55)		
$\bar{R}^2$	65.8%	66.1%	64.3%	64.7%	65.4%	65.7%	64.0%	64.5%	65.8%	67.4%	70.2%	63.8%	67.2%
NObs	493	493	467	493	493	493	467	493	493	493	493	481	481

Table 1.4 – Continued
Panel Regressions of the Risk Premium Volatility on Investors' Information Environment Measures

Panel B: Dependent Variable - σ_{IRP}													
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)	Model (10)	Model (11)	Model (12)	Model (13)
<i>DReq</i>	-1.066 (-5.54)				-0.972 (-4.92)				-1.073 (-5.50)	-1.177 (-6.40)	-0.978 (-4.72)		-0.847 (-4.48)
<i>SReg</i>		-1.045 (-5.38)				-0.939 (-4.76)							
<i>AcStd</i>			-1.526 (-3.87)				-1.416 (-3.31)						
<i>AntSel</i>				-0.655 (-4.67)				-0.623 (-4.01)					
<i>Law</i>	-1.266 (-5.78)	-1.258 (-5.70)	-1.284 (-4.59)	-1.043 (-4.40)					-1.239 (-5.69)	-1.256 (-5.96)	-1.277 (-5.68)		-1.220 (-6.03)
<i>Enf</i>					-1.332 (-4.66)	-1.334 (-4.54)	-1.413 (-4.18)	-1.007 (-3.24)					
<i>Uncertainty</i>												0.535 (3.21)	0.404 (2.94)
σ_{GDP}	9.374 (4.00)	9.824 (4.08)	6.691 (2.69)	10.017 (4.10)	8.151 (3.48)	8.532 (3.45)	6.737 (2.62)	9.046 (3.52)	8.992 (3.70)	8.543 (3.62)	8.896 (3.81)	2.777 (1.18)	5.665 (2.36)
<i>GDPC</i>	0.682 (1.35)	0.585 (1.22)	1.234 (2.31)	0.178 (0.39)	0.406 (0.75)	0.333 (0.62)	1.121 (2.13)	-0.195 (-0.38)	0.704 (1.39)	0.697 (1.44)	0.730 (1.43)	-2.134 (-6.15)	0.521 (1.11)
<i>Turn</i>	0.013 (0.35)	0.011 (0.28)	0.044 (0.81)	-0.009 (-0.23)	-0.040 (-0.98)	-0.042 (-1.01)	-0.046 (-0.83)	-0.052 (-1.18)	0.016 (0.42)	-0.005 (-0.12)	0.028 (0.81)	0.014 (0.32)	0.021 (0.56)
<i>MCap</i>	-0.047 (-1.23)	-0.079 (-2.12)	-0.059 (-1.45)	-0.045 (-1.13)	-0.029 (-0.71)	-0.058 (-1.43)	-0.034 (-0.80)	-0.030 (-0.70)	-0.053 (-1.40)	-0.038 (-1.03)	-0.052 (-1.42)	0.024 (0.57)	-0.013 (-0.34)
<i>NFirms</i>	0.028 (0.84)	0.016 (0.48)	-0.080 (-2.52)	-0.022 (-0.71)	0.048 (1.46)	0.036 (1.11)	-0.044 (-1.40)	0.000 (-0.01)	0.033 (0.96)	0.037 (1.14)		-0.025 (-0.84)	0.026 (0.84)
<i>Firm_HI</i>	0.697 (1.30)	1.176 (2.32)	0.943 (1.65)	1.179 (2.22)	0.923 (1.95)	1.364 (3.00)	1.098 (2.19)	1.317 (2.76)		0.708 (1.38)	0.658 (1.16)	1.265 (2.64)	0.689 (1.40)
<i>Ind_HI</i>									0.763 (1.49)				
<i>EAsia</i>										0.635 (4.49)			
<i>NFIBES</i>											-0.007 (-0.17)		
$\bar{R}^2$	52.0%	50.9%	52.4%	50.4%	49.6%	48.5%	50.3%	48.3%	52.1%	53.6%	52.2%	46.8%	55.2%
NObs	542	542	492	542	542	542	492	542	542	542	543	538	538

Table 1.5
Fama-Macbeth Regressions of the Risk Premium Volatility on Investors' Information Environment Measures

This table presents Fama-Macbeth regression results of the risk premium volatility on investors' information environment measures and unreported control variables. The dependent variable is σ_{VAR} in Panel A and is σ_{IRP} in Panel B. σ_{VAR} and σ_{IRP} are, respectively, the log of standard deviation of VAR-based risk premia and IRP estimated each year. Mandatory information environment (i.e., *DReq*, *SReq*, *AcStd*, *Law*, and *AntSel*) and analyst uncertainty are measures of the investors' information environment. *DReq*, *SReq*, and *AcStd* are the respective disclosure requirements, securities regulation, and accounting standard indexes, and *Law* is a legal-related index; these indexes are from La Porta et al. (1998, 2006). *AntSel* is the anti-self-dealing index from Djankov et al. (2006). *Uncertainty* is the analyst uncertainty implied by analyst earnings forecasts and actual earnings reported in the I/B/E/S database. The control variables are σ_{GDP} , *GDPC*, *Turn*, *NFirms*, *MCap*, and *Firm_HI*. σ_{GDP} is the standard deviation of the GDP growth rate. *GDPC* is US-denominated GDP per capita and its coefficient is multiplied by 10^5 . *Turn* is the overall stock market turnover ratio. *NFirms* is the log number of listed firms. *MCap* is the log of country-year median-firm market capitalization at June-end. *Firm_HI* is the firm Herfindahl index. The *EAsia* dummy is equal to 1 for East Asian countries during 1997 and 1998, and zero otherwise. All *t*-statistics reported in parentheses are based on Newey-West heteroskedasticity and autocorrelation corrected standard errors. $\bar{R}^2$ is the adjusted R^2 . Sample period is from January 1988 to December 2005.

	Panel A: Dependent Variable - σ_{VAR}					Panel B: Dependent Variable - σ_{IRP}						
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)	Model (10)	Model (11)	Model (12)
<i>DReq</i>	-0.684 (-7.52)					-0.504 (-5.23)	-0.921 (-2.66)					-0.630 (-2.20)
<i>SReq</i>		-0.922 (-7.73)						-1.318 (-6.10)				
<i>AcStd</i>			-0.750 (-2.13)						-2.113 (-2.86)			
<i>AntSel</i>				-0.466 (-3.47)						-0.843 (-3.77)		
<i>Law</i>	-0.610 (-2.93)	-0.944 (-4.73)	-0.846 (-4.47)	-0.378 (-1.58)		-0.513 (-3.15)	-1.206 (-5.46)	-1.134 (-6.16)	-1.024 (-3.30)	-0.613 (-2.25)		-1.028 (-4.88)
<i>Uncertainty</i>					0.404 (1.38)	0.553 (3.69)					1.163 (4.56)	0.805 (4.93)

Table 1.6
Summary Statistics on IRP and Economic Variables during the Asian Financial Crisis

This table reports summary statistics of additional variables employed in our analysis of the impact of information measures on the time variation in equity risk premia during the 1997 Asian financial crisis. $IRP_{Dec'96}$ is the implied risk premium measured in December 1996, and $IRP_{High'98}$ is the highest implied risk premium measured during 1998. $IRP_{\Delta} = IRP_{High'98} - IRP_{Dec'96}$. $GBudget$ is the central government's budget deficit or surplus as a percent of GDP in 1996, and $Reserves$ is the central bank's reserves in billions of US dollars at the end of 1996. $GBudget$ and $Reserves$ from Johnson et al. (2000). $EAsiaDummy$ is equal to one for China, Hong Kong, Indonesia, Korea, Malaysia, the Philippines, Singapore, Thailand, and Taiwan and zero otherwise.

Country (1)	$IRP_{Dec'96}(\%)$ (2)	$IRP_{High'98}(\%)$ (3)	$IRP_{\Delta}(\%)$ (4)	$GBudget(\%)$ (5)	$Reserves$ (6)	$EAsiaDummy$ (7)
Argentina	7.54	11.07	3.53	-2.0	18.1	0
Brazil	12.69	19.43	6.74	-3.9	60.1	0
Chile	5.82	12.15	6.33	2.2	14.8	0
China	5.50	14.63	9.13	-0.9	107.0	1
Colombia	7.33	28.37	21.04	-1.1	9.6	0
Czech Republic	10.96	13.32	2.36	-0.1	12.4	0
Greece	8.76	8.45	-0.31	-7.4	17.5	0
Hong Kong	8.13	15.76	7.63	1.3	63.8	1
Hungary	11.15	16.83	5.67	-3.3	9.8	0
India	15.60	14.22	-1.38	-5.0	20.2	0
Indonesia	7.40	29.29	21.89	0.0	18.3	1
Israel	6.54	7.47	0.93	-4.3	11.4	0
Korea	8.27	18.30	10.03	-1.8	33.2	1
Malaysia	3.87	14.21	10.34	-0.5	27.0	1
Mexico	10.84	15.56	4.72	0.4	19.4	0
Philippines	7.43	15.24	7.81	-0.2	10.0	1
Poland	10.62	15.85	5.24	-2.5	17.8	0
Portugal	4.12	5.34	1.22	-2.3	21.9	0
Singapore	3.19	10.86	7.67	7.0	76.8	1
South Africa	9.49	15.84	6.36	-5.6	0.9	0
Taiwan	2.15	6.09	3.94	-8.7	88.0	1
Thailand	7.98	16.69	8.71	1.5	37.7	1
Turkey	26.38	39.10	12.72	-8.2	16.5	0
Venezuela	11.51	34.01	22.50	1.4	11.8	0

Table 1.7
Information Measures and Changes in Risk Premia During the Asian Financial Crisis

This table reports regression results of IRP_{Δ} on the investors' information environment variables and unreported control variables. $IRP_{\Delta} = IRP_{High'98} - IRP_{Dec'96}$, where $IRP_{High'98}$ is the highest implied risk premium measured during 1998, and $IRP_{Dec'96}$ is the implied risk premium measured in December 1996. Mandatory information environment (i.e., $DReq$, $SReg$, $AcStd$, Law , and $AntSel$) and analyst uncertainty are measures of the investors' information environment. $GBudget$ is the central government's budget deficit or surplus as a percent of GDP in 1996, and $Reserves$ is the central bank's reserves in billions of US dollars at the end of 1996. $GBudget$ and $Reserves$ are from Johnson et al. (2000). $EAsiaDummy$ is equal to one for China, Hong Kong, Indonesia, Korea, Malaysia, Philippines, Singapore, Thailand, and Taiwan and zero otherwise. $DReq$ is the disclosure requirements index; $SReg$ is the securities regulation index; $AcStd$ is the accounting standard index; Law is a legal-related index. $DReq$, $SReg$, $AcStd$ and Law are from La Porta et al. (1998, 2006). $AntSel$ is the anti-self-dealing index in Djankov et al. (2006). $Uncertainty$ is the analyst uncertainty implied by analyst earnings forecasts and actual earnings reported in the I/B/E/S database. The control variables are σ_{GDP} , $GDPC$, $Turn$, $NFirms$, $MCap$, and $Firm.HI$. σ_{GDP} is the standard deviation of the GDP growth rate. $GDPC$ is US-denominated GDP per capita and its coefficient is multiplied by 10^5 . $Turn$ is the overall stock market turnover ratio. $NFirms$ is the log number of listed firms. $MCap$ is the log of country-year median-firm market capitalization at June-end. $Firm.HI$ is the firm Herfindahl index. $\bar{R}^2$ is the adjusted R^2 .

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
Intercept	0.078 (4.04)	0.078 (3.99)	0.242 (4.14)	0.269 (3.95)	0.269 (2.17)	0.143 (2.31)	0.071 (2.50)	0.236 (3.47)
<i>EAsiaDummy</i>	0.056 (1.70)	0.020 (0.70)	0.109 (2.91)	0.118 (2.85)	0.062 (1.31)	0.052 (1.22)	0.022 (0.49)	0.102 (1.92)
<i>DReq</i>			-0.198 (-2.99)					-0.191 (-2.52)
<i>SReg</i>				-0.283 (-2.74)				
<i>AcStd</i>					-0.252 (-1.34)			
<i>AntSel</i>						-0.022 (-0.32)		
<i>Law</i>			-0.112 (-1.16)	-0.096 (-0.96)	-0.119 (-1.04)	-0.101 (-0.82)		-0.112 (-1.12)
<i>Uncertainty</i>							0.019 (1.21)	0.003 (0.22)
<i>Reserves</i> * 10^{-1}	-0.007 (-1.24)		-0.005 (-0.54)	-0.006 (-0.65)	0.000 (0.02)	-0.004 (-0.39)	-0.007 (-0.92)	-0.004 (-0.43)
<i>GBudget</i> * 10^{-1}		0.047 (1.21)						
$\bar{R}^2$	4.0%	3.7%	34.8%	30.7%	-4.5%	-3.3%	6.1%	30.4%
NObs	24	24	20	20	19	20	20	20

Table 1.8
Alternative Measures of the Information Environment

This table presents panel regression results of the risk premium volatility on alternative measures of the information environment and unreported control variables. Panel A reports the panel regression results of σ_{VAR} on the measures of the information environment. σ_{VAR} is the log standard deviation of the monthly VAR-based expected-return news, calculated over the past 12 months. *DScore* is the financial disclosure score index in Jin and Myers (2006). *FTrans* and *GTrans* are financial and governance transparency factors in Bushman et al. (2004). *Opacity* is PricewaterhouseCoopers's opacity index in Gelos and Wei (2005). *ETrans* is the earnings transparency index in Bhattacharya, Daouk, and Welker (2003). The control variables are σ_{GDP} , *GDPC*, *Turn*, *NFirms*, *MCap*, and *Firm_HI*. σ_{GDP} is the standard deviation of the GDP growth rate. *GDPC* is US-denominated GDP per capita and its coefficient is multiplied by 10^5 . *Turn* is the overall stock market turnover ratio. *NFirms* is the log number of listed firms. *MCap* is the log of country-year median-firm market capitalization at June-end. *Firm_HI* is the firm Herfindahl index. Panel B reports panel regression results of σ_{IRP} on measures of the information environment. σ_{IRP} is the log standard deviation of the implied risk premium, calculated over the past 12 months. All *t*-statistics reported in parentheses are based on Newey-West heteroskedasticity and autocorrelation corrected standard errors. $\bar{R}^2$ is adjusted R^2 . The sample period is from January 1988 to December 2005.

	Panel A: σ_{VAR}				Panel B: σ_{IRP}			
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
<i>DScore</i>	-2.152 (-2.94)				-3.378 (-5.07)			
<i>FTrans</i>		-0.253 (-5.28)				-0.372 (-6.14)		
<i>GTrans</i>		-0.144 (-4.58)				-0.244 (-5.79)		
<i>Opacity</i>			0.987 (3.88)				0.860 (2.59)	
<i>ETrans</i>				-0.551 (-3.45)				-0.314 (-1.81)
$\sigma(GDP)$	9.360 (5.64)	12.831 (7.47)	4.682 (3.05)	12.241 (5.98)	6.604 (2.63)	9.142 (3.33)	2.888 (1.06)	3.926 (1.73)
<i>GDPC</i>	-2.351 (-4.66)	-1.677 (-4.94)	-1.973 (-5.20)	-2.343 (-6.40)	0.077 (0.18)	0.355 (0.87)	-1.214 (-2.50)	-1.301 (-3.93)
<i>Turn</i>	0.051 (1.43)	0.014 (0.30)	0.035 (1.21)	0.062 (1.60)	-0.020 (-0.38)	0.027 (0.58)	-0.014 (-0.32)	0.105 (2.67)
<i>MCap</i>	-0.032 (-0.92)	0.018 (0.53)	-0.029 (-0.89)	-0.106 (-2.81)	-0.086 (-2.00)	0.019 (0.53)	-0.084 (-1.58)	-0.103 (-2.45)
<i>NFirms</i>	-0.063 (-1.79)	-0.015 (-0.50)	-0.183 (-6.17)	-0.047 (-1.60)	-0.067 (-2.02)	-0.006 (-0.22)	-0.073 (-1.42)	-0.050 (-1.69)
<i>Firm_HI</i>	0.625 (1.12)	0.451 (0.88)	0.076 (0.28)	1.499 (4.76)	0.376 (0.73)	1.318 (2.56)	1.596 (3.21)	1.306 (2.01)
$\bar{R}^2$	60.7%	65.3%	70.0%	61.7%	41.8%	53.3%	36.5%	43.0%
NObs	456	460	298	427	488	506	367	435

Table 1.9
Information Environment Measures and Adjusted Risk Premium Volatility

This table reports panel regressions of the adjusted risk premium volatility on measures of the investors' information environment and unreported control variables. The risk premium volatility is adjusted for the conditional variance and for the conditional variance and hedging demands. *DReq*, *SReq*, and *AcStd* are the respective disclosure requirements, securities regulation, and accounting standard indexes, and *Law* and *Enf* are legal-related indexes; these indexes are from La Porta et al. (1998, 2006). *AntSel* is the anti-self-dealing index from Djankov et al. (2006). *Uncertainty* is the analyst uncertainty implied by analyst earnings forecasts and actual earnings reported in the I/B/E/S database. The control variables are σ_{GDP} , *GDPC*, *Turn*, *NFirms*, *MCap*, and *FirmHI*. σ_{GDP} is the standard deviation of the GDP growth rate. *GDPC* is US-denominated GDP per capita and its coefficient is multiplied by 10^5 . *Turn* is the overall stock market turnover ratio. *NFirms* is the log number of listed firms. *MCap* is the log of country-year median-firm market capitalization at June-end. *FirmHI* is the firm Herfindahl index. All *t*-statistics reported in parentheses are based on Newey-West heteroskedasticity and autocorrelation corrected standard errors. $\bar{R}^2$ is adjusted R^2 . Sample period is from January 1988 to December 2005.

Panel A: σ_{VAR} adjusted for													
(i) Conditional Variance							(ii) Conditional Variance and Hedging Demands						
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)	Model (10)	Model (11)	Model (12)	
<i>DReq</i>	-0.498 (-3.24)					-0.410 (-2.69)	-0.509 (-2.87)					-0.391 (-2.21)	
<i>SReq</i>		-0.627 (-3.75)						-0.698 (-3.55)					
<i>AcStd</i>			-0.064 (-0.17)						0.571 (1.22)				
<i>AntSel</i>				-0.171 (-1.46)						-0.193 (-1.50)			
<i>Law</i>	-0.930 (-4.65)	-0.944 (-4.89)	-1.042 (-5.21)	-0.876 (-4.08)		-0.816 (-4.21)	-1.034 (-4.40)	-1.048 (-4.66)	-1.272 (-5.33)	-0.971 (-4.04)			-0.898 (-3.97)
<i>Uncertainty</i>					0.345 (2.98)	0.258 (2.77)					0.424 (2.97)	0.333 (2.79)	
$\bar{R}^2$	66.1%	66.7%	64.5%	65.0%	63.9%	67.4%	56.0%	57.0%	55.4%	54.9%	54.1%	58.2%	
NObs	493	493	467	493	481	481	493	493	467	493	481	481	

Table 1.9 – Continued
Analysts’ Information Environment Measures and Adjusted Risk Premium Volatility

Panel B: σ_{IRP} adjusted for											
(i) Conditional Variance						(ii) Conditional Variance and Hedging Demands					
Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)	Model (10)	Model (11)	Model (12)
<i>DReq</i>	-1.029 (-5.40)				-0.789 (-4.26)	-0.970 (-5.11)					-0.770 (-4.06)
<i>SReg</i>	-1.088 (-6.04)						-0.983 (-5.90)				
<i>AcStd</i>		-1.659 (-4.80)						-1.549 (-4.71)			
<i>AntSel</i>			-0.630 (-4.69)						-0.575 (-4.51)		
<i>Law</i>	-1.280 (-5.88)	-1.274 (-5.82)	-1.263 (-4.62)	-1.064 (-4.54)	-1.228 (-6.12)	-1.280 (-6.07)	-1.272 (-5.99)	-1.280 (-4.98)	-1.081 (-4.76)		-1.220 (-6.39)
<i>Uncertainty</i>				0.586 (3.65)	0.462 (3.47)					0.496 (3.04)	0.375 (2.77)
$\bar{R}^2$	54.2%	53.9%	55.4%	52.8%	50.1%	55.0%	54.3%	56.0%	53.4%	49.3%	57.9%
NObs	534	534	484	534	530	534	534	484	534	530	530

Table 1.10
Various Specifications in VAR Approach

Panel A of this table presents, by country, proportion of the variation of expected return news to stock market excess return variation, estimated using the VAR method for the period 1988 to 2005. Panel B presents the panel regressions of σ_{VAR} , estimated from specifications in Panel A, on mandatory information environment variables. Specification 1 (S1) has the full state variables used in estimating the VAR system including the domestic (foreign) excess stock return, world excess stock return, real interest rate, relative bill rate, domestic (foreign) price-to-earnings ratio, world price-to-earnings ratio, default spread, term spread, excess bond return, real exchange rate of the US dollar for foreign markets, and segmentation. S2 drops segmentation and world price-to-earnings ratio in the full state variable set. S3 drops segmentation and world excess stock return. S4 drops world price-to-earnings ratio and world excess stock return. S5 drops segmentation and world excess stock return, and replaces world price-to-earnings ratio with world dividend yield ratio. S6 drops segmentation and replaces domestic (foreign) price-to-earnings ratio and world price-to-earnings ratio with dividend yield ratio. S7 drops segmentation, world price-to-earnings ratio, and world excess stock return. S8 drops segmentation and relative bill rate. S9 drops segmentation, default spread, term spread, and excess bond return. S10 drops segmentation, relative bill rate, default spread, term spread, and excess bond return.

Panel A: Robustness of VAR specification										
Market	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Argentina	1.487	0.309	1.611	0.366	2.100	1.178	0.307	1.632	1.264	1.272
Australia	0.921	0.894	0.934	0.954	0.895	0.794	0.936	0.878	0.721	0.723
Austria	1.165	1.207	1.193	1.164	1.328	1.216	1.187	1.219	1.403	1.341
Belgium	0.352	0.374	0.371	0.345	0.366	0.364	0.369	0.378	0.353	0.298
Brazil	1.181	1.028	1.198	0.992	1.147	0.868	1.032	1.310	1.320	1.247
Canada	0.478	0.461	0.461	0.521	0.586	0.539	0.457	0.449	0.398	0.342
Chile	2.109	1.745	2.212	1.283	1.730	2.347	1.676	2.781	2.583	2.565
China	1.090	0.832	1.066	0.821	1.059	0.741	0.836	1.076	0.804	0.812
Colombia	5.504	3.606	4.043	3.505	2.862	4.145	3.189	5.091	2.223	2.214
Denmark	0.699	0.318	0.334	0.739	0.310	0.567	0.318	0.295	0.236	0.243
Finland	1.702	1.203	1.346	1.613	1.120	0.890	1.200	1.602	0.818	0.789
France	0.144	0.133	0.131	0.143	0.140	0.225	0.132	0.131	0.099	0.086
Germany	0.340	0.328	0.331	0.324	0.352	0.313	0.322	0.343	0.276	0.281
Greece	0.661	0.667	0.757	0.523	0.654	0.574	0.671	1.052	0.957	0.707
Hong Kong	0.219	0.211	0.201	0.207	0.217	0.474	0.205	0.196	0.213	0.216
India	0.282	0.330	0.273	0.216	0.316	1.053	0.273	0.263	0.057	0.057
Indonesia	1.291	1.026	1.161	0.947	1.154	1.740	0.968	1.259	0.626	0.601
Ireland	0.464	0.417	0.460	0.418	0.429	0.506	0.420	0.410	0.285	0.305
Italy	0.451	0.305	0.396	0.321	0.408	0.347	0.275	0.505	0.602	0.549
Japan	0.400	0.413	0.397	0.398	0.425	0.546	0.409	0.323	0.275	0.297
Korea	1.040	1.123	1.089	1.107	1.122	1.076	1.125	1.097	1.053	1.042
Malaysia	0.484	0.460	0.622	0.413	0.911	1.078	0.462	0.634	0.209	0.207
Mexico	1.232	0.688	1.185	0.588	1.043	0.954	0.659	1.145	1.025	0.996
Netherlands	0.489	0.351	0.362	0.587	0.502	0.478	0.350	0.354	0.325	0.308
New Zealand	0.708	0.722	0.665	0.693	0.725	0.781	0.702	0.703	0.344	0.397
Norway	0.434	0.330	0.431	0.370	0.428	0.758	0.320	0.368	0.353	0.368
Peru	3.442	1.130	3.083	1.027	2.637	1.952	1.053	4.214	3.566	3.494
Philippines	1.260	1.179	1.343	1.079	1.501	1.254	1.175	1.109	1.028	1.051
Poland	1.269	0.429	1.187	0.727	0.921	2.246	0.407	1.296	1.771	1.592
Portugal	0.654	0.486	0.627	0.489	0.575	0.592	0.486	0.660	0.362	0.223
Singapore	0.637	0.571	0.654	0.542	0.767	1.027	0.573	0.669	0.695	0.761
South Africa	0.584	0.608	0.619	0.615	0.533	0.485	0.628	0.608	0.606	0.637
Spain	0.916	0.268	0.823	0.282	0.714	0.858	0.269	0.956	1.221	1.287
Sweden	0.172	0.122	0.123	0.113	0.222	0.276	0.103	0.127	0.047	0.050
Switzerland	0.204	0.209	0.211	0.204	0.210	0.216	0.204	0.202	0.164	0.148
Taiwan	0.550	0.550	0.564	0.562	0.573	0.937	0.547	0.470	0.427	0.354
Thailand	1.163	1.289	1.452	0.945	1.591	1.746	1.272	1.418	0.679	0.680
Turkey	0.834	0.919	0.837	0.864	0.772	0.547	0.882	0.816	0.811	0.698
U.K.	0.646	0.682	0.659	0.626	0.666	0.999	0.658	0.659	0.518	0.517
U.S.	0.383	0.399	0.371	0.384	0.426	0.501	0.394	0.377	0.259	0.238

Table 1.10 – Continued
Various Specifications in VAR Approach

	Panel B: Robustness of Regressions with VAR Specification									
	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
<i>DReq</i>	-0.517 (-3.33)	-0.166 (-0.87)	-0.465 (-2.91)	-0.203 (-1.11)	-0.357 (-2.19)	-0.167 (-1.06)	-0.168 (-0.88)	-0.618 (-3.91)	-0.808 (-4.38)	-0.694 (-3.65)
<i>Law</i>	-0.970 (-4.81)	-0.796 (-3.36)	-0.885 (-4.31)	-0.790 (-3.24)	-0.747 (-3.78)	-0.821 (-4.05)	-0.766 (-3.17)	-0.811 (-4.14)	-1.061 (-5.21)	-1.142 (-5.23)
σ_{GDP}	11.541 (7.75)	5.993 (2.13)	12.109 (7.77)	6.848 (2.81)	12.793 (7.93)	12.551 (7.76)	6.478 (2.39)	12.137 (7.77)	11.788 (5.74)	11.297 (5.02)
<i>GDP</i>	-0.798 (-1.71)	-1.148 (-2.02)	-1.155 (-2.32)	-0.780 (-1.40)	-1.168 (-2.46)	-1.024 (-2.05)	-1.117 (-1.93)	-1.420 (-3.06)	-0.265 (-0.45)	-0.140 (-0.22)
<i>Turn</i>	0.064 (2.00)	0.172 (3.46)	0.062 (1.83)	0.173 (3.85)	0.053 (1.65)	0.035 (1.07)	0.170 (3.50)	0.039 (1.13)	0.073 (1.59)	0.074 (1.53)
<i>MCap</i>	-0.053 (-1.63)	-0.129 (-3.07)	-0.059 (-1.71)	-0.115 (-2.79)	-0.065 (-2.05)	-0.005 (-0.15)	-0.131 (-3.14)	-0.043 (-1.27)	-0.054 (-1.32)	-0.047 (-1.12)
<i>NFirms</i>	-0.041 (-1.25)	-0.072 (-1.90)	-0.042 (-1.20)	-0.087 (-2.26)	-0.031 (-0.94)	0.005 (0.15)	-0.077 (-1.99)	-0.025 (-0.75)	-0.068 (-1.44)	-0.072 (-1.51)
<i>Firm_HI</i>	0.274 (0.44)	-0.407 (-0.52)	0.048 (0.08)	-0.185 (-0.24)	-0.071 (-0.13)	-0.245 (-0.44)	-0.389 (-0.50)	0.051 (0.08)	-0.546 (-0.90)	-0.395 (-0.67)
$\bar{R}^2$	63.1%	49.8%	63.8%	46.9%	63.8%	58.0%	49.7%	64.8%	53.6%	52.3%
NObs	493	493	493	493	493	499	493	493	493	493

Table 1.11
Various Specifications in IRP Approach

This table reports panel regressions of the volatility of different measures of IRP on measures of mandatory information environment. The dependent variable is based on different ICOC estimates. They are estimated from CT, GLS, OJ, MPEG models, Easton's (2004) simultaneous estimates of ICOC, and ETSS model (denoted by IRP_{CT} , IRP_{GLS} , IRP_{OJ} , IRP_{MPEG} , IRP_{Easton} , and IRP_{ETSS} , respectively). $WIRP$ represents value-weight measures. $DReq$ is the disclosure requirements, and Law is law and order index; these indexes are from La Porta et al. (1998, 2006). The control variables are σ_{GDP} , $GDPC$, $Turn$, $NFirms$, $MCap$, and $Firm_{HI}$. σ_{GDP} is the standard deviation of the GDP growth rate. $GDPC$ is US-denominated GDP per capita and its coefficient is multiplied by 10^5 . $Turn$ is the overall stock market turnover ratio. $NFirms$ is the log number of listed firms. $MCap$ is the log of country-year median-firm market capitalization at June-end. $Firm_{HI}$ is the firm Herfindahl index. All t -statistics reported in parentheses are based on Newey-West heteroskedasticity and autocorrelation corrected standard errors. $\bar{R}^2$ is adjusted R^2 . Sample period is from January 1988 to December 2005.

