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Abstract
We study the effects of investor protection on stock returns and portfolio allocation decisions. In our theoretical model, if investor protection is weak, wealthy investors have an incentive to become controlling shareholders. In equilibrium, the stock price reflects the demand from both controlling shareholders and portfolio investors. Due to the high demand from controlling shareholders, the price of weak corporate governance stocks is not low enough to fully discount the extraction of private benefits. Thus, stocks have lower expected returns when investor protection is weak. This has implications for domestic and foreign investors' stockholdings. In particular, we show that portfolio investors' participation in the domestic stock market and home equity bias are positively related to investor protection and provide original evidence in their support.

Disciplines
Finance | Finance and Financial Management

Comments
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INVESTOR PROTECTION, EQUITY RETURNS, AND FINANCIAL GLOBALIZATION*

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Abstract

We study the effects of investor protection on equilibrium stock prices, returns and portfolio allocation decisions. In our theoretical model, if investor protection is weak, wealthy investors have an incentive to become controlling shareholders. In equilibrium, the stock price reflects the demand from both controlling shareholders and portfolio investors. As a consequence, due to the high demand from controlling shareholders, the price of weak corporate governance stocks is not low enough to fully discount the extraction of private benefits. This generates the following empirical implications. First, stocks should have lower expected returns when investor protection is weak. Second, domestic and foreign investors' participation in the stock market should be lower in countries with weak investor protection. Third, portfolio investors from countries with weak investor protection should hold relatively more foreign equity. Fourth, countries with weak investor protection should receive relatively more foreign direct investment. We show that these implications are consistent with existing empirical studies and we provide original evidence that domestic portfolio investors are less likely to participate in the domestic stock market and hold more foreign equity, when investor protection is weak.

JEL codes: G11; G32; G38; F21; F36.

Keywords: Investor Protection; Corporate Governance; Private Benefits of Control; Stock Returns; Portfolio Choice; Home Equity Bias.

I Introduction

Investor protection is well known to affect corporate financial policies, firm valuations, and ownership concentration. Only recently academics have started to investigate how investor protection and corporate governance are related to investors' portfolio holdings. There is now growing evidence that portfolio investors avoid investing in companies or countries that display weak corporate governance. For example, Giannetti and Simonov (2006) show that both foreign and domestic portfolio investors are less likely to invest in Swedish companies with weak corporate governance. Leuz, Lins and Warnock (2008) provide evidence that U.S. investors avoid investing in foreign companies when investor protection is deemed to be a problem. In addition, Kho, Stulz, and Warnock (2006) show that U.S. investors increase their holdings of shares in Korean firms, when those firms improve their corporate governance. There is also anecdotal evidence indicating that corporate governance is important in portfolio allocation decisions. In its survey, McKinsey&Company (2002) quotes the CFO from a major European private bank saying that "I simply would not buy a company with poor corporate governance".

At first sight, this phenomenon is puzzling. If it is common knowledge that portfolio investors may suffer from poor investor protection, then the possibility of getting expropriated should be fully discounted in the stock price. Portfolio investors should thus have no reason to avoid investing in poorly governed firms or countries. A possible explanation is that stocks of weak corporate governance firms are not available to outside investors. Stulz (2005) argues that in poorly governed countries, corporate insiders find it optimal to hold large stakes as a commitment mechanism not to expropriate outside investors too much. As a result of concentrated ownership, the amount of stocks available to portfolio investors is limited. Indeed, once the availability of stocks is taken into account, the tendency for U.S. investors to avoid poorly governed countries is less pronounced, as shown by Dahlquist, Pinkowitz, Stulz and Williamson (2003). However, taking into account insider ownership does not eliminate the home bias in U.S. investors' portfolios.

In this paper, we build on the idea that corporate governance plays an important role in investors' portfolio allocation decisions. We show that the effects of ownership concentration, resulting from weak investor protection, can go well beyond limiting the supply of stocks available to portfolio investors. If in equilibrium the excess demand curve for stocks is less than perfectly elastic, prices reflect not only security benefits, but also the consumption of private benefits of control by insiders. Our key insight is that stock prices may not fully discount the consumption of private benefits of control by insiders,

because those investors are willing to increase their demand for stocks and drive up the market clearing prices. In our model, investor protection affects how a firm's cash flows are divided between security benefits, which accrue to all shareholders pro-rata, and private benefits, which only the controlling shareholders have access to. This division in turn affects the prices that different classes of investors are willing to pay for their stocks. If some investors can gain access to both private and security benefits, then those investors are willing to pay more for stocks than investors who can only enjoy security benefits. Since the market price of stocks reflects the demand from both controlling and outside shareholders, the equilibrium price of weak corporate governance stocks is not low enough to fully discount the extraction of private benefits. Outside shareholders are still willing to hold weak corporate governance stocks for diversification reasons, but they reduce their demand. In equilibrium, the expected return of holding stocks for outside investors is lower than it would be in the absence of expropriation of private benefits of control.

Our model offers an explanation for a growing body of empirical evidence showing that weak investor protection is negatively related to stock returns (Gompers, Ishii and Metrick, 2003; Core, Guay and Rusticus, 2006; Cremers and Nair, 2005; and Yermack, 2006). This finding is puzzling from the perspective of existing partial equilibrium models predicting that the possibility of getting expropriated should be fully discounted in the stock price. We show that the possibility of extracting private benefits affects some investors's preferences for stocks, and, consequently, asset prices. From a theoretical point of view, our point is similar to Fama and French (2007) who show that tastes for assets as consumption goods affect asset prices. More in general, the explanation we put forward is related to the literature, initiated by Summers (1985) and Shleifer (1986), that points out how demand and supply are important for determining stock prices if arbitrage does not function perfectly.[1] Our contribution is to show how corporate governance and ownership concentration affect aggregate demand for stocks and thus equilibrium returns.

We also study how investor protection influences the equity holdings of different classes of investors, depending on the amount of wealth they have been endowed with. Using a simple two-country equilibrium model, we generate several empirical implications on cross-country capital flows.

First, lower security returns reduce the incentives to invest in stocks for those shareholders who are not wealthy enough to acquire large equity stakes and to participate in the extraction of private benefits

[1] For some papers emphasizing the importance of demand and supply effects, see Bagwell (1991), Gompers and Metrick (2001), and Hong, Kubik and Stein (2005).

of control. In the aggregate, domestic and foreign portfolio investors hold the free-float portfolio in equilibrium. Hence, as suggested by Stulz (2005), weak investor protection reduces foreign portfolio investors equity holdings by lowering the free-float. However, portfolio investors with low initial wealth may refrain from buying weak investor protection stocks all together, resulting in individual portfolios that are tilted towards good corporate governance stocks even in comparison to the free-float.

Weak investor protection thus reduces the incentives to participate in the domestic stock market for both domestic and foreign outside investors, suggesting that home equity bias and limited participation puzzle are related. Investors from a strong corporate governance country prefer to invest in their own country, leading to the *home equity bias*. Similarly, domestic non-controlling investors are less inclined to participate in the domestic stock market if investor protection is weak. They are interested in investing in foreign countries that offer better investor protection than their home country. To put it differently, these investors are less prone to participate in the domestic market and exhibit a *good country bias*. In the aggregate, however, we expect the home equity bias to hold also in weak investor protection countries, because the domestic wealthy investors have an incentive to acquire control blocks in their own country when less wealthy investors have stronger incentives to invest abroad. Large shareholders' home equity bias overwhelms the good country bias of domestic portfolio investors in aggregate data.

Second, while portfolio investors have a good country bias in selecting their equity investment, foreign controlling shareholders exhibit a *bad country bias*, meaning that they prefer to invest in weak investor protection countries. This last theoretical implication is consistent with some recent empirical evidence on the foreign investments of U.S. multinationals (Kelley and Woidtke, 2006), international M&A (Rossi and Volpin, 2004), and foreign investment in emerging markets (Desai and Moel, 2008). The flow of foreign direct investments (which refers to foreign investments whose objective is to acquire control in contrast to foreign portfolio investments) to countries with weak investor protection does not run counter to the home equity bias, because the literature –and the statistics– on home equity bias refer only to equity holdings of portfolio investors.

Third, if the market for corporate control is segmented across countries, in equilibrium, it is not necessarily true that a country with worse investor protection has higher ownership concentration. The initial distribution of wealth is as important as investor protection in determining ownership structure. If wealth distribution is even and the markets for control are segmented, nobody may be wealthy

enough to be able to acquire control and extract private benefits.[2] Hence, even if investor protection is weak, participation in the domestic stock market and return on equity for portfolio investors may be high. Conversely, small improvements in investor protection are not sufficient to spur equity market participation if the wealth distribution is skewed. Changes in wealth distribution can thus explain why the relation between ownership concentration and investor protection is weaker or does not hold if long periods of time are considered (Rajan and Zingales, 2003).