Variable	IRP_{CT} (1)	IRP_{GLS} (2)	IRP_{OJ} (3)	IRP_{MPEG} (4)	IRP_{Easton} (5)	IRP_{ETSS} (6)	$WIRP_{CT}$ (7)	$WIRP_{GLS}$ (8)	$WIRP_{OJ}$ (9)	$WIRP_{MPEG}$ (10)
$DReq$	-0.994 (-5.26)	-0.758 (-4.34)	-1.046 (-4.99)	-0.916 (-5.17)	-1.982 (-5.54)	-0.880 (-4.49)	-1.122 (-5.88)	-0.569 (-3.40)	-1.047 (-4.19)	-0.904 (-4.43)
Law	-1.357 (-5.57)	-0.940 (-5.03)	-1.425 (-5.60)	-1.407 (-7.46)	-2.241 (-6.18)	-1.160 (-5.16)	-1.405 (-5.37)	-1.011 (-5.52)	-1.840 (-6.69)	-1.519 (-7.45)
σ_{GDP}	10.350 (4.36)	6.041 (2.78)	10.152 (3.56)	8.777 (4.21)	15.413 (3.51)	6.634 (2.67)	11.036 (4.37)	2.819 (1.49)	9.402 (2.93)	12.463 (4.70)
$GDPC$	0.993 (1.86)	-0.200 (-0.46)	0.894 (1.73)	1.233 (2.67)	1.189 (1.38)	-0.246 (-0.44)	1.008 (1.80)	-0.228 (-0.53)	1.286 (1.98)	1.488 (2.68)
$Turn$	0.030 (0.77)	0.040 (1.03)	0.079 (1.36)	-0.011 (-0.31)	-0.157 (-2.00)	0.066 (1.29)	0.029 (0.59)	0.094 (2.58)	0.074 (1.39)	0.026 (0.67)
$MCap$	-0.091 (-2.30)	0.003 (0.10)	-0.107 (-2.32)	-0.042 (-1.19)	-0.060 (-1.00)	0.030 (0.62)	-0.089 (-2.10)	0.004 (0.12)	-0.071 (-1.51)	-0.069 (-1.77)
$NFirms$	0.000 (0.00)	0.037 (1.17)	0.001 (0.01)	0.017 (0.51)	-0.199 (-3.84)	-0.041 (-1.01)	0.061 (1.74)	0.016 (0.45)	-0.003 (-0.07)	-0.002 (-0.05)
$Firm_{HI}$	0.800 (1.19)	1.250 (1.90)	0.373 (0.62)	0.847 (1.72)	0.502 (0.91)	-0.168 (-0.28)	0.880 (1.32)	1.317 (1.98)	1.144 (2.02)	1.467 (3.18)
$\bar{R}^2$	50.3%	52.0%	43.3%	47.8%	55.9%	39.0%	50.3%	50.8%	48.9%	49.2%
NObs	526	527	536	542	539	515	521	521	527	539

2 MUTUAL FUND TRADING AROUND THE WORLD: DO INFORMATION ENVIRONMENTS MATTER?

2.1 Introduction

The momentum and contrarian trading strategies of mutual funds have received considerable attention in financial economics. Indeed, the sheer size of the mutual fund industry (\$12.47 trillion in equity as of 2007, which accounts for 20 percent of world market capitalization) and its growing trend (asset size tripled over the past decade) reflect the important role mutual funds play in global financial markets. Hence their trading strategies have important implications for financial asset prices and are of interest to many academics, practitioners and investors at large.

Previous studies show that mutual funds' trading are significantly associated with past returns. For example, Grinblatt, Titman, and Wermers (1995), Wermers (1999), among others, show that U.S. mutual funds engage in momentum trading or trend chasing strategies. Grinblatt and Keloharju (2000) document that foreign investors (often mutual funds and investment firms) are momentum traders in Finland. Due to the difficulty of obtaining international fund data, existing empirical studies primarily focus on U.S. institutions or a single country. No study has yet examined the trading strategies of mutual funds across the globe. It is thus not clear whether existing evidence on mutual fund trading strategies can be generalized to countries around the world. The lack of international data also makes it difficult to study the forces underlying fund trading because country-level institutional factors can play an important role in how funds formulate their strategies.

Given an immensely rich global dataset that recently becomes available to us, we are able to address these critical issues. To the best of our knowledge, this study represents the first international study to conduct a thorough and comprehensive examination of the trading behavior of mutual funds worldwide. The richness of our dataset also allows us to examine cross-country differences in mutual fund trading behavior as well as gaining insights into the underlying factors that drive their trading strategies. We employ a database from Thomson Financial Securities

(TFS) that contains detailed equity holdings of 14,198 domestic mutual funds from 19 developed and 13 emerging countries and 41,750 foreign mutual funds in 20 developed and 18 emerging countries worldwide for the period 1998 to 2007. Over the sample period, these funds together invest a sizeable amount of about \$4.89 trillion on average in these markets.

We use the semi-annual changes in equity holdings of the sample domestic and foreign funds to determine fund buys and sells during each six-month holding period. Distinguishing between fund buys and sells allows us to capture the different investment motivations for fund trades. Typically, fund buys are motivated by positive information or by funds' optimistic expectations of the future performance of stocks. On the other hand, fund sells could reflect negative information or funds' pessimistic expectations of a stock's future performance that causes funds to sell the stock, and/or suggest various motivations such as liquidity needs, portfolio diversification or rebalancing. Our results show that the investment decisions of mutual funds are strongly related to past stock returns. Mutual funds, in general, systematically buy and sell winner stocks, even after controlling for book-to-market, size, and country effects as well as fund styles. The finding is more pronounced among foreign funds than domestic funds. These fund trading strategies have important implications about the existence of information asymmetry between domestic and foreign funds and about their return performances. Our study therefore proceeds to address these related issues.

In the international finance literature, the question of whether domestic investors are better informed than foreign investors remains controversial.²⁶ Studies such as Shukla and van Inwegen (1995), Hau (2001), Choe, Kho, and Stulz (2005), and Dvorak (2005) collectively show that domestic investors are better informed than foreign investors. On the other hand, Seasholes (2000), Grinblatt and Keloharju (2000), Froot, O'Connell, and Seasholes (2001) and Froot and Ramadorai (2001) argue that foreign investors are more sophisticated than locals. Furthermore, theoretical models suggest different predictions about investor trading behavior. Rational asset

²⁶There is also an extensive empirical literature that compares information or performance differences between foreign investors or local institutions and domestic individual investors that we do not discuss here.

pricing models of Wang (1993) and Brennan and Cao (1997) provide some empirical implications for the trading behavior of informed and uninformed investors. Their models predict that less informed investors are momentum investors, whereas more informed investors are contrarians. Brennan and Cao develop their model in an international context and argue that foreign investors are typically informationally disadvantaged and hence they would underperform domestic investors. The behavioral finance literature,²⁷ on the other hand, employs psychological biases to explain investor trading behavior. Daniel, Hirshleifer, and Subramanyam (1998) develop a model of investor confidence and show that overconfident-informed investors overreact to their private information, causing short-term return momentum. We argue that the varying implications of the two theoretical models are specific to the quality of information environment.

When the information environment is rich, both domestic and foreign institutions have greater incentives to gather more information and conduct informed trading. In this case, the trading strategies of domestic and foreign investors in the Brennan and Cao model would not differ significantly. However, the greater likelihood of being informed makes domestic institutions overconfident; here it is reasonable to assume that foreigners are less confident since they are in a foreign environment. As a result, domestic institutions may do more momentum trading, as implied by the Daniel, Hirshleifer, and Subramanyam model. On the other hand, when the information environment is poor, foreigners would be less informed than their domestic counterparts. As implied by both Brennan and Cao, this weak information environment might induce foreigners to do more momentum trading than domestic institutions. In such an information environment, it is less likely that investors would be overconfident.

Our current work expands this stream of empirical and theoretical literature by examining whether foreign or domestic funds are informationally disadvantaged relative to their counterparts across the globe. Unlike extant studies, we use a different approach to examining this issue. We test whether and how a firm's and country's information environments drive the trading strategies of domestic and foreign funds and also whether their strategies have any predictive

²⁷See, for example, Barberis, et al. (1998), Daniel, et al.(1998), and Hong and Stein (1999).

abilities for future stock returns. Given the substantial mixed evidence from the institutional trading literature and different theoretical predictions about investor trading behavior, it is important that our study lets the comprehensive fund holdings data tell their own story rather than tell the story of models that impose on the data.

Drawn from existing literature, we employ seven proxies for a country's information environment. These proxies include the corporate governance related disclosure requirement index from La Porta et al. (LLSV, 2005), the exchange related non-survey disclosure requirement index from Frost, Gordon, and Hayes (2006), the anti-self-dealing index from Djankov et al. (2007), a developed country dummy, and finally, three proxies from Bushman, Piotroski, and Smith (2004). The latter are a measure of the frequency and comprehensiveness of interim report, the financial transparency index, and the governance transparency index.

Additionally, we employ three measures of a firm's information environment. We use the probability of informed trades (PIN), as developed in the structural microstructure model of Easley, Hvidkjaer, and O'Hara (2002), and an adjusted PIN , extended by Duarte and Young (2007), as measures of stock price informativeness. Large PIN firms indicate that more information of the firms is revealed by their stocks through informed trading, and hence greater stock price informativeness. Ferreira and Laux (2007) show that firms with better corporate governance would tend to encourage investors to gather more information about the firms. Vega (2006) finds that higher PIN stocks experience a lower post announcement earnings drift, an indication that information gets incorporated promptly and effectively into their stock prices. Therefore, these results suggest that PIN is a reasonable proxy for a firm's information environment. We use global intradaily equity transactions data from TAQTIC to estimate the two different PIN measures for our sample of more than 12,000 different stocks around the world. In addition, R^2 has been widely used as another measure of stock price informativeness (e.g., Morck, Yeung, and Yu (2000)). We adopt R^2 as an alternative proxy for the firm-level information environment.

Our evidence suggests that foreign funds engage in more momentum buying than domestic funds in countries and firms with poor information environments. Domestic funds, on the other hand, tend to buy more winner stocks than their foreign counterparts in countries and firms with high-quality information environments. We also find that the trading activity of domestic funds predicts future stock returns better than that of foreign funds, especially in low-information environments. Taken together, our results suggest that foreign funds are informationally disadvantaged relative to domestic funds. Finally, there is also little evidence that the trading of foreign funds destabilizes stock prices, especially in markets with low information quality, where foreigners are typically convenient targets for blame. Foreign funds, in fact, help speed up the price adjustment toward its efficient level.

Our research contributes to a growing literature on mutual funds around the world. Khorana, Servaes, and Tufano (2002) present the first study to look at mutual funds worldwide. These authors examine what factors contribute to the size of the global fund industry and also explain why the size of the fund industry varies across 56 countries. Their subsequent study in 2008, however, focuses on how funds from various countries charge their fees and explain why these fees differ across their sample of 18 countries. Covrig, Lau, and Ng (2006) examine the stock preferences of domestic and foreign funds across 13 developed countries. Ferreira, Miguel, and Ramos (2007) investigate the determinants of domestic fund performance for 19 countries. They focus on the fund-level performance, while we evaluate fund performance based on their stockholdings.

The remainder of this paper is as follows. Section 2.2 describes the data sources of our sample and the construction of the key variables employed in our study. Sections 2.3 and 2.4 provides evidence on the trading strategies of domestic and foreign funds and shows the impact of information environments on fund trading strategies. The final section concludes.

2.2 Data and Sample Description

This study uses data from several different sources. Our sample consists of (a) mutual fund stockholdings from TFS for the period 1999 to 2005, (b) monthly stock returns from Datastream, (c) intradaily equity transactions data from Taqtic, and (d) firm-specific and country financial variables from Worldscope, International I/B/E/S, International Financial Statistics (IFS), World Development Indicators, and Economic Freedom Network.

2.2.1 Mutual Fund Holdings

TFS mutual fund database contains the information of mutual funds worldwide, starting 1999. The database only includes equity mutual funds that hold at least one stock. Therefore, it excludes money market funds and fixed income funds. TFS provides three data files: (a) the Fund Master File, containing the fund number, fund name, management company name, country code, and report date; (b) the Security Master File, containing the security number, security name, country code, security price in U.S. dollar, and shares outstanding; and (c) the Portfolio Holdings File, containing the fund number, security number, number of shares held by the fund, and net changes in shares held since prior report dates. A majority of these mutual funds report their holdings at least twice a year.

Over the sample period, our sample contains, on average, 19,639 domestic mutual funds and 125,357 foreign funds that have equity investments in 20 developed and 8 emerging markets. Summary statistics of domestic and foreign funds, by country, are presented in Table 2.1. As shown in Panel A, the number of domestic funds varies substantially across countries, with the largest in the U.S. (i.e., 4,786) and smallest in Austria (i.e., 71). On average, funds from the developed markets have larger average total net asset value (TNA), compared with their counterparts from the developing markets. There are also large variations in the percentage of TNA invested in domestic markets and in the number of domestic stocks held by domestic funds. The panel also reports the domestic funds' average scores for market capitalization (size), book-

to-market ratio (BM), and average monthly turnover ratio over the past six months (turnover). The scores are constructed as follows.

For each country, at the beginning of every six-month period, we rank all available stocks based on, respectively, size, BM, and turnover. Each stock is assigned a fractional ranking (between 0 and 1), with 0 for the lowest ranked stock and 1 for the highest ranked stock. Then we take the average of the fractional rankings of all stocks held by each fund as the fund's score. We also report the average percentage buy (sell) volume for each stock. The buy (sell) volume is derived by first calculating funds' aggregate trading volume relative to the shares outstanding for each stock, and then averaging across all stocks held in each six-month period. Unless stated otherwise, all statistics are measured every six months and then averaged over the sample period. Consistent with earlier studies,²⁸ the findings suggest that funds in general have a strong preference for large size stocks and stocks with low BM and high turnover. Overall, we find similar patterns in foreign funds reported in Panel B of Table 2.1.

Given the extreme variation in the firms' size, BM, and turnover within and across countries, we sort all available stocks in a country by these three characteristics, separately, and then divide them into 50 portfolios. We assign a categorical value to each portfolio, with 1 to the portfolio having the lowest value (for example, size) and 50 to the one having the highest.

2.2.2 Proxies of the Country-Level Information Environment

Drawn from existing literature, we employ the following seven measures of the information environment at the country level.

- (i) Disclosure requirements index, *DisReq*, which is the average score of six sub-indexes: prospectus delivering, insider compensations, large shareholder ownership, insider ownership, contracts outside the normal course of business, and related parties' transactions.

²⁸For example, Falkenstein (1996) and Aggarwal, Klapper, and Wysocki (2004) study U.S. funds and Covrig, Lau, and Ng (2006) examine mutual funds from 13 developed markets and all these studies show that funds generally prefer stocks with large market capitalization, highly liquid stocks.

All these sub-indexes are dummy variables, and for each sub-index, the value of one is assigned to the index if it signifies high quality disclosure and zero if otherwise.²⁹

- (ii) Anti-self-dealing index, *AntSel*, which is based on a collection of designed surveys answered by attorneys from Lex Mundi Law firms across 72 countries, based on 2003 legal rules. *AntSel* focuses on a country's disclosure quality, approval, and litigation governing self-dealing transactions. Djankov et al. (2006) show that *AntSel* is strongly correlated with disclosure requirements, with a correlation coefficient of about 67%.
- (ii) The timeliness of financial reporting, *Freq*, is a measure of the frequency and comprehensiveness of interim reports. We obtain this index from Bushman, Piotroski, and Smith (2004). The value of *Freq* is defined as the average percentile rank among a sample of countries in the CIFAR dataset.
- (iii) Stock exchange non-survey-based measure, *Disc*, which is the average of five non-survey-based disclosure indexes in Frost, Gordon, and Hayes (2006). They include enforcement action over the period from 1997 to 1998, dissemination of information about rules and enforcement, improvement of disclosure requirements, improvement of exchange enforcement, and changes in information dissemination system.
- (iv) Anti-self-dealing index, *AntSel*, which is based on a collection of designed surveys answered by attorneys from Lex Mundi Law firms across 72 countries, based on 2003 legal rules. *AntSel* focuses on a country's disclosure quality, approval, and litigation governing self-dealing transactions. Djankov et al. (2006) show that *AntSel* is strongly correlated with disclosure requirements, with a correlation coefficient of about 67%.
- (v-vi) Financial transparency factor, *FTran*, and governance transparency factor, *GTran*, are created by factor analysis in Bushman, Piotroski, and Smith (2004). Financial transparency factor captures intensity and timeliness of financial disclosures by firms, and coverage by analysts and media. Governance transparency factor focuses on the intensity

²⁹ A detailed description of these sub-indexes is contained in Table 1 of La Porta et al. (2006).

of governance disclosure on share holdings and remuneration of firms' insiders and major shareholders.

- (vii) Developed market indicator, *Developed*, is equal to 1 if a country's stock market is a developed equity market and 0 otherwise.

Panel A of Table 2.2 presents the distribution of these information environment measures across our sample of 28 countries. Overall, the statistics show that developed countries score better on disclosure and financial and governance transparency measures than do developing countries.

2.2.3 Proxies of the Firm-level Information Environment

We construct three proxies for the firm-level information environment: *PIN*, adjusted *PIN*, and R^2 . The first measure is *PIN*, originally introduced by Easley, Kiefer, O'Hara, and Paperman (1996) and further developed by EHO. Under the assumption that informed trading results in abnormal and unbalanced order flows, *PIN* is estimated from a structural market microstructure model by detecting the probability of a trade that comes from an informed investor. We briefly introduce the intuition of this *PIN* measure below.³⁰

In this model, trades are executed by two groups of investors: informed and uninformed investors. According to independent Poisson processes, uninformed investors submit their buy (sell) orders under a daily rate ε_b (ε_s) for the purpose of liquidity needs or noisy trading, while informed investors utilize their private information advantage to perform informed trading. At the beginning of each trading day, a private information event occurs with the daily probability α , where the probability that bad news happens is δ and the probability that good news happens is $1 - \delta$. If good (bad) news occurs, informed investors execute buy (sell) orders at a daily rate μ . Thus, the probability of an information-based trade is

$$PIN = \frac{\alpha\mu}{\alpha\mu + \varepsilon_b + \varepsilon_s}, \quad (39)$$

³⁰ A more detailed discussion of *PIN* is provided in EHO.

where PIN increases with either the frequency of private information events α or the average daily trading intensity of informed investors μ .

Existing studies widely employ PIN as a proxy of information asymmetry between informed and uninformed investors and stock price informativeness. In asset pricing, EHO show that investors require a premium to compensate for their potential risk of information-based trading, and Duarte et al. (2007) extend EHO's implication and examine the impact of Regulation Fair Disclosure on firms' information environments and the cost of capital. By linking firm characteristics to information asymmetry, Brown, Hillegeist, and Lo (2004) find that firms' conference calls can lead to long-term reductions in PIN s, and Brown and Hillegeist (2007) show that enhancing firms' disclosure quality reduces information asymmetry measured by PIN . Ferreira and Laux (2007) report that firms with fewer anti-takeover restrictions encourage gathering of more private information and greater number of informed trading participants; both of which result in higher PIN s.

There is another strand of research documenting that stocks with high PIN are more informative than those with low PIN . Vega (2006) finds that stocks associated with high PIN experience low or insignificant post-earnings-announcement drift. Moreover, Chen, Goldstein, and Jiang (2006) and Ferreira, Ferreira, and Raposo (2007) show that firm managers can learn from stocks with high PIN in making corporate investment decisions.

Even though PIN has been well established as a good measure of information asymmetry and stock price informativeness, we construct a modified measure of PIN , PIN_{Adj} , developed by Duarte and Young (2007), to avoid possible weaknesses of PIN . Duarte and Young argue that the PIN model is inconsistent with the observed positive correlation between buyer- and seller-initiated order flows and also with the large variance of buys and sells. The main reason is that the PIN model does not distinguish liquidity shocks from abnormal order flows. Buys and sells can increase dramatically on a day even with the absence of private information. For example, when a public news announcement is released, investors may have different opinions as

to what extent it affects stock price. Hence different opinions of public information, as opposed to private information, causes PIN to rise. Alternatively, traders coordinate their trading on a particular day, especially for illiquid stocks, and this may induce an increase in PIN .

In Duarte and Young's (2007) extended PIN model, informed investors submit their buy and sell orders at different daily rates of μ_b and μ_s , respectively, conditional on the day with a private information event. This approach accounts for the possible different variances of buys and sells and also allows for a systematic order flow shock. If a systematic trading occurs with a daily probability θ , traders will execute Δ_b buys and Δ_s sells. Therefore, PIN_{Adj} can be expressed as

$$PIN_{Adj} = \frac{\alpha((1 - \delta)\mu_b + \delta\mu_s)}{\alpha((1 - \delta)\mu_b + \delta\mu_s) + \theta(\Delta_b + \Delta_s) + \varepsilon_b + \varepsilon_s}. \quad (40)$$

Notice that the inclusion of a systematic order flow shock, $\theta(\Delta_b + \Delta_s)$, results in a smaller PIN_{Adj} , compared with PIN .

We estimate (39) and (40) for stocks listed on the main exchange of each sample country for the period 1998 to 2004. All intra-day trade and quote data are collected from TAQTIC. TAQTIC is a historical market server, managed by Securities Industry Research Center of Asia-Pacific (SIRCA), which receives the original data directly from Reuters, and provides global intra-day trade, quote, and market depth data for stocks, financial derivatives, indices, and bonds. For this study, we only employ common stocks and exclude preferred stocks, mutual funds, and other derivatives.

We require trades and quotes submitted in regular trading hours. Trades with special conditions are excluded. For quotes, we eliminate bid-ask spreads which are greater than half of the mid-point quote price. To identify buy- or sell-initiated trades, we employ the Lee and Ready (1991) algorithm. If quotes for a day are missing, we use tick tests to classify trades. We use the likelihood function to estimate parameters for each year. To avoid corner and local optimal solutions, we try ten sets of initial values for each maximization algorithm and obtain full estimations coverage of our sample.

The third measure is R^2 . We follow Morck, Yeung, and Yu (2000) and measure R^2 as follows:

$$r_{i,t} = \alpha_i + \beta_{i,t} r_{m,jt} + \beta_{2,t} [r_{US,t} + e_{j,t}] + \epsilon_{i,t} \quad (41)$$

where $r_{i,t}$ is the return of firm i in time t , $r_{m,jt}$ refers to return of market index for country j , $r_{US,t}$ refers to return of the US market index, and $e_{j,t}$ refers to a change in the exchange rate per US dollar for the currency of country j . We use weekly data to estimate R^2 every six months.

Panel B of Table 2.2 reports firm-level means of PIN and PIN_{Adj} across the 28 developed and developing countries. The United States has the lowest PIN of 0.17. Denmark with PIN of 0.34 and Malaysia with PIN of 0.32 have the largest PIN s. The statistics show a reduced PIN_{Adj} , with the values for United States, Denmark, and Malaysia of 0.16, 0.24, and 0.20, respectively. The average R^2 is 0.15. Consistent with Morck et al., R^2 is lower for developed countries than emerging countries. For example, R^2 is 0.11 for the United States and United Kingdom, while it is 0.25 for Taiwan and 0.22 for Thailand.

2.3 Effects of Past Stock Returns on Fund Trading Strategies

Existing studies have shown that mutual fund trading strategies are strongly associated with past stock returns. Grinblatt, Titman, and Wermers (1995) show that U.S. mutual funds systematically buy past winner stocks and that they do not systematically sell past losers. Using a larger and more recent sample, Wermers (1999) corroborates their finding that U.S. mutual funds tend to buy winners. Kaminsky, Lyons, and Schmukler (2000) examine the trading strategies of U.S. mutual funds in emerging markets and find that these funds systematically buy winners and sell losers. Alti, Kaniel, and Yoeli (2006) provide confirming evidence that mutual funds tend to buy winner stocks. However, all these studies focus only on the trading behavior of U.S. mutual funds.

In this section, we analyze changes in the stock holdings that mutual funds report every six months. Information of the changes in their fund holdings allows us to investigate the trading strategies of both domestic and foreign funds across 28 countries worldwide. Particularly, we

analyze whether domestic and foreign funds adopt similar trading strategies and whether their strategies are affected by past stock returns. We also examine whether fund trading strategies differ for purchases and sales of stocks and for different fund styles.

2.3.1 Past Returns across Countries

We test whether and how past returns influence the trading decisions of domestic and foreign funds. Specifically, we look at the effects of past returns not only on the funds' net changes in stockholdings, but also on their net purchases and net sales of stocks. Investors generally have different motivations for buying and selling a stock. Investors buying stocks is generally motivated by positive information and/or by their optimistic expectations of the future performance of the stocks. On the other hand, investors selling stocks could reflect negative information that causes the investors to sell a stock and/or suggest various motivations, such as liquidity needs, portfolio diversification, and the investors' pessimistic expectations of the stocks' future performance. It is therefore imperative that we distinguish past return effects on fund purchases and sales.

We conduct two regression models. The first model allows us to test the past return effect on funds' net trading, and the other facilitates separate tests of past return effects on the funds' purchases and sales of stocks. They are given as follows.

$$\Delta fo_{j,i,t} = \beta_0 + \beta_1 R_{i,t-1} + \beta_2 MV_{i,t-1} + \beta_3 BM_{i,t-1} + \text{controls} + \epsilon_{i,t}, \quad (42)$$

$$\Delta fo_{j,i,t} = \beta_0 + \beta_1 R_{i,t-1}^B + \beta_2 R_{i,t-1}^S + \beta_3 MV_{i,t-1} + \beta_4 BM_{i,t-1} + \text{controls} + \epsilon_{i,t}. \quad (43)$$

The notations for Models (4) and (43) are as follows. Time t refers to a 6-month interval, with the first interval ending December 2000 and the last ending December 2005. $\Delta fo_{j,i,t}$ is the 6-month net trading of fund j (measured by a change in the fund's percentage holding relative to the number of shares outstanding) in stock i at time t . $R_{i,t-1}$ is the 6-month stock return at time $t - 1$.³¹ $R_{i,t-1}^B$ equals $R_{i,t-1}$ if $\Delta fo_{j,i,t} > 0$ and 0 otherwise, whereas $R_{i,t-1}^S$ equals $R_{i,t-1}$ if

³¹We skip one month when computing $R_{i,t-1}$ to minimize the impact of the bid-ask bounce.

$\Delta f_{o,j,i,t} < 0$ and 0 otherwise. $MV_{i,t-1}$ and $BM_{i,t-1}$ are stock i 's log of market capitalization and log of book-to-market ranks, respectively, at $t - 1$. For part of our analysis we run cross-country pooled regressions. We hence rank each control variable variable within each country to make it comparable across countries. Specifically, for every country and for each t , we group all firms into 50 portfolios based on their $MV_{i,t}$ or $BM_{i,t}$, with rank 1 assigned to the portfolio with the lowest $MV_{i,t}$ or $BM_{i,t}$ values and rank 50 assigned to the portfolio with the highest values. All firms within a portfolio receive the same rank as the portfolio to which they belong. In (4) and (43), we also control for semi-annual effects by incorporating dummy variables into the regression models.

Panel A of Table 2.4 shows, by country, only estimates of the coefficients associated with past returns from Models (4) and (43) together with their t -statistics. Panel A of the table shows those of domestic funds, and Panel B reports their foreign funds' counterparts. There emerge a number of notable observations. First, the results from Model (4) with no distinction between fund buys and sells show that a majority of the domestic and foreign funds are momentum traders. For example, except for the domestic funds from Austria, Brazil, Italy, Taiwan, and Thailand, the coefficients of β_1 for those from the remaining 23 countries are positive. Out of these 23 β_1 estimates, 15 are statistically significant at the 5% level whereas 4 are significant at the 10% level. Similarly, foreign funds are also momentum traders. While their β_1 estimates of all countries, except Greece and South Africa, are positive, 19 of the 26 estimates are statistically significant at the 10% level.

Second, distinguishing fund buys and sells in Model (43) reveals a couple of interesting results. There is strong evidence that mutual funds, especially foreign funds, follow momentum buy strategies. Their decisions to buy are strongly related to past stock returns. Estimates of β_B from Model (43) are all positive and highly significant. For domestic funds, 23 of the β_B estimates are statistically significant at the 5% level and 1 at the 10% level. Only those associated with domestic funds from Austria, Greece, Italy, and the Netherlands, while positive, are statistically insignificant. Interestingly, however, the β_B estimates associated with foreign

funds across all sample countries, except the Netherlands, are statistically significant.

Finally, there is little evidence that in general mutual funds, while not domestic funds from Germany, Greece, Switzerland and the U.K., are momentum investors. That is, though they systematically buy winner stocks, they do not systematically sell loser stocks. With the majority of β_S estimates being negative, this result suggests that mutual funds, on average, follow contrarian-sell strategies – selling winner stocks. In 13 countries (i.e., Australia, Brazil, Canada, Hong Kong, India, Italy, Japan, Norway, Portugal, Singapore, South Africa, Spain, and Thailand), both domestic and foreign funds engage in contrarian-sell strategies. There also appear more contrarian sellers among foreign than domestic funds.

The finding that domestic funds tend to buy winner stocks not only is robust across countries, but also confirms existing U.S. studies on mutual funds by Grinblatt, Titman, and Wermers (1995) and Wermers (1999). Grinblatt, Titman, and Wermers analyze the quarterly holdings of 155 U.S. domestic mutual funds for the period December 1974 to December 1984 and show that most funds tend to purchase stocks that have recently performed well. Wermers reaches the same conclusion using a larger and more recent sample. Badrinath and Wahal (2002) document that U.S. institutions are on average momentum buyers but contrarian sellers. However, our evidence on foreign funds investing in the U.S. contradicts the results of Kaminsky, Lyons, and Schmukler (2000) who look at a small sample of U.S. funds investing in Latin America during April 1993 to January 1999 (24 quarters); they find that these 13 funds on average engage in momentum trading, systematically buying winner stocks and selling loser stocks.

On the other hand, Grinblatt and Keloharju (2000) report that foreign investors (often mutual funds and investment firms) pursue momentum strategies in Finland. It is noted that momentum profits are weakly positive in Finland according to Griffin et al. (2003).

2.3.2 Past Returns and Fund Styles

It is plausible that our above results might be driven simply by some popular fund style(s). Grinblatt, Titman, and Wermers (1995) find that momentum investing is more pronounced in growth and aggressive-growth oriented funds. To address this concern, we re-examine the trading strategies of funds based on their styles. We follow the approach of Chan, Chen, and Lakonishok (2002) to measuring the style of each fund in our sample. Drawn from existing academic research, their style classifications are based on two common dimensions – market capitalization and value-growth.

For each country, at the beginning of every six-month period, we rank all available stocks based on, respectively, their market capitalization (size), book-to-market ratio (BM), and average monthly turnover ratio over the past six months (turnover). Each stock is assigned a fractional ranking (between 0 and 1), with 0 for the lowest ranked stock and 1 for the highest ranked stock. Then we take the average of the fractional rankings of all stocks held by each fund as the fund's rank. Therefore, every fund has a rank each for size, BM, and turnover, and its ranks determine the fund's style. Funds with size ranks above the median size rank of all funds are classified as large-cap funds and those equal or below as small-cap funds. Similarly, funds with BM ranks above the median BM rank of all funds are classified as value funds and those equal or below as growth funds. In total, funds are classified into four different styles.

Similar to those of Panel A, Table 2.4, for each country, we re-estimate Models (4) and (43) for funds by style. We also perform similar tests by pooling all funds with the same style across countries and across the sample period, while controlling for both semi-annual and country effects. The overall results are strong and consistent. To conserve space, we report results of the latter. Weighted least-square (WLS) regression estimates of the coefficients associated with past returns are presented in Panel B of Table 2.4, with the same format as that of Panel A. In these WLS regressions, the weight assigned to each observation is proportional to the inverse of the total number of observations available within each country. Results of Panel B are not only

consistent with, but also stronger than those of Panel A, suggesting that our earlier evidence is not driven by fund styles.

In summary, this section shows strong cross-country evidence that mutual funds systematically buy and sell winner stocks, and the evidence is stronger for foreign than for domestic funds.

2.4 Information Environments, Fund Trading Strategies, and Performance

We have established that mutual funds, especially foreign funds, act as momentum traders when they buy stocks and as contrarians when they sell. These results prompt us to address two important issues. We ask whether and how trading strategies reflect the existence of any asymmetric information between domestic and foreign funds, and also whether these trading strategies are able to generate any positive return performance for either or both groups of funds.

These trading strategies, as implied by existing theories, might reflect informational differences between domestic and foreign funds. Of relevance to our study is Brennan and Cao's (1997) dynamic rational asset pricing model for international portfolio investment. Their model shows that asymmetric information between domestic and foreign investors can explain their differential trading behaviors. Furthermore, it provides testable predictions that foreign investors who are informationally disadvantaged follow momentum strategies and that they underperform domestic investors. On the other hand, the behavioral model of Daniel, Hirshleifer, and Subramanyam (1998) posits that trades of informed investors tend to be momentum in nature as investors overreact to their private information.

We expect that if both domestic and foreign funds are equally informed, there should be no significant difference in their trading strategies and hence their return performances. However, if domestic funds have informational advantage over foreign funds, or foreign funds are more investment savvy than their domestic counterparts, then their trading strategies ought to re-

veal their relative advantage in information or in skills. Consequently, such differential trading strategies would produce differential performances between domestic and foreign funds.

2.4.1 Correlation of Domestic and Foreign Trades

We begin by providing some preliminary analysis of how domestic and foreign funds trade relative to each other and how their trades are correlated, conditioned on the firm's or country's information environment. Brennan and Cao (1997) argue that foreign investors are at an informational disadvantage compared to domestic investors. As a result, they do more momentum trading and tend to trade against domestic investors. Accordingly, one would expect this pattern to be stronger in poor information environments where foreigners' informational disadvantage is likely more severe.

We compute the proportion of trades that both funds trade in the same direction as buyers or sellers of a stock and that they trade in opposite directions. We also calculate the difference of their buy proportions in low- and high-quality information environments. These proportions are presented in Panel B of Table 2.3, assuming that both domestic and foreign funds are independent traders. The value below each computed proportion shows its corresponding z -statistic that tests whether the proportion of Buy or Sell is equal to 0.25 and whether the proportion of Opposite is equal to 0.5.

Without conditioning on information environment measures, domestic and foreign funds have a significantly positive correlation in buys (z -stat=17.3), while a significantly negative correlation in sells (z -Stat=-18.3) in the overall case *ALL*. This suggests that both funds conduct more consistently correlated buy trades, as they trade in the same direction, possibly implying that they both trade against local retailers or other institutions. On the contrary, they behave more differently when they sell stocks, possibly suggesting that they trade on the other side of each other's transaction.

Furthermore, we look at how information environments affect their trading proportion in

both buys and sells. We find that domestic and foreign funds conduct more positively correlated buys in good information environments, and they execute less positively correlated buys in poor information environments. To gain a better insight about the trading activities of domestic and foreign funds, Panel B of Table 2.3 reports their trading correlation coefficients conditional on country and firm-level information variables. The results of Panel B further corroborate the findings in Panel A.

2.4.2 Information Environments and Fund Trading Strategies

As discussed above, we consider several measures of a country's and firm's information environments. We evaluate the impact of a country's/firm's information environment on fund trading strategies by running the following pooled cross-sectional and time-series regressions for domestic vs. foreign funds.

$$\begin{aligned} \Delta fo_{i,t}^{Dom} - \Delta fo_{i,t}^{For} = & \beta_0 + \beta_1 R_{i,t-1}^B + \beta_2 R_{i,t-1}^{B.L(IM)} + \beta_3 R_{i,t-1}^S + \beta_4 R_{i,t-1}^{S.L(IM)} + \beta_5 MV_{i,t-1} \\ & + \beta_6 BM_{i,t-1} + \text{controls} + \epsilon_{i,t}, \end{aligned} \quad (44)$$

where $R_{i,t-1}^B$ equals $R_{i,t-1}$ if $\Delta fo_{i,t}^{Dom} > 0$ and $\Delta fo_{i,t}^{For} > 0$ and 0 otherwise, whereas $R_{i,t-1}^S$ equals $R_{i,t-1}$ if $\Delta fo_{i,t}^{Dom} < 0$ and $\Delta fo_{i,t}^{For} < 0$ and 0 otherwise. IM denotes information measures for either at the country ($IM \equiv C$) or firm level ($IM \equiv F$). $R_{i,t-1}^{B.L(C)} = R_{i,t-1}^B$ if the country-level information quality proxy is below the cross-country median, except for the developed vs. emerging market where dummy variables are employed. $R_{i,t-1}^{B.L(F)} = R_{i,t-1}^B$ if the firm-level information quality proxy is below its firm median (i.e. low information quality). The sell counterparts are similarly defined. We also include unreported semi-annual effects and country effects as controls

In regression model (44), we test whether and how the quality of a country's or firm's information environment affects the differential trading strategies between domestic and foreign funds. Results of regression estimates of (44) are reported in Panels A and B of Table 2.5, where Panel A contains coefficient estimates of past stock return associated with *All* and with

each country-level information environment measure and Panel B reports those associated with firm-level measures of information environment, PIN , PIN_{Adj} , and R^2 .

Several interesting observations emerge from the table. First, without considering the quality of the information environment, we find that there are no significant differences in the buying strategies of domestic and foreign funds, as evidenced by the statistically insignificant coefficient of $R_{Bi,t-1}$ (i.e., -0.095 with t -stat = 1.23). Second, information environments at both the country and firm levels play a significant role in the trading strategies of domestic and foreign funds. Results show that the information environments, in general, have statistically differential impacts on how the two groups of funds trade. At country level, in weak information environments, foreign funds tend to actively buy more winner stocks, whereas in rich information environments, domestic funds have the propensity to buy more winner stocks. Measures such as corporate governance disclosure requirement index $DisReq$, the frequency and comprehensiveness of corporate interim reports $Freq$, anti-self-dealing index $AntSel$, and governance transparency $GTran$ are strong drivers of the differential trading strategies between domestic and foreign funds. Moreover, the firm-level information measures, PIN , PIN_{Adj} , and R^2 , are all statistically significant at conventional levels.

Finally, it is evident that the selling strategies between domestic and foreign funds, in general, differ. The coefficient for this difference (All) is 0.588 with t -statistic of 5.90. But this difference becomes weak at the country level and statistically insignificant at the firm level. As we discussed earlier, fund sells might be motivated by various non-information based considerations, such as portfolio rebalancing, global diversification, and liquidity constraints. It is therefore not surprising that information environments do not matter for the sell results.

In summary, the evidence of strong differential buying strategies suggests that there exists asymmetric information between domestic and foreign funds.

2.4.3 Performance of Domestic Funds vs. Foreign Funds

In the preceding subsection, we show evidence of informational differences of domestic vs. foreign funds in their trading strategies, especially their buying strategies. These findings suggest that information environments do matter. Thus, a natural question that arises is which funds are more informed about the domestic markets, and this subsection answers this question.

We examine the return predictive power of the trading strategies of domestic vs. foreign funds by performing test of the regression model below.

$$\begin{aligned}
 R_{i,t+1} = & \beta_0 + \beta_1 \Delta f o_{i,t}^{B.Dom} + \beta_2 \Delta f o_{i,t}^{B.Dom.L(IM)} + \beta_3 \Delta f o_{i,t}^{B.For} + \beta_4 \Delta f o_{i,t}^{B.For.L(IM)} \\
 & + \beta_5 \Delta f o_{i,t}^{S.Dom} + \beta_6 \Delta f o_{i,t}^{S.Dom.L(IM)} + \beta_7 \Delta f o_{i,t}^{S.For} + \beta_8 \Delta f o_{i,t}^{S.For.L(IM)} \\
 & + \beta_9 R_{i,t-1} + \beta_{10} MV_{i,t-1} + \beta_{11} BM_{i,t-1} + \text{controls} + \epsilon_{i,t+1}.
 \end{aligned} \tag{45}$$

Panel A of Table 2.6 presents the regression estimates of (7) with their corresponding t -statistics expressed below. It is evident that the buying strategy of domestic funds has the ability to predict future returns than the buying activity of foreign funds. For example, independent of information environment proxies, the coefficient of $\Delta f o_{i,t}^{B.Dom}$ is positive and statistically significant; its β_1 estimate is 0.204 with a t -statistic of 5.18. Additionally, most of the $\Delta f o_{i,t}^{B.Dom}$ coefficients, particularly those associated with low-quality information environment proxies, are positive and statistically significant, compared with those of its foreign counterpart $\Delta f o_{i,t}^{B.For}$. In fact, the latter coefficient is statistically indifferent from zero, albeit positive. F -tests reject the null hypothesis that there is no difference between the trading coefficients between domestic and foreign funds. Similar findings are shown using firm-level information proxies, PIN and PIN_{Adj} , although the results become insignificant for R^2 . Overall, the above results suggest that the buys of domestic funds predict future stock returns better than those of foreign funds, especially in weak information environment, consistent with the notion that domestic funds are more informed.

Consistent with the findings of Table 2.5, there exist not only significant differences in the

selling activities of foreign and domestic funds, but also significant differences in their predictive powers for future returns. The return predictive power of foreign funds' contrarian sell strategies works better in low-quality information environments at both the country and firm levels.

Existing studies argue that institutional momentum strategies can destabilize stock market prices. Friedman (1953) argues that irrational investors destabilize stock prices by following momentum strategies, and that rational speculators stabilize asset prices by following contrarian strategies. The implication is that irrational or noisy investors move prices away from fundamentals, whereas rational investors move prices toward fundamentals. On the other hand, Cutler, Poterba, and Summers (1990) and De Long, Shleifer, Summers, and Waldmann (1990) show that positive feedback trading strategies can result in excess volatility, hence destabilizing stock prices. Froot, Scharfstein, and Stein (1992), and Bikhchandani, Hirshleifer, and Welch (1992), however, argue that if investors are better informed, then their positive-feedback (momentum) behavior can move prices toward than away from fundamental values. For completeness, this subsection further tests whether the observed trading strategies of mutual funds cause any destabilizing effect on the market. For this purpose, we conduct the following regression model.

$$\begin{aligned}
 R_{i,t} = & \beta_0 + \beta_1 \Delta f o_{j,i,t}^{B.Dom} + \beta_2 \Delta f o_{j,i,t}^{B.Dom-L(IM)} + \beta_3 \Delta f o_{j,i,t}^{B.For} + \beta_4 \Delta f o_{j,i,t}^{B.For-L(IM)} \\
 & + \beta_5 \Delta f o_{j,i,t}^{S.Dom} + \beta_6 \Delta f o_{j,i,t}^{S.Dom-L(IM)} + \beta_7 \Delta f o_{j,i,t}^{S.For} + \beta_8 \Delta f o_{j,i,t}^{S.For-L(IM)} \\
 & + \beta_9 R_{i,t-1} + \beta_{10} MV_{i,t-1} + \beta_{11} BM_{i,t-1} + \text{controls} + \epsilon_{i,t}.
 \end{aligned} \tag{46}$$

Panel B of Table 2.6 shows the regression estimates of (8) in the same format as that of Panel A. The results from this panel seem weaker than those of Panel A. Particularly, the trading strategies associated with the low-quality information environment show negative or insignificant coefficient estimates, suggesting no evidence that mutual funds, especially foreign funds, destabilize the local markets.

2.4.4 Interpretation and Discussion of Results

In summary, the overall results of Tables 2.5 and 2.6 suggest that domestic funds have information advantage over their foreign counterparts and that, compared with foreign funds, domestic funds do more momentum buying in high-quality information environments but less in low-quality information environments. These findings have a couple of implications that we discuss below.

One, without considering the quality of the information environment, one would deduce that there are no significant differences in the buying strategies of domestic and foreign funds, as evidenced by the statistically insignificant coefficient of $R_{i,t-1}^B$ (i.e., -0.095 with t -stat = 1.23 from Table 2.5). It is important to stress that information environments of a firm and a country play a critical role in explaining the differential trading strategies between domestic and foreign funds. This finding perhaps provides an explanation for why existing studies have generated mixed evidence using different types of institutions. Thus far, none of these studies has considered these information environments in their analyses.

Two, are our results supportive of the different empirical implications of Brennan and Cao's (1997) and Daniel, Hirshleifer, and Subramanyam's (1998) theoretical models? As discussed in the Introduction, the former predict that informational disadvantaged foreign investors follow momentum buys, whereas the latter predict that informed investors are momentum traders. It is evident that neither model can fully explain the trading strategies of funds in both low and high quality information environments. Interestingly, however, their predictions are supported by our results in specific information environments.

Our findings that foreign funds are informationally disadvantaged relative to their domestic counterparts in low-quality information environments and that they follow momentum strategies are in accord with Brennan and Cao's theoretical predictions. In low or poor quality information environments, the level of information asymmetry between firms and investors is high and hence foreign funds' accessibility to information about local firms is more limited, compared with

domestic funds. This explanation is consistent with the home bias or local bias literature in both the international financial markets and domestic equity markets. It is often argued that geographic distance forms a barrier that foreign investors face when accessing information in local markets, suggesting the extent of informational asymmetry between foreign and domestic investors. Furthermore, Coval and Moskowitz (1999) argue that the local bias exhibited by domestic fund managers is driven by fund managers' superior information about their local stocks. Hence the implication is that even when the information asymmetry associated with a low quality information environment is high, domestic funds, being geographically closer to local firms, still have an informational advantage over their foreign counterparts. Our findings support this argument.

On the other hand, our evidence that domestic funds are more informed than their foreign counterparts and that they do more momentum buying in high-quality information environments seems consistent with Daniel, Hirshleifer, and Subrahmanyam's (1998) behavioral model. High quality information environments are characterized by greater corporate transparency and more information disclosures. In their model, informed investors are overconfident about the information they have and hence they overestimate the precision of their own information relative to the public information signals they receive. As more public information is released, confirming the informed investors' own private information that they trade on, their confidence rises, generating further overreaction. Daniel, Hirshleifer, and Subrahmanyam argue that this continuing overreaction causes the momentum behavior of informed investors. Such a phenomenon is more feasible in high- than low-quality information environments, and therefore it explains the active momentum buying of the more informed domestic funds in high-quality information environments.

2.5 Summary and Conclusion

There is a voluminous empirical research on institutional trading, but their results thus far are mixed. The plausible reasons are that studies examine segments of institutions and of different

categories, foreign investors of various types, and focus on single countries, primarily the United States. These reasons therefore make it difficult for one to draw any valid comparison between these vastly different results. Our study differs from extant research in that it examines the trading strategies of both domestic and foreign funds - a large homogeneous group of institutional investors with comparable investment skills and whose common objective is to serve the interest of their fund shareholders. While these funds are similar in many respects, they differ in geographic proximity to their investments. This difference in geographic proximity prompts us to further examine whether their trading strategies reflect any informational differences between them. Particularly, we look at the impact of a country's and a firm's information environments on fund trading strategies and whether their trading activities are in the direction of future stock performance. Understanding how varying information environments affect trading strategies is an important step toward gaining insights about the existence of asymmetric information between the two groups of funds.

We analyze the equity holdings of 19,639 domestic mutual funds from 28 countries worldwide and of 125,357 foreign funds who have equity investments in these markets; information of these equity holdings is from a global fund database from Thomson Financial Securities and for the period 1999 to 2005. The overall evidence strongly suggests that information environments affect how domestic and foreign funds trade and that domestic funds have a relative information advantage over their foreign counterparts. In weak information environments characterized by poor corporate disclosure and transparency, we find that foreign funds actively buy more stocks that have performed well in the past six months than do their domestic counterparts. This finding is implied by Brennan and Cao's (1997) theoretical model for international portfolio investment, suggesting that the less informed investors (i.e., foreign funds that our evidence has shown) follow momentum buying. Interestingly, however, in strong information environments, domestic funds are those who buy more winner stocks. This result is possibly in line with the empirical implications of Daniel, Hirshleifer, and Subrahmayam's (1998) behavioral model, as more confirming public information (i.e., good news) arrives in a market with high quality

information environment, the more informed overconfident domestic investors would continue to act on their private information, thereby generating more momentum buying.

Our results further show that the buying activity of domestic, while not foreign, funds is in the direction of future stock performance. Further, we find no evidence suggesting that this large group of institutions, whether domestic or foreign, causes destabilizing price effects on the wide cross-section of equity markets.

Finally, our two key findings that the information environment matters for institutional trading behavior and that foreign funds are informationally disadvantaged relative to domestic funds offer several important implications for market participants and policy makers. First, foreign funds conduct more momentum buy strategies in countries with poor information environments and their return predictability is weaker than that of domestic funds. This is an implication that countries may need to improve their information environments in order to attract more foreign funds to their local equity markets by motivating these funds to conduct more information-based trading and earn greater profits. Second, firms should also similarly improve their information environments by enhancing their corporate governance and financial disclosures (see Ferreira and Laux, 2007) to attract foreign funds to trade and hold their stocks. Last but not least, our empirical findings suggest that more future theoretical work is needed to explain why both foreign and domestic funds systematically buy stocks that have performed well in the recent past and sell those that have performed poorly and also why their strategies differ across different firm- and country-level information environments.

References

- Barberis, Nicholas, Andrei Shleifer, and Robert Vishny, A model of investor sentiment, *Journal of Financial Economics* 49, 307-343.
- Badrinath, S.G. and Sunil Wahal, 2002, Momentum trading by institutions, *Journal of Finance* 57, 2449-2478.
- Bikhchandani, S., Hirshleifer, D., Welch, I., 1992, A theory of fads, fashion, custom, and cultural change as informational cascades, *Journal of Political Economy* 100, 992-1026.
- Brown, Stephen and Stephen A. Hillegeist, 2007, How disclosure quality affects the level of information asymmetry, *Review of Accounting Studies* 12, 443-477.
- Brown, Stephen, Stephen A. Hillegeist, and Kin Lo, 2004, Conference calls and information asymmetry, *Journal of Accounting and Economics* 37, 343-366.
- Bushman, Robert M., Joseph Piotroski, and Abbie J. Smith, 2004, What determines corporate transparency?, *Journal of Accounting Research* 42, 207-252.
- Chan, Louis K.C., Hsiu-Lang Chen, and Josef Lakonishok, 2002, On mutual fund investment styles, *Review of Financial Studies* 15, 1407-1437.
- Chen, Qi, Itay Goldstein, and Wei Jiang, 2006, Price informativeness and investment sensitivity to stock price, *Review of Financial Studies* 20, 619-650.
- Choe, H., Kho, B.C., and Stulz, R., 1999, Do foreign investors destabilize stock markets? The Korean experience in 1997, *Journal of Financial Economics* 54, 227-264.
- Coval, Joshua D., and Tobias J. Moskowitz, 1999, Home bias at home - local equity preference in domestic portfolios, *Journal of Finance* 54, 2045-2073.

- Covrig, Vicentiu, Sie-Ting Lau, and Lilian Ng, 2006, Do domestic and foreign fund managers have similar preferences for stock characteristics? a cross-country analysis, *Journal of International Business Studies* 37, 407-429.
- Cutler, D.M., Poterba, J.M., Summers, L.H., 1990, Speculative dynamics and the role of feedback traders, *American Economic Review* 80, 63-68.
- Daniel, Kent, David Hirshleifer, and Avanidhar Subrahmanyam, 1988, Investor psychology and security market under- and overreactions, *Journal of Finance* 53, 1839-1885.
- De Long, J. Bradford, Andrei Shleifer, Lawrence H. Summers, and Robert J. Waldman, 1990, Positive feedback investment strategies and destabilizing rational speculation, *Journal of Finance* 45, 379-396.
- Djankov, Simeon, Rafael La Porta, F. Lopez-De-Silanes, and Andrei Shleifer, 2006, The law and economics of self-dealing, Working Paper at Harvard University.
- Duarte, Jefferson, Xi Han, Jarrad Harford, and Lance Young, 2007, Information asymmetry, information dissemination and the effect of regulation FD on the cost of capital, forthcoming, *Journal of Financial Economics*.
- Duarte, Jefferson, and Lance Young, 2007, Why is PIN priced?, forthcoming, *Journal of Financial Economics*.
- Easley, David, S. Hvidkjaer, Maureen, O'Hara, 2002, Is information risk a determinant of asset returns?, *Journal of Finance* 57, 2185-2221.
- Easley, David, Nicholas Kiefer, Maureen O'Hara, and Joseph Paperman, 1996, Liquidity, information and infrequently traded stocks, *Journal of Finance* 51, 1405-1436.
- Ferreira, Daniel, Miguel A. Ferreira, Clara C. Raposo, 2007. Board structure and price informativeness. Working paper.

- Ferreira, Miguel A., and Paul A. Laux, 2007. Corporate governance, idiosyncratic risk, and information flow. *Journal of Finance* 62, 951-989.
- Ferreira, Miguel A., Antonio F. Miguel, and Sofia Ramos, 2007, The determinants of mutual fund performance: a cross-country study, A Swiss Finance Research Paper Series No. 06-30.
- Friedman, M., 1953, The case for flexible exchange rates, in: Milton Friedman, M. (Eds.), Essays in Positive Economics, University of Chicago Press, Chicago, IL.
- Froot, Kenneth, Paul O'Connell, and Mark Seasholes, 2001, The portfolio flows of international investors, *Journal of Financial Economics* 59, 151-193.
- Froot, Kenneth, and Tarun Ramadorai, 2001, The information content of international portfolio flows, Working Paper 8472, NBER.
- Froot, K.A., Scharfstein, D.S., Stein, J.C., 1992, Herd on the street: Informational inefficiencies in a market with short-term speculation, *Journal of Finance* 47, 1461-1484.
- Frost, Carol Ann, Elizabeth A. Gordon, Andrew F. Hayes, 2006, Stock exchange disclosure and market development: an analysis of 50 international exchanges, *Journal of Accounting Research* 44, 437-483.
- Gompers, P., Metrick, A., 2001, Institutions investors and Equity Prices, *Quarterly Journal of Economics* 116, 229-259.
- Grinblatt, M., Titman, S., Wermers, R., 1995, Momentum investment strategies, portfolio performance, and herding: A study of mutual fund behavior, *American Economic Review* 85, 1088-1105.
- Grinblatt, M., Keloharju, M., 2001, What makes investors trade?, *Journal of Finance* 56, 589-616.

- Griffin, John M., Jeffrey H. Harris, and Selim Topaloglu, 2003, The dynamics of institutional and individual trading, *Journal of Finance* 58, 2285-2320.
- Grinblatt, Mark, and M. Keloharju, 2000, The investment behavior and performance of various investor types: a study of Finland's unique data set, *Journal of Financial Economics* 55, 43-67.
- Grinblatt, Mark, and Sheridan Titman, 1992, The persistence of mutual fund performance, *Journal of Finance* 47, 1977-1984.
- Grinblatt, Mark, Sheridan Titman, and Russ Wermers, 1994, Momentum investment strategies, portfolio performance, and herding: A study of mutual fund behavior, *American Economic Review* 85, 1088-1105.
- Gruber, Martin J., 1996, Another Puzzle: The Growth in Actively Managed Mutual Funds, *Journal of Finance* 51, 783-810.
- Hau, Harald, 2001, Location matters: An examination of trading profits, *Journal of Finance* 56, 1951-1983.
- Hendricks, Darryll, Jayendu Patel, and Richard Zeckhauser, 1993, Hot hands in mutual funds: Short-run persistence of relative performance, 1974-1988, *Journal of Finance* 48, 93-130.
- Hong, Harrison, and Jeremy Stein, 1999, A unified theory of underreaction, momentum trading, and overreaction in asset markets, *Journal of Finance* 54, 2143-2184.
- Huang, Roger, and Cheng-Yi Shiu, 2005, Overseas monitors in emerging financial markets: Evidence from foreign ownership in Taiwan, Working Paper, University of Notre Dame.
- Huberman, Gur, 2001, Familiarity breeds investment, *Review of Financial Studies* 14, 659-80.
- Ivković, Zoran, and Scott Weisbenner, 2005, Local does as local is: Information content of the geography of individual investors' common stock investments, *Journal of Finance* 60, 267-306.

- Kahnemann, Daniel, and Amos Tversky, 1979, Prospect theory: An analysis of decisions under risk, *Econometrica* 47, 262-91
- Kaminsky, Graciela, Richard Lyons, and Sergio Schmukler, 2004, Managers, investors, and crises: mutual fund strategies in emerging Markets, *Journal of International Economics* 64, 113-134.
- Khorana, Ajay, Henri Servaes, and Peter Tufano, 2005, Explaining the size of the mutual fund industry around the world, *Journal of Financial Economics* 78, 145-185.
- Khorana, Ajay, Henri Servaes, and Peter Tufano, 2008, Mutual fund fees around the world, Forthcoming in *Journal of Financial Economics*.
- Lakonishok, J., Shleifer, A., Vishny, R.W., 1992, The impact of institutional trading on stock prices, *Journal of Financial Economics* 32, 23-43.
- Lakonishok, Josef, Andrei Shleifer, Richard Thaler, and Robert Vishny, 1991, Window dressing by pension fund managers, *American Economic Review* 81, 227-231.
- La Porta, Rafael, F. Lopez-De-Silanes, Andrei Shleifer, 2005, What works in securities laws? Forthcoming, *Journal of Finance*.
- Morck, Randall, Bernard Yeung, and Wayne Yu, 2000, The information content of stock markets: Why do emerging markets have synchronous stock price movements? *Journal of Financial Economics* 58, 215-260.
- Vega, Clara, 2006, Stock price reaction to public and private information, *Journal of Financial Economics* 82, 103-133.
- Wermers, Russ, 1999, Mutual fund herding and its impact on stock prices, *Journal of Finance* 54, 581-622.
- Wang, Jiang, 1993, A model of intertemporal asset prices under asymmetric information, *Review of Economic Studies* 60, 249-282.

Wu, Fei, and Lilian Ng, 2007, The trading behavior of institutions and individuals in Chinese equity markets," *Journal of Banking and Finance* 31, 2695-2710.

Yan, Xuemin S., and Zhe Zhang, 2007, Institutional institutions and equity returns: Are short-term institutions better informed?, forthcoming, *Review of Financial Studies*.

Table 2.1
Summary Statistics

This table reports summary statistics for domestic and foreign funds investing in the market, the average fund's total net asset value (TNA) in millions of U.S. dollars, the percentage of fund assets invested in the local market, and the total number of distinct local stocks covered by those funds' local investment portfolio. It also reports average size, book-to-market, and turnover (Turn) scores for domestic and foreign funds, and average percentage buy and sell volumes for each stock. The buy (sell) volume is determined by first calculating funds' aggregate trading volume relative to the shares outstanding for each stock, and then averaging across all stocks held in each six-month period. $MV_{i,t-1}$, $BM_{i,t-1}$, and $Turn_{i,t-1}$ are stock i 's respective market capitalization, book-to-market, and turnover scores at $t - 1$. Each variable's score is constructed as follows. For each country and for each t , we group all firms into 50 portfolios based on the variable of interest, with score 1 assigned to the portfolio with the lowest variable value and score 50 assigned to the portfolio with the highest value. All firms within a portfolio receive the same ranking score as the portfolio to which they belong. Unless stated otherwise, all statistics are measured every six months and then averaged over the sample period. The sample period is from January 2000 to December 2005.

Panel A: Domestic Funds										Panel B: Foreign Funds									
	No. of funds	Ave. TNA (US\$m)	% in local equity	No. of stocks held	Size score	BM score	Turn-over		No. of funds	Ave. TNA (US\$m)	% assets invested locally	No. of stocks held	Size score	BM score	Turn-over				
							Buy vol	Sell vol							Buy vol	Sell vol			
Australia	207	301.27	53.80	316	0.92	0.41	0.73	2.32	-2.03	2,821	515.35	1.63	446	0.96	0.36	0.81	0.79		
Austria	71	124.51	6.80	45	0.83	0.45	0.82	0.69	-0.59	1,818	362.67	0.70	47	0.90	0.42	0.86	2.11		
Belgium	310	148.23	14.55	114	0.85	0.35	0.78	0.55	-1.33	5,333	255.45	0.78	105	0.95	0.32	0.83	1.10		
Brazil	399	65.23	76.15	144	0.88	0.33	0.81	6.22	-4.25	597	1256.24	1.66	94	0.93	0.25	0.81	2.43		
Canada	825	228.14	25.65	305	0.80	0.42	0.60	2.88	-4.55	1,569	810.64	2.35	258	0.82	0.37	0.58	1.68		
Denmark	90	87.61	35.52	91	0.89	0.24	0.75	1.24	-1.53	2,880	402.08	0.90	102	0.96	0.23	0.78	1.50		
Finland	96	150.20	42.17	98	0.81	0.39	0.74	2.23	-2.94	9,579	204.02	1.55	101	0.98	0.20	0.88	1.89		
France	767	264.94	48.60	490	0.92	0.41	0.86	1.21	-1.31	11,180	223.19	14.25	393	0.97	0.39	0.90	1.71		
Germany	4,206	151.93	17.63	426	0.96	0.42	0.38	1.49	-2.29	7,074	259.53	4.09	393	0.96	0.38	0.39	1.49		
Greece	84	59.61	76.38	157	0.86	0.37	0.51	1.80	-1.28	1,711	449.28	0.51	155	0.97	0.33	0.55	0.66		
Hong Kong	213	788.59	6.79	205	0.92	0.29	0.68	0.77	-0.80	3,216	566.64	1.57	365	0.95	0.26	0.67	1.39		
India	226	45.68	74.99	378	0.86	0.33	0.62	2.17	-1.36	572	1374.06	1.45	209	0.94	0.26	0.66	1.37		
Italy	357	350.29	32.84	193	0.88	0.32	0.76	0.90	-1.54	9,375	217.42	2.98	232	0.94	0.27	0.81	1.22		
Japan	547	334.22	85.07	1,959	0.87	0.28	0.70	1.07	-0.95	4,992	395.56	12.03	1,988	0.95	0.24	0.71	0.87		
Malaysia	105	43.32	83.84	296	0.80	0.33	0.59	1.15	-1.32	1,039	831.43	0.58	237	0.94	0.18	0.66	0.62		
Mexico	82	57.28	68.34	85	0.83	0.30	0.77	1.91	-1.42	728	1122.29	1.67	77	0.85	0.27	0.82	3.21		
Netherlands	160	422.72	10.34	78	0.88	0.33	0.78	1.11	-1.13	10,729	219.61	2.79	97	0.94	0.38	0.80	1.92		
Norway	129	101.80	29.66	117	0.80	0.40	0.69	1.97	-2.49	2,540	384.53	0.89	88	0.95	0.37	0.74	1.52		
Portugal	102	72.82	63.14	42	0.86	0.31	0.73	1.03	-1.28	3,126	273.62	0.49	36	0.96	0.24	0.84	1.01		
Singapore	172	419.45	18.40	118	0.91	0.28	0.72	0.76	-0.88	2,042	543.26	2.17	201	0.96	0.30	0.72	0.83		
South Africa	190	184.78	15.86	214	0.82	0.38	0.76	2.04	-1.38	782	1113.62	0.77	137	0.95	0.31	0.87	0.82		
Spain	2,835	27.23	16.78	114	0.86	0.39	0.75	0.75	-1.03	7,653	261.71	2.04	100	0.94	0.33	0.83	0.78		
Sweden	357	396.01	15.45	234	0.88	0.44	0.74	2.18	-1.81	5,894	278.98	1.21	197	0.96	0.34	0.83	1.39		
Switzerland	413	182.95	28.72	162	0.89	0.27	0.77	2.70	-2.45	8,111	260.03	3.14	168	0.95	0.23	0.79	2.23		
Taiwan	258	63.30	94.53	364	0.86	0.21	0.72	3.04	-2.52	1,274	979.45	1.73	269	0.95	0.20	0.56	1.20		
Thailand	72	45.82	51.75	108	0.90	0.30	0.57	0.84	-0.92	1,164	778.42	0.73	131	0.93	0.26	0.55	1.22		
U.K.	1,580	571.50	69.98	1,165	0.90	0.41	0.78	4.08	-4.59	10,134	270.40	43.33	851	0.97	0.41	0.80	4.59		
U.S.	4,786	881.61	83.88	3,703	0.87	0.33	0.66	0.88	-0.59	7,494	164.06	33.08	9,540	0.04	0.98	0.69	0.56		

Table 2.2
Measures of Information Environments

This table reports country and firm-level information variables. *DisReq* is the corporate governance related disclosure requirement index from LLSV; *Freq* measures the frequency and comprehensiveness of the interim report; *Disc* is the exchange related no-survey-based disclosure requirement index from Frost et al. (2006); *AntSel* is the anti-self-dealing index in Djankov et al. (2007); *FTran* is financial transparency index; *GTran* is governance transparency index. *Freq*, *FTran*, and *GTran* from Bushman et al. (2004). *Dev* is the developed country dummy. For firm-level information variables, *PIN* is the probability of informed trading; *PIN_{Adj}* is the adjusted probability of informed trading; *R²* is the R-square variable.