Finally, we explore some of our model's empirical implications. We find that cross-country differences in portfolio choices are indeed related to differences in investor protection. First, fewer domestic individual investors participate in the domestic stock market in weak investor protection countries. Second, in weak investor protection countries, domestic portfolio investors' holdings of foreign relative to domestic equity are larger than in countries where minority shareholders are better protected.

The remainder of this paper is organized as follows. Section 2 relates the paper to the literature. Section 3 and Section 4 present the model and the main results, respectively. Section 5 outlines some extensions, while Section 6 provides existing and novel empirical evidence supporting the implications of the model. Section 7 concludes.

II Related literature

This paper is related to three main strands of literature: the law and finance literature, the home equity bias literature, and the literature on limited investor participation in stock markets. Firstly, this paper is related to the large literature initiated by La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997 and 1998).[3] They show that the size and scope of capital markets are positively related to investor protection. Moreover, they show that companies with controlling shareholders are very common around the world and that ownership is more concentrated in weak investor protection countries (La Porta, Lopez-de-Silanes and Shleifer, 1999). Typically, the literature on law and finance has emphasized the protection of minority shareholders in the corporate law. However, securities law may be at least as important for the functioning of financial markets (La Porta, Lopez-de-Silanes and Shleifer, 2006).

[2] This is clearly the case if portfolio investors, such as pension funds and other institutional investors, are able to monitor and prevent the management from extracting private benefits when control is contestable. Analyzing these issues is beyond the scope of this paper.

[3] For an overview, see La Porta, Lopez-de-Silanes and Shleifer (2008) and La Porta, Lopez-de-Silanes, Shleifer and Vishny (2000).

In the law and finance literature, our paper is closest to Shleifer and Wolfenzon (2002), who show that companies have higher valuation and ownership is less concentrated in countries with better investor protection. While Shleifer and Wolfenzon (2002) focus on the implications of investor protection on corporate financing and investment, we aim to analyze investors' portfolio choices.[4]

Secondly, this paper is also related to the large literature on the home equity bias. The home equity bias is one of the least contested empirical facts in finance (for a survey, see Lewis, 1999). Under standard assumptions from portfolio theory and absent legal restrictions, investors should hold the world portfolio. Empirically, however, this is not the case. Studies document that the home bias holds for very diverse countries ranging from the developed financial markets of the U.S. to small markets like the Scandinavian ones, all the way to emerging markets.[5] There exist several other explanations for the home equity bias besides the explanation provided in this paper. Legal restrictions were an important factor when there were binding restrictions on international capital flows, but home bias has persisted even though legal restrictions on foreign ownership have been relaxed. Also foreign investments may be taxed more harshly than domestic investments.[6] However, as argued by Ahearne, Griever and Warnock (2004), legal restrictions and taxes are of secondary importance in explaining the home equity bias. In international finance, the most widely cited reason for the home equity bias is asymmetric information. Domestic investors are assumed to know more about domestic stocks than foreign investors leading to increased investments in domestic equities (Brennan and Cao, 1997). This explanation can, however, be challenged. Informational advantage could be in fact the opposite in some cases: it can be argued that large foreign portfolio investors are more sophisticated, and, therefore, better informed than small domestic investors. Consistently, Grinblatt and Keloharju (2000) show using Finnish data that foreign investors have outperformed domestic investors.

Finally, this paper is related to the literature on limited stock market participation (see, for instance, Mankiw and Zeldes, 1991; Vissing-Jorgensen, 2002; and Brav, Constantinides and Gezcy, 2002). All papers in this literature explore low household participation in the stock market within a single country. However, Guiso, Haliassos and Jappelli (2001 and 2003) have showed that there are signifi-

[4] In a recent paper, Albuquerque and Wang (2007) study asset prices using a dynamic general equilibrium model where large shareholders are able to extract private benefits. In Albuquerque and Wang, poor investor protection leads to higher investment, resulting in increased stock price volatility, and hence higher risk premium.

[5] For example, for the U.S., Ahearne, Griever, and Warnock (2004) document that at the end of 1997, U.S. stocks comprised 48.3% of the world market portfolio, yet U.S. investors only invested 10.1% of their stock portfolios abroad.

[6] Black (1974) and Stulz (1981) model barriers to international investments as taxes paid on foreign holdings.

cant cross-country differences in investor participation rates. The phenomenon has lacked a theoretical justification, and this paper is the first one to provide an explanation for that.

III The model

We study the effects of investor protection and ownership concentration on equilibrium equity returns, and domestic and foreign investors' portfolio allocation in a simple two-country model. We abstract from firm investment policies and assume that in each country there is one company (risky asset or stock) with exogenously given random cash-flows. In addition, there is a risk-free asset, which is common to both countries. Investors are endowed with different amounts of wealth, which consists of the domestic risky asset and the risk free asset. We analyze how given the initial distribution of wealth, investors reallocate their portfolios between foreign and domestic stocks and the risk free asset, depending on the exogenously given level of investor protection.

A Investment opportunities

Two symmetric countries, called Home and Foreign, differ in the level of investor protection and the distribution of wealth. We denote foreign variables with an asterisk. Home's (Foreign's) risky asset has a gross random payoff $\widetilde{X}$ ($\widetilde{X}$ *). The expected payoff of the risky assets is μ_X and their variance is σ_X^2. The payoffs of the two assets are identically and independently distributed.[7] The price of the domestic (foreign) risky asset is denoted by P (P^*) and is determined endogenously in equilibrium. Risky assets are available in fixed supply, which we normalize to 1, and are initially owned by each country's residents.

Investors have also access to a risk-free asset, identical in both countries, whose return we normalize to 0. We take the risk free asset to be the numeraire and assume that one unit of the risk free asset is available in each country.

B Investors

In both countries, there are heterogeneous investors, who differ in the amount of initial wealth, W_0. There is a finite number of large investors (without loss of generality, 2 per country) and a contin-

[7] This assumption allows us to simplify the calculations, but it is not essential for the results.

uum of small investors. Investors' initial wealth consists of a share w_0 (w_0^*) of their country's assets. Total domestic wealth is $1+P$ at Home and $1+P^*$ in Foreign. Each large investor owns a share of the initial wealth, $\overline{\overline{w}}_0 < \frac{1}{2}$ at Home ($\overline{\overline{w}}_0^* < \frac{1}{2}$ in Foreign). Small investors' initial share of wealth w_0 (w_0^*) is distributed between 0 and $\overline{w}_0$ ($\overline{w}_0^*$), and satisfies the condition $\int_0^{\overline{w}_0} w_0 dF(w_0) = 1 - 2\overline{\overline{w}}_0$ $\left(\int_0^{\overline{w}_0^*} w_0^* dF^*(w_0^*) = 1 - 2\overline{\overline{w}}_0^*\right)$, where F (F^*) is a continuous cumulative density function describing the distribution of initial wealth among small investors at Home (in Foreign). The distribution of initial wealth among all investors at Home (in Foreign) is described by G (G^*). Investors can allocate their initial wealth $W_0 \equiv w_0(1+P)$ ($W_0^* \equiv w_0^*(1+P^*)$ in Foreign) between the risk free asset, domestic and foreign risky assets. We allow all investors to submit limit orders (i.e., demand schedules specifying the amounts of stock they are willing to buy conditional on prices). Investors cannot borrow to invest in the stock market, nor can they sell stocks short.[8]

In our model, buying a risky asset is equivalent to participating in the stock market. Following the existing literature (see, e.g., Vissing-Jorgensen, 2002), we assume that buying a risky asset entails a fixed participation cost, denoted by c. Investors pay a separate cost for participating in the domestic and foreign markets. The cost is assumed to be equal for both markets.[9]

An investor can acquire control in a company if he buys a share of the company stock larger than $\underline{\alpha}$ and he becomes the largest shareholder. The controlling shareholder (CS) enjoys private benefits of control in addition to security benefits, which are shared equally by all investors. The benchmark results of the model are derived assuming that the market for control is segmented, while financial markets are otherwise perfectly integrated. That is, foreign investors are not able to extract private benefits of control.[10] In Section V, we extend the model by relaxing this assumption.

We denote Home controlling shareholder's domestic and foreign shareholdings as α_{CS}^H and α_{CS}^F ($\alpha_{CS^*}^F$ and $\alpha_{CS^*}^H$ for Foreign controlling shareholder). The emergence of controlling shareholders is determined endogenously. We refer to investors without control as portfolio investors (PI) and denote their domestic and foreign shareholdings as: α_{PI}^H and α_{PI}^F ($\alpha_{PI^*}^F$ and $\alpha_{PI^*}^H$ for portfolio investors in Foreign).[11]

[8] These assumptions are stronger than we actually need. It would suffice for our purposes to impose that margin requirements existed (i.e., there were limits on how much investors can borrow) and that short sales were more costly than taking long positions.

[9] None of the qualitative results of the model would change if we assumed the participation costs to differ across markets.

[10] The main reason we make this assumption is that foreign equity holdings that have a control motive are classified as foreign direct investment and are not considered as portfolio investment in the literature on home equity bias to which we want to relate (see, e.g., Ahearne et al., 2004).

[11] Note that, since we have normalized the supply of the risky assets to 1, α denotes both the fraction of shares held in a company and the quantity invested in the company.

Private benefits of control consist of an amount of cash flows B (B^*) that the controlling shareholder diverts from the Home (Foreign) company's cash-flows. For simplicity, we assume that $B < X_{\min}$, where $X_{\min}$ is the lower bound of the support of $\widetilde{X}$. This assumption implies that even when the realized payoff is low, there is some cash flow that can be diverted.[12] Larger private benefits of control capture weaker investor protection. No private benefits are extracted if there is no controlling shareholder.

Our assumptions imply that the benefits from stockholdings are weakly increasing in the ownership stake. That is, we model the entrenchment effect of ownership concentration. For simplicity, we ignore the deadweight losses from the extraction of private benefits and, consequently, the incentive effect of ownership concentration. As we discuss in Subsection V.B., our central results do not depend on this assumption.

Investors' utility depends on the final wealth, $\widetilde{W}$. The utility of controlling shareholders also depends positively on the private benefits of control. The expected utility of the Home investor can be expressed as:

$$U(\alpha^H, \alpha^F, B) = E(\widetilde{W}) - \frac{Var(\widetilde{W})}{2\gamma} + I_{\alpha^H > \underline{\alpha}}(\alpha^H)B, \tag{1}$$

where γ is the risk aversion parameter and $I_{\alpha^H > \underline{\alpha}}(\alpha^H)$ is an indicator function equal to 1 if $\alpha^H > \underline{\alpha}$ and equal to zero otherwise. It captures the idea that investors can enjoy private benefits of control only by becoming controlling shareholders.

The choice variables of an investor are the portfolio allocations to the domestic and foreign risky assets, respectively, $\alpha^H$and α^F. Choosing $\alpha^H > \underline{\alpha}$ implies that an investor becomes a controlling shareholder. Investors' expected utility depends on the expected final period wealth and its variance, which can be written as follows (under the assumption that there exists a controlling shareholder):[13]

$$\begin{aligned} E(\widetilde{W}) = W_0 - \alpha^H P - \alpha^F P^* + \alpha^H(\mu_X - B) + \alpha^F(\mu_X - B^*) \\ - I_{\alpha^H>0}(\alpha^H)c - I_{\alpha^F>0}(\alpha^F)c \end{aligned} \tag{2}$$

$$Var(\widetilde{W}) = \sigma_X^2 \left((\alpha^H)^2 + \left(\alpha^F\right)^2 \right), \tag{3}$$

[12] This assumption is quite common in the literature (see, for instance, Perotti and Von Thadden, 2006) and is done for simplicity only. The qualitative results would not change if private benefits were *ex ante* uncertain, although the algebra would become more cumbersome.

[13] If there is no controlling shareholder the expected wealth is $E(\widetilde{W}) = W_0 - \alpha^H P - \alpha^F P^* + \alpha^H \mu_X + \alpha^F \mu_X - I_{\alpha^H>0}(\alpha^H)c - I_{\alpha^F>0}(\alpha^F)c$

where $I_{a>0}(a)$ is an indicator function equal to 1 if $a > 0$ and equal to zero otherwise. The expressions for the Foreign investors are similar and are thus omitted.

To make the problem non-trivial, we assume that $\underline{\alpha}$ is larger than the amount an investor would find it optimal to invest in the absence of control benefits. A sufficient condition for this to hold is that $\underline{\alpha} > \max\left\{\frac{\mu_X - B}{\gamma\sigma_X^2}, \frac{\mu_X - B^*}{\gamma\sigma_X^2}\right\}$.

C Timing and definition of equilibrium

The initial wealth distribution, the quality of investor protection and the distribution of asset returns are common knowledge. The timing of events is as follows:

- At $t = 0$, domestic and foreign investors make their portfolio decisions. In each country, one investor may become controlling shareholder.
- At $t = 1$, after risky assets' random payoffs are realized and before they are distributed to portfolio investors, controlling shareholders (if any) extract private benefits of control.[14]
- At $t = 2$, payoffs net of private benefits of control are distributed to all investors.

Definition 1 *An equilibrium consists of portfolio allocations and decisions whether to become controlling shareholders such that:*

- *In Home and Foreign, a large investor becomes controlling shareholder if this maximizes his expected utility. No other investor has an incentive to acquire a stake larger than the controlling shareholder's if the controlling stake is smaller than* $\frac{1}{2}$.
- *All investors' portfolio allocations maximize their expected utility, taking other agents' choices as given.*
- *Portfolio investors take prices as given.*
- *Asset markets clear.*

[14] As will be clear later, in our model investors become controlling shareholders only in order to extract private benefits. Hence, we abstract from controlling shareholders' decision whether to extract private benefits.

IV Main results

Here, we take the perspective of the Home country. Results for the Foreign country are identical, unless noted otherwise. All proofs are in the Appendix.

Let's define $\alpha^H_{optimal} \equiv \frac{\mu_X - B - P}{\gamma \sigma_X^2}$ and $\alpha^F_{optimal} \equiv \frac{\mu_X - B^* - P^*}{\gamma \sigma_X^2}$ as the demands of domestic and foreign stocks of a portfolio investor for whom the no-borrowing constraint $W_0 \geq \alpha^H P + \alpha^F P^* + 2c$ is not binding in equilibrium. Our assumptions imply that $\underline{\alpha} > \max\left\{\alpha^H_{optimal}, \alpha^F_{optimal}\right\}$. Hence, in the absence of control benefits, no shareholder would find it optimal to acquire a share of the risky asset larger or equal to $\underline{\alpha}$.

Proposition 1 gives conditions for the existence of controlling shareholders and describes their asset holdings.[15]

Proposition 1 *For given prices, a large investor is more likely to acquire control if B and $\overline{\overline{w}}_0$ are relatively high. The Home controlling shareholder demands domestic and foreign risky assets in the following amounts: $\alpha^H_{CS} \geq \underline{\alpha} > \alpha^H_{optimal}$ and $0 \leq \alpha^F_{CS} \leq \alpha^F_{optimal}$. Additionally, $\alpha^H_{CS} - \alpha^H_{optimal}$ is weakly increasing in B.*

Controlling shareholders expect higher returns than portfolio investors. Hence, large investors may choose to underdiversify their portfolio and acquire control. Unobservable private benefits of control can thus help to explain why French and Poterba (1991) find that, based on the observed portfolio patterns, investors seem to expect domestic stock returns to be several hundred basis points higher than what foreign investors expect for the same markets.[16]

The difference between the ownership stake of the controlling shareholder and the holdings of portfolio investors increases in the level of private benefits because of the effect of competition for control. For given α^H_{CS}, the utility of a controlling shareholder is increasing in B. The other large shareholder's incentives to contest control thus increase in B as well. By acquiring a larger stake, the controlling

[15] Note that since we allow all investors to submit limit orders (demand schedules conditional on price), Proposition 1 applies to a situation where the controlling shareholder and portfolio investors make their portfolio allocation decisions simultaneously.

[16] We have updated the calculations of Poterba and French for the implied expected returns by using more accurate holdings data from the 2002 IMF Coordinated Survey of Portfolio Investment and monthly country index returns from MSCI (from 1993 to 2002). Our results are qualitatively similar to those of French and Poterba. Domestic investors still seem to expect significantly higher returns from investing in their own country compared to investors from other countries. The main difference is that the implied return premium of UK investors for investing in their home country has declined and the premium of Japanese investors for investing in Japan has substantially increased.

shareholder makes control non-contestable.[17]

The wealth threshold above which an investor chooses to become a controlling shareholder differs across countries because potential controlling shareholders at Home and in Foreign face different investor protection, equity prices, and competition for control from other large shareholders.