Country	Panel A: At the Country Level							Panel B: At the Firm Level		
	<i>DisReq</i>	<i>Freq</i>	<i>Disc</i>	<i>AntSel</i>	<i>FTran</i>	<i>GTran</i>	<i>Dev</i>	<i>PIN</i>	<i>PIN_{Adj}</i>	<i>R²</i>
Australia	0.75	89.13	0.68	0.76	0.36	1.08	Yes	0.25	0.19	0.09
Austria	0.25	68.12	0.10	0.21	-0.11	-0.08	Yes	0.24	0.22	0.11
Belgium	0.42	63.04	-0.18	0.54	0.50	-0.07	Yes	0.22	0.22	0.13
Brazil	0.25	86.96	-0.25	0.27	0.10	-0.87	No	0.28	0.23	0.14
Canada	0.92	99.28	0.08	0.64	1.17	-0.57	Yes	0.21	0.19	0.11
Denmark	0.58	73.91	-0.26	0.46	0.48	-0.08	Yes	0.34	0.24	0.12
Finland	0.50	78.99	0.26	0.46	0.56	0.75	Yes	0.26	0.19	0.13
France	0.75	78.26	-0.35	0.38	1.27	-0.63	Yes	0.29	0.23	0.12
Germany	0.42	68.12	-0.68	0.28	1.62	-0.38	Yes	0.23	0.18	0.11
Greece	0.33	17.39	-0.09	0.22	-0.87	-1.02	Yes	0.22	0.20	0.29
Hong Kong	0.92	69.57	0.24	0.96	0.66	0.57	Yes	0.29	0.22	0.16
India	0.92	45.65	N.A.	0.58	-0.64	0.04	No	0.29	0.20	0.18
Italy	0.67	86.96	0.35	0.42	1.16	-0.58	Yes	0.23	0.18	0.19
Japan	0.75	86.23	-0.08	0.50	0.68	0.36	Yes	0.24	0.20	0.18
Malaysia	0.92	65.22	0.98	0.95	0.23	1.24	No	0.32	0.20	0.23
Mexico	0.58	84.78	0.60	0.17	0.39	-0.81	No	0.25	0.21	0.15
Netherlands	0.50	78.26	0.68	0.20	1.34	0.38	Yes	0.22	0.20	0.14
Norway	0.58	94.20	0.50	0.42	0.28	0.55	Yes	0.27	0.19	0.14
Portugal	0.42	62.32	-0.68	0.44	-0.26	-0.34	No	0.27	0.22	0.13
Singapore	1.00	63.77	0.55	1.00	0.46	1.34	Yes	0.26	0.20	0.18
South Africa	0.83	86.96	0.35	0.81	-0.41	1.13	No	0.23	0.19	0.12
Spain	0.50	89.13	-0.51	0.37	0.88	0.15	Yes	0.19	0.16	0.17
Sweden	0.58	86.23	1.23	0.33	0.80	1.06	Yes	0.24	0.20	0.17
Switzerland	0.67	73.91	0.50	0.27	0.81	0.56	Yes	0.21	0.20	0.13
Taiwan	0.75	17.39	-0.68	0.56	N.A.	N.A.	No	0.23	0.24	0.25
Thailand	0.92	89.13	0.68	0.81	-0.36	-0.82	No	0.27	0.18	0.22
U.K.	0.83	86.96	0.35	0.95	0.75	1.03	Yes	0.22	0.20	0.11
U.S.	1.00	97.83	-0.08	0.65	1.59	-0.34	Yes	0.17	0.16	0.11
Average	0.66	74.56	3.73	0.52	0.50	0.14		0.25	0.20	0.15

Table 2.3

Trade Proportion of and Correlation Between Domestic and Foreign Mutual Funds

Panel A of this table reports the trade proportion for domestic and foreign mutual funds conditional on country and firm-level information variables. Buy (Sell) reports the proportion of trades that both funds are buyers (sellers) of a stock. Opposite describes the proportion that they trade in opposite directions. $Diff^{Buy}$ shows the test of the difference in buy proportions between low and high information environments. Low (High) means low (high)-quality information environments. Panel B shows the correlation of their buys and sells. Country- and firm-level information variables are defined in Table 2.

Information	Quality	Panel A: Proportion of Trades				Panel B: Correlation of Trades		
		Buy	Sell	Opposite	$Diff^{Buy}$	All	Buy	Sell
<i>All</i>		0.273	0.225	0.501		0.075	0.132	0.133
		17.30	-18.35	0.91		(< .00)	(< .00)	(< .00)
<i>DisReq</i>	Low	0.241	0.241	0.518		0.115	0.202	0.202
		-2.43	-2.37	4.16		(< .00)	(< .00)	(< .00)
	High	0.278	0.223	0.499	0.037	0.071	0.136	0.138
		19.44	-18.73	-0.61	9.24	(< .00)	(< .00)	(< .00)
<i>Freq</i>	Low	0.245	0.241	0.513		0.094	0.166	0.194
		-1.60	-2.93	3.92		(< .00)	(< .00)	(< .00)
	High	0.281	0.221	0.498	0.035	0.077	0.162	0.163
		20.28	-19.13	-1.00	10.67	(< .00)	(< .00)	(< .00)
<i>Disc</i>	Low	0.279	0.224	0.497		0.068	0.123	0.125
		18.40	-16.50	-1.64		(< .00)	(< .00)	(< .00)
	High	0.258	0.229	0.513	-0.021	0.089	0.152	0.153
		3.20	-8.22	4.35	-6.89	(< .00)	(< .00)	(< .00)
<i>AntSel</i>	Low	0.235	0.255	0.509		0.103	0.207	0.204
		-4.48	1.68	2.43		(< .00)	(< .00)	(< .00)
	High	0.281	0.219	0.500	0.046	0.074	0.139	0.151
		21.06	-20.93	-0.11	12.95	(< .00)	(< .00)	(< .00)
<i>FTran</i>	Low	0.253	0.219	0.528		0.028	0.112	0.092
		0.93	-9.50	7.42		(< .00)	(< .00)	(< .00)
	High	0.278	0.227	0.496	0.024	0.085	0.144	0.147
		18.59	-15.83	-2.39	6.81	(< .00)	(< .00)	(< .00)
<i>GTran</i>	Low	0.265	0.240	0.495		0.057	0.061	0.093
		8.03	-5.45	-2.24		(< .00)	(< .00)	(< .00)
	High	0.283	0.208	0.509	0.019	0.098	0.235	0.205
		16.79	-21.11	3.74	6.65	(< .00)	(< .00)	(< .00)
<i>Developed</i>	Low	0.246	0.220	0.534		0.025	0.157	0.116
		-0.85	-7.25	7.01		(< .00)	(< .00)	(< .00)
	High	0.276	0.226	0.498	0.030	0.081	0.133	0.140
		18.56	-16.92	-1.42	6.76	(< .00)	(< .00)	(< .00)
<i>PIN</i>	Low	0.301	0.228	0.471		0.077	0.114	0.134
		16.38	-7.15	-7.99		(< .00)	(< .00)	(< .00)
	High	0.288	0.216	0.496	-0.014	0.087	0.160	0.143
		12.08	-10.88	-1.04	-2.92	(< .00)	(< .00)	(< .00)
<i>PIN_{Adj}</i>	Low	0.291	0.229	0.480		0.070	0.105	0.115
		12.93	-6.66	-5.43		(< .00)	(< .00)	(< .00)
	High	0.299	0.214	0.487	0.008	0.091	0.151	0.154
		15.52	-11.40	-3.57	1.71	(< .00)	(< .00)	(< .00)
<i>R²</i>	Low	0.288	0.232	0.479		0.073	0.123	0.121
		12.17	-5.58	-5.71		(< .00)	(< .00)	(< .00)
	High	0.299	0.213	0.488	0.011	0.089	0.138	0.148
		15.73	-11.91	-3.31	2.36	(< .00)	(< .00)	(< .00)

Table 2.4

Domestic and Foreign Mutual Fund Trading and Past Returns by Country and by Style

This table reports results for the following pooled cross-sectional and time-series regressions for domestic and foreign funds:

$$\Delta f_{o,j,i,t} = \beta_0 + \beta_1 R_{i,t-1} + \beta_2 MV_{i,t-1} + \beta_3 BM_{i,t-1} + \text{controls} + \epsilon_{i,t},$$

$$\Delta f_{o,j,i,t} = \beta_0 + \beta_1 R_{i,t-1}^B + \beta_2 R_{i,t-1}^S + \beta_3 MV_{i,t-1} + \beta_4 BM_{i,t-1} + \text{controls} + \epsilon_{i,t}.$$

Time t refers to a 6-month interval, with the first interval ending December 2000 and the last ending December 2005. $\Delta f_{o,j,i,t}$ is the 6-month net trading of fund j (measured by a change in the fund's percentage holding relative to the number of shares outstanding) in stock i at time t . $R_{i,t-1}$ is the 6-month (skip one month) stock return at time $t-1$. $R_{i,t-1}^B$ equals $R_{i,t-1}$ if $\Delta f_{o,j,i,t} > 0$ and 0 otherwise, whereas $R_{i,t-1}^S$ equals $R_{i,t-1}$ if $\Delta f_{o,j,i,t} < 0$ and 0 otherwise. $MV_{i,t-1}$ and $BM_{i,t-1}$ are stock i 's log of market capitalization and log of book-to-market ranks, respectively, at $t-1$. MV and BM ranks are constructed as follows. For each country and for each t , we group all firms into 50 portfolios based on their $MV_{i,t}$ or $BM_{i,t}$, with rank 1 assigned to the portfolio with the lowest $MV_{i,t}$ or $BM_{i,t}$ value and rank 50 assigned to the portfolio with the highest value. All firms within a portfolio receive the same rank as the portfolio to which they belong. Both regression estimates in Panel A also control for unreported semi-annual effects, and those in Panel B control for both unreported semi-annual and country effects.

Panel A: Trading Strategies of Domestic and Foreign Funds by Country												
Country	Domestic Funds						Foreign Funds					
	$R_{i,t-1}$	$t\text{-stat}$	$R_{i,t-1}^B$	$t\text{-stat}$	$R_{i,t-1}^S$	$t\text{-stat}$	$R_{i,t-1}$	$t\text{-Stat}$	$R_{i,t-1}^B$	$t\text{-stat}$	$R_{i,t-1}^S$	$t\text{-stat}$
Australia	1.34	4.93	2.97	8.74	-0.89	-2.20	0.22	2.60	0.77	6.94	-0.42	-3.11
Austria	-0.05	-0.19	0.53	1.41	-0.41	-1.33	0.16	0.15	5.42	3.15	-1.97	-1.62
Belgium	0.33	2.08	0.40	1.93	0.27	1.10	0.79	2.03	2.43	4.63	-0.91	-1.59
Brazil	-0.12	-0.28	1.25	2.07	-1.50	-2.41	0.30	0.59	1.85	2.86	-1.78	-2.38
Canada	0.75	4.22	2.85	11.50	-1.12	-4.69	0.15	1.29	1.21	7.82	-1.06	-6.36
Denmark	0.48	1.66	0.85	2.24	0.12	0.29	0.93	2.94	2.08	5.49	-1.34	-2.53
Finland	0.73	1.67	1.59	3.13	-0.74	-1.09	1.46	2.39	3.20	4.16	-0.92	-0.98
France	0.70	5.88	1.17	7.71	0.10	0.51	0.53	2.73	2.28	7.67	-0.69	-2.50
Germany	0.98	4.59	1.15	4.41	0.93	2.70	0.48	2.63	1.42	5.14	-0.08	-0.34
Greece	0.75	3.13	0.15	0.45	1.51	5.30	-0.02	-0.08	0.46	1.75	-0.39	-1.19
Hong Kong	0.27	2.78	1.27	10.63	-0.92	-7.09	0.43	3.68	1.76	10.66	-0.86	-4.92
India	0.54	3.77	1.39	8.33	-0.77	-3.86	0.41	2.27	1.40	6.62	-1.02	-4.12
Italy	-0.28	-1.13	0.58	1.54	-0.83	-2.68	0.39	1.46	1.20	3.56	-0.63	-1.65
Japan	1.05	18.22	1.85	27.16	-0.47	-5.10	0.34	6.88	1.15	18.07	-0.70	-9.31
Malaysia	0.78	5.54	1.40	8.55	-0.30	-1.36	0.27	2.68	1.13	8.94	-0.55	-3.89
Mexico	0.12	0.47	0.72	2.12	-0.91	-1.89	0.90	1.64	2.87	3.87	-0.80	-1.08
Netherlands	0.11	0.28	0.41	0.82	-0.33	-0.56	0.29	0.52	1.11	1.53	-0.63	-0.80
Norway	0.18	0.60	1.03	2.83	-1.12	-2.50	0.93	2.76	2.14	5.25	-0.93	-1.76
Portugal	0.25	0.85	0.74	2.14	-0.87	-1.66	0.44	1.33	1.04	2.70	-1.14	-1.88
Singapore	0.46	2.17	1.50	5.90	-1.02	-3.35	0.24	1.83	1.17	6.65	-0.60	-3.31
South Africa	0.51	1.91	2.29	6.25	-1.22	-3.31	-0.03	-0.21	0.82	3.88	-0.91	-4.33
Spain	0.75	2.64	2.31	6.24	-0.84	-2.23	1.00	2.56	2.69	5.51	-1.62	-2.79
Sweden	0.54	1.93	1.23	3.49	-0.34	-0.82	0.56	1.73	1.52	3.67	-0.60	-1.29
Switzerland	1.36	4.45	1.57	4.38	0.97	2.07	2.50	6.09	3.71	7.22	1.32	2.15
Taiwan	-0.50	-2.02	1.39	4.32	-2.20	-7.16	0.47	2.76	1.19	5.69	-0.38	-1.55
Thailand	-0.13	-1.75	0.66	5.22	-0.42	-5.32	0.16	0.82	1.15	4.83	-1.23	-4.45
U.K.	1.07	6.65	1.62	7.87	0.42	1.70	0.42	5.04	0.93	8.74	-0.26	-1.85
U.S.	1.01	20.21	1.84	30.45	-0.50	-6.27	0.14	7.12	0.30	11.52	-0.04	-1.58

Table 2.4 - Continued
Domestic and Foreign Mutual Fund Trading and Past Returns by Country and by Style

Panel B: Trading Strategies of Domestic and Foreign Funds by Style												
Style	Domestic Funds						Foreign Funds					
	$R_{i,t-1}$	t -stat	$R_{i,t-1}^B$	t -stat	$R_{i,t-1}^S$	t -stat	$R_{i,t-1}$	t -stat	$R_{i,t-1}^B$	t -stat	$R_{i,t-1}^S$	t -stat
All funds	0.48	16.66	1.48	38.42	-0.64	-15.31	0.39	12.96	1.50	37.51	-0.87	-19.53
Small-cap	0.37	20.60	1.41	54.62	-0.51	-20.45	0.33	11.50	1.48	35.45	-0.62	-15.53
Large-cap	0.12	17.64	0.58	49.91	-0.25	-20.38	0.03	2.25	0.56	18.85	-0.77	-16.05
Value	0.21	9.70	0.81	27.44	-0.43	-13.45	0.24	9.87	1.04	28.74	-0.43	-11.78
Growth	0.24	15.35	1.14	46.33	-0.44	-18.91	0.13	7.38	1.09	37.03	-0.67	-22.50
Low turn	0.27	12.29	0.91	29.44	-0.38	-11.47	0.22	9.48	1.12	31.23	-0.53	-14.23
High turn	0.23	14.42	1.13	44.16	-0.43	-18.06	0.14	7.46	1.00	32.70	-0.59	-19.43

Table 2.5
Information Measures and Domestic vs. Foreign Fund Trading Strategies

This table reports results for the following pooled cross-sectional and time-series regressions for domestic and foreign funds:

$$\Delta fo_{j,i,t}^{Dom} - \Delta fo_{j,i,t}^{For} = \beta_0 + \beta_1 R_{t-1}^B + \beta_2 R_{t-1}^{B-L(IM)} + \beta_3 R_{t-1}^S + \beta_4 R_{t-1}^{S-L(IM)} + \beta_5 MV_{i,t-1} + \beta_6 BM_{i,t-1} + \text{controls} + \epsilon_{i,t},$$

Time t refers to a 6-month interval, with the first interval ending December 2000 and the last ending December 2005. IM denotes information measures for the country ($IM \equiv C$) and firm level ($IM \equiv F$). $\Delta fo_{j,i,t}$ is the 6-month net trading of fund j (measured by a change in the fund's percentage holding relative to the number of shares outstanding) in stock i at time t . $R_{i,t-1}$ is the 6-month (skip one month) stock return at time $t-1$. $R_{i,t-1}^B$ equals $R_{i,t-1}$ if $\Delta fo_{j,i,t} > 0$ and 0 otherwise, whereas $R_{i,t-1}^S$ equals $R_{i,t-1}$ if $\Delta fo_{j,i,t} < 0$ and 0 otherwise. $MV_{i,t-1}$ and $BM_{i,t-1}$ are stock i 's log of market capitalization and log of book-to-market ranks, respectively, at $t-1$. Construction of MV and BM ranks is contained in Table 3. We further classify stocks based on the quality of their country- and firm-level information proxies. Both firm and country-level proxies are defined in Table 2. $R_{i,t-1}^{B-L(IM)} = R_{i,t-1}^B$ if the country-level (firm-level) information quality proxy is below the cross-country (country) median, except for the developed vs. emerging market proxy where dummy variables are employed as explicitly defined in Table 2. Panels A and B report results for the country- and firm-level information measures, respectively. For each independent variable, the first row reports coefficient estimates with corresponding t -statistics beneath them. Regression models control for unreported semi-annual and country effects.

Variable	Panel A: At the Country level								Panel B: At the Firm level		
	<i>All</i>	<i>DisReq</i>	<i>Freq</i>	<i>Disc</i>	<i>AntSel</i>	<i>FTran</i>	<i>GTran</i>	<i>Dev</i>	<i>PIN</i>	<i>PIN_{Adj}</i>	<i>R²</i>
$R_{i,t-1}^B$	-0.095	0.018	0.018	0.067	0.019	0.016	0.445	0.017	1.393	1.272	1.128
	-1.23	2.20	2.21	0.47	2.24	1.99	4.15	2.04	9.23	8.02	7.20
$R_{i,t-1}^{B-L(C)}$		-1.187	-0.631	-0.051	-1.094	0.044	-0.431	-0.201	-1.514	-1.102	-0.801
		-5.50	-4.06	-0.36	-5.75	0.25	-4.00	-0.97	-6.80	-4.98	-3.59
$R_{i,t-1}^S$	0.588	-0.072	-0.062	0.201	-0.093	0.018	0.059	0.136	-0.114	0.008	-0.107
	5.90	-0.68	-0.56	1.04	-0.86	0.17	0.38	1.27	-0.59	0.04	-0.52
$R_{i,t-1}^{S-L(C)}$		1.299	0.694	-0.137	1.103	0.484	0.082	-0.289	0.272	-0.016	0.354
		4.45	2.97	-0.62	4.25	1.84	0.41	-1.00	0.91	-0.05	1.18

Table 2.6
Effects of Mutual Fund Trading on Contemporaneous and Future Stock Returns

Panels A and B of this table report results for the following pooled cross-sectional and time-series regressions using country- and firm-level information measures (IM), respectively, across 28 markets:

$$R_{i,t+1} = \beta_0 + \beta_1 \Delta f o_{i,t}^{B-Dom} + \beta_2 \Delta f o_{i,t}^{B-Dom-L(IM)} + \beta_3 \Delta f o_{i,t}^{B-For} + \beta_4 \Delta f o_{i,t}^{B-For-L(IM)} + \beta_5 \Delta f o_{i,t}^{S-Dom} + \beta_6 \Delta f o_{i,t}^{S-Dom-L(IM)} + \beta_7 \Delta f o_{i,t}^{S-For} + \beta_8 \Delta f o_{i,t}^{S-For-L(IM)} + \beta_9 R_{i,t-1} + \beta_{10} M V_{i,t-1} + \beta_{11} B M_{i,t-1} + \text{controls} + \epsilon_{i,t+1},$$

and

$$R_{i,t} = \beta_0 + \beta_1 \Delta f o_{j,i,t}^{B-Dom} + \beta_2 \Delta f o_{j,i,t}^{B-Dom-L(IM)} + \beta_3 \Delta f o_{j,i,t}^{B-For} + \beta_4 \Delta f o_{j,i,t}^{B-For-L(IM)} + \beta_5 \Delta f o_{j,i,t}^{S-Dom} + \beta_6 \Delta f o_{j,i,t}^{S-Dom-L(IM)} + \beta_7 \Delta f o_{j,i,t}^{S-For} + \beta_8 \Delta f o_{j,i,t}^{S-For-L(IM)} + \beta_9 R_{i,t-1} + \beta_{10} M V_{i,t-1} + \beta_{11} B M_{i,t-1} + \text{controls} + \epsilon_{i,t},$$

Time t refers to a 6-month interval, with the first interval ending December 2000 and the last ending December 2005. $\Delta f o_{j,i,t}^{B-Dom}$ and $\Delta f o_{j,i,t}^{B-For}$ are the current 6-month net trading (measured by a change in the fund's percentage holding relative to the number of shares outstanding) of domestic and foreign funds for stock i , respectively. $R_{i,t}$ is the 6-month (skipping one month) stock return at time $t-1$. $\Delta f o_{j,i,t}^{B-Dom} = \Delta f o_{j,i,t}^{B-Dom}$ if domestic funds net trading for stock i is positive, and zero otherwise. $\Delta f o_{j,i,t}^{S-Dom} = \Delta f o_{j,i,t}^{S-Dom}$ if domestic funds net trading for stock i is negative, and zero otherwise. $\Delta f o_{j,i,t}^{S-For}$ and $\Delta f o_{j,i,t}^{S-For}$ are defined similarly for foreign funds. $M V_{i,t-1}$ and $B M_{i,t-1}$ are stock i 's log of market capitalization and log of book-to-market ratio at $t-1$, respectively. Construction of $M V$ and $B M$ ranks are defined in Table 3. The controls include semi-annual and country effects, but are unreported. For domestic buys, $\Delta f o_{j,i,t}^{B-Dom-L(C)} = \Delta f o_{j,i,t}^{B-Dom}$ if the country-level information quality proxy is below the cross-country median (except for the developed vs. emerging market proxy explicitly defined in Table 2). $\Delta f o_{j,i,t}^{B-Dom-L(F)} = \Delta f o_{j,i,t}^{B-Dom}$ if the firm-level information quality proxies are below the country median. Foreign buys and sells are defined in the same way. Coefficient estimates (x100) and t -statistics are from WLS regressions, where the weight assigned to each observation is proportional to the inverse of the total number of observations available within the country to which it belongs. It also reports the difference between the domestic and foreign trading coefficients in both high information quality market (from the above first regression), $\beta_1 - \beta_3$ for buys, and $\beta_5 - \beta_7$ for sells) and low information quality market (from the above second regression), $\beta_1 + \beta_2 - \beta_3 - \beta_4$ for buys, $\beta_5 + \beta_6 - \beta_7 - \beta_8$ for sells). The p -values for corresponding F -tests indicate that these differences are zero.

Table 2.6 - continued
Effects of Mutual Fund Trading on Future and Contemporaneous Stock Returns

Panel A: Effects of Fund Trading Strategies associated with Different Country and Firm-Level Information Environment Measures on Future Returns												
Variable	At the Country Level							At the Firm Level				
	All	DisReq	Freq	Disc	AntSel	FTran	GTran	Develop	PIN	PINAdj	R ²	
$\Delta fo_{i,t}^{B_Dom}$	0.204	0.171	0.096	0.123	0.282	0.076	0.223	0.156	0.045	0.216	0.385	
	5.18	3.22	1.74	2.25	5.30	1.42	4.18	3.35	0.68	3.26	7.62	
$\Delta fo_{i,t}^{B_Dom-L(C)}$		0.077	0.215	0.167	-0.169	0.275	-0.037	0.178	0.494	0.119	-0.346	
		0.97	2.75	2.14	-2.14	3.50	-0.47	2.06	5.69	1.38	-5.34	
$\Delta fo_{i,t}^{B_For}$	0.060	0.102	-0.011	0.092	0.041	0.004	0.012	-0.029	0.302	0.212	0.079	
	1.55	1.99	-0.21	1.70	0.80	0.08	0.24	-0.64	4.51	3.17	1.56	
$\Delta fo_{i,t}^{B_For-L(C)}$		-0.094	0.135	-0.057	0.050	0.123	0.107	0.307	-0.396	-0.185	-0.030	
		-1.27	1.82	-0.78	0.67	1.66	1.44	3.77	-4.55	-2.13	-0.46	
$\Delta fo_{i,t}^{S_Dom}$	0.010	-0.060	-0.092	0.048	0.002	-0.112	0.084	0.059	-0.192	-0.004	0.091	
	0.24	-1.11	-1.62	0.86	0.03	-2.04	1.53	1.25	-2.84	-0.05	1.76	
$\Delta fo_{i,t}^{S_Dom-L(C)}$		0.153	0.197	-0.070	0.017	0.259	-0.155	-0.161	0.388	-0.003	-0.173	
		1.92	2.47	-0.87	0.22	3.25	-1.95	-1.83	4.40	-0.03	-2.62	
$\Delta fo_{i,t}^{S_For}$	-0.321	-0.232	-0.412	-0.261	-0.242	-0.361	-0.315	-0.411	0.019	-0.102	-0.191	
	-7.97	-4.30	-7.42	-4.66	-4.48	-6.63	-5.79	-8.66	0.27	-1.44	-3.50	
$\Delta fo_{i,t}^{S_For-L(C)}$		-0.194	0.176	-0.118	-0.158	0.087	-0.007	0.302	-0.593	-0.321	-0.187	
		-2.48	2.25	-1.51	-2.01	1.11	-0.08	3.52	-6.33	-3.43	-2.65	
R_{t-1}	1.075	1.075	1.075	1.075	1.074	1.075	1.076	1.074	0.958	0.960	1.064	
	21.76	21.76	21.75	21.76	21.74	21.75	21.77	21.73	23.09	23.12	21.64	
MV	0.058	0.059	0.060	0.057	0.057	0.058	0.059	0.061	-0.004	-0.001	0.079	
	5.02	5.06	5.21	4.96	4.89	5.03	5.07	5.24	-0.25	-0.05	6.69	
BM	0.300	0.299	0.302	0.300	0.300	0.300	0.300	0.300	0.307	0.310	0.302	
	35.95	35.90	36.10	35.95	35.96	35.99	35.99	36.02	27.54	27.87	36.04	
F-tests on the difference between the trading coefficients associated with domestic and foreign funds												
Buy (high)	0.144	0.069	0.107	0.031	0.241	0.072	0.210	0.185	-0.257	0.004	0.306	
P-Value	0.02	0.39	0.19	0.71	0.00	0.38	0.01	0.01	0.02	0.97	0.00	
Buy (Low)		0.240	0.187	0.256	0.023	0.224	0.067	0.057	0.633	0.308	-0.010	
P-Value		0.01	0.03	0.00	0.80	0.01	0.45	0.60	0.00	0.01	0.91	
Sell (high)	0.331	0.172	0.320	0.309	0.244	0.249	0.399	0.471	-0.211	0.099	0.282	
P-Value	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.38	0.00	
Sell (low)		0.519	0.341	0.357	0.419	0.421	0.251	0.008	0.770	0.417	0.296	
P-Value		0.00	0.00	0.00	0.00	0.00	0.01	0.94	0.00	0.00	0.00	

Table 2.6 - continued
Effects of Mutual Fund Trading on Contemporaneous and Future Stock Returns

Panel B: Effects of Fund Trading Strategies associated with Different Country and Firm-Level Information Environment Measures on Current Returns												
Variable	At the Country Level							At the Firm Level				
	All	DisReq	Freq	Disc	AntSel	FTran	GTran	Develop	PIN	PIN _{Adj}	R ²	
$\Delta f o_{i,t}^{B-Dom}$	0.803 3.70	1.336 4.56	0.740 2.46	0.777 2.58	1.337 4.56	0.887 3.00	0.884 3.01	0.694 2.71	0.392 0.65	1.246 2.05	1.102 3.97	
$\Delta f o_{i,t}^{B-Dom-L(C)}$		-1.182 -2.74	0.114 0.27	0.071 0.16	-1.197 -2.77	-0.172 -0.40	-0.182 -0.42	0.385 0.81	0.940 1.18	-0.894 -1.13	-0.627 -1.77	
$\Delta f o_{i,t}^{B-For}$	0.672 3.16	0.271 0.97	0.290 0.99	0.990 3.36	0.295 1.06	0.443 1.55	0.838 2.96	0.675 2.70	0.811 1.33	-0.150 -0.25	0.534 1.92	
$\Delta f o_{i,t}^{B-For-L(C)}$		0.908 2.23	0.763 1.88	-0.646 -1.59	0.887 2.18	0.477 1.18	-0.358 -0.88	-0.028 -0.06	-1.145 -1.44	0.890 1.12	0.303 0.84	
$\Delta f o_{i,t}^{S-Dom}$	0.214 1.00	0.318 1.09	0.458 1.52	-0.040 -0.13	0.341 1.17	0.347 1.19	0.061 0.21	0.277 1.10	-0.468 -0.77	1.309 2.14	0.540 1.96	
$\Delta f o_{i,t}^{S-Dom-L(C)}$		-0.248 -0.58	-0.496 -1.17	0.530 1.25	-0.314 -0.74	-0.274 -0.65	0.332 0.78	-0.189 -0.40	2.002 2.55	-1.690 -2.16	-0.683 -1.94	
$\Delta f o_{i,t}^{S-For}$	-0.596 -2.76	-0.837 -2.90	-0.789 -2.66	-0.343 -1.15	-0.773 -2.68	-1.003 -3.45	-0.409 -1.41	-0.843 -3.32	-0.588 -0.94	-1.562 -2.46	-0.660 -2.28	
$\Delta f o_{i,t}^{S-For-L(C)}$		0.556 1.34	0.394 0.95	-0.521 -1.26	0.441 1.06	0.863 2.08	-0.411 -0.99	0.836 1.83	-1.124 -1.35	0.952 1.15	0.191 0.51	
R_{t-1}	4.319 15.56	4.315 15.54	4.318 15.55	4.318 15.55	4.317 15.55	4.316 15.54	4.319 15.55	4.319 15.56	4.258 11.02	4.258 11.02	4.312 15.52	
MV	-0.098 -1.55	-0.105 -1.66	-0.095 -1.50	-0.097 -1.54	-0.102 -1.62	-0.096 -1.52	-0.099 -1.56	-0.095 -1.50	-0.178 -1.18	-0.138 -0.94	-0.075 -1.16	
BM	0.401 8.94	0.400 8.91	0.404 8.99	0.398 8.87	0.401 8.93	0.401 8.95	0.400 8.91	0.400 8.91	0.450 4.47	0.471 4.70	0.400 8.89	
F-tests on the difference between the trading coefficients associated with domestic and foreign funds												
Buy (high)	0.131	1.064	0.451	-0.213	1.042	0.444	0.045	0.019	-0.418	1.395	0.568	
P-Value	0.69	0.02	0.32	0.64	0.02	0.32	0.92	0.96	0.67	0.16	0.21	
Buy (Low)		-1.025	-0.199	0.503	-1.042	-0.206	0.221	0.433	1.666	-0.388	-0.362	
P-Value		0.04	0.67	0.28	0.03	0.66	0.65	0.47	0.12	0.71	0.44	
Sell (high)	0.810	1.155	1.247	0.303	1.115	1.350	0.470	1.119	0.121	2.871	1.200	
P-Value	0.01	0.01	0.01	0.50	0.01	0.00	0.29	0.00	0.90	0.00	0.01	
Sell (low)		0.351	0.357	1.353	0.359	0.213	1.213	0.095	3.247	0.229	0.326	
P-Value		0.47	0.45	0.00	0.46	0.65	0.01	0.87	0.00	0.83	0.48	

3 THE WORLD PRICE OF HOME BIAS

3.1 Introduction

Despite the apparent diversification benefits, investors still overweight domestic stocks in their portfolios.³² This home bias phenomenon continues to exist in every country. Many explanations for this bias include explicit barriers to international capital flows, hedging motives, deviations from purchasing power parity, information asymmetries, and behavioral biases.³³ However, these explanations are either no longer applicable in light of the increased globalization of capital markets around the world, or unable to explain the magnitude of the observed home bias. The pervasive evidence of home bias has important implications for the cost of capital,³⁴ and the main focus of our study is to explore this asset pricing implication of the home bias.