Corollary 1 *For given wealth distributions in the domestic and foreign countries, and given prices of the risky assets, the portfolio shares of Home portfolio investors with different levels of wealth are:*

1. *If* $W_0 \leq \underline{\underline{W}}(B, B^*, P, P^*)$, *then* $\alpha_{PI}^H = \alpha_{PI}^F = 0$,
2. *If* $\underline{\underline{W}}(B, B^*, P, P^*) \leq W_0 < \underline{W}(B, B^*, P, P^*)$, *then* $\alpha_{PI}^H \leqq \frac{\mu_X - B - P}{\gamma \sigma_X^2}$, *and* $\alpha_{PI}^F = 0$, *if* $\mu_X - B - P > \mu_X - B^* - P^*$; $\alpha_{PI}^H = 0$ *and* $\alpha_{PI}^F \leqq \frac{\mu_X - B^* - P^*}{\gamma \sigma_X^2}$ *if* $\mu_X - B - P < \mu_X - B^* - P^*$,
3. *If* $\underline{W}(B, B^*, P, P^*) \leq W_0 < \overline{W}(B, B^*, P, P^*)$, *then* $0 < \alpha_{PI}^H \leq \alpha_{optimal}^H$, $0 < \alpha_{PI}^F \leq \alpha_{optimal}^F$.

Due to the existence of participation costs and the possibility of extracting private benefits of control, individuals have different incentives to participate in the stock market and diversify their portfolios depending on their initial wealth. The poorest investors do not buy stocks at all. Less wealthy individuals participate only in one risky asset market. In particular, if the security returns are higher in Foreign than at Home (i.e., $\mu_X - B - P < \mu_X - B^* - P^*$), individuals with relatively low wealth invest only in the foreign risky asset. Contrary to investors who aspire to acquire control, portfolio investors face identical risks and returns independently from their country of residence. Foreign and domestic portfolio investors with equal initial wealth thus hold identical portfolios.

It is useful to note that for given prices an improvement in investor protection at Home has the following effects on the demand for equity: If investor protection improves in the domestic economy, it becomes more lucrative to invest in the domestic risky asset for the less wealthy investors, because domestic stocks' payoffs are higher. If corporate governance at Home becomes better than in Foreign, some individuals, who previously found it optimal to stay out of both risky asset markets, are now willing to pay the fixed participation cost c and invest in the domestic stock market. Improved domestic investor protection also increases the incentives to invest in the domestic risky asset compared to investing abroad. Those less wealthy investors that found it optimal to invest only in the foreign stock market

[17] In equilibrium, the controlling shareholder has the same utility as the other large investor (who would be able to contest control) if $\alpha_{CS}^H < \frac{1}{2}$.

may thus be willing to switch to the domestic market or start investing in the domestic market, in addition to the foreign market. Wealthier portfolio investors, who participate in both the domestic and the foreign markets, are now willing to invest more at Home.

Until now, we have taken prices as given. Differences in investor protection, however, affect the demand of investors with different wealth levels and, consequently, prices of risky assets at Home and in Foreign.

The prices are determined from the following market clearing conditions:

$$\int_{\underline{\underline{W}}}^{\overline{W}} \alpha_{PI}^{H}(W_0, P, P^*)dG(W_0) + \int_{\underline{\underline{W}}^*}^{\overline{W}^*} \alpha_{PI^*}^{H}(W_0, P, P^*)dG^*(W_0) + \alpha_{CS}^{H}(W_0, P, P^*) + \alpha_{CS^*}^{H}(W_0, P, P^*) = 1 \tag{4}$$

$$\int_{\underline{\underline{W}}^*}^{\overline{W}^*} \alpha_{PI^*}^{F}(W_0, P, P^*)dG^*(W_0) + \int_{\underline{\underline{W}}}^{\overline{W}} \alpha_{PI}^{F}(W_0, P, P^*)dG(W_0) + \alpha_{CS^*}^{F}(W_0, P, P^*) + \alpha_{CS}^{F}(W_0, P, P^*) = 1. \tag{5}$$

It is not possible to derive prices in closed form without assuming a specific functional form for the distribution of wealth. Additionally, the no-borrowing constraint implies that individual demands and, therefore, the market clearing conditions are non linear in the asset prices. However, we can derive implications on the relation between equilibrium prices and investor protection. We prove in the Appendix that our assumptions guarantee the existence of the equilibrium.

Ownership concentration influences the equilibrium relation between equity prices and investor protection.

Proposition 2 *The relation between the price of the risky asset and quality of investor protection is non-monotonic. If in equilibrium ownership concentration is large enough (i.e., portfolio investors' holdings are small) and* $B < \frac{\gamma\sigma_X^2}{2}$, *$P$ is increasing in B. For lower levels of ownership concentration or when* $B > \frac{\gamma\sigma_X^2}{2}$, *$P$ is decreasing in B.*

Proposition 2 underlines that general equilibrium effects may be important for the relationship between ownership concentration and firm valuation. An improvement in investor protection (decrease in B) can increase the aggregate demand for stocks and therefore the stock price, if portfolio investors hold a lot of stocks. Conversely, a decrease in investor protection can increase the aggregate demand for stocks and the stock price, if few portfolio investors participate in the domestic stock market. In several influential empirical papers (see, e.g., McConnell and Servaes, 1990; Morck, Shleifer and

Vishny, 1988), a large controlling equity share has been thought to increase firm market valuation because it would increase the controlling shareholder's incentives to maximize future cash flows.[18] In our model, ownership concentration does not increase cash flows. Nonetheless, stock prices may increase in ownership concentration because of a general equilibrium effect: when wealth is concentrated, the aggregate demand for a risky asset increases if extracting private benefits of control becomes easier. The stock price increases because some investors try to acquire control using open-market transactions.[19]

Proposition 2 implies that the relationship between corporate valuations and investor protection is ambiguous without controlling for the ownership structure. Only for give ownership concentration, valuations are positively related to investor protection. La Porta, Lopez-de-Silanes, Shleifer and Vishny (2002) provide evidence consistent with this implication of the model.

Another important implication of the model is that the wealth distribution is important in determining which equilibrium prevails in a country.

Corollary 2 *Equilibrium ownership concentration depends not only on B, but also on the wealth distribution.*

As an illustration, let's consider a country with weak investor protection, but even distribution of wealth, so that there are no large shareholders. We would then have an equilibrium in which no individual is wealthy enough to acquire control rights. Equilibrium prices would be such that individuals invest in the risky asset without being able to extract private benefits of control. Moreover, even if the quality of investor protection were very low, stock market participation would be high. The reason is that there would be no diversion of cash flows, and thus investors would have a higher incentive to participate in the risky asset market.

Changes in wealth distribution can explain why the relation between ownership concentration and investor protection is weaker or does not hold if long periods of time are considered. Morck, Percy, Tian and Yeung (2004) report that in Canada at the beginning of the 1900's ownership was highly concentrated and investor protection poor. By the middle of the century, however, widely held firms had become predominant, even though investor protection had *not* improved. This finding is less surprising

[18] In a related paper, Lins (2003) shows that non-management blockholders increase firm valuations, especially in countries with weak investor protection laws.

[19] This effect is similar to Zingales (1995) who shows that, because of the probability of a corporate control contest, ownership concentration has an effect on the price of voting shares without any effect on the company's cash flows. The mechanism is, however, different. In our model, any change in the identity of the controlling shareholder (i.e., block transactions that do not affect the free-float) would not have any effect on prices.

if one takes into account that in the same period an expanding middle class capable of investing in shares emerged. Our model suggests that the demand for shares by the middle class increased stock prices, and this in turn made it optimal for controlling shareholders to reduce their equity holdings. Morck et al. (2004) also show that the prevalence of widely held firms in Canada has declined starting from the 1970s. This coincides with the abolition of the inheritance tax in 1972 and widening wealth inequality.[20]

The implications of our model are also compatible with the experience of Italy in the same period. Aganin and Volpin (2004) report that Italian listed companies were widely held in the early 1900s. Ownership became more concentrated only after the Great Depression, when recession and high inflation had eroded the incomes of the middle class, and hence, its ability to invest in stocks (Zamagni, 1990). More in general, Rajan and Zingales (2003) demonstrate that there was a great reversal in financial development in Europe, where financial markets were well developed before the World War I and deteriorated afterwards. The negative impact of the Great Depression on the middle class wealth in Europe can contribute to explain why this reversal happened, without changes in laws weakening investor protection.

Consider now two countries where some shareholders acquire control and extract private benefits. Equity returns in a country are increasing in the level of investor protection. This is proved in Proposition 3.