Theoretical arguments suggest that as the home bias decreases, the cost of capital falls. For example, Stulz (1999) argues that the extent of the home bias determines the impact of financial globalization on the cost of capital. In his Presidential address at the 2005 American Finance Association meetings, Stulz postulates that one of the economic benefits of financial globalization is that it facilitates the sharing of risks globally. However, faced with “twin agency problems”,³⁵ investors of a country cannot fully enjoy this risk sharing advantage of financial globalization. Such agency problems are implicit barriers to cross-border investment and hence in part contribute to the observed home bias in domestic stocks.³⁶ The home bias effect might limit the cost of capital benefits of globalization because global risk sharing between domestic and foreign investors is reduced. As a result, domestic investors face a greater risk premium when not taking full advantage of the cost of capital benefits of globalization.

³²Lewis (1999) and Karolyi and Stulz (2003) provide extensive reviews of the literature.

³³See, for instance, Black (1974), Stulz (1981a), and Errunza and Losq (1985) on explicit barriers to international capital flows; Solnik (1974), Adler and Dumas (1983), Stulz (1981b), and Baxter and Jermann (1997) on hedging motives; Cooper and Kaplanis (1994) on deviations from purchasing power parity; Kang and Stulz (1997), Jeske (2001), and Ahearne, Grier, and Warnock (2004) on information asymmetries; Shiller, Kon-Ya and Tsutsui (1996) and Graham, Harvey, and Huang (2005) on behavioral biases; and Young and Guenther (2003), Bradshaw, Bushee, and Miller (2004), and Covrig, Defond, and Hung (2006) on accounting environments.

³⁴Throughout this study, the term “cost of capital” refers to “cost of equity capital”, unless otherwise stated.

³⁵The existence of twin agency problems suggests that all investors risk expropriation by the country and that outside investors additionally risk expropriation by those who control the firm.

³⁶See Dahlquist, Pinkowitz, Stulz, and Williamson (2003) and Kho, Stulz, and Warnock (2006).

In this study, we examine whether the existence of home bias matters for asset prices. Particularly, we investigate whether and how varying degrees of the home bias exhibited by domestic investors from 38 countries are related to the cross-country variation in the cost of capital. We implement several models to estimate the cost of capital of a country. Results show that, consistent with theoretical arguments, countries with stronger home bias effects have a significantly greater cost of capital, after controlling for traditional risk proxies and country-specific characteristics. The implication of the results is that a country can enjoy a significantly lower cost of capital by reducing the degree of its home bias. For example, if domestic investors in Czech Republic and Peru were to hold local stocks in the proportion implied by standard portfolio theory, they could enjoy a fall in their country's cost of capital by about 180 basis points.

We measure the degree of a country's home bias by using the information on how domestic mutual funds in different countries allocate their equity portfolios between domestic and foreign stocks. Such information on mutual fund holdings is available from Thomson Financial Securities (TFS) for the 10-year period from 1998 to 2007. A much shorter time period of this data set has been employed by Chan, Covrig, and Ng (2005) and Hau and Rey (2008) to examine the home bias phenomenon. Our analysis employs Chan, Covrig, and Ng's country-level home bias measure as the main variable of our analysis and, in the spirit of Hau and Rey's fund-level home bias, the firm-level home-bias measure in our robustness checks. We, however, adjust their home bias measures to reflect the fraction of shares that are predominantly owned by controlling shareholders and are not freely tradeable. Thus, the country(firm)-level home bias measure is defined as the share of domestic mutual funds' holdings in their country's (a domestic firm's) stock market capitalization divided by their country's (the domestic firm's) world-float market capitalization weight.

We recognize that such measures would be more precise if they are based on stockholdings of both domestic individual and institutional investors, including mutual funds. Mutual funds have, however, become a popular investment vehicle among individual investors worldwide, and

have contributed to the tremendous growth of this industry in this past decade. As of December 2007, there were 66,350 mutual funds worldwide and their total net assets worth \$26.2 trillion.³⁷ Furthermore, Hau and Rey (2008) compare the geographic distribution of their sample of fund holdings with the best aggregate data available on international investment, i.e., the Coordinated Portfolio Investment Survey (CPIS) of the International Monetary Fund (IMF). Their statistical analysis suggests that the mutual funds are representative of foreign equity positions in the world economy. Our robustness tests show that the home bias effect on the cost of capital still holds when a country's home bias is measured using the CPIS data.

Our empirical design is based on the approach of Hail and Leuz (2006). In their study, the authors examine whether differences in countries' legal institutions and securities regulation can explain differences in the countries' cost of capital, as measured by the implied cost of capital (ICOC). Their results show that cross-country variation in firms' cost of capital is strongly related to the international differences in legal institutions and securities regulation, even after controlling for traditional proxies for firm risk and country factors associated with differences in inflation and macroeconomic activity. Our analysis controls for their main variables as well as other variables drawn from existing literature to ensure that any evidence of the home bias impact on the cost of capital is not driven by any of these variables. Hail and Leuz's research methodology therefore establishes the basic framework for us to examine the impact of home bias on the cost of capital.

Our research contributes to the literature in two significant ways. First, we perform direct tests of home bias effects on the cost of capital of a country and, more importantly, the tests allow us to quantify the magnitude of the cost of capital impact of home bias. We employ three different proxies for the cost of capital. The first proxy is the ICOC, computed using earnings forecasts. The ICOC has been widely adopted in the accounting literature, and in recent years it is gaining popularity in the financial economic literature. Lee, Ng, and Swaminathan (2003), Hail and Leuz (2006), and Pastor, Sinha, and Swaminathan (2007) show that the ICOC is able

³⁷See Investment Company Institute's website <http://www.ici.org/stats/mf/arcglo/index.html#2007>.

to explain the international risk-return relationship. The other two proxies include the average realized return, a widely employed traditional measure of the cost of capital, and the expected dividend yield, as adopted in Bekaert and Harvey (2000) and Fama and French (2002). These two measures do not rely on accounting information and are commonly applied in the finance literature. While the three proxies do not consistently yield the predicted relationships between the cost of capital and traditional risk proxies, they produce compelling evidence that the home bias measure systematically captures the cross-sectional variation in country cost of capital.

Second, our work adds to the plethora of related studies that analyze the impact of foreign ownership on valuation ratios. Previous studies such as Ahearne, Grier, and Warnock (2004), Doidge, Karolyi, and Stulz (2004), Sarkissian and Schill (2004), and Ferreira and Matos (2006) show that internationalization of firms, through increased foreign ownership or cross-listings on foreign exchanges, has a significant impact on firm valuation ratios such as book-to-market or Tobin's Q ratio. These results imply that globalization improves firm valuation by decreasing the cost of capital. Other studies use an event-study approach to examine stock market liberalization effects on the cost of capital. The notion is that stock market liberalization facilitates foreign investors to hold shares in the local stock market, thereby globalizing the shareholder base of domestic firms. For example, Henry (2000) shows that stock market liberalization increases stock returns through a reduction in the cost of capital. Foerster and Karolyi (1999), Miller (1999), and Errunza and Miller (2000) examine the returns around the announcement of an American Depositary Receipts program. They find positive returns and interpret this as evidence of an increase in shareholder wealth and hence a fall in the cost of capital.

There are, however, several problems associated with the use of valuation ratios and event studies. They tend to overstate the cost of capital benefits of market liberalization. The event-study approach assumes that firms experience a constant growth before and after the market liberalizes, but firms especially in emerging economies generally enjoy substantial growth opportunities following market liberalization. Studies using Tobin's Q ratios also face the endogeneity problem when examining the valuation impact of foreign ownership. Our cost of capital ap-

proach circumvents such problems. Unlike the valuation ratios and event-study approaches, our method provides a direct test of the cost of capital impact of home bias and also allows us to gauge the size of the impact. Furthermore, our study examines the cost of capital impact of the home bias at the country and firm levels across a broad range of countries. In contrast, existing studies generally focus on subsets of countries (i.e., countries that have experienced stock market liberalization) or subsets of firms (i.e., firms that have their shares listed on foreign exchanges).

The remainder of this paper proceeds as follows. Section 3.2 briefly discusses a simple theoretical relationship between the cost of capital and home bias. Section 3.3 describes the data sources of our sample and the construction of the key variables employed in our study. Section 3.4 offers the empirical evidence of the cost of capital impact of home bias, and Section 3.5 performs a battery of robustness tests. The final section concludes.

3.2 Home Bias and Cost of Capital

Assuming no investment barriers and markets are perfectly integrated, Adler and Dumas (1983) show that a country's expected return is determined by the covariance of its return with the world market portfolio return and possibly with currency deposits. On the other hand, when markets are fully segmented, a country's expected return is determined solely by its own return variance. When there exist some investment barriers and hence markets are partially integrated, a country's risk premium is a weighted average of the covariance of the country's return with the world portfolio return and its own variance, with the degree of the country's market integration as the weight (see Bekaert and Harvey (1995) and De Jong and De Roon (2005)). The implication of these pricing models is that the equities of fully segmented markets are held solely by domestic investors and those of fully integrated markets are held by both domestic and foreign investors. Hence domestic investors from different countries would exhibit varying degrees of home bias. In this section, we explore a simple pricing model that incorporates the impact of this home bias.

Following Lewis's (1999) theoretical approach, we begin by assuming that domestic investors

hold both domestic and foreign equity. For simplicity, we take the persistence of a home bias as given and proceed to show how the home bias can affect a country's cost of capital. Let there be L small countries, with country l having N^l equity assets and r_l as its dollar-denominated index return and r_i as the dollar-denominated return for asset i . We further assume that there exists a representative mean-variance domestic investor d in a country and that investor d holds a portfolio Y^d with a proportion w_i^d in asset i . Investor d maximizes the following utility function.

$$U = U(E(R), \Sigma), \quad (47)$$

with $E(R) = (E(r_1) \dots E(r_N))$ and $\Sigma = Var(R)$. The first-order condition is therefore given by

$$E(R) = \gamma \Sigma W^d, \quad (48)$$

where γ denotes the relative risk aversion parameter, and for simplicity all investors are assumed to have the same degree of relative risk aversion. W^d denotes the vector of the proportions of asset holdings. The expected return of a domestic asset i in investor d 's country l is given by

$$E(r_i) = \gamma \sum_{j=1}^{N^l} w_j^d Cov(r_i, r_j), \quad (49)$$

where N^l denotes the number of securities in country l .

If asset i is held only by domestic investors, by aggregating over all these investors and taking the wealth-weighted average, we show in Appendix A that the equilibrium risk premium is

$$E(r_i) = \gamma \frac{w_l - w_l^*}{1 - w_l^*} Cov(r_i, r_l) + \gamma \frac{1 - w_l}{1 - w_l^*} Cov(r_i, r_w), \quad (50)$$

where $w_l = \frac{\sum_{d=1}^{D^l} Y^d \sum_{j=1}^{N^l} w_j^d}{\sum_{d=1}^{D^l} Y^d}$ denotes the proportion of domestic investors' portfolios allocated to domestic equity, w_l^* is the country l 's market share in the world market portfolio, D^l represents the total number of domestic investors in country l , and r_w denotes the world market index return. The first term on the right hand side of (50) reflects the risk premium associated with the covariance of asset i with the domestic market return, whereas the second term is the risk component related to the covariance of asset i with the world market portfolio return. Then,

by multiplying both sides of (50) by the market capitalization weight of asset i held by all domestic investors and aggregating over all assets they hold in country l , we obtain country l 's risk premium as

$$E(r_l) = \gamma \frac{w_l - w_l^*}{1 - w_l^*} Var(r_l) + \gamma \frac{1 - w_l}{1 - w_l^*} Cov(r_l, r_w). \quad (51)$$

Equation (51) indicates that the level of domestic investors' holdings of local equity affects the expected return of the equity index.

Consider an extreme case in which domestic investors hold solely domestic equity (i.e., $w_l = 1$). Substituting this condition into Equation (51) yields

$$E(r_l) = \gamma Var(r_l). \quad (52)$$

When domestic investors hold only local equity, the expected return of their portfolio is proportional to the variance of the market return. This pricing relationship is the same as the asset pricing model in a completely segmented market. While (52) does not explain why investors exhibit home bias, it emphasizes the cost of capital impact of the home bias. It is therefore apparent that without international diversification the price of the domestic market portfolio is determined only by its own return variance.

Consider another case in which investors hold domestic equity in proportion to the country's share of the world market portfolio, as implied by standard international portfolio theory. In this case, $w_l = w_l^*$, and hence domestic investors exhibit no home bias. Based on these conditions, Equation (51) can be expressed as

$$E(r_l) = \gamma Cov(r_l, r_w). \quad (53)$$

When investors exhibit no home bias, it implies that they can well diversify their portfolios internationally and that the domestic market is completely integrated with the world market. In this case, the expected return of domestic equity is proportional to the covariance of domestic equity return with the return on the world market portfolio.³⁸

³⁸If investors exhibit no home bias in a market, it is not necessary to distinguish foreign investors and domestic investors. However, we do address this issue below.

In reality, however, investors do exhibit varying degrees of the home bias. Thus, the proportion of their domestic equity holdings falls within the interval of $(w_l^*, 1)$. We can rewrite (51) as

$$E(r_l) = \gamma \frac{w_l - w_l^*}{1 - w_l^*} (Var(r_l) - Cov(r_l, r_w)) + \gamma Cov(r_l, r_w). \quad (54)$$

Our pricing model (54) implicitly links the degree of home bias to the cost of capital. As (54) implies, the greater the domestic investors' portfolio allocation to their own domestic equity (w_l), the larger is the degree of their home bias. Equation (54) is also similar to that of Bekaert and Harvey (1995), who develop a regime-switching model to capture the differing degrees of market integration. The term $\frac{w_l - w_l^*}{1 - w_l^*}$ in (54) can also be interpreted as the degree of market integration in Bekaert and Harvey. A country with larger w_l would imply that it has a lower degree of market integration or a higher degree of market segmentation. The increasing degree of home bias or of market segmentation will induce a larger cost of capital if the following condition holds.

$$Var(r_l) > Cov(r_l, r_w). \quad (55)$$

In our sample of 38 countries, our preliminary analysis has indicated that the return variance of the MSCI country index is always greater than the covariance of the MSCI country index return with the MSCI world index return, implying that the local idiosyncratic risk exceeds the global covariance risk.³⁹ Therefore, we hypothesize that the cost of capital of a country is positively associated with the proportion of domestic portfolios in domestic equity and hence the degree of home bias.

Thus far, the derivation of our simple pricing relationship has not incorporated the possible costs of cross-border investments and the marginal portfolio effects of foreign investors. Following Cooper and Kaplanis (2000) and Stulz (1981a), we can easily incorporate these effects by modifying Equation (48) as follows.

$$E(R^z) - C^z = \gamma \Sigma^z W^z, \quad (56)$$

³⁹Stulz (1999) also provides the same finding, and our preliminary results are available upon request.

where $E(R^z)$ is a vector of returns for the assets held in non-zero amounts by representative investor z , C^z is a vector of investor z 's deadweight costs for long or short asset positions, Σ^z is the covariance matrix of asset returns censored with zero holdings in investor z 's portfolio, and W^z is a vector of the proportions of asset holdings also censored with zero holdings. In contrast to (48), Equation (56) now incorporates a vector of (direct and indirect) deadweight costs.⁴⁰ Aggregating (56) over all investors and taking a wealth-weighted average gives the equilibrium expected return,

$$E(R) = \hat{C} + \gamma \hat{\beta}, \quad (57)$$

where $\hat{C} = (\sum y^z p^z)^{-1} (\sum y^z p^z C^z)$, $\hat{\beta} = (\sum y^z p^z)^{-1} W^*$, y^z is investor z 's share of the world wealth, p^z is the inverse of Σ^z augmented with zeros in the positions censored from the original matrix, and W^* is the vector of asset weights in the world market portfolio. In this setting, the expected return depends on the costs of cross-border investments and segmented risks associated with incomplete global risk-sharing, which in turn is affected by these costs.

For a country with zero costs of cross-border investments, the home bias effects on risk premiums can be partly mitigated if there is an increasing demand by foreign investors to hold domestic assets for diversification purposes. In other words, the required return is determined by the marginal portfolio effects of both domestic and foreign investors. As a result, the expected return will be determined by only the world market $\hat{\beta}$. However, in practice, foreign investors generally bear greater costs of cross-border investments, explicitly or implicitly, when investing in many countries. The positive difference of the costs of local investments in asset i to foreign investor f and domestic investor d , i.e. $(C_i^f - C_i^d)$, therefore provides an upper bound for a country's cost of capital. Below this upper bound, an increase in the degree of home bias will induce an increase in $\hat{\beta}$ risk through incomplete global risk-sharing and hence the market becomes more segmented.

In sum, both Models (54) and (57) imply that investors with concentrated domestic asset

⁴⁰Examples of direct deadweight costs include withholding taxes and capital flow restriction costs, and of indirect deadweight costs include information asymmetries and agency costs.

holdings would require to be compensated with higher returns, as there is less global risk-sharing. Therefore, a larger degree of home bias would lead to a higher cost of capital. To capture the spirit of our simple models, we follow Chan, Covrig, and Ng (2005) by explicitly measuring the degree of home bias using the log ratio of the share of domestic holdings in the country's market capitalization to the country's world market capitalization weight (i.e., $\ln(\frac{w}{w^*})$). For consistency and comparison purposes, this home bias measure is employed as the key variable of our analysis throughout our study. Hau and Rey (2008) use a similar measure, but at the mutual fund level. We employ the firm-level measure in our subsequent robustness tests.

Our empirical analysis in subsequent sections shows that the international differences in the cost of capital are not only strongly and positively related to the varying degrees of the home bias across our sample of 38 countries worldwide, but also economically significant.

3.3 Data and Sample Construction

This section describes the sample we construct from different data sources. The sample period of our analysis is between 1998 and 2007, because the mutual funds holdings data we use to calculate the home bias measure only became available from 1998 onwards. Our sample consists mainly of (a) the stockholdings of mutual funds worldwide from TFS, (b) monthly returns of both stocks and Morgan Stanley Capital International (MSCI) country and world indexes from Datastream, and (c) a multitude of firm-specific and country financial variables from various databases, namely Worldscope, International I/B/E/S, International Financial Statistics (IFS), World Development Indicators, and Economic Freedom Network.

3.3.1 Home Bias As Revealed By Mutual Fund Portfolio Holdings

The traditional standard portfolio theory predicts that with no barriers to cross-border investments all investors hold the world market portfolio. In other words, in the absence of home bias, the share of an investor's equity investment in her own equity market would equal the country's market capitalization weight in the world market portfolio. As discussed in the Introduction

Section, the extent of home bias as revealed by the stockholdings of domestic mutual funds is assumed to provide a reasonable approximation of the degree of home bias exhibited by domestic investors in a country.

The TFS mutual funds database contains information of all mutual funds from countries across the world starting 1998.⁴¹ The database contains three data files: (a) the Fund Master File, containing the fund number, fund name, management company name, country code, and report date; (b) the Security Master File, containing the security number, security name, country code, security price in US dollar, and shares outstanding; and (c) the Portfolio Holdings File, containing the fund number, security number, number of shares held by the fund, and net changes in shares held since prior report dates. About one-third of these mutual funds report their holdings at least twice a year, and about half only twice a year. Given that more than 75% of the funds report their holdings in December of each year, we measure the extent of home bias using the fund holdings reported in the second half of the calendar year.

Our study employs information on the holdings of mutual funds from 15 emerging countries and 23 developed countries to measure the degrees of home bias displayed by local investors from these 38 different countries worldwide. For each country, we calculate its world-float market capitalization weight and then determine the extent of the country's home bias by taking the ratio of its local funds' aggregate portfolio weight in the local market relative to its world-float market capitalization weight.

When calculating the country's world-float market capitalization weight, we adjust for any fraction of shares local firms issue that are predominantly owned by a large shareholder or a group of controlling shareholders and hence are not freely traded.⁴² This adjustment is necessary,⁴³ because Dahlquist, Pinkowitz, Stulz, and Williamson (2003) and Kho, Stulz, and Warnock

⁴¹The TFS database only includes equity mutual funds that hold at least one stock. Therefore, it excludes money market funds and fixed income funds.

⁴²Our results are qualitatively the same even without the adjustment.

⁴³Leuz, Lins, and Warnock (2008) make a similar adjustment for controlled ownerships in firms when computing U.S. investment in foreign countries, but the adjustment does not alter their main finding of a significant negative relation between family/management control and U.S. investment.

(2007) show that the home bias phenomenon is partly attributed to the prevalence of closely-held firms in countries with poor investor protection. They argue that the level of controlled ownership in a firm affects the extent to which foreign investors can own shares of stock of the firm. For example, a firm with 30% controlled ownership implies that only the remaining 70% of its ownership can be purchased by foreign investors. Kho, Stulz, and Warnock further show that the home bias effect, while still significant, decreases between 1994 and 2004 in countries where insiders have smaller stakes in 1994 and where such stakes have decreased during their sample period. Hence, following Dahlquist et al., our proxy for the home bias is determined relative to a country's float-adjusted world market portfolio that adjusts for shares of controlling ownership in firms.

A country's yearly float-adjusted world market capitalization weight is given by

$$w_i^* = \frac{(1 - \delta_i)MCap_i}{\sum_{j=1}^{N=38} (1 - \delta_j)MCap_j}, \quad (58)$$

where δ_i is the fraction of shares closely held by controlling shareholders in country i and $MCap_i$ is the total market capitalization of country i 's stock market, and yearly information on $MCap_i$ is obtained from World Development Indicators of the World Bank. Closely-held shares are shares held by insiders, who include officers, directors, and their immediate families, shares held by individual shareholders who own at least 5% of the outstanding number of shares, shares held in trust, and shares held by another firm (except shares held in a fiduciary capacity by financial institutions), and shares held by pension plans. Data on closely-held shares of our sample firms are from Worldscope.

Columns (2)-(4) of Table 3.1 present, by country, the type of markets (developed (DEV) or emerging (EMG) market), average annual world market capitalization weight and average annual float-adjusted world market capitalization weight. Column (3) shows that US stock markets are the largest, constituting about 44.86% of the world market portfolio, and Peru's equity market is the smallest, forming about 0.05% of the world market portfolio. For 31 of these 38 countries, their world market capitalization weights are larger than their float-adjusted world

market capitalization weights, an indication that there exists a significant level of controlled ownership in these countries. It is not surprising that Japan experiences the largest reduction in its share of the float-adjusted world market portfolio from 9.29% to 8.05%. This observation is consistent with Japan's unique industrial structures (i.e., the *kereitsus*), where each industrial group consists of a network of firms, affiliated with a main bank or a major firm, in which firms have strong cross-holdings and product-market ties. Finland, Ireland, the Netherlands, Sweden, Switzerland, the United Kingdom, and the United States, on the other hand, increase their shares of the float-adjusted world market portfolio. The United States has the largest increase in the world market share from 44.86% to 51.75%.

Next, we measure the extent of the home bias as revealed by the portfolio holdings of local mutual funds in each country. Columns (5) and (6) of Table 3.1 report the average annual number of funds in our sample and the funds' average allocation of their portfolios to domestic stocks (in percentage). In aggregate, the average annual number of domestic funds in these 38 countries over the sample period is 26,029. Column (5) shows a significant cross-country variation in the average number of domestic funds, ranging from 10 in the Philippines to 6,253 in the United States. The size of the mutual fund industry in terms of the number of funds roughly corresponds to the size of the country's stock market capitalization – countries with smaller stock market capitalizations tend to have fewer funds available. As expected, column (6) confirms earlier evidence that the home bias phenomenon exists in every country; investors tend to put more weight in local stocks than the weight implied by standard portfolio theory (columns (3) and (4)). Mutual funds in, for example, Brazil, Taiwan, and Thailand invest all of their wealth in local equity markets, even though their respective float-adjusted world market capitalization weights are about 0.47%, 1.05% and 0.14%.

Column (7) provides the magnitude of the home bias measure by country. The construction of HB is as follows. For each year, we calculate w_i , the fraction of domestic stockholdings in

the portfolio holdings of all domestic mutual funds in country i , and is expressed as

$$w_i = \frac{h_i}{H_i},$$

where h_i is the market value of domestic stocks held by all domestic mutual funds in country i , and H_i is the total market value of domestic mutual fund holdings. Hence the measure of home bias for country i , HB_i , is given by

$$HB_i = \frac{w_i}{w_i^*},$$

and is expressed in natural logarithm throughout our analyses. Column (6) indicates that, compared with their float-adjusted world market capitalization weights, Czech Republic has the largest home bias measure ($HB=8.14$) and the United States has the lowest ($HB=0.55$).

3.3.2 Cost Of Capital Proxies Around The World

It is well recognized that estimating the cost of capital is somewhat difficult. Thus far, there is no uniformly superior method of estimating the cost of capital. Our analysis therefore considers three vastly different cost of capital proxies to ensure that the home bias effect is not sensitive to a particular cost of capital proxy employed. Below we discuss each proxy and also its advantages and disadvantages.

3.3.2.1 Implied Cost of Capital (ICOC) Estimation

Following Hail and Leuz (2006), our test employs the average of four different ICOC estimates as a proxy for a firm's cost of capital. The four models are (i) Gebhardt, Lee, and Swaminathan's (2001, GLS) residual income valuation model; (ii) Claus and Thomas's (2001, CT) residual income valuation model; (iii) Ohlson and Juettner-Nauroth's (2005, OJ) abnormal earnings growth valuation model; and finally (iv) Easton's (2004) MPEG ratio (Price-to-Earnings ratios divided by Growth rate) model, a special case of (iii). The basic premise of these models is that the ICOC is the internal rate of return that equates current stock price to the present value of expected future sequence of residual incomes or abnormal earnings. Hail and Leuz offer detailed

comparisons of the four models and show how they vary in the use of analyst forecasts data, the short-term and long-term growth assumptions, the forecasting horizon, and whether and how inflation is incorporated into the steady-state terminal value. Our estimation of these models strictly follows their method and data requirements, as described in their Appendices A.1 and A.2 (p. 525-528). Thus, we provide the specifications of the four ICOC models in Appendix B and also briefly discuss the data requirements and procedures in estimating them.

For each firm in a given year, we estimate its four *ex ante* ICOCs based on the four different models, as implied by the stock price and earnings forecast information, and then take the average of the four estimates. For each country in a year, the median value of average ICOC estimates of all sample firms in the country is employed as a proxy for the country's ICOC; we label this country-year median value of the average ICOC as R_{ICOC} . Column (9) of Table 3.1 reports the annual average number of unique firms we use to compute the ICOC, and Column (10) shows the cross-sectional average country-year median R_{ICOC} . There is substantial international variation in R_{ICOC} , ranging from 7.6% in Japan to 17.0% in Brazil.

The precision of ICOC estimates, however, depends on the quality of analyst earnings forecasts. Prior research suggests that the forecasts are biased and inaccurate (see, for example, Brown (1993)) and that analysts tend to follow the market (see, for example, Abarbanell (1991)). We circumvent these problems in a few ways. We show that there exists a significant international relationship between R_{ICOC} estimates and traditional risk proxies. Furthermore, we employ the country-year median of R_{ICOC} estimates at the firm level to ensure that the ICOC estimates are not tilted toward larger firms that are widely followed by analysts and have analyst earnings forecast information.

3.3.2.2 Realized Return Estimation

In the finance literature, the historical average realized return is a widely employed proxy for the expected rate of return or cost of capital. For each country and for each year, we compute the monthly realized MSCI country index return in excess of the monthly return on the US

Treasury Bill as a measure of the cost of capital, R_M . For comparison with the other two cost of capital proxies, Column (8) of Table 3.1 reports the annualized raw realized country returns for the sample of 38 countries. The annualized R_M ranges from a low of 5.5% per annum in the United States to a high of 35.7% per annum in Czech Republic, followed by 30.9% per annum in Brazil. It is apparent that developing markets tend to have larger expected returns than developed markets, indicating that stocks from developing markets are expectedly riskier than those from developed markets.

One concern about using average realized returns as a proxy for expected returns is that their estimates could be noisy. Elton (1999) and Lundblad (2007) argue that the method requires a very long sample to obtain more stable expected return estimates.

3.3.2.3 Dividend Yield Estimation

Recent studies such as Bekaert and Harvey (2000), Bhattacharya and Daouk (2002), Fama and French (2002), De Jong and De Roon (2005), and Hail and Leuz (2006) employ the dividend yield as an alternative measure of the cost of capital. The dividend yield is not only closely linked to the cost of capital in many asset pricing models, but also easily measurable and fairly stable. Bekaert and Harvey show that the dividend yield offers a more accurate proxy for the expected return than the historical average of realized returns, especially in volatile emerging markets.