Proposition 3 *Expected security returns at Home, $\mu_X - B - P$, are increasing in the level of investor protection. Additionally, if wealth distribution is identical in both countries, security returns are higher in the country with stronger investor protection.*

Proposition 3 implies that the return to equity for portfolio investors decreases if investor protection worsens. In other words, the price P does not decrease enough to compensate for an increase in B. The intuition is the following: As B increases, the stock price does not fully decrease to reflect the lower security benefits $\mu_X - B$, because of the controlling shareholder's demand for stocks. The stock price may even increase, as established by Proposition 2.

In Albuquerque and Wang (2007) expected returns are a decreasing function of investor protection because investment increases when investor protection is poor. In the presence of investment-specific

[20] For the widening wealth inequality in Canada, see Kerstetter (2002).

shocks, this increases stock return volatility. As a result also expected returns increase. Our result does not necessarily contradict this: we suggest that expected returns are increasing in investor protection for a given level of return volatility. Hence, risk-adjusted expected returns are lower when investor protection is poor.

The following corollary follows immediately from Proposition 3.

Corollary 3 *Domestic and Foreign portfolio investors' participation in the domestic stock market decreases as domestic investor protection gets weaker. Conversely, the higher is the quality of investor protection in the Foreign country, the more willing are domestic and foreign portfolio investors to invest in Foreign.*

In our model, there is no difference between domestic and foreign portfolio investors. All portfolio investors have identical portfolios for given initial wealth. On aggregate, portfolio investors hold the free-float, as suggested by Stulz (2005). Thus, the aggregate equity holdings of portfolio investors depend on investor protection only indirectly through the free-float. Portfolio investors with low initial wealth, however, underweight weak investor protection stocks even with respect to the free-float by deciding not to buy those stocks. For them, investor protection has an effect that goes beyond the free-float, because these investors choose not to hold stocks in firms with higher extraction of private benefits and lower expected returns.

For given wealth distribution, domestic portfolio investors' participation in the domestic stock market is lower in countries with poor investor protection because they offer lower security returns. This implies that portfolio investors from countries with weak investor protection invest abroad more than portfolio investors from countries with stronger investor protection. To put it differently, they exhibit a *good country bias.*

Even though we identify a good country bias for portfolio investors, our model exhibits *home equity bias* in the aggregate because wealthy investors have stronger incentives to invest in domestic stocks in poorer investor protection countries. The home equity bias, however, does not necessarily become less severe as investor protection improves. If investor protection is strong at Home but weak in Foreign, portfolio investors, including the domestic ones, are more willing to invest at Home. This counterbalances the fact that the very wealthy have stronger incentives to diversify internationally, instead of acquiring control.[21]

[21] The extent of home equity bias depends once again on wealth distribution.

V Extensions and robustness

A Perfectly integrated market for control

So far, we have assumed that the markets for the control of the risky assets are segmented. This assumption has some empirical support as foreign ownership restrictions often limit outsiders' possibility to acquire control stakes. Biases of domestic judges and politicians favoring domestic stakeholders may also induce segmentation in the market for control (Bhattacharya, Galpin, and Haslem, 2007). Finally, regulation in the domestic country may limit extraction of private benefits by controlling shareholders from strong investor protection countries.

Complete segmentation of the market for control is, however, a too strong assumption. We observe cross-country acquisitions and large flows of foreign direct investment, which may enable extraction of private benefits in other countries. Therefore, this Section modifies the analysis and assumes that the market for control is perfectly integrated. Now foreign (domestic) controlling shareholders are allowed to enjoy private benefits at Home (in Foreign). Hence, they might choose $\alpha_{CS}^{F} > \underline{\alpha}$ and $\alpha_{CS}^{H} > \underline{\alpha}$.

For simplicity, we assume that large investors can acquire control only in one country. Proposition 1 and Corollary 1 easily extend to this context because the incentives to acquire control are similar for domestic and foreign investors. The demand for the risky assets still comes from controlling shareholders and portfolio investors and the equilibrium conditions (4) and (5) are only slightly modified (the nationality of controlling shareholders may change but not the functional form of their demands). Hence, allowing for an integrated market for control does not affect the mechanisms driving our main results. In particular, Proposition 2 and 3 still hold. Since private benefits of control are reflected in the market price, security returns continue to be lower when corporate governance is weaker. Also, portfolio investors invest less in countries with weak corporate governance.

Since only the holdings of foreign portfolio investors are taken into account in studies documenting the home equity bias – while foreign holdings of control blocks are classified as foreign direct investment – our model can still explain the home equity bias. Note however that if the market for control is perfectly integrated there is no longer a connection between domestic wealth distribution and extraction of private benefits. If no domestic investors are wealthy enough to acquire control in weak investor protection countries, foreign wealthy investors may be able to extract private benefits.

Proposition 4 describes the equilibrium.

Proposition 4 *Assume that there is extraction of private benefits in both countries and $B > B^*$, then in equilibrium:*

1. *Ownership is more concentrated at Home;*
2. *Participation of portfolio investors is larger in Foreign;*
3. *Security returns are lower at Home than in Foreign;*
4. *If wealth distribution is identical in both countries, Home receives net inflows of foreign direct investment, while Foreign receives net inflows of portfolio investment.*

The model with integrated market for control generates an interesting implication for the directions of portfolio flows and foreign direct investment. While portfolio investors have a good country bias in selecting their equity investment, controlling shareholders exhibit a bad country bias, meaning that ceteris paribus they prefer to invest in weak investor protection countries. This suggest that portfolio flows and foreign direct investment may be substitutes and that the type of investment a country receives depends on investor protection. Consistently, comparing the experiences of Poland and the Czech Republic, Desai and Moel (2008) note that the Czech Republic receives more foreign direct investment and less portfolio investment than Poland, which offers stronger investor protection. Other empirical evidence also supports this implication of the model. Kelley and Woidtke (2005), for instance, show that foreign direct investments of U.S. multinationals are predominantly in countries with weak investor protection. Similarly, Rossi and Volpin (2004) find that acquisition targets are typically from countries with poorer shareholder protection than their acquirers. The contrary is true for portfolio flows. For instance, the portfolio flows of U.S. investors are directed primarily to strong investor protection countries (Leuz et al., 2008).

B Other determinants of ownership concentration

So far, we have modelled the entrenchment effects of ownership concentration. In our model, for given wealth distribution, weaker investor protection leads to higher demand for stocks for control reasons. Our results on the relation between investor protection, equity returns and portfolio investors' stockholdings would be invariant if greater insider ownership reduced extraction of private benefits in equilibrium. In this case, weaker investor protection would also lead to more concentrated ownership

(just like in Shleifer and Wolfenzon, 2002). Thus, independently from the specific mechanism leading to more concentrated ownership, investor protection affects the supply of stocks to portfolio investors, security returns and portfolio decisions in the way we highlight.

C Discussion of the remaining hypotheses

Our assumptions imply that in equilibrium neither the supply nor the demand for stocks are perfectly elastic. This is compatible with the empirical evidence showing that demand shocks affect stock prices (Shleifer, 1986; Gompers and Metrick, 2001; and Wurgler and Zhuravskaya, 2002). Additionally, we also need to assume that the market for portfolio investors and controlling shareholders is not completely segmented. We hypothesize that there is only one market clearing price for stocks. We do not consider that the price of control blocks often deviates from the open market price of stocks. Our results are robust to considering a market for control blocks. It suffices for our purposes that controlling shareholders trade in the open market as well as in the market for controlling blocks. This is in fact what actually happens, since it is cheaper for investors with a control interest to assemble part of a block in the open market.[22] Moreover, changes in ownership concentration have to necessarily pass through the open market as they are equivalent to changes in the free-float.

Similarly, we assume that there is only one class of shares, so that there is no separation between cash flow and voting rights. Hence, there are no different stocks for portfolio investors and controlling shareholders. This assumption is not very restrictive, since dual shares are far from being predominant. For example, Dyck and Zingales (2004) report that in the countries that allow two classes of shares only 14 percent of companies actually has dual class shares. Additionally, when dual class shares are used, super-voting shares are often traded also by portfolio investors. Hence, the effects highlighted in the model would hold for those shares.

These are the only assumptions that we really need. All the other assumptions we make are not essential and are done only for simplicity. All our results would still hold with different utility functions, although the model would be less tractable. Furthermore, we could assume a different technology for the extraction of private benefits of control.

The interpretation of the model can also be generalized. In the exposition, we concentrate on individual investors' direct shareholdings. The analysis would be similar, if we considered indirect

[22] For example, in the context of takeovers Betton and Eckbo (2000) show that bidders, who by definition have a control interest, are likely to trade in the open market by acquiring a toehold before launching a takeover bid.

shareholdings through mutual funds and mutual funds were not able to distribute private benefits of control to their investors. As a consequence, mutual funds would be rarer in countries with poor legal environment, as Khorana, Servaes and Tufano (2005) document.

Finally, we have framed the model as an analysis of two countries with separate stock markets. Another interpretation would be that it deals with different risky assets within a country. According to this interpretation, portfolio investors should be less likely to hold stocks of companies in which extraction of private benefits of control is expected to be larger. Interestingly, using individual shareholdings in Swedish companies, Giannetti and Simonov (2006) find that outside investors hold a smaller proportion of their portfolios in weak corporate governance firms.

VI Empirical evidence

Our model has several implications on equity returns and portfolio holdings of different investors in relation to investor protection. Ceteris paribus, the following relations hold:

1. Equity returns are lower in weak investor protection countries (Proposition 3);
2. Foreigners hold less equity in countries with poor investor protection (Corollary 3);
3. Household participation in the domestic market is lower in countries with poor investor protection (Corollary 3);
4. In countries with poor investor protection, portfolio investors hold relatively more foreign equity (Corollary 3).

The existing literature offers plenty of evidence on the first two points. Our model is consistent with the growing empirical evidence showing that weaker investor protection is associated with lower stock returns in the U.S. (Gompers, Ishii and Metrick, 2003; Core, Guay and Rusticus, 2006; Cremers and Nair, 2005; Yermack, 2006; Cremers, Nair and John, 2007). Note that our model implies a positive relation between stock returns and investor protection only for countries with *similar* wealth distribution. In this respect, the model may be more useful in rationalizing differences in returns between portfolios of weak and strong corporate governance companies within the same country. Thus, our model does not necessarily contrast with the results of Hail and Leuz (2006) or Daouk, Lee and Ng

(2006), who show that expected returns are higher in poor corporate governance countries. Moreover, the country-level evidence is ambiguous, since Lombardo and Pagano (1999) find that countries with weak investor protection have lower stock returns.

There exists empirical evidence also in support of the second implication. Dahlquist et al. (2003) show that the prevalence of closely held firms in countries with poor investor protection explains part of the home bias of U.S. investors, and that the world free-float portfolio available to investors who are not controlling shareholders is more important than the world market portfolio in explaining the portfolio weights of U.S. investors. This is exactly what our model implies: if investors who can enjoy private benefits of control have a large demand for shares, the holdings of portfolio investors are lower as a consequence.

Our theory is also consistent with the finding that the quality of corporate governance matters directly for individual (as opposed to aggregate) investors' portfolio decisions. Several authors (see Giannetti and Simonov, 2006; Aggarwal, Klapper and Wysocki, 2005; Daouk et al., 2006; Leuz et al., 2008; Kim, Sung and Wei, 2007; and Li, Ortiz-Molina and Zhao, 2007) show that portfolio investors hold less equity in companies and countries with weaker corporate governance, even after controlling for the free-float. In the light of our model, this evidence suggests that investor protection affects not only the free-float, but also the participation decision of portfolio investors. Due to lower wealth, assets under management or higher participation costs, some investors decide not to invest in stocks that offer weaker investor protection.

We dedicate the rest of this section to provide empirical evidence on the third and fourth implications of our model, which, to the best of our knowledge, have not been explored in existing empirical studies.

A Participation in the domestic market

Lack of data has prevented international comparisons of households' portfolio choices. Guiso et al. (2001 and 2003) make a first attempt to compare cross-country differences in stock market participation. Using household surveys from France, Germany, Italy, Sweden, the U.K., and the U.S., they show that there are sizable differences in stock market participation rates across countries. As our model would predict, differences are larger for poor and middle-class households. Rich households always have high participation rates.

We gather domestic investors' participation rates in the domestic stock market for a larger set of

countries that we list in Table 1 with the corresponding data sources.

[Insert Table 1]

These data have several drawbacks: we do not have information on indirect holdings. In addition, the data refer to different years (between 1997 and 2000). Although these caveats have to be kept in mind, we believe that it is valuable to provide international evidence on household stock market participation, especially since prior evidence is so sparse. Moreover, the lack of information on indirect stockholdings should not bias our results, since Guiso et al. (2003) find that financial intermediaries are less developed in countries where stock market participation is low.

[Insert Table 2]

Table 2 shows that stronger investor protection is indeed associated with higher stock market participation.[23] The effect is not only statistically significant, but also economically relevant as, for instance in column (1) of Panel A, our proxy for investor protection, the anti-director rights index, explains 48 percent of the variance in stock market participation rates.

We control for a number of country characteristics that may affect the decision to hold domestic equity.[24] Investors may participate in the stock market to a greater extent in richer countries. We thus include the logarithm of GDP per capita as a control. Moreover, since investors may have stronger incentives to participate in the stock market if it is larger and offers more opportunities, we control for the size of the market by including the ratio of stock market capitalization to GDP. We also control for the adult population's average years of schooling, as better educated individuals are more inclined to hold stocks (Guiso, 2001). Finally, our model implies that wealth distribution matters. Hence, we include the Gini coefficient of income.[25] In all specifications, the proxy for investor protection is positive and statistically significant. The result does not depend on the presence of outliers, since estimates remain

[23] Alternatively, we could relate household participation to equity returns. Since it is difficult to obtain clean measures of expected equity returns, we prefer to relate equity holdings to proxies for the exogenous parameters of our model.

[24] When we include controls, we lose some observations due to missing variables for some countries. Including the mutual fund assets as a share of GDP as a control would further reduce our sample, but would not change the parameter estimates. For this reason, we chose not to include this additional control in the regressions we report.

[25] Ideally, we would like to control for the Gini coefficient of wealth, which unfortunately is unavailable for a large cross-section of countries.

qualitatively invariant if we use the Huber's (1964) estimator that is robust to the presence of outliers (Columns (5) and (6) in Panel A of Table 2).

In Panel B of Table 2, we substitute the anti-director rights index with a number of different measures of investor protection, which are summarized in the caption of Table 2. Investor protection still has a positive effect on domestic investors' participation in the domestic stock market. Interestingly, we find that investors' ability to privately enforce their own rights is more important than public enforcement for domestic investors' participation decision. The index of public enforcement is the only measure of investor protection that is not statistically significant. This is fully consistent with La Porta et al. (2006) who find little evidence that public enforcement benefits stock markets, while laws mandating disclosure and facilitating private enforcement through liability rules matter.

Our estimates suggest that the correlation between investor protection and the proportion of domestic households who hold domestic stocks is robust and consistent with the third implication of our model. However, given the limited sample of cross-sectional data, it is difficult to establish that the effect is causal and to rule out that omitted factors affect our estimates.[26] Nevertheless, we attempt to establish that a causal relationship exists using instrumental variables.

To capture the exogenous component of investor protection, we use the categories of legal origin provided by La Porta et al. (1997 and 1998). They note that most countries can be divided into countries with predominantly English, French, German or Scandinavian legal origin and that countries typically obtained their legal system through occupation or colonization. La Porta et al. show that legal origin helps to explain cross-country differences in investor protection.[27] Legal origin is unlikely to have a direct effect on portfolio decisions, especially because we control for financial development. Thus, we can use legal origin to construct instruments. Our instruments for the investor protection proxy are three dummy variables that take value 1 if a country has, respectively, English, French or German legal origin. The estimates in column (7) of Panel A in Table 2 suggest a positive causal effect of investor protection on the proportion of domestic investors who hold domestic stocks. Moreover,

[26] Since our main proxy for investor protection, the anti-director rights index, is predetermined with respect to the participation rates, reverse causality problems are less of a concern. In fact, La Porta et al. (1997) compute the index for the first half of the 1990's, while households' participation rates increased dramatically in the second half of the decennium (Guiso et al., 2003). Hence, it is unlikely that in countries with high participation rates households lobbied for better investor protection. Nor can the results on foreign holdings in the next subsection be subject to this criticism, as foreigners cannot vote for improvements in investor protection.

[27] As the F-test of excluded instruments reported in Table 2 shows, legal origin performs well in explaining investor protection also in our sample.

since the equation is overidentified, we can test overidentifying restrictions. The Sargan test suggests that the null hypothesis that the instruments are valid cannot be rejected. This increases our confidence that a causal effect of investor protection on domestic households' decision to hold domestic equity is not at odds with the empirical evidence.