Column (11) of Table 3.1 depicts a wide cross-country distribution in the dividend yield DY , which is computed by taking the total amount of dividends for a country as a percentage of the country's total stock market capitalization. Interestingly, Japan has not only the lowest R_{ICOC} , but also the smallest DY of 0.009. Similarly, Brazil has the largest R_{ICOC} and also a correspondingly large DY of 0.041. New Zealand has the largest DY of 0.042. Comparing DY with cost of capital proxies, R_M and R_{ICOC} , across countries, it is evident that R_M has the largest cross-country average of 15.0%, followed by R_{ICOC} of 10.8% and then DY of 2.5%. Their corresponding standard deviations are 7.1%, 2.0%, and 0.7%. Dividend yields exhibit

the lowest variation. A particular shortcoming of using dividend yields in our context is that changes in dividend yields may reflect changes in growth opportunities. Our subsequent analysis will therefore have to control for growth opportunities of a country.

3.3.3 Other Risk Proxies And Control Variables

Throughout our analysis, we control for a multitude of conventional risk proxies and country- and firm-specific variables that are drawn from existing literature.

Market beta (*Beta*), firm size (*MCap*), and the book-to-market ratio (*BM*) are included as risk proxies that have been shown to explain the cross-sectional variation of stock returns (Fama and French (1992, 1993)). Evidence shows that *Beta* and *BM* have a positive, while *MCap* has a negative, impact on the cost of capital. *Beta* is defined as the covariance of the MSCI country index monthly return with the MSCI value-weighted world index monthly return divided by the monthly return variance of the MSCI value-weighted world index, and is estimated over the past five years. *MCap* is calculated as the log of a firm's previous fiscal year-end market capitalization. *BM* is calculated as the log ratio of a firm's book value to market capitalization at the previous fiscal year-end. Our analysis employs the median values of firm-specific variables for a given year as control variables. For simplicity, we label these variables country-year median values, and they are reported in Columns (2), (3), and (4) of Table 3.2. Country-year median *Beta*, *MCap*, and *BM* exhibit substantial cross-country variations. *Beta* ranges from 0.62 (Austria and Peru) to 1.82 (Brazil), suggesting that changes in the market returns are quite sensitive to changes in the return of the world market portfolio. *MCap* varies between 2.04 (Peru) and 6.59 (Luxembourg), and *BM* is between 0.31 (China) and 1.81 (Czech Republic).

Empirical studies by Bekaert and Harvey (1995) and Gebhardt, Lee, and Swaminathan (2001) show that the expected return is positively related to the idiosyncratic volatility. A recent study by Ang, Hodrick, Xiang, and Zhang (2006), however, shows that stocks with high idiosyncratic volatility have low expected returns. While these studies offer conflicting evidence of the role of *Var* in the cost of capital, we control for *Var* to ensure robustness of our result. *Var*

is measured by the monthly return variance of a firm's stock over the past year.⁴⁴ Additionally, we employ turnover, *Turn*, to control for liquidity, and past year's return performance, *Retn*₋₁, to control for momentum effects. *Turn* is defined as the mean monthly trading volume over the prior 12 months divided by the number of shares outstanding, and *Retn*₋₁ is the prior 12-month average return. The country-year medians of *Turn*, *Var*, and *Retn*₋₁ are provided in Columns (5)-(7) of Table 3.2. During the entire sample period, liquidity is the lowest in Czech Republic (*Turn* = 0.03%) but is the highest in Taiwan (*Turn* = 13.0%). Hong Kong has the most volatile equity market (*Var* = 2.5%), whereas Spain has the least volatile equity market (*Var* = 0.5%). Thailand generates the largest average past return performance of 1.97%, while China produces a negative average past return performance of -0.30% for the period 1998-2007.

Additionally, we control for the information environment of a country. Existing studies document that the quality and precision of information can influence the equity risk premium. Bhattacharya, Daouk, and Welker (2003) show that a country's level of earnings transparency is strongly related to its cost of capital. Earnings transparency measures the extent to which reported earnings of firms in a country reflect the true, but unobservable, economic earnings. The greater the earnings transparency, the lower is the asymmetric information between firms and investors and hence the smaller is the firms' cost of equity. Further, Leuz, Nanda, and Wysocki (2003) find that measures of earnings management capture various dimensions along which insiders can exercise their discretion to manage reported earnings. On the other hand, Botosan, Plumlee, and Xie (2004) suggest that analyst forecast dispersion is associated significantly with the cost of capital. Botosan (1997) and Francis et al. (2004) provide evidence that firms with high level of voluntary disclosures and favorable accounting earnings attributes, respectively, experience a low cost of equity capital.

Drawn from existing studies, we employ the magnitude of accruals (*Accrual*) and earnings smoothing (*Smooth*) to measure the degree of earnings opacity in a country,⁴⁵ and the analyst

⁴⁴We have also measured the idiosyncratic volatility using stock returns over the past five years, and the results remained qualitatively the same.

⁴⁵We have also estimated the results using a correlation variable, which is calculated as the correlation between

forecast dispersion (*Disp*) and forecast errors (*FError*) to measure its level of financial transparency. We define *Accrual* as the absolute value of firm accruals divided by the absolute value of cash flow from operations,⁴⁶ and *Smooth* as the ratio of the standard deviation of operating income to standard deviation of operating cash flow over the last five years. *Disp* is determined by the standard deviation of analyst forecasts scaled by the mean of analyst forecasts in the past year, whereas *FError* is the absolute value of the difference between announced earnings and the mean of estimated earnings scaled by the mean of analyst forecasts in the past year. The distributions of the country-year median values of these four control variables are indicated in Columns (8)-(11). Not surprisingly, developed countries tend to have low accruals, high earnings smoothing, and low analyst forecast dispersion and errors than do developing markets. For example, the United States has the lowest medians for *Accrual*, *Disp*, and *FError*, and the highest median for *Smooth*, whereas developed countries such as Greece, Peru, and Portugal experience, correspondingly, the other extreme values.

The first country-level control variable is the inflation rate. Analyst forecasts used in estimating the ICOC are in nominal terms and hence the resulting estimates reflect countries' expected inflation rates as well. To ensure that our results are not driven by international differences in expected inflation rates, we control this effect by incorporating the future inflation rate, *Inf*, into our regression model. *Inf* is the median of the following year's annualized monthly change in the consumer price index, which is obtained from the IFS.⁴⁷ The second control variable is foreign exchange risk. Theoretically, the foreign exchange risk arises from deviations from purchasing power parity. Investors from different countries have access to the same assets at different prices, and movements in asset prices are driven by changes in exchange rates, thereby contributing to another source of risk to investors (see Dumas and Solnik (1995)). We construct

changes in accruals and in operating cash flows. The results are qualitatively the same as the smooth variable.

⁴⁶ $Accrual = |ACC/CF|$, where $Acc = (\Delta CA - \Delta CASH) - (\Delta CL - \Delta SD - \Delta TP) - DEPN$, ΔCA is a change in total current assets; $\Delta CASH$ is a change in cash and equivalent; ΔCL is a change in total current liability; ΔSD is a change in short-term debt included in current liabilities; ΔTP is a change in income taxes payable; $DEPN$ is the depreciation and amortization expense. When short-term debt and taxes payable are not available for a firm, their changes are assumed to be zero. $CF = Inc - Acc$; CF is operating cash flow and Inc is operating income.

⁴⁷ Note that the inflation and exchange rate data for Taiwan are downloaded from Datastream.

a control variable, *Exch*, which is the covariance of the monthly stock market index return with the monthly depreciation of the local currency with respect to the US dollar. Monthly foreign exchange rates are obtained from the IFS.

The next two control variables measure a country's mandatory disclosures and investor protection environment. Studies demonstrate that legal institutions, securities regulation, and enforcement mechanisms are systematically associated with international differences in the cost of capital. Hail and Leuz (2006) show that the international variation in securities regulation is significantly related to international differences in the ICOC. Countries with stronger securities regulation ought to attract more foreign equity investment than those with weaker securities regulatory system. Djankov et al. (2008) find that the regulation of corporate governance, as measured by their anti-self-dealing index, is statistically and economically associated with stock market development across 72 countries. Countries with better corporate governance regulation tend to have a larger stock market capitalization scaled by their GDP, thereby implying that these countries would enjoy a lower cost of capital. We therefore consider two proxies to control for this regulatory risk factor. The first proxy is a regulatory index (*SecReg*) that combines the disclosure requirements index with liability standard and public enforcement indexes; the latter indexes are from La Porta et al. (2006, LLSV). The other proxy is Djankov et al.'s anti-self-dealing index (*Antsel*) that focuses on a country's disclosure quality, approval, and litigation governing self-dealing transactions. A higher *Antsel* score implies that a country holds high standard in its corporate governance environment. Both *SecReg* and *AntSel* measure similarly a country's regulatory environment and therefore are highly correlated. Hence our empirical analysis employs each proxy separately.

The control variables at the country level are presented in Columns (12)-(15) of Table 3.2. *Inf* in Column (12) varies vastly between 0.3% in Hong Kong to 8.1% in Argentina. *Exch* also fluctuates widely across countries. For example, the value of *Exch* in Column (13) suggests that the exchange rate risk of Argentina pesos against the US dollar is the most volatile, while those of Hong Kong dollar, Chile peso, Chinese yuan, and Japanese yen against the US dollar are the

least volatile during 1998-2007. Countries whose currencies are either managed float or pegged to the US dollar exhibit almost zero volatility. For example, the Hong Kong dollar is pegged to the US dollar and its *Exch* is zero, and the Singapore dollar is managed float and its *Exch* is -0.06%. *AntSel* is the lowest in Mexico but highest in Singapore. Finally, *SecReg* ranges from 0.18 in Austria to 0.97 in the United States, indicating the more stringent securities regulatory system adopted by the United States, compared with that by Austria.⁴⁸

Panel B of Table 3.2 produces the cross-correlation matrix of the dependent and key independent variables used in our analysis. As theoretically predicted, the home bias measure, *HB*, is positively correlated with our three different proxies of the cost of capital, R_M , R_{ICOC} , and *DY*. Interestingly, the three proxies are also positively correlated with each other; the strongest correlation is between R_M and R_{ICOC} whereas the weakest is between *DY* and either R_M or R_{ICOC} .

3.4 Does the degree of home bias affect the cost of capital?

This section tests whether the persistence of home bias across the world is priced. We employ several approaches to examine whether and how the varying degrees of home bias across countries can explain international differences in the cost of capital.

3.4.1 Using the Implied Cost Of Capital, R_{ICOC}

This subsection employs a panel regression approach to directly test the relationship between R_{ICOC} and the home bias measure alone and also in combinations with various control variables, as described in Section III. The regression analyses include unreported year effects. Table 3.3 presents panel regression estimates, together with their robust *t*-statistics in parentheses. Throughout this study, all *t*-statistics reported are based on Newey-West heteroskedasticity and autocorrelation corrected standard errors.

⁴⁸Note that we are unable to obtain *SecReg* information for China, Czech Republic, Luxembourg, and Poland.

We first establish in Model (1) that R_{ICOC} is positively related to the degree of the home bias. As theoretically predicted, HB is positive and statistically significant at conventional levels; its estimated coefficient is 0.448% with a t -statistic of 7.34. We also establish in Model (2) that there exists a systematic and stable relationship between the R_{ICOC} and conventional risk proxies, market beta, the book-to-market ratio, and market capitalization, while controlling for turnover, inflation, idiosyncratic volatility, past return performance, and exchange-rate risk. These factors explain about 38.6% of the variation in R_{ICOC} across 38 countries, suggesting that the R_{ICOC} is a reasonably good proxy for a country's cost of capital. Regression estimates indicate that international differences in the cost of capital are systematically and strongly related to traditional risk proxies with predicted signs. Consistent with Fama and French (1992, 1993), the cost of capital is negatively related to $MCap$, but positively related to $Beta$ and BM . The coefficient on $MCap$ is -0.005 ($t = -2.91$), and those on $Beta$ and BM are 0.015 ($t = 3.57$) and 0.012 ($t = 3.31$). All these estimates are statistically significant at the 1% level.

As predicted, the coefficient of Inf is positive and statistically significant at the 5% level. This observation confirms that R_{ICOC} also reflects a country's inflationary expectations. Further, the cross-country differences in the cost of capital can also be explained by the exchange-rate risk $Exch$, but not by idiosyncratic volatility. Consistent with prior evidence, $Exch$ is positive and statistically significant; its estimate is 1.828 (t -statistic $= 2.89$). However, $Turn$, Var , and $Retn_{-1}$ play no role in explaining the cross-sectional differences in the cost of capital.

We proceed to examine whether the role of home bias in the cost of capital merely captures the underlying effects of traditional risk proxies or institutional factors, which are previously shown to affect the cost of capital. Model (3) combines Models (1) and (2) by including the home bias measure jointly with traditional risk proxies and control variables. It is evident in Model (3) that the effect of HB on the cost of capital is not driven by those of $Beta$, BM , and $MCap$. After controlling for traditional proxies together with Var , Inf , $Retn_{-1}$, and $Exch$, the HB coefficient estimate of 0.22% (t -statistic $= 3.11$) remains statistically significant at the 1% level. Similarly, the coefficients of $Beta$ and $MCap$, while less pronounced in the case of BM ,

also maintain their level of statistical significance.

It can be argued that the cross-sectional explanatory power of the home bias measure might be driven by cross-country differences in securities regulation, the regulation of corporate governance, or the information environment. Countries with sound and effective securities regulatory environment ought to attract greater foreign equity investment to their local markets. Similarly, countries with better corporate governance regulation would encourage more foreign investment and hence lower the home bias. Also, higher quality information environment reduces the cost of capital by lowering the level of information asymmetry between foreign and domestic investors, thereby decreasing the home bias phenomenon. To ensure that the impact of home bias on the cost of capital in our baseline Model (3) is not driven by the effects of legal, institutional, and information environments, Models (4)-(10) of Table 3.3 incorporate *AntSel* and *SecReg* as proxies for the regulatory environment and also earnings opacity variables (*Accrual* and *Smooth*) and the precision of earnings forecast variables (*Disp* and *FError*) as various measures of a country's information environment or financial transparency.

Results of Models (4) and (5) show that there is a cost associated with the home bias and that the cost is not attributed to the cross-country variation in corporate governance and securities regulatory system. *AntSel* is found to be statistically insignificant. Hence *AntSel* has no significant bearing on the cost of capital, nor does it drive the significant pricing of the home bias. Of particular interest is that *SecReg* is also weakly associated with the ICOC proxy for the cost of capital, while that of Hail and Leuz (2006) exhibits a positive and statistically significant relationship with R_{ICOC} . We therefore explore this issue to gain a better understanding of what drives the difference between our results and Hail and Leuz's. Their study excludes China, Czech Republic, Luxembourg, and Poland that have no *SecReg* information, whereas our sample of 38 countries discards Indonesia, Israel, South Korea, and Sri Lanka that have fewer than 10 mutual funds available and also Pakistan and Egypt that have no mutual fund information in Thomson Reuters's database. For verification, we conduct the same regressions in Table 3.3 using an expanded sample of countries that include the four countries with a small number of

mutual funds (i.e., Indonesia, Israel, South Korea, and Sri Lanka) and their corresponding R_{ICOC} estimates. The untabulated results yield a larger estimate of the HB coefficient, ranging from 0.238% (t -statistic = 3.17) to 0.636% (t -statistic = 7.41). The coefficient of $SecReg$ is -0.019 with t -statistic of 2.24, compared with Hail and Leuz's estimate of -0.023 with t -statistic of 2.24 (see Table 3.4, p. 505). Thus, including Hail and Leuz's sample of four developing markets in our regression models introduces sufficient cross-country variation in $SecReg$ to have a significant impact on R_{ICOC} .

Models (6)-(9) test whether the role of HB in determining the cost of capital captures the relationship between a country's information environment and the cost of capital. Given that earnings opacity and earnings forecast variables measure similarly the quality of the information environment, we evaluate their impact on the significance of HB separately. Only $Smooth$ is statistically significant, but bears an inconsistent sign. More importantly, the results indicate that measures of the information environment do not mitigate the home bias impact on the cost of capital. The HB coefficient estimate varies from 0.176% in Model (8) to 0.286% in Model (7), compared with 0.222% in our baseline Model (3); all the associated robust t -statistics show statistical significance at the 5% level. Additionally, controlling for each information variable also has a minimal effect on traditional risk proxies.

Last but not least, the significant impact of HB on the cost of capital is also robust to various joint combinations of regulatory and information proxies. Such combined controls also have virtually no material impact on the effects of $Beta$, $MCap$, and BM coefficients, as well as on that of $Exch$. To conserve space, we report one such combination in Model (10). This example shows that the coefficient estimates of HB , $Beta$, and BM are comparable with their counterparts of Model (3), while that of $MCap$ becomes marginally significant.

Finally, it is recognized that most funds domiciled in offshore financial centers, such as Ireland and Luxembourg, could be primarily motivated by significant tax incentives offered to investment companies and therefore subscribed by investors from all over the world. Thus,

the asset allocations of such funds might not necessarily measure the home bias of domestic investors in the two countries. To ensure that our results are not driven by the home bias measure computed from these fund allocations, we have re-estimated our models by excluding Ireland and Luxembourg. Our unreported results remain materially unchanged. For example, the coefficient of the home bias measure in the baseline Model (3) with the exclusion of Ireland and Luxembourg is 0.253% (t -statistic = 3.58), compared with the original 0.222% (t -statistic = 3.11) in Model 3.

3.4.2 Using Realized Returns, R_M

In Table 3.4, we test the relationship between the home bias measure and monthly realized index excess returns using Fama and MacBeth's (1973) approach. For each month, we regress equity index excess returns against the home bias measure and also in combinations with the control variables employed in Table 3.3. Table 3.4 presents time-series averages of the regression slope coefficients together with their robust t -statistics in parentheses.

Models (1) and (2) show strong evidence that R_M is not only significantly associated with HB , but also related to conventional risk proxies, $Beta$, $MCap$, and BM . In contrast, however, the coefficient estimates of these variables are smaller than their counterparts in Table 3.3. When estimating HB and the three risk proxies jointly in Model (3), their coefficient estimates and statistical significance remain substantially unaffected. For example, its estimated coefficient of HB is 0.101% (t -statistic of 5.39), and those of $Beta$, $MCap$, and BM are, respectively, 0.004 (t -statistic = 3.09), -0.001 (t -statistic = -2.56), and 0.003 (t -statistic = 2.76).

Table 3.4 also highlights a few striking results that differ from those of Table 3.3. The exchange rate risk and idiosyncratic volatility, respectively, yield either a negative or an insignificant effect on the expected excess return. It appears that the effects of Var and $Exch$ on the cost of capital are sensitive to the different cost of capital proxies employed. For example, Var has an insignificant effect on R_{ICOC} , but a statistically significantly negative effect on the dividend yield, as shown below. $Exch$, on the other hand, bears a negative sign, contradicting

its positive impact on R_{ICOC} and no effect on the dividend yield. On the other hand, both the past-year return performance $Retn_{-1}$ and expected inflation Inf are consistently positive, but only $Retn_{-1}$ is statistically significant across different model specifications. The bottom line is that none of these controls has any bearing on the home-bias effect on the cost of capital.

While *AntSel* continues to have no effect on the cost of capital proxy, *SecReg* in Model (5) yields a negative and statistically significant effect on R_M . Interestingly, the effect of *SecReg* partly subsumes the cost of capital effect of home bias. The estimated coefficient of *HB* falls from 0.101% in Model (3) to 0.040% in Model (5), but it is still statistically significant at the 5% level. Furthermore, the different measures of the information environment, except *Smooth*, yield the predicted positive sign and are statistically significant at conventional levels. The greater the earnings opacity, as measured by the magnitude of accruals, the larger is the expected excess return. Similarly, earnings forecast dispersion and earnings forecast error also increase in the level of R_M . However, the significant effects of the information variables do not reduce the home bias impact on the cost of capital. The *HB* coefficient estimate is between 0.057% in Model (8) and 0.101% in Model (7); all the coefficient estimates remain statistically significant at conventional levels. Apparently, controlling for each information variable has varying effects on traditional risk proxies. For example, adding *Smooth* and *FError* to Model (3) has virtually no impact on the coefficients of *Beta*, *MCap*, and *BM*, as shown in Models (7) and (9), compared with their counterparts in Model (3). In contrast, the effect of *Accrual* in Model (6) completely subsumes the effects of *MCap* and *BM*, whereas the impact of *Disp* in Model (8) subsumes those of *Beta* and *BM*.

3.4.3 Using The Dividend Yield, *DY*

Table 3.5 replicates the panel regression results of Table 3.3, but using a country's dividend yield *DY* as a proxy for the cost of capital and also controlling for a country's growth opportunities. Previous studies find that changes in the dividend yield can stem from changes in growth oppor-

tunities, and such changes are more pronounced in emerging than in developed markets.⁴⁹ As in existing studies, we employ analyst forecasts of long-term earnings growth for each country as a proxy for growth opportunities, *gIBES*.

A number of striking observations emerge from Table 3.5. Dividend yield increases significantly in the home bias measure, even after controlling for growth opportunities, *gIBES*. Both the coefficients on *HB* and *gIBES* are statistically significant at conventional levels. In fact, the relationship between *HB* and the dividend yield is consistently positive and statistically significant across regression models with various control variables in place. The magnitude of the *HB* coefficient estimate varies from 0.096% in Model (8) to 0.148% in Model (1), and these estimates are smaller than their counterparts estimated from the ICOC approach.

Contrary to the results of Tables 3.3 and 3.4, the coefficients on traditional risk proxies, *Beta*, *MCap*, and *BM*, are generally statistically insignificant. This finding, while consistent with that of Hail and Leuz (2006), perhaps suggests that the dividend yield is a better proxy for the cost of capital of developing countries. The coefficient on *Var* is statistically significant but negative, which is in line with the recent empirical finding of Ang, Hodrick, Xiang, and Zhang (2006) but contradicts those of Bekaert and Harvey (2000) and Gebhardt, Lee, and Swaminathan (2001). None of the *Turn*, *Inf*, and *Exch* variables, however, affect the significant cost of capital impact of the home bias measure. Among the proxies for legal institutions and information environment, only the quality of corporate governance regulation has a statistically significant and positive effect on the dividend yield.

In summary, this section offers reinforcing evidence that the different degrees of home bias across developed and developing countries are strongly and positively related to international differences in the cost of capital. This evidence is independent of the cost of capital proxies employed. The greater the degree of home bias, the larger is the cost of capital, suggesting the asset pricing implication of the lack of risk sharing between foreign and domestic investors.

⁴⁹See, for example, Bekaert and Harvey (2000), Bhattacharya and Daouk (2002), Fama and French (2002), De Jong and De Roon (2005), and Hail and Leuz (2006).

The significant relationships between $Beta$, $MCap$, and BM and cost of capital proxies, R_{ICOC} and R_M , while not DY , seem to suggest that the ICOC and average realized return are better proxies for the cost of capital.

3.5 Robustness Tests

In this section, we perform extensive analyses to evaluate the robustness of our primary finding that the cost of capital increases in the home bias. First, we address concerns about the use of ICOC as a proxy for the cost of capital. Next, we examine whether our findings are sensitive to alternative proxies for home bias and the cost of foreign investment. For brevity, Tables 3.6-3.8 report these results only for our baseline Model (3) of Tables 3.3-3.5.

3.5.1 The Impact Of Cross-Country Growth Differences

While the four ICOC estimates reflect market expectations about growth differences across countries, they are also sensitive to their underlying assumption about long-term growth in residual income or abnormal earnings beyond the explicit forecast horizon (see Easton et al. (2002)). For example, the MPEG model implicitly assumes that the short-term growth forecast also captures the long-term growth. Arguably, such an assumption might be overly simplistic and bias our ICOC estimates. The extent of cross-country growth differential impacts on cost of capital estimates may be further driven by international differences in the accounting system. For example, varying degrees of accounting conservatism could potentially affect analyst forecasts and therefore drive the long-term growth differences across countries. As a result, our R_{ICOC} could be quite sensitive to the assumptions about long-run growth and differences in accounting practice.

In this subsection, we employ a number of approaches to examine the plausible impact of cross-country growth differences on our key evidence. As a basis of comparison, we first present our main analysis using the four different ICOCs individually, and they are CT's r_{CT} , GLS's r_{GLS} , OJ's r_{OJ} , and the MPEG estimate, r_{MPEG} . Recall that the average of these four ICOC

estimates is our key proxy for the country cost of capital. As briefly discussed in Appendix B, each ICOC model requires a specific growth assumption in order to back out the ICOC. It would be interesting to see how their differing growth assumptions influence the results. Columns (2)-(5) of Table 3.6 show that there exists a systematic and stable relationship between the cost of capital proxy and HB as well as traditional risk proxies, $Beta$, $MCap$, and BM when r_{CT} , r_{OJ} , and r_{MPEG} are employed as cost of capital proxies, but that the relationship is weak when r_{GLS} is employed instead. These results seem to suggest that differences in long-term growth assumptions have no effects on our primary finding.

Easton (2004) and Easton et al. (2002) develop ICOC models that avoid the assumption about the rate of growth in earnings beyond the forecast horizon. Both studies employ a regression approach to simultaneously estimate the cost of equity capital and long-term growth in residual income or change in abnormal earnings growth for a portfolio of firms. For each country and for each year, we estimate ICOC using Easton's and Easton et al.'s models (denoted by r_{Easton} and r_{ETSS} , respectively) at the country level using all the firm observations. Next, we run our baseline regression model using r_{ETSS} and r_{Easton} , separately, as our dependent variable, with their corresponding growth rates, g_{Easton} and g_{ETSS} , as an additional control variable. While these results, as presented in Columns (6) and (7) of Table 3.6, are broadly consistent with those based on R_{ICOC} , employed earlier, they are sensitive to the inclusion of their simultaneously estimated implied growth rate.

In Columns (8)-(11), we repeat our main analysis by explicitly controlling for cross-country growth differences. Models (8) and (9) control for implied growth rates, g_{ETSS} and g_{Easton} , respectively. In Model (10), we follow the suggestion of Joos and Lang (1994) by using return on equity, ROE , defined as the net income before extraordinary items divided by book value of equity, to control for differences in cross-country accounting systems. ROE also controls for long-term growth fairly well if analyst earnings forecasts are less accurate. Model (11) incorporates the annual GDP growth, g_{GDP} , that takes into account cross-country economic growth differences as a control for differences in long-term growth. Results of these different

models suggest that the coefficient of HB remains statistically significant at the 5% level, even after controlling for measures of cross-country growth differences.

3.5.2 Alternative Home Bias Proxies

Our study measures the home bias as revealed by the equity allocations of mutual funds worldwide. It is plausible that the role of mutual funds varies across countries and might depend on some country characteristics. Thus, using mutual fund allocations to measure the extent of a country's home bias might induce a measurement bias. Also, mutual funds represent only a subset of domestic investors, and that their equity allocations between domestic and foreign stocks do not necessarily reflect those of individual investors and other groups of institutional investors. To reduce the potential aggregate measurement bias, we employ the median value of the home bias measured at the firm level. Here we assume that a country's median firm's home bias measure offers a better representation of the degree of home bias exhibited by domestic investors. The firm-level home bias, hb , is calculated as the market capitalization weight of a firm's stock in all domestic funds' portfolios relative to the portfolio weight of the firm in the world-float market portfolio, and is expressed in natural logarithm.

Our analysis also employs the CPIS survey data to construct another alternative home bias proxy that does not rely on a single group of investors. The survey data contain the total value of equity holdings of all foreign investors investing in a country. Therefore, for each country, we determine the aggregate equity value of domestic investors' holdings by taking the difference between the country's stock market capitalization and the aggregate value of foreign investors' holdings in its local stock market. The CPIS data are available only for 1997 and from 2001 – 2006. For consistency, we maintain the same sample period 1998 to 2007. We use the average holding values of 1997 and 2001 to compute home bias measures for 1998-2000 and those of 2006 to calculate the home bias measure for 2007. The home bias associated with each country, $HB(CPIS)$, is measured by the share of domestic investors' holdings in their local

markets (i.e., the difference between the country's total market capitalization and the value of foreign investors' holdings in domestic equities) divided by the country's world-float market capitalization weight.

Untabulated average correlation coefficients indicate that the two alternative home bias measures and our key measure, HB , are highly correlated. The average correlation coefficient between hb and HB is 0.931, but more surprising is that the average correlation coefficient between $HB(CPIS)$ and HB , which are constructed from two independent data sources, is 0.929. The latter observation provides some degree of assurance that the domestic and foreign equity allocations of domestic mutual funds is an adequate proxy for the home bias. Results based on the two alternative home-bias measures are presented in Table 3.7.

The results are substantially the same as our main analysis of Model (3) in Tables 3.3-3.5. Both the coefficients of hb and $HB(CPIS)$ are positive and statistically significant at conventional levels. On average, the coefficient of hb is only about 0.4 basis points smaller, while that of $HB(CPIS)$ is about 2.9 basis points smaller, than its counterparts in Tables 3.3-3.5. Again, the findings suggest that a significant cross-country relationship between the cost of capital and traditional risk proxies, $Beta$, $MCap$, and BM , exist when R_M and R_{ICOC} are employed as the cost of capital proxies.

3.5.3 Costs To Cross-Border Investments

Cooper and Kaplanis (2000) argue that the level of segmentation of a domestic market depends on the level of investor costs to cross-border investments. Implicit or explicit costs therefore constrain both outward and inward investments and ultimately affect the equilibrium equity premium in the local market. To ensure that the home bias effect is not driven by the segmentation effect due to costs to foreign investors investing in local markets, we control for such costs.

We employ the foreign bias measure, introduced in Chan, Covrig, and Ng (2005), as a proxy

for investment costs to foreign investors. This measure is shown to be significantly related to stock market development and investor-protection variables, which are the two most important determinants of foreign investment decisions. Their results suggest that foreign investors would have greater incentives to invest more in countries with more developed stock markets in terms of larger market capitalization, lower transaction costs, and higher turnover, and in countries with strong investor-protection rights. The measure of foreign bias is defined as the share of equity investment in country i in the portfolios of all mutual funds from a foreign country j divided by the country i 's market capitalization weight in the world market portfolio. FB for country i is expressed as the average of the logarithm foreign bias measures computed across all foreign countries investing in country i . A larger FB ought to have lower foreign investment costs in order to induce more foreign investment in the country. Hence FB is inversely related to foreign investment costs. Alternatively, costs of foreign investment are also generally viewed to be lower in developed than in developing countries. To rule out this possibility, we conduct our main analysis on the 23 developed countries in our sample.

We therefore repeat our main analysis in Models (1) to (3) of Table 3.8 by controlling for FB , and in Models (4) to (6) by focusing on a sub-sample of 23 developed markets. The findings confirm our primary evidence. Incorporating foreign investment costs in our regression analysis does not mitigate the magnitude and statistical significance of the HB coefficient. The coefficient of FB is negative and significant only when DY is employed as the cost of capital proxy, but the segmentation effect of FB does not subsume the home bias effect on the cost of capital. Additionally, results based on developed markets yield qualitatively similar results, suggesting that the cost to foreign investment is not driving our main finding.

Overall, this section further corroborates our evidence that the persistence of the home bias across the wide range of countries has important asset pricing implications. Specifically, international differences in the degree of the home bias are strongly and positively associated with the cross-sectional variation of the cost of capital in our sample of countries, even after controlling for cross-country differences in growth rates, accounting systems, and costs to foreign

investment.