B Foreign equity holdings

We start to explore the fourth implication using the 2002 Coordinated Portfolio Investment Survey (CPIS), undertaken by the International Monetary Fund (IMF). From the survey, we obtain domestic holdings of foreign equity and foreign holdings of domestic equity for a wide range of countries.[28]

Our model implies that the good country bias emerges only for portfolio investors (and not in the aggregate). We compute the percentage of market capitalization that is closely held using the average of the percentage of closely held shares for firms reported in Worldscope, similarly to Dahlquist et al. (2003). Then, we calculate a proxy for the holdings of domestic and foreign portfolio investors using the percentage of stock market capitalization that is not closely held. The share of foreign equity in the portfolios of domestic investors who are not controlling shareholders is calculated as follows:

$$\widehat{\alpha_{PI}^{F}} = \frac{\text{Domestic Holdings of Foreign Equity}}{\text{(1-\% Closely Held Market Cap.)} \times \text{Market Cap.} + \text{Domestic Holdings of Foreign Equity- Foreign Holdings of Domestic Equity}}.$$

Our estimates of $\widehat{\alpha_{PI}^{F}}$ are reported in Table 1. In countries where investor protection as measured by the index of private enforcement is above the median, domestic portfolio investors hold on average 33 percent of their portfolio in foreign stocks. In countries with investor protection below the median, the percentage of foreign stocks in the portfolio of domestic portfolio investors is 60 percent. The difference is statistically significant at the 5 percent level.

However, this cannot be interpreted as evidence in favor of our model. According to the international capital asset pricing model, investors should hold equity in proportion to a country's weight in the world market portfolio (i.e., in proportion to the relative supply of stocks). Thus, the difference in foreign equity holdings could just indicate that weak investor protection countries have smaller stock markets.

[28] This measure of foreign equity is unlikely to include any wealth that individuals illegally keep abroad to avoid taxes in the domestic country. Hence, our results should not depend on the fact that individuals often invest abroad for tax reasons.

For this reason, as suggested by Ahearne et al. (2004), we measure the home equity bias as 1 minus the ratio of the weight of foreign equity in the portfolio of investors from a given country ($\widehat{\alpha_{PI}^{F}}$) to the foreign countries' weight in the world market capitalization. The home equity bias is still less pronounced in weak investor protection countries, where it is, on average, 39 percent, than in strong investor protection countries, where the bias reaches, on average, 65 percent. The difference is once again statistically significant at the 5 percent level.

Since the supply of stocks to portfolio investors is best captured by the free float (Dahlquist et al., 2003 and Kho et al., 2006), we also measure the home equity bias in investors' portfolios as 1 minus the ratio of the weight of foreign equity in the portfolio of investors from a given country ($\widehat{\alpha_{PI}^{F}}$) to the foreign countries' weight in the free-float world market capitalization. We find that in weak investor protection countries the home bias is, on average, 42 percent, but it averages 62 percent in strong investor protection countries. The difference, even though less pronounced, is still statistically significant at 10 percent level.[29]

These differences suggest that while the home equity bias –that clearly has many other determinants beyond the ones highlighted by our model– always exists, it is less pronounced in weak investor protection countries. Even though informative, the above measures of home equity bias could be biased by the foreign equity holdings of controlling shareholders, which we cannot single out using the CPIS. For this reason, we further explore the validity of the fourth implication of our model using a dataset compiled by Thomson Financial Securities Data (TFSD).[30] This dataset includes the equity holdings of mutual funds and other institutional investors and allows us to focus on the foreign equity holdings of investors who enjoy only security benefits. Our data consist of the investors' equity holdings as of December 31, 2002 and includes investments from 31 countries.

We compute the portfolio shares that all institutional investors incorporated in a given country (origin) have in another country (target). Note that the fact that institutional investors from different countries may be differently represented in the dataset or even that countries differ in the level of financial intermediation should not be a problem, since we standardize the holdings of all institutional investors in a country using their total assets and study the portfolio shares of an average institutional

[29] Results are similar when we use alternative measures of shareholders' rights. In all cases, it is crucial to distinguish the holdings of controlling shareholders by correcting the denominator for the percentage of closely held shares. If we did not use this correction, we would find the opposite. This would be consistent with our model that suggests that the home equity bias always prevails in the aggregate.

[30] Chan et al. (2005) use the same cross-sectional data source.

investor.

To control for differences in the supply of stocks across countries, we define our dependent variable as 1 minus the ratio of the weight of the target country in the portfolio of a given origin country's institutional investors to the weight of the target country in the world market capitalization or in the free-float world market capitalization.

We relate these measures of home equity bias to investor protection in the origin and target countries. Since we are particularly concerned that the proxies for investor protection may be correlated with the size of the stock market in target and origin countries, in all regressions we include the weight of target and origin countries in the world market capitalization or in the free-float portfolio.[31]

Furthermore, in order to be as conservative as possible in evaluating our theory's fourth implication, we cluster standard errors at the country of origin level. Since we aim to test whether portfolio investors from weaker investor protection countries hold more foreign equity, our main variable of interest only varies between countries of origin. As pointed out by Moulton (1990), if we did not cluster errors at the country of origin level, measurement errors could bias the standard errors of our estimates downward.[32]

[Insert Table 3 and Table 4]

The main variables are summarized in Table 3. Consistently with the fourth implication of our theory, Table 4 shows that investors based in countries with weaker investor protection invest more abroad. This holds whether we control for size by using the weight in the world market capitalization (Column (1) of Panel A) or the weight in the free-float world market capitalization (all the other specifications) and for different proxies for investor protection. Once again, the ability to privately enforce one's own rights is more important than public enforcement (Column (4) of Panel A): The latter partially offsets the positive effect of private enforcement on the measure of home equity bias. This finding is not completely surprising in the light of La Porta et al.'s (2006) result that public enforcement is unimportant for stock market development as well as of our previous finding that public enforcement does not increase domestic investors' participation in the domestic stock market.

The results are not only statistically, but also economically significant. In Column (2) of Panel A, if the measure of investor protection in the origin country increases by one standard deviation, the home

[31] The results presented in Table 4 are qualitatively invariant if we exclude these controls.

[32] This concern turns out not to be relevant here, because the significance of our estimates is similar if we do not cluster standard errors or if we cluster at the destination country level.

bias in investors portfolios increases by nearly 10 percentage points with respect to the median.

It is important to note that when we define the bias with respect to the country's weight in the world market portfolio (Column (1) of Panel A), our estimates suggest that weak investor protection at Home induces the institutional investors in our sample to under-weight domestic equity. Nevertheless, they could still hold domestic stocks in proportion to their weight in the free-float market capitalization, as our model implies that all portfolio investors should do in the aggregate. Interestingly, though, the rest of our estimates in which we define the bias with respect to a country's weight in the free-float market capitalization suggest that, ceteris paribus, the institutional investors in our sample underweight domestic stocks also with respect to the weight in the free-float market capitalization. Thus, some institutional investors participate in the domestic stock market to a lesser degree and invest more in foreign equity when their rights are poorly protected.

Institutional investors, however, appear to distribute their foreign equity holdings in proportion to the target countries' weight in the free-float world market capitalization. In fact, only in two specifications (Column (7) of Panel A and Column (5) of Panel B), the home equity bias is significantly lower when the target country has stronger investor protection, once we control for the target country's weight in the free-float world market capitalization. According to our model, in this case, a further negative effect of investor protection in the target country on portfolio investors' foreign equity holdings would indicate that the category of investors we are analyzing is more discouraged to hold stocks than other portfolio investors. We find no evidence of this for the foreign institutional investors in our sample.

We control for various characteristics of target and origin countries that may affect foreign equity holdings, such as the market capitalization to GDP in the origin country to further account for the supply of assets at Home; the logarithm of the distance between the main financial centres of each pair of countries to capture the fact that investors hold more assets in proximate countries; and measures of capital controls (both restrictions to foreign capital inflows and access to foreign capital markets for domestic investors).[33]

While the estimates in Panel A of Table 4 suggest that weak investor protection in the Home country decreases the home equity bias of domestic portfolio investors, we are aware that omitted factors could drive our estimates. To mitigate the concerns that the correlations we show are spurious, in Panel B of Table 4 we perform a set of robustness checks by controlling in turn for variables that are known to

[33] Because of missing variables, the number of observations varies across specifications.

affect foreign portfolio investment and can potentially be correlated with investor protection.[34]

First, we include the previous year's stock return in target and origin countries and the stock return correlation (Column (1)). Higher returns in both the origin and target countries decrease the home bias as, more surprisingly, does a higher return correlation. The latter probably captures the similarity between target and origin countries. In other (not reported) specifications, we also include stock turnover or the aggregate mutual funds' assets as a share of GDP both in the origin and target stock markets. These additional control variables are never significant. In all cases, the estimate of our variable of interest remains qualitatively invariant.