3.6 Conclusions

It is now well documented that even in today's integrated global financial markets, evidence that domestic investors exhibit strong preference for their own domestic stocks is not only prevalent, but persistent across countries worldwide. This evidence instigates us to investigate the implication of the persistence of this home bias on the cost of capital of a country. We use the domestic and foreign equity allocations of mutual funds from 38 developed and developing countries to measure the home bias exhibited by domestic investors. We employ various approaches to measuring a country's cost of capital and find that all the approaches yield corroborating evidence that the home bias has a significant and economic impact on the cost of capital, even after controlling for traditional risk proxies and country-specific characteristics.

Our evidence that the home bias matters for the cost of capital has several implications. One, the significant pricing of the home bias suggests that corporations could reduce their cost of capital by increasing their global shareholder base. There are greater incentives for corporations to attract foreign investors to invest in their firms by possibly improving their corporate policies such as corporate governance, information environment, and transparency. Two, given that the home bias cannot be explained by the prevalent institutional factors (differences in cross-border investment barriers, taxes, transaction costs, among others) and investor behavioral biases, policy makers especially in countries with larger degree of home bias might need to consider enforcing better legal institutions, effective securities regulation and stronger investor protection rights, and fully eliminating capital flow restrictions to attract foreign investments in domestic equity markets. More importantly, as the degree of home bias dictates the extent to which a country is financially integrated with the world markets, the lower cost of capital associated with a reduced home bias perhaps suggests that the country is enjoying greater economic benefits of financial globalization.

Appendix A: Model Derivation

Assuming a world of L countries and country l having N^l equities. r_l denotes the dollar-denominated index return for country l , and r_i denotes the dollar-denominated return for each equity i . A representative domestic investor d in a country hold a portfolio Y^d with a proportion w_i^d in asset i . If the investor only cares about the expected return and variance of her portfolio, she maximizes the following utility function.

$$U = U(E(R), \Sigma), \quad (59)$$

with $E(R) = (E(r_1) \dots E(r_N))$ and $\Sigma = Var(R)$. The first-order condition can be derived as

$$E(R) = \gamma \Sigma W^d, \quad (60)$$

where γ denotes the relative risk aversion parameter, and for simplicity, all investors are assumed to have the same relative risk aversion. And W^d denotes the vector of the proportions of asset holdings. The expected return of a domestic asset i in investor d 's country l is

$$E(r_i) = \gamma \sum_{j=1}^{N^l} w_j^d Cov(r_i, r_j). \quad (61)$$

We multiply both sides of (61) by Y^d and then aggregate it over all domestic investors in country l holding equity i . As a result, we obtain

$$\left(\sum_{d=1}^{D^l} Y^d \right) E(r_i) = \gamma \sum_{j=1}^{N^l} \sum_{d=1}^{D^l} Y^d w_j^d Cov(r_i, r_j), \quad (62)$$

where D^l denotes the total number of domestic investors in country l holding domestic asset i . Dividing both sides of (62) by the total wealth of these investors yields

$$E(r_i) = \gamma \sum_{j=1}^{N^l} w_j Cov(r_i, r_j), \quad (63)$$

where $w_j = \frac{\sum_{d=1}^{D^l} Y^d w_j^d}{\sum_{d=1}^{D^l} Y^d}$.

Assuming that all domestic investors hold their respective country's stock market portfolio. Then $\frac{w_j}{\sum_{j \in N^l} w_j} = \frac{w_j^*}{\sum_{j \in N^l} w_j^*}$, $l = 1 \dots L$, where w_j^* is asset j 's share of the world market portfolio. Substituting this condition into (63), we have

$$E(r_i) = \gamma \sum_{k=1}^L \sum_{j \in N_k} Cov(r_i, w_j r_j) \quad (64)$$

$$= \gamma \sum_{k=1}^L \sum_{j \in N_k} \left(\sum_{j \in N_k} w_j \right) Cov(r_i, \frac{w_j^*}{\sum_{j \in N^l} w_j^*} r_j) = \gamma \sum_{k=1}^L w_k Cov(r_i, r_k). \quad (65)$$

Further assuming that domestic investors hold foreign equity in the proportion of the foreign country's market capitalization weight in the world market portfolio and that they allocate $(1 - w_l)$ portion of their portfolios to foreign equity and the remaining w_l to local equity. By decomposing the allocation w_k in (65) into domestic and foreign portfolio allocations of domestic investors, we show that

$$E(r_i) = \gamma(1 - w_l^*) \frac{w_l}{1 - w_l^*} Cov(r_i, r_l) + \gamma \sum_{k=1, k \neq l}^L (1 - w_l) \frac{w_k^*}{1 - w_l^*} Cov(r_i, r_k). \quad (66)$$

Then, by modifying (66) with $r_w = \sum_{k=1}^L w_k^* r_k$, we have

$$E(r_i) = \gamma \frac{w_l - w_l^*}{1 - w_l^*} Cov(r_i, r_l) + \gamma \frac{1 - w_l}{1 - w_l^*} Cov(r_i, r_w), \quad (67)$$

where r_w denotes the world market index return. For asset i , the first term on the right hand side of (67) reflects the risk premium associated with the covariance of asset i 's return with its local market return, while the second term captures the premium associated with the covariance of asset i 's return with the world market return.

Appendix B: Implied Cost of Capital Models

We follow Hail and Leuz (2006) by employing the average of four different ICOCs as a proxy for each firm's yearly cost of capital. Then, for each country and for each year, our analysis uses the median of firms' ICOC estimates as a proxy for the country's annual cost of capital. For consistency and for comparison of results with those of Hail and Leuz, we closely adopt the two authors' specifications and assumptions of the four models, as described below, when estimating the ex ante cost of capital as implied by each model.

1. Gebhardt, Lee, and Swaminathan's (2001) residual income valuation model is given by

$$P_t = bv_t + \sum_{\tau=1}^T \frac{(e\hat{p}s_{t+\tau} - r_{GLS} \cdot bv_{t+\tau-1})}{(1 + r_{GLS})^\tau} + \frac{(e\hat{p}s_{t+T+1} - r_{GLS} \cdot bv_{t+T})}{r_{GLS}(1 + r_{GLS})^T}, \quad (68)$$

where P_t is the market price of a firm's stock at time t , $e\hat{p}s_{t+\tau}$ is the expected future earnings per share for period $(t + \tau - 1, t + \tau)$, and $bv_{t+\tau-1}$ is the book value per share at time $t + \tau - 1$. The model obtains the initial three years of expected future residual income from actual book values per share and forecasted earnings per share up to three years ahead. Assuming clean surplus, future book values are imputed from current book values, forecasted earnings, and dividends; the same assumption is also adopted by Claus and Thomas (2001) below. For each year, dividends are set equal to the average of the past three years of payout ratios. Dividends are defined in the same way for the following three models. Beyond the initial three years, the stream of residual incomes is derived by linearly decreasing the forecasted accounting return on equity over the next nine years to the firm's specific sector's median return on equity determined over the past three years. Following Hail and Leuz (2006), we classify firms into industrial, service, and financial sectors. If a specific sector's median is negative, then we replace it by the country-year median. Residual income is assumed to remain constant beyond 12 years.

2. Claus and Thomas's (2001) residual income valuation model is given by

$$P_t = bv_t + \sum_{\tau=1}^T \frac{(e\hat{p}s_{t+\tau} - r_{CT} \cdot bv_{t+\tau-1})}{(1 + r_{CT})^\tau} + \frac{(e\hat{p}s_{t+T} - r_{CT} \cdot bv_{t+T-1})(1 + g)}{(r_{CT} - g)(1 + r_{CT})^T}. \quad (69)$$

The model obtains the stream of expected future residual income from actual book values per share and forecasted earnings per share up to five years ahead. Beyond year five, nominal residual income is assumed to grow at the rate g equal to the expected inflation (as proxied by the annualized median of a country's one-year ahead realized monthly inflation rates).

3. Easton's (2004) MPEG model is given by

$$P_t = \frac{(e\hat{p}s_{t+2} + r_{MPEG} \cdot \hat{d}_{t+1} - e\hat{p}s_{t+1})}{r_{MPEG}^2}. \quad (70)$$

The model derives a measure of abnormal earnings growth by using one-year and two-year ahead earnings per share forecasts as well as expected dividends per share in period $t + 1$. It assumes perpetual growth in abnormal earnings after the initial period.

4. Ohlson and Juettner-Nauroth's (2005) abnormal earnings growth valuation model is specified as follows.

$$P_t = \frac{e\hat{p}s_{t+1}}{r_{OJ}} \cdot \frac{(g_{st} + r_{OJ} \cdot \frac{\hat{d}_{t+1}}{e\hat{p}s_{t+1}} - g_{lt})}{(r_{OJ} - g_{lt})}. \quad (71)$$

The model uses one-year-ahead forecasted earnings and dividends per share as well as forecasts of short-term and long-term abnormal earnings growths. The short-term growth rate g_{st} is equal to the average of the forecasted percentage change in the first two years of earnings and the five-year growth forecast provided by financial analysts on I/B/E/S. The long-term earnings growth rate g_{lt} is set equal to the annualized country-specific median of one-year-ahead realized monthly inflation rates.

We obtain financial information from the Worldscope database and analyst earnings forecasts (proxies for future earnings) and stock price information from the *I/B/E/S* database. All information is denominated in local currency. Our sample includes firms that have current stock price P_t , earnings forecasts of one and two periods ahead ($e\hat{p}s_{t+1}$ and $e\hat{p}s_{t+2}$), and either $e\hat{p}s_{t+3}$ through $e\hat{p}s_{t+5}$ or a long-term earnings growth forecast. Only positive earnings forecasts are

employed. All analyst earnings forecasts are mean analyst consensus forecasts in I/B/E/S and this information is updated every third Thursday of each month.

Analyst earnings forecasts and stock prices are measured as of month +10 subsequent to the fiscal year-end. Using information that is released 10 months after the fiscal year-end ensures that financial information, such as earnings and book values of equity, is already released to the public and gets reflected in the stock price we use to estimate the ICOC. As such, a firm's one-period ahead earnings forecast $\hat{eps}_{t+1}$ is two months prior to its fiscal year-end. Accordingly, the current stock price P_t in all the four ICOC models corresponds to P_{t+10} , where t refers to the firm's previous fiscal year-end. As a result of these data requirements, the final sample contains 14,166 unique firms from 38 countries and 371 country-year observations. The latter is a result of five missing years for Luxembourg and four for Greece.

In all our estimations, we use an iterative algorithm to back out the value of each ICOC from the model, and the ICOC is constrained to be positive or missing otherwise. The iterative procedure stops when the imputed price is within a 0.001 difference of its actual price.

References

- Abarbanell, J., 1991, Do analysts' earnings forecasts incorporate information in prior stock price changes, *Journal of Accounting and Economics* 14, 147-165.
- Ang, Andrew, Robert J. Hodrick, Yuhang Xiang, and Xiaoyan Zhang, 2006, The cross-section of volatility and expected returns. *Journal of Finance* 51, 259-299.
- Adler, Michael and Bernard Dumas, 1983, International portfolio selection and corporate finance: A synthesis. *Journal of Finance* 46, 925-984.
- Ahearne, Alan, Grier William, and Francis Warnock, 2004, Information costs and home bias: An analysis of US holdings of foreign equities, *Journal of International Economics* 62, 313-336.
- Baxter, Marianne and Urban J. Jermann, 1997, The international diversification puzzle is worse than you think, *American Economic Review* 87, 170-180.
- Bekaert, Geert, and Campbell Harvey, 1995, Time varying world market integration, *Journal of Finance* 50, 403-444.
- Bekaert, Geert, and Campbell Harvey, 2000, Foreign speculators and emerging equity markets, *Journal of Finance* 55, 565-613.
- Bhattacharya, Utpal, Hazem Daouk, and Michael Welker, 2003, The world price of earning opacity, *The Accounting Review* 78, 641-678.
- Black, Fisher, 1974, International capital market equilibrium with investment barriers, *Journal of Financial Economics* 1, 337-352.
- Botosan, Christine A., 1997, Disclosure level and the cost of equity capital, *The Accounting Review* 72, 323-349.

- Botosan, Christine A., Marlene A. Plumlee, and Yuan Xie, 2005, The role of information precision in determining the cost of equity capital, *Review of Accounting Studies* 9, 233-259.
- Bradshaw, Mark, Brian Bushee, and Gregory Miller, 2004, Accounting choice, home bias, and U.S. investment in non-U.S. firms, *Journal of Accounting Research* 42, 795-841.
- Brown, Lawrence D., 1993, Earnings Forecasting Research: Its Implications for Capital Market Research, *International Journal of Forecasting*, 349-356.
- Chan, Kalok, Vicentiu Covrig, and Lilian Ng, 2005, What determines the domestic bias and foreign bias? evidence from mutual fund equity allocations worldwide, *Journal of Finance* 60, 1495-1534.
- Claus, James, and Jacob Thomas, 2001, The equity risk premium is much lower than you think it is: empirical estimates from a new approach, *Journal of Finance* 58, 643-684.
- Cooper, Ian, and Evi Kaplanis, 1994, Home bias in equity portfolios, inflation hedging, and international capital market equilibrium, *Review of Financial Studies* 7, 45-60.
- Cooper, Ian, and Evi Kaplanis, 2000, Partially segmented international capital markets and international capital budgeting, *Journal of International Money and Finance* 19, 309-329.
- Covrig, Vicentiu, Mark Defond, and Mingyi Hung, 2006, Home bias, foreign mutual fund holdings, and the voluntary adoption of international accounting standards, Forthcoming, *Journal of Accounting Research*.
- Dahlquist, Marcus, Lee Pinkowitz, Rene Stulz, and Rohan Williamson, 2003, Corporate governance, investor protection, and home bias, *Journal of Financial and Quantitative Analysis* 38, 87-110.
- De Jong, Frank, and Frans de Roon, 2005, Time-varying market integration and expected returns in emerging markets, *Journal of Financial Economics* 78, 583-613.

- Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes, Andrei Shleifer, 2008, The law and economics of self-dealing, *Journal of Financial Economics* 88, 430-465.
- Doidge, Craig, Andrew Karolyi, and Rene Stulz, 2004, Why are foreign firms listed in the U.S. worth more? *Journal of Financial Economics* 71, 205-238
- Dumas, Bernard, and Bruno Solnik, 1995, The world price of exchange rate risk, *Journal of Finance* 50, 445-479.
- Easton, Peter, 2004, PE ratios and PEG ratios, and estimating the implied expected rate of return on equity capital, *The Accounting Review* 80, 501-538.
- Easton, Peter, Gary Taylor, Pervin Shroff, and Theodore Sougiannis, 2002, Using forecasts of earnings to simultaneously estimate growth and the rate of return on equity investment, *Journal of Accounting Research* 40, 657-676.
- Elton, Edwin J., 1999, Expected return, realized return, and asset pricing tests, *Journal of Finance* 54, 1199-1220.
- Errunza, Vihang, and Etienne Losq, 1985, International asset pricing under mild segmentation: Theory and test, *Journal of Finance* 40, 105-124.
- Errunza, Vihang and Darius Miller, 2000, Market segmentation and the cost of capital in international equity markets, *Journal of Financial and Quantitative Analysis* 35, 577-600.
- Fama, Eugene, and Kenneth French, 1992, The cross-section of expected stock returns, *Journal of Finance* 47, 427-465.
- Fama, Eugene, and Kenneth French, 1993, Common risk factors in the returns on stocks and bonds, *Journal of Financial Economics*, 3-56.
- Fama, Eugene, and Kenneth French, 2002, The equity premium, *Journal of Finance* 57, 637-659.

- Ferreira, Miguel A., and Pedro P. Matos, 2006, The colors of investors' money: Which firms attract institutional investors from around the world?, Working paper, University of Southern California.
- Foerster, Stephen, and Andrew Karolyi, 1999, The effects of market segmentation and investor recognition on asset prices: evidence from foreign stocks listing in the U.S., *Journal of Finance* 54, 981-1014.
- Francis, J, R. LaFond, P. Olsson, and K. Schipper, 2004, Costs of equity and earnings attributes *The Accounting Review* 79, 967-1010.
- Gebhardt, William R., Charles M. Lee, and Bhaskaran Swaminathan, 2001, Toward an implied cost of capital, *Journal of Accounting Research* 39, 135-176.
- Graham, John R., Campbell R. Harvey, and H Huang, 2005, Investor competence, trading frequency, and home bias, 2006 American Finance Association Meetings paper.
- Hail, Luzi, and Christian Leuz, 2006, International differences in the cost of equity capital: do legal institutions and securities regulation matter? *Journal of Accounting Research* 44, 485-531.
- Harvey, Campbell, 1991, The world price of covariance risk, *Journal of Finance* 46, 111-157.
- Hau, Harald, and Helene Rey, 2008, Home bias at the fund level, *American Economic Review* 98, 333-338.
- Henry, Peter, 2000, Stock market liberalization, economic reform, and emerging market equity prices, *Journal of Finance* 55, 529-564.
- Jeske, K., 2001, Equity home bias: Can information cost explain the puzzle?, *Federal Reserve Bank of Atlanta Economic Review* (Third quarter), 31-42.
- Joos, Peter, and Mark Lang, 1994, The effects of accounting diversity: Evidence from the European Union, *Journal of Accounting Research* 32, 141-168.

- Kang, Jun-koo and Rene Stulz, 1997, Why is there a home bias? An analysis of foreign portfolio equity ownership in Japan, *Journal of Financial Economics* 46, 3-28.
- Karolyi, Andrew, and Rene Stulz, 2003, Are financial assets priced locally or globally?, in George Constantinides, Milton Harris, and Rene M. Stulz, eds.: *The Handbook of the Economics and Finance* (North-Holland, New York).
- Kho, Bong Chan, Rene M. Stulz, and Francis Warnock, 2006, Financial globalization, governance, evolution of home bias, Working paper, Ohio State University.
- La Porta, Rafael, F. Lopez-De-Silanes, Andrei Shleifer, and Robert Vishny, 1999, Corporate ownership around the world, *Journal of Finance* 54, 471-517.
- La Porta, Rafael, F. Lopez-De-Silanes, Andrei Shleifer, and Robert Vishny, 2002, Investor protection and corporate valuation, *Journal of Finance* 57, 1147-1170.
- La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer, 2006, What works in securities laws?, *Journal of Finance* 61, 1-32.
- Lee, Charles, David Ng, Bhaskaran Swaminathan, 2004, International asset pricing: Evidence from the cross section of implied cost of capital, Working paper, Cornell University and University of Chicago.
- Leuz, Christian, Dhananjay Nanda, and Peter D. Wysocki, 2003, Earnings management and investor protection: An international comparison, *Journal of Financial Economics* 69, 505-527.
- Lewis, Karen, 1999, Explaining home bias in equities and consumption, *Journal of Economic Literature* 37, 571-608.
- Lundblad, Christian, 2007, The risk return tradeoff in the long-run: 1836-2003, *Journal of Financial Economics* 85, 123-150.

- Miller, Darius, 1999, The market reaction to international cross-listing: evidence from depositary receipts, *Journal of Financial Economics* 51, 103-123
- Ohlson, J., and B. Juettner-Nauroth, 2005, Expected EPS and EPS growth as determinants of value, *Review of Accounting Studies* 10, 349-365.
- Pastor, Lubos, Meenakshi Sinha, Bhaskaran Swaminathan, 2007, Estimating the intertemporal risk-return tradeoff using the implied cost of capital, Forthcoming in *Journal of Finance*.
- Sarkissian, Sergei, and Michael Schill, 2004, Are there permanent valuation gains to overseas listing? Evidence from market sequencing and selection, Working paper, University of Virginia.
- Solnik, Bruno, 1974, An equilibrium model of the international capital market, *Journal of Economic Theory* 8, 500-524.
- Shiller, Robert J., F. Kon-Ya, and Y. Tsutsui, 1996, Why did the Nikkei crash? Expanding the scope of expectations data collection, *Review of Economics and Statistics* 78, 156-164.
- Stulz, Rene, M., 1981a, On the effects of barriers to international investment, *Journal of Finance* 36, 923-934.
- Stulz, Rene, M., 1981b, A model of international asset pricing, *Journal of Financial Economics* 9, 383-406.
- Stulz, Rene, M., 1999, Globalization of equity markets and the cost of capital, Working paper, Dice center, Ohio State University.
- Stulz, Rene, M., 2005, The limits of financial globalization, *Journal of Finance* 60, 1595-1638.
- Young, Danqing, and David A. Guenther, 2003, Financial reporting environments and international capital mobility, *Journal of Accounting Research* 41, 553-579.

TABLE 3.1

Summary Statistics on Domestic Funds, Home Bias Measure, and Cost of Capital Proxies

This table provides summary mean statistics of our sample by country. Type of market indicates whether the country is developed (DEV) or emerging markets (EMG). World MCap Wt (%) is the country's percent share of the world market capitalization weight, and World-Float MCap Wt (%) is the share of the domestic equity market in the world market portfolio after adjusting for closely-held ownerships. *Num* indicates the average number of funds and % Local is the percentage of domestic funds' holdings in domestic securities. *HB* is the aggregate measure of home bias, defined as the share of domestic mutual funds holdings in their country's stock market capitalization divided by their country's world-float market capitalization weight and is expressed in natural log. R_M is the annualized raw realized MSCI index return, *NFirms* is the number of sample firms in each country for which we compute their implied cost of capital (ICOC), and R_{ICOC} is the country-year median of the average firm-level ICOC estimated for this number of sample firms. R_{ICOC} is the mean of the four ICOCs estimated from the four different models described in Appendix B. *DY* is the country dividend yield, calculated by taking the total amount of dividends as a percentage of the country's total stock market capitalization. Sample period is between 1998 and 2007.

Country (1)	Type of Market (2)	World Cap Wt (%) (3)	World-Float Cap Wt (%) (4)	Domestic Funds		<i>H</i> B (7)	<i>R</i> _{<i>M</i>} (8)	Implied COC		
	<i>N</i> um (5)	% <i>Local</i> (6)	<i>N</i> Firms (9)	<i>R</i> ICOC (10)	<i>D</i> Y (11)					
Argentina	EMG	0.158	0.058	62	60.461	7.274	0.202	53	0.129	0.022
Australia	DEV	1.701	1.650	244	78.914	3.937	0.171	511	0.096	0.034
Austria	DEV	0.152	0.087	202	22.914	5.418	0.167	56	0.099	0.018
Belgium	DEV	0.627	0.499	436	17.713	3.547	0.099	103	0.096	0.029
Brazil	EMG	0.710	0.466	539	100.000	5.367	0.309	131	0.170	0.041
Canada	DEV	2.674	2.614	1276	28.667	2.266	0.172	773	0.097	0.020
Chile	EMG	0.233	0.106	44	55.310	6.263	0.140	44	0.105	0.030
China	EMG	1.841	0.788	139	99.395	4.842	0.122	149	0.106	0.034
Czech Republic	EMG	0.061	0.022	15	58.589	8.138	0.357	11	0.113	0.033
Denmark	DEV	0.370	0.303	207	23.690	4.303	0.160	94	0.103	0.017
Finland	DEV	0.547	0.620	144	66.198	4.278	0.238	115	0.113	0.030
France	DEV	4.131	3.502	1238	55.480	2.840	0.121	465	0.098	0.027
Germany	DEV	3.208	2.779	4511	29.349	2.358	0.115	516	0.095	0.020
Greece	EMG	0.329	0.247	144	91.937	5.909	0.186	126	0.100	0.023
Hong Kong	DEV	2.078	1.369	267	22.506	2.730	0.120	327	0.118	0.029
India	EMG	0.706	0.435	230	99.508	5.435	0.206	207	0.130	0.018
Ireland	DEV	0.261	0.313	101	2.512	2.019	0.056	50	0.103	0.020
Italy	DEV	1.956	1.604	585	40.763	3.253	0.111	202	0.091	0.032
Japan	DEV	9.286	8.045	756	98.501	2.501	0.056	1569	0.076	0.009
Luxembourg	DEV	0.116	0.050	402	12.205	5.380	0.125	15	0.081	0.024
Malaysia	EMG	0.432	0.294	117	99.899	5.820	0.175	286	0.108	0.027
Mexico	EMG	0.444	0.321	87	77.729	5.580	0.200	76	0.120	0.015
Netherlands	DEV	1.568	1.604	233	31.183	2.959	0.081	145	0.110	0.028
New Zealand	DEV	0.088	0.058	35	61.383	6.962	0.083	86	0.095	0.042
Norway	DEV	0.288	0.170	162	52.269	5.815	0.189	151	0.120	0.023
Peru	EMG	0.051	0.030	12	89.006	8.057	0.268	25	0.141	0.028
Philippines	EMG	0.121	0.041	10	99.518	7.787	0.070	55	0.110	0.017
Poland	EMG	0.118	0.054	17	82.459	7.474	0.202	56	0.105	0.014
Portugal	DEV	0.184	0.141	142	42.945	5.762	0.082	36	0.093	0.026
Singapore	DEV	0.510	0.268	283	19.995	4.278	0.145	216	0.118	0.024
South Africa	EMG	0.802	0.599	211	79.918	4.885	0.174	190	0.158	0.029
Spain	DEV	2.088	1.821	3192	38.887	3.065	0.154	123	0.096	0.023
Sweden	DEV	1.001	1.028	434	48.364	3.861	0.141	214	0.100	0.025
Switzerland	DEV	2.237	2.416	673	21.081	2.134	0.083	179	0.091	0.016
Taiwan	EMG	1.095	1.046	242	100.000	4.560	0.060	300	0.112	0.020
Thailand	EMG	0.228	0.141	78	100.000	6.576	0.239	179	0.140	0.027
United Kingdom	DEV	7.641	8.994	2306	42.946	1.540	0.069	1296	0.097	0.030
United States	DEV	44.856	51.748	6253	86.877	0.553	0.055	5036	0.088	0.016

TABLE 3.2

Summary Statistics and Pairwise Correlation of Control Variables

Panel A provides the average of control variables by country. *Beta* is the covariance of the MSCI country index return with MSCI world index return over the past 5 years divided by variance of MSCI world index return; *MCap* is the log firm market capitalization; *BM* is the book-to-market ratio; *Var* is the return variance of a firm; *Turn* is the stock turnover ratio; *Retn₋₁* is a firm's past year's mean monthly return; *Accrual* is the magnitude of a firm's accruals; *Smooth* is the smoothness of its accounting reports and is the ratio of the standard deviation of operating income to standard deviation of operating cash flows over the last 5 years; *Disp* is the analyst earnings forecast dispersion; *FError* is the absolute difference between announced earnings and mean of estimated earnings scaled by the mean of analyst forecasts. The median values of all firm-specific variables are reported below. *Inf* is the median of annualized monthly inflation rate over the next year; *Exch* is the covariance of the monthly stock market index return with monthly depreciation of the local currency with respect to the dollar over the past 5 years; *AntSel* is the anti-self-dealing index from Djankov et al. (2008); *SecReg* is the LLSV security regulation index. Panel B shows their pairwise correlation coefficients; * denotes 5% significance level. † denotes values multiplied by 100.

Panel A: Control Variables														
Country (1)	Beta (2)	MCap (3)	BM (4)	Turn† (5)	Var† (6)	Retn ₋₁ † (7)	Accrual (8)	Smooth (9)	Disp (10)	FError (11)	Inf† (12)	Exch† (13)	AntSel (14)	SecReg (15)
Argentina	1.08	4.49	0.65	1.00	1.33	0.36	0.50	0.69	0.23	0.42	8.06	0.20	0.34	0.43
Australia	0.89	3.48	0.55	3.12	1.59	0.33	0.42	0.77	0.07	0.13	3.18	-0.01	0.76	0.77
Austria	0.62	4.97	0.74	1.26	0.61	0.41	0.63	0.43	0.11	0.28	1.86	0.03	0.21	0.18
Belgium	0.70	5.64	0.59	1.42	0.62	1.16	0.58	0.53	0.09	0.20	1.98	0.01	0.54	0.34
Brazil	1.82	4.02	1.20	0.06	2.17	1.42	0.53	0.62	0.29	0.41	5.91	0.03	0.27	0.39
Canada	1.12	3.26	0.56	3.08	2.43	0.39	0.44	0.77	0.13	0.25	1.90	-0.02	0.64	0.91
Chile	0.98	4.40	1.08	0.19	0.68	0.39	0.52	0.45	0.15	0.27	2.51	0.00	0.63	0.50
China	1.16	5.48	0.31	8.48	1.10	-0.30	0.73	0.38	0.12	0.25	0.90	0.00	0.76	NA
Czech Republic	0.66	4.14	1.81	0.03	1.24	0.62	0.62	0.48	0.18	0.26	1.14	-0.02	0.33	NA
Denmark	0.81	4.12	0.73	2.03	0.55	1.06	0.53	0.55	0.11	0.24	1.07	0.03	0.46	0.50
Finland	1.61	4.88	0.52	3.00	0.80	1.19	0.45	0.70	0.15	0.26	1.19	0.06	0.46	0.49
France	1.02	4.93	0.47	2.09	1.13	0.85	0.59	0.56	0.11	0.23	2.06	0.03	0.38	0.58
Germany	1.17	4.39	0.72	0.73	1.20	0.66	0.73	0.58	0.16	0.41	1.65	0.04	0.28	0.21
Greece	1.11	4.62	0.57	3.85	2.02	0.49	0.82	0.37	0.15	0.27	1.70	0.01	0.22	0.38
Hong Kong	1.28	4.45	0.94	2.58	2.50	0.03	0.70	0.59	0.12	0.25	0.30	0.00	0.96	0.81
India	0.67	3.43	0.83	1.50	2.26	0.06	0.53	0.53	0.12	0.17	4.83	-0.01	0.58	0.75
Ireland	0.88	5.30	0.47	3.22	0.98	1.61	0.41	0.56	0.04	0.11	4.21	0.03	0.79	0.49
Italy	0.93	5.95	0.58	4.96	0.85	1.07	0.65	0.48	0.15	0.27	2.34	0.02	0.42	0.46
Japan	0.89	4.95	0.89	2.22	1.08	0.98	0.55	0.46	0.12	0.29	0.60	0.00	0.50	0.47
Luxembourg	1.08	6.59	0.41	0.23	1.20	1.05	0.47	0.62	0.14	0.19	1.23	0.01	0.28	NA
Malaysia	1.03	3.80	1.00	1.90	1.24	0.27	0.77	0.52	0.11	0.23	1.31	-0.05	0.95	0.78
Mexico	1.38	4.95	1.08	0.71	1.04	1.05	0.44	0.60	0.19	0.31	4.72	-0.03	0.17	0.35
Netherlands	1.02	5.57	0.54	6.17	0.90	0.64	0.46	0.58	0.09	0.18	1.43	0.04	0.20	0.62
New Zealand	0.91	3.90	0.63	1.47	0.67	1.35	0.43	0.53	0.09	0.15	2.61	-0.04	0.95	0.48
Norway	1.05	4.44	0.62	4.02	1.33	1.38	0.61	0.64	0.19	0.37	0.79	0.02	0.42	0.43
Peru	0.62	2.04	1.79	0.45	0.66	0.03	0.56	0.58	0.29	0.44	1.03	-0.02	0.45	0.59
Philippines	1.02	3.32	1.34	0.45	2.29	1.36	0.80	0.45	0.22	0.36	3.53	-0.08	0.22	0.89
Poland	1.39	3.91	0.76	2.49	1.50	0.26	0.74	0.52	0.15	0.26	1.66	-0.04	0.29	NA
Portugal	0.82	5.06	0.65	1.65	0.57	1.02	0.76	0.36	0.15	0.22	2.16	0.03	0.44	0.55
Singapore	1.19	4.20	0.80	2.60	1.57	0.29	0.68	0.53	0.12	0.25	0.64	-0.06	1.00	0.84
South Africa	1.11	4.41	0.65	1.65	1.37	1.34	0.49	0.67	0.07	0.12	5.38	-0.04	0.81	0.58
Spain	1.15	6.01	0.50	4.50	0.50	1.77	0.53	0.47	0.11	0.15	3.05	0.02	0.37	0.50
Sweden	1.43	4.84	0.41	4.32	1.21	1.26	0.42	0.79	0.14	0.27	1.16	0.01	0.33	0.45
Switzerland	0.79	5.66	0.55	2.74	0.58	1.40	0.45	0.62	0.10	0.17	0.41	0.03	0.27	0.48
Taiwan	1.09	4.76	0.79	13.00	1.77	0.28	0.67	0.50	0.19	0.36	0.47	-0.02	0.56	0.64
Thailand	1.57	3.14	1.05	2.96	1.79	1.97	0.64	0.56	0.18	0.34	1.70	-0.04	0.81	0.62
United Kingdom	0.78	4.46	0.45	4.38	1.33	0.38	0.43	0.68	0.07	0.19	2.98	0.01	0.95	0.73

TABLE 3.2 (Continued)
Summary Statistics of Control Variables

Panel B: Pearson's Pairwise Correlation Coefficients																		
Variable	R_M	R_{ICOC}	DY	HB	Beta	MCap	BM	Turn	Var	Inf	Retn_1	Exch	AntSel	SecReg	Accrual	Smooth	Disp	FError
R_M	1																	
R_{ICOC}	0.49*	1																
DY	0.28*	0.23*	1															
HB	0.56*	0.38*	0.23*	1														
Beta	0.19*	0.24*	-0.03	0.02	1													
MCap	-0.36*	-0.40*	-0.16*	-0.43*	-0.02	1												
BM	0.46*	0.39*	0.27*	0.52*	-0.02	-0.61*	1											
Turn	-0.21*	-0.19*	-0.11*	-0.22*	0.06	0.21*	-0.30*	1										
Var	0.08	0.19	-0.16*	0.08	0.36*	-0.35*	0.17*	0.02	1									
Inf	0.14*	0.31*	0.00	0.15*	0.00	-0.08	0.02*	-0.09	0.02	1								
Retn_1	0.03	-0.23	-0.04	-0.09	0.08	0.19*	-0.18*	0.15*	0.11*	0.00	1							
Exch	0.15*	0.20*	0.06	0.01	-0.01	0.03	0.11	-0.05	0.02	0.16*	0.00	1						
AntSel	-0.20*	0.02*	0.19*	-0.16*	-0.07	-0.23*	-0.08	0.14*	0.16*	-0.08	-0.04	-0.15*	1					
SecReg	-0.18*	-0.01*	-0.02	-0.14*	-0.05	-0.41*	0.10	0.17*	0.31*	-0.05	-0.06	-0.18*	0.55*	1				
Accrual	0.03	0.13	0.01	0.36*	0.02	-0.19*	0.26*	0.01	0.23*	-0.07	-0.21*	-0.05	-0.06	0.00	1			
Smooth	0.10	0.10	0.00	-0.27*	0.18*	-0.14*	-0.11*	-0.03	0.09	0.14*	0.09	0.10*	0.11*	0.30*	-0.48*	1		
Disp	0.36*	0.41*	0.09	0.42*	0.25*	-0.29*	0.45*	-0.17*	0.36*	0.10	-0.20*	0.21*	-0.25*	-0.16*	0.39*	-0.05	1	
FError	0.18*	0.25*	0.01	0.25*	0.16*	-0.20*	0.26*	-0.10*	0.25*	-0.01	-0.15*	0.12*	-0.16*	-0.14*	0.37*	-0.11	0.67*	1

TABLE 3.3
Implied Cost of Capital and Home Bias Measure

This table show regression results of the following model.

$$R_{ICOC,it} = \alpha_0 + \alpha_1 HB_{it} + \alpha_2 Beta_{it} + \alpha_3 MCap_{it} + \alpha_4 BM_{it} + \alpha_5 Turn_{it} + \alpha_6 Var_{it} + \alpha_7 Inf_{it} + \alpha_8 Retn_{-1,it} + \alpha_9 Exch_{it} + \sum_j \alpha_j \text{Other Controls}_{it} + \epsilon_{it}.$$

$R_{ICOC,it}$ is the country-year median of the average ICOC of firms in country i at time t . The R_{ICOC} is the average of four ICOC estimates using the four models described in Appendix B. HB is defined as the share of domestic mutual funds holdings in their country's stock market capitalization divided by the country's world-float market capitalization weight, and is expressed in natural log; its coefficient estimate is multiplied by 100. $Beta$ is the covariance of the MSCI country index return with MSCI world index return over the past 5 years divided by variance of MSCI world index return; $MCap$ is the log firm market capitalization; BM is the log book-to-market ratio; $Turn$ is the stock turnover ratio; Var is the past year's monthly return variance of a stock; $Retn_{-1}$ is the average monthly return over the past year; $Exch$ is the covariance of the monthly stock market index return with the monthly depreciation of the local currency with respect to the dollar over past 5 years. $Antsel$ is the anti-self-dealing index from Djankov et al. (2008); $SecReg$ is the LLSV index of security regulation. $Accrual$ is the magnitude of accruals; $Smooth$ is the smoothness of accounting reports, and is the ratio of the standard deviation of operating income to standard deviation of operating cash flows over the last 5 years; $Disp$ is the analyst forecast dispersion; $FError$ is the absolute difference between announced earnings and mean of estimated earnings scaled by the mean of analyst forecasts. The country-year median values of all firm characteristics are employed in the regression analysis. All t -statistics reported in parentheses are based on Newey-West heteroskedasticity and autocorrelation corrected standard errors. Sample period is 1998-2007.

Dependent Variable = R_{ICOC}										
Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
HB	0.448 (7.34)		0.222 (3.11)	0.242 (3.24)	0.211 (2.27)	0.249 (3.27)	0.286 (3.61)	0.176 (2.36)	0.220 (3.12)	0.220 (2.69)
$Beta$		0.015 (3.76)	0.015 (3.57)	0.015 (3.76)	0.016 (3.76)	0.014 (3.57)	0.013 (2.92)	0.014 (3.38)	0.015 (3.55)	0.014 (3.52)
$MCap$		-0.005 (-2.91)	-0.004 (-2.48)	-0.003 (-1.78)	-0.005 (-2.20)	-0.004 (-2.33)	-0.003 (-1.38)	-0.005 (-2.80)	-0.004 (-2.49)	-0.003 (-1.84)
BM		0.012 (3.31)	0.008 (1.90)	0.009 (2.12)	0.009 (1.88)	0.008 (1.95)	0.009 (2.25)	0.007 (1.71)	0.008 (1.88)	0.008 (2.00)
$Turn$		-0.007 (-0.20)	-0.001 (-0.03)	-0.006 (-0.20)	0.012 (0.34)	0.004 (0.12)	0.008 (0.25)	0.000 (-0.00)	-0.001 (-0.03)	-0.002 (-0.05)
Var		-0.061 (-0.64)	-0.019 (-0.20)	-0.040 (-0.42)	-0.018 (-0.19)	0.005 (0.05)	-0.033 (-0.36)	-0.067 (-0.68)	-0.020 (-0.21)	-0.083 (-0.83)
Inf		0.215 (2.66)	0.198 (2.49)	0.200 (2.52)	0.214 (2.34)	0.192 (2.51)	0.182 (2.29)	0.197 (2.41)	0.198 (2.51)	0.193 (2.42)
$Retn_{-1}$		-0.087 (-1.59)	-0.094 (-1.77)	-0.091 (-1.68)	-0.109 (-1.81)	-0.110 (-1.93)	-0.095 (-1.83)	-0.074 (-1.39)	-0.094 (-1.76)	-0.081 (-1.40)
$Exch$		1.828 (2.89)	1.959 (3.15)	2.068 (3.22)	1.882 (2.96)	1.938 (3.19)	1.750 (3.00)	1.676 (2.97)	1.949 (3.22)	1.691 (3.11)
$AntSel$				0.007 (1.26)						0.010 (1.71)
$SecReg$					-0.006 (-0.65)					
$Accrual$						-0.010 (-0.92)				-0.012 (-1.19)
$Smooth$							0.025 (2.41)			
$Disp$								0.027 (1.42)		0.037 (2.03)
$FError$									0.001 (0.10)	
NObs	371	371	371	371	336	371	371	371	371	371
$\bar{R}^2$	22.4%	38.6%	40.6%	40.9%	41.5%	40.7%	41.8%	41.1%	40.5%	41.9%
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

TABLE 3.4
Fama-Macbeth Regressions of Realized Returns on the Home Bias Measure

This table show regression results of the following model.

$$R_{Mi,t+1} = \alpha_0 + \alpha_1 HB_{it} + \alpha_2 Beta_{it} + \alpha_3 MCap_{it} + \alpha_4 BM_{it} + \alpha_5 Turn_{it} + \alpha_6 Var_{it} + \alpha_7 Inf_{it} + \alpha_8 Retn_{-1,it} + \alpha_9 Exch_{i,t} + \sum_j \alpha_j \text{Other Controls}_{it} + \epsilon_{it+1}.$$

$R_{Mi,t+1}$ is the monthly realized index excess returns on country i at time $t + 1$; HB is defined as the share of domestic mutual funds holdings in their country's stock market capitalization divided by their country's world-float market capitalization weight; it is expressed in natural log and its estimate is multiplied by 100. $Beta$ is the covariance of MSCI country index return with the MSCI world index return over past 5 years divided by MSCI world index return variance; $MCap$ is the log firm market capitalization; BM is the log book-to-market ratio. $Turn$ is the stock turnover ratio; Var is the past year's monthly return variance of a stock; $Retn_{-1}$ is the average monthly return over the past year; $Exch$ is the covariance of the monthly stock market index return with the monthly depreciation of the local currency with respect to the dollar over past 5 years. $Antsel$ is the anti-self-dealing index from Djankov et al. (2008); $SecReg$ is the LLSV index of security regulation. $Accrual$ is the magnitude of accruals; $Smooth$ is the smoothness of accounting reports, and is the ratio of the standard deviation of operating income to standard deviation of operating cash flows over the last 5 years; $Disp$ is the analyst forecast dispersion; $FError$ is the absolute difference between announced earnings and mean of estimated earnings scaled by the mean of analyst forecasts. The country-year median values of all firm characteristics are employed in the regression analysis. All t-statistics reported in parentheses are based on Newey-West heteroskedasticity and autocorrelation corrected standard errors. Sample period is 1998-2007.

Dependent Variable = R_M										
Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
HB	0.136 (5.31)		0.101 (5.39)	0.113 (5.82)	0.040 (2.31)	0.087 (4.13)	0.101 (5.00)	0.057 (2.69)	0.088 (4.38)	0.057 (2.45)
$Beta$		0.001 (1.70)	0.004 (3.09)	0.004 (2.88)	0.006 (4.22)	0.005 (3.92)	0.004 (3.25)	0.000 (0.41)	0.004 (3.21)	0.001 (0.59)
$MCap$		-0.001 (-2.56)	-0.001 (-2.56)	-0.001 (-2.58)	-0.003 (-6.27)	-0.001 (-1.49)	-0.001 (-2.53)	-0.001 (-1.74)	-0.002 (-5.21)	0.000 (-0.82)
BM		0.002 (3.06)	0.003 (2.76)	0.003 (2.38)	0.000 (-0.15)	0.000 (0.29)	0.002 (2.05)	0.000 (0.10)	0.003 (2.80)	-0.002 (-1.70)
$Turn$		0.028 (2.96)	0.007 (0.55)	0.012 (0.89)	-0.018 (-1.15)	-0.025 (-1.78)	0.003 (0.23)	-0.012 (-0.89)	0.020 (1.56)	-0.045 (-3.04)
Var		0.011 (0.28)	0.028 (0.56)	-0.004 (-0.08)	-0.008 (-0.17)	0.050 (1.03)	0.066 (1.37)	-0.054 (-0.99)	0.006 (0.12)	-0.059 (-1.20)
Inf		0.043 (4.23)	0.011 (0.89)	0.020 (1.67)	0.003 (0.26)	0.020 (1.66)	0.003 (0.28)	0.014 (1.17)	0.026 (2.13)	0.023 (1.88)
$Retn_{-1}$		0.035 (1.80)	0.068 (3.28)	0.065 (3.16)	0.065 (2.85)	0.068 (3.24)	0.074 (3.78)	0.096 (4.68)	0.067 (3.36)	0.091 (4.31)
$Exch$		-1.403 (-5.68)	-0.355 (-1.02)	-0.293 (-0.82)	-0.976 (-2.35)	-0.157 (-0.45)	0.044 (0.13)	-0.944 (-2.78)	-0.688 (-1.99)	-1.052 (-2.98)
$AntSel$				0.002 (1.33)						0.002 (1.44)
$SecReg$					-0.007 (-3.29)					
$Accrual$						0.007 (2.21)				-0.001 (-0.16)
$Smooth$							-0.001 (-0.47)			
$Disp$								0.041 (5.97)		0.046 (6.05)
$FError$									0.011 (4.83)	
Intercept	0.005 (3.37)	0.012 (5.96)	0.006 (3.32)	0.004 (2.08)	0.019 (6.67)	0.000 (-0.04)	0.007 (2.17)	0.005 (2.28)	0.010 (4.72)	0.001 (0.55)

TABLE 3.5
Dividend Yield and Home Bias Measure

This table show regression results of the following model.

$$DY_{it} = \alpha_0 + \alpha_{10}gIBES_{it} + \alpha_1HB_{it} + \alpha_2Beta_{it} + \alpha_3MCap_{it} + \alpha_4BM_{it} + \alpha_5Turn_{it} + \alpha_6Var_{it} + \alpha_7Inf_{it} + \alpha_8Retn_{-1,it} + \alpha_9Exch_{it} + \sum_j \alpha_j \text{Other Controls}_{it} + \epsilon_{it}.$$

DY_{it} is the dividend yield of country i at time t ; dividend yield is measured by the total amount of dividend of a country divided by the total stock market capitalization. HB is defined as the share of domestic mutual funds holdings in their country's stock market capitalization divided by their country's world-float market capitalization weight. HB is expressed in natural log and its coefficient estimate is multiplied by 100. $gIBES$ is the analyst forecasts of long-term earnings growth rate. $Beta$ is the covariance of the MSCI country index return with MSCI world index return over the past 5 years divided by variance of MSCI world index return; $MCap$ is the log firm market capitalization; BM is the log book-to-market ratio; $Turn$ is the stock turnover ratio; Var is the past year's monthly return variance of a stock; $Retn_{-1}$ is the average monthly return over the past year; $Exch$ is the covariance of the monthly stock market index return with the monthly depreciation of the local currency with respect to the dollar over past 5 years. $Antsel$ is the anti-self-dealing index from Djankov et al. (2008); $SecReg$ is the LLSV index of security regulation. $Accrual$ is the magnitude of accruals; $Smooth$ is the smoothness of accounting reports, and is the ratio of the standard deviation of operating income to standard deviation of operating cash flows over the last 5 years; $Disp$ is the analyst forecast dispersion; $FError$ is the absolute difference between announced earnings and mean of estimated earnings scaled by the mean of analyst forecasts. The country-year median values of all firm characteristics are employed in the regression analysis. All t -statistics reported in parentheses are based on Newey-West heteroskedasticity and autocorrelation corrected standard errors. Sample period is 1998-2007.

Dependent Variable = DY										
Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
<i>HB</i>	0.148 (3.34)		0.106 (2.40)	0.146 (3.77)	0.096 (1.87)	0.117 (2.54)	0.099 (2.12)	0.096 (2.01)	0.106 (2.34)	0.134 (3.24)
<i>gIBES</i>	-0.054 (-2.39)	-0.060 (-2.48)	-0.057 (-2.31)	-0.045 (-1.98)	-0.041 (-1.55)	-0.054 (-2.14)	-0.058 (-2.36)	-0.057 (-2.30)	-0.057 (-2.31)	-0.043 (-1.84)
<i>Beta</i>		0.002 (1.01)	0.002 (0.84)	0.003 (1.29)	0.004 (1.73)	0.002 (0.80)	0.002 (0.89)	0.002 (0.69)	0.002 (0.82)	0.002 (0.93)
<i>MCap</i>		-0.002 (-1.89)	-0.002 (-1.58)	0.000 (-0.17)	-0.002 (-1.64)	-0.002 (-1.47)	-0.002 (-1.63)	-0.002 (-1.55)	-0.002 (-1.52)	0.000 (-0.18)
<i>BM</i>		0.003 (1.17)	0.001 (0.29)	0.002 (0.86)	0.000 (-0.07)	0.001 (0.32)	0.001 (0.24)	0.001 (0.21)	0.001 (0.29)	0.002 (0.68)
<i>Turn</i>		-0.002 (-0.15)	0.001 (0.05)	-0.012 (-0.96)	-0.001 (-0.04)	0.002 (0.19)	0.000 (-0.01)	0.001 (0.07)	0.001 (0.05)	-0.010 (-0.82)
<i>Var</i>		-0.165 (-2.37)	-0.145 (-2.04)	-0.187 (-2.72)	-0.170 (-2.30)	-0.136 (-1.94)	-0.144 (-2.04)	-0.156 (-1.99)	-0.145 (-1.95)	-0.209 (-2.79)
<i>Inf</i>		0.001 (0.01)	-0.008 (-0.18)	-0.005 (-0.11)	0.011 (0.25)	-0.011 (-0.23)	-0.007 (-0.14)	-0.008 (-0.19)	-0.008 (-0.18)	-0.009 (-0.18)
<i>Retn₋₁</i>		0.015 (0.42)	0.012 (0.34)	0.020 (0.62)	-0.017 (-0.44)	0.006 (0.17)	0.012 (0.34)	0.016 (0.43)	0.012 (0.33)	0.026 (0.76)
<i>Exch</i>		0.403 (0.85)	0.467 (0.94)	0.682 (1.57)	0.543 (1.19)	0.461 (0.92)	0.487 (0.99)	0.405 (0.84)	0.468 (0.96)	0.507 (1.17)
<i>AntSel</i>				0.014 (5.00)						0.015 (5.74)
<i>SecReg</i>					0.003 (0.67)					
<i>Accrual</i>						-0.004 (-0.74)				-0.005 (-0.97)
<i>Smooth</i>							-0.003 (-0.44)			
<i>Disp</i>								0.006 (0.45)		0.018 (1.18)
<i>FError</i>									0.000 (-0.01)	
NObs	371	371	371	371	336	371	371	371	371	371
$\bar{R}^2$	14.7%	14.4%	16.4%	23.6%	15.6%	16.4%	16.3%	16.3%	16.2%	24.5%
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

TABLE 3.6

Long Term Growth Rates, Implied Cost of Capital Estimates, and Home Bias Measure

This table presents regression results of different ICOC estimates on the home bias measure, HB , with different growth control variables. The dependent variable is based on different ICOC estimates. They are estimated from CT, GLS, OJ, MPEG models, ETSS simultaneous estimates of ICOC and growth, and Easton's (2004) model (denoted by r_{CT} , r_{GLS} , r_{OJ} , r_{MPEG} , r_{ETSS} , and r_{Easton} , respectively), in addition to R_{ICOC} estimate employed in Table 4. R_{ICOC} is the average of MPEG, GLS, OJ, and CT ICOC estimates, as given in Appendix B. HB is defined as the share of domestic mutual funds holdings in their country's stock market capitalization divided by the country's world-float market capitalization weight, and is expressed in natural log; its coefficient estimate is multiplied by 100. $Beta$ is the covariance of the MSCI country index return with MSCI world index return over the past 5 years divided by variance of MSCI world index return; $MCap$ is the log firm market capitalization; BM is the log book-to-market ratio; $Turn$ is the stock turnover ratio; Var is the past year's monthly return variance of a stock; $Retn_{-1}$ is the average monthly return over the past year; $Exch$ is the covariance of the monthly stock market index return with the monthly depreciation of the local currency with respect to the dollar over the past 5 years. g_{Easton} and g_{ETSS} are implied estimated growth rates from Easton's (2004) and ETSS's models; g_{GDP} is the past year's GDP growth; and ROE is the return on equity. The country-year median values of all firm characteristics are employed in the regression analysis. All t -statistics reported in parentheses are based on Newey-West heteroskedasticity and autocorrelation corrected standard errors. Sample period is 1998-2007.

Variable (1)	Dependent Variable = Different ICOC Estimates									
	r_{CT} (2)	r_{GLS} (3)	r_{OJ} (4)	r_{MPEG} (5)	r_{ETSS} (6)	r_{Easton} (7)	R_{ICOC} (8)	R_{ICOC} (9)	R_{ICOC} (10)	R_{ICOC} (11)
HB	0.166 (2.11)	0.332 (3.53)	0.263 (3.36)	0.178 (2.12)	0.113 (2.08)	0.603 (2.64)	0.234 (3.50)	0.227 (3.17)	0.218 (3.10)	0.199 (2.84)
$Beta$	0.012 (2.76)	0.008 (1.53)	0.017 (3.58)	0.020 (4.52)	0.008 (3.03)	0.013 (1.83)	0.015 (4.03)	0.014 (3.57)	0.013 (3.24)	0.015 (3.78)
$MCap$	-0.005 (-3.09)	-0.001 (-0.36)	-0.004 (-2.34)	-0.005 (-2.17)	-0.004 (-3.07)	0.008 (1.19)	-0.002 (-1.58)	-0.004 (-2.31)	-0.005 (-3.14)	-0.004 (-2.23)
BM	0.010 (2.08)	-0.007 (-1.29)	0.012 (2.47)	0.018 (3.20)	0.006 (1.74)	0.008 (0.78)	0.009 (2.31)	0.008 (1.95)	0.009 (2.15)	0.009 (2.25)
$Turn$	0.027 (0.99)	-0.043 (-0.70)	0.020 (0.80)	-0.022 (-0.79)	0.011 (0.46)	-0.157 (-2.43)	-0.002 (-0.06)	-0.001 (-0.04)	0.001 (0.03)	-0.007 (-0.20)
Var	0.012 (0.13)	-0.420 (-3.31)	0.136 (0.96)	0.103 (2.14)	-0.173 (-2.30)	0.163 (0.65)	-0.020 (-0.23)	-0.018 (-0.19)	0.144 (1.29)	-0.020 (-0.22)
Inf	0.286 (3.08)	0.047 (0.39)	0.288 (3.74)	0.169 (3.07)	0.146 (4.41)	0.255 (2.76)	0.194 (2.70)	0.196 (2.47)	0.180 (2.87)	0.192 (2.61)
$Retn_{-1}$	-0.108 (-1.93)	0.029 (0.35)	-0.179 (-2.91)	-0.057 (-1.31)	-0.019 (-0.45)	0.053 (0.50)	-0.086 (-1.70)	-0.096 (-1.81)	-0.172 (-3.54)	-0.123 (-2.15)
$Exch$	1.414 (2.71)	0.111 (0.20)	2.678 (2.97)	3.399 (3.84)	0.238 (0.56)	4.232 (1.97)	1.924 (3.25)	1.935 (3.13)	2.153 (3.43)	1.993 (3.27)
g_{ETSS}					0.723 (20.33)		0.093 (1.11)			
g_{Easton}						0.828 (12.12)		-0.005 (-1.05)		
ROE									0.143 (4.29)	
g_{GDP}										0.074 (1.62)
NObs	371	371	371	371	370	371	370	371	371	371
$\bar{R}^2$	41.6%	18.3%	49.0%	51.1%	89.9%	92.4%	44.4%	40.6%	46.5%	41.1%
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

TABLE 3.7
Cost of Capital and Alternative Measures of Home Bias

This table presents regression results using three different dependent variables: the average implied cost of capital (R_{ICOC}), MSCI country index excess return (R_M), and country dividend yield (DY) on two alternative home bias measures, with key control variables. R_{ICOC} is the average of MPEG, GLS, OJ, and CT ICOC estimates, as given in Appendix B. The first home bias measure is the firm-level measure of home bias, hb , defined as the share of domestic mutual funds holdings in a domestic firm's stock market capitalization divided by the domestic firm's world-float market capitalization weight. The other measure is $HB(CPIS)$, based on the IMF's annual Consolidated Portfolio Investment Survey (CPIS) data. $HB(CPIS)$ is defined as the share of domestic investors holdings in their country's stock market capitalization divided by their country's world-float market capitalization weight. Both hb and $HB(CPIS)$ are expressed in natural log and estimates of their coefficients are multiplied by 100. $gIBES$ is the analyst forecasts of long-term earnings growth rate. $Beta$ is the covariance of the MSCI country index return with MSCI world index return over the past 5 years divided by variance of MSCI world index return; $MCap$ is the log firm market capitalization; BM is the log book-to-market ratio; $Turn$ is the stock turnover ratio; Var is the past year's monthly return variance of a stock; $Retn_{-1}$ is the average monthly return over the past year; $Exch$ is the covariance of the monthly stock market index return with the monthly depreciation of the local currency with respect to the dollar over the past 5 years. The country-year median values of all firm characteristics are employed in the regression analysis. All t -statistics reported in parentheses are based on Newey-West heteroskedasticity and autocorrelation corrected standard errors. Sample period is 1998-2007.

Variable (1)	Firm-Level Home-Bias Measure, hb			CPIS-Based Home-Bias Measure, $HB(CPIS)$		
	R_{ICOC} (2)	R_M (3)	DY (4)	R_{ICOC} (5)	R_M (6)	DY (7)
hb	0.200 (2.97)	0.095 (5.72)	0.122 (3.25)			
$HB(CPIS)$				0.171 (2.22)	0.073 (3.24)	0.097 (2.17)
$gIBES$			-0.055 (-2.24)			-0.040 (-1.90)
$Beta$	0.014 (3.52)	0.004 (3.13)	0.002 (0.77)	0.018 (5.31)	0.001 (1.24)	0.001 (0.42)
$MCap$	-0.004 (-2.10)	-0.001 (-1.83)	-0.001 (-1.14)	-0.003 (-1.63)	-0.002 (-3.66)	-0.002 (-1.73)
BM	0.008 (1.87)	0.002 (1.73)	0.000 (0.05)	0.017 (4.32)	0.003 (2.70)	-0.001 (-0.49)
$Turn$	0.003 (0.09)	0.012 (0.89)	0.003 (0.29)	0.053 (2.23)	0.035 (3.33)	-0.004 (-0.37)
Var	-0.008 (-0.08)	0.031 (0.61)	-0.134 (-1.89)	0.067 (0.77)	0.093 (1.81)	-0.093 (-2.64)
Inf	0.202 (2.59)	0.010 (0.85)	-0.008 (-0.18)	0.257 (3.76)	0.028 (2.74)	-0.011 (-0.33)
$Retn_{-1}$	-0.101 (-1.89)	0.060 (2.97)	0.007 (0.21)	-0.193 (-3.51)	0.071 (3.04)	-0.023 (-1.25)
$Exch$	2.074 (3.17)	-0.256 (-0.72)	0.556 (1.12)	0.769 (1.11)	-1.671 (-5.98)	0.670 (1.83)
Intercept		0.004 (1.91)			0.012 (5.15)	
NObs	371		371	374		374
$\bar{R}^2$	40.6%		17.9%	55.2%		14.8%
Year Effects	Yes		Yes	Yes		Yes

TABLE 3.8
Foreign Investment Costs on the Home-Bias Impact of the Cost of Capital

This table presents regression results using three different dependent variables: the average implied cost of capital (R_{ICOC}), MSCI country index excess return (R_M), and country dividend yield (DY) on two alternative home bias measures, with key control variables. R_{ICOC} is the average of MPEG, GLS, OJ, and CT ICOC estimates, as given in Appendix B. HB is defined as the share of domestic mutual funds holdings in their country's stock market capitalization divided by the country's float-adjusted world market capitalization weight, and is expressed in natural log and its coefficient estimate is multiplied by 100. The first set of results controls for FB , a proxy for the inverse of foreign investment costs, as measured by the average of foreign investors' share of equity investment in country i in their portfolios divided by the country's market capitalization weight in the world-float market portfolio and is expressed in log. The second set of results looks at only 23 developed countries as defined in Table 1. $gIBES$ is the analyst forecasts of long-term earnings growth rate. $Beta$ is the covariance of the MSCI country index return with MSCI world index return over the past 5 years divided by variance of MSCI world index return; $MCap$ is the log firm market capitalization; BM is the log book-to-market ratio; $Turn$ is the stock turnover ratio; Var is the past year's monthly return variance of a stock; $Retn_{-1}$ is the average monthly return over the past year; $Exch$ is the covariance of the monthly stock market index return with the monthly depreciation of the local currency with respect to the dollar over past 5 years. The country-year median values of all firm characteristics are employed in the regression analysis. All t -statistics reported in parentheses are based on Newey-West heteroskedasticity and autocorrelation corrected standard errors. Sample period is 1998-2007.

Variable (1)	Controlling for Foreign Investment Cost, FB			Only Developed Countries		
	R_{ICOC} (2)	R_M (3)	DY (4)	R_{ICOC} (5)	R_M (6)	DY (7)
HB	0.224 (3.11)	0.096 (4.15)	0.112 (2.56)	0.299 (2.90)	0.107 (4.96)	0.236 (5.29)
FB	-0.050 (-0.34)	0.024 (0.56)	-0.146 (-2.00)			
$gIBES$			-0.057 (-2.24)			-0.064 (-3.84)
$Beta$	0.015 (3.55)	0.003 (2.83)	0.002 (1.04)	0.011 (2.18)	0.007 (2.64)	0.001 (0.48)
$MCap$	-0.004 (-2.11)	-0.001 (-3.27)	-0.001 (-0.99)	0.000 (-0.20)	-0.001 (-0.93)	-0.001 (-0.52)
BM	0.008 (1.96)	0.002 (2.32)	0.002 (0.61)	0.009 (1.34)	0.001 (0.43)	-0.002 (-0.71)
$Turn$	-0.002 (-0.07)	0.035 (2.88)	-0.004 (-0.32)	-0.017 (-0.38)	-0.032 (-2.74)	-0.026 (-1.12)
Var	-0.023 (-0.25)	-0.022 (-0.40)	-0.159 (-2.26)	0.205 (0.77)	0.095 (1.31)	0.084 (0.82)
Inf	0.195 (2.42)	0.030 (2.03)	-0.017 (-0.37)	0.273 (2.62)	-0.034 (-1.46)	0.080 (2.74)
$Retn_{-1}$	-0.094 (-1.75)	0.041 (1.62)	0.013 (0.38)	-0.060 (-0.63)	0.105 (3.67)	-0.050 (-1.45)
$Exch$	1.964 (3.15)	0.371 (0.65)	0.482 (0.99)	4.395 (0.71)	-1.580 (-1.00)	-1.486 (-0.86)
Intercept		0.007 (3.63)			0.000 (0.06)	
NObs	371		371	230		230
$\bar{R}^2$	40.5%		17.5%	21.4%		40.8%
Year Effects	Yes		Yes	Yes		Yes