Second, we control for economic performance by including GDP per capita and the previous year's GDP growth (Column (2)). The home bias is less pronounced when target and origin countries have higher GDP per capita. Moreover, as expected, target countries with high growth attract more foreign investment, while investors from countries with high growth invest less abroad. We still find, however, that investors from strong investor protection countries invest less abroad.

Third, since familiarity is known to breed investment, we control for whether the target and origin countries have the same legal origin and whether they share the language or one of the countries was colonized by the other (Column (3)). The latter variable capturing cultural similarity indeed decreases the home equity bias, as one would expect. However, the parameter estimate of our variable of interest is once again unaffected. The economic and statistical significance of our variable of interest is not affected (estimates not reported) if we include also proxies for economic proximity (such as the origin country's percentage of exports to the target country) or industrial proximity (such as the correlation of industry rankings for each pair of countries).

Fourth, since our theory suggests that wealth distribution matters for portfolio decisions, we control for the Gini coefficient of income in the country of origin (Column (4)). Interestingly, the home bias of portfolio investors appears less pronounced when resources are more unevenly distributed. This is consistent with the model's prediction that when some investors have resources to become controlling shareholders, domestic portfolio investors have weaker incentives to invest at Home. More importantly, we still find that stronger investor protection in the origin country increases the home equity bias.

Fifth, countries that are more open to international trade may also be more inclined to invest in foreign financial assets and, at the same time, receive more foreign investment. We measure a country's

[34] Since many of these control variables, such as measures of economic performance and stock returns, are highly correlated with each other, we include them in turns.

openness to international trade using the sum of imports and exports as a percentage of GDP. The new control variables have the expected sign, but only minimal statistical and economic significance. More importantly, not only strong investor protection in the country of origin and home equity bias are still positively associated, but also investor protection in the target country appears to increase that country's weight in the portfolios of institutional investors.

Sixth, in a recent paper, Desai and Dharmapala (2007) suggest that foreign portfolio investment may be lower towards countries with low corporate tax rates, as multinational companies have stronger incentives to directly invest in these countries for tax reasons, and thus investors do not need to hold foreign stocks themselves if they wish to diversify. For this reason, we include the corporate tax rate in the origin and target country (Column (6)). We find little evidence that corporate tax rates in the target country affect the extent of the home equity bias, while investors from countries with high corporate tax rates hold less foreign equity, possibly because multinational companies originating from these countries have stronger incentives to invest abroad. In other specifications that we do not report for brevity, we examine the effect of capital gains and dividend taxes and proxies for tax compliance in the origin and target countries. They are never statistically significant, and, once again, the estimates of our variable of interest remain qualitatively invariant.

Finally, we explore to what extent our results are driven by emerging markets where the tendency to invest abroad may be explained by political uncertainty and economic and financial volatility more than by the mechanisms that we highlight in our theory. For this reason, we restrict the sample to institutional investors from OECD economies (Column (7)). We find that, if anything, our results are stronger. This is an important result because by restricting the sample to OECD economies we exclude emerging markets with small weight in term of free-float world market capitalization. Thus, this confirms that our results are unlikely to be explained by the size of the stock market in the country of origin. Results are also qualitatively invariant if we directly control for the effects of economic and financial volatility using financial and economic risk ratings (estimates not reported).[35]

If unobservable determinants of foreign equity holdings drove our results, one would expect that increasing the set of control variables or varying the sample of countries had a large impact on the effect of investor protection as the additional control variables may be correlated with the omitted factors. In

[35] Our estimates are equally unaffected if in the whole sample we include a dummy variable that takes value equal to 1 if the origin country exports oil. While oil exporters may invest oil revenues abroad, the dummy variable is not statistically significant.

fact, our estimates are almost invariant. This suggests that the effect of domestic investor protection on foreign equity holdings is unlikely to depend on unobserved heterogeneity.

In Panel C, we make a more direct attempt to establish a causal relationship between domestic investor protection and foreign equity holdings using instrumental variables. In Columns (1) to (3), we construct instrumental variables based on legal origin, as we do in Subsection V.A. Our instruments for investor protection in the origin and target countries are six dummy variables that take value 1 if the origin or target country has, respectively, English, French, or German legal origin. The estimates suggest a positive causal effect of investor protection on the home equity bias. The parameter estimate is larger than in the ordinary least squares regressions, suggesting that measurement errors and omitted factors may bias our estimates downward. The F-test of excluded instruments implies that our instruments are not weak. Additionally, when we test the overidentifying restrictions, the Sargan test does not allow us to reject the null hypothesis that the instruments are valid. This increases our confidence that the empirical evidence is consistent with the fourth implication of our model.

Since our sample includes countries that were former European colonies, we can provide an alternative test of our theory's fourth implication. Acemoglu, Johnson and Robinson (2001) note that Europeans adopted very different colonization policies in different colonies, with different associated institutions. In places where European faced high mortality rates, because of the disease environment, they could not settle and were more likely to set up extractive institutions that have persisted to the present. In contrast, in places where Europeans faced a more hospitable environment, they put strong emphasis on property rights that may still affect today's level of investor protection. Acemoglu et al. (2001) provide evidence that this is indeed the case.

For this reason, in Columns (4) to (6), we instrument the different proxies for investor protection using the settlers' mortality rate from Acemoglu et al. (2001). Even though our sample is greatly reduced (as the instruments are not defined for countries that were not former colonies), the instruments are not weak and the estimates confirm our previous finding that the home bias is more pronounced in countries with strong investor protection.[36]

Overall, the consistency of our results across different samples, different definitions of the dependent variable, different controls for omitted factors, different estimation methods[37], and different sets of

[36] In this case, we are unable to test overidentifying restrictions because the equation is exactly identified.

[37] Outliers do not appear to be a concern also because our estimates are invariant when we use Huber's (1964) estimator that is robust to the presence of outliers.

instruments suggests a robust causal effect of investor protection in the country of origin on the Home equity bias in institutional investors' portfolios.

In this respect, it is also worthwhile to note that alternative explanations would have a hard time in reconciling our empirical findings on domestic households participation in the domestic stock market and on portfolio investors' foreign equity holdings. Guiso et al. (2003), for instance, argue that differences in stock market participation rates across countries may depend on differences in participation costs. It may well be that participation costs are higher in countries with poor investor protection. These may even lead portfolio investors to use foreign financial intermediaries thus providing an alternative explanation of the evidence based on aggregate data. However, a difference in participation costs cannot explain why in countries with weak investor protection, domestic financial institutions hold more foreign equity that in countries with high investor protection, without making an assumption that in countries where investors rights are poorly protected, the fixed costs associated to buying foreign equity are relatively lower than in countries with higher investor protection. Our explanation based on the relative payoff from domestic and foreign investments allows a more parsimonious explanation of these different aspects of portfolio choices.

VII Conclusions

To our knowledge, this is the first paper that studies in a theoretical model the effect of investor protection on the demand for equity. We show that the explicit consideration of the demand for equity is important for understanding why investor protection affects positively stock returns. Stock prices reflect the demand for equity of controlling shareholders and portfolio investors alike. Wealthy individuals are relatively more willing to acquire control when investor protection is weaker. Stock prices are thus too high – and expected returns too low – with respect to the cash flows distributed to all shareholders. Lower expected returns for portfolio investors lead to lower stock market participation rates in the domestic market.

This suggests a rationale why companies issue voting and non-voting shares. Investors buy non-voting shares exclusively for portfolio reasons. Hence, their price reflects only future cash flows after the extraction of private benefits, and not the demand from investors who wish to acquire control. Consequently, having non-voting shares may make it easier to attract portfolio investors, for whom the

mere security return of voting shares would be too low.

Not only our theory can explain why weak investor protection leads to lower expected returns, but also generates implications on domestic and foreign equity holdings that are consistent with existing empirical studies as well as with novel empirical evidence that we present. Cross-sectional data indeed suggest that investor protection explains some of the differences in households participation rates across countries and that portfolio investors from weaker investor protection countries hold more foreign equity in their portfolios.

In this respect, our paper indicates new avenues to a growing literature analyzing the effects of investor protection on portfolio choices. While the literature has focused on how investor protection in the target countries affects incentives to hold equity, we suggest that the effects of financial reform at Home may be equally important. We leave to future research to explore how financial reforms shape the portfolio of institutional and individual investors within a country.

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VIII Appendix

A Proof of Proposition 1

Here, we take the equilibrium prices as given and derive the strategies of large investors.

Define V as the indirect utility function of a large investor. A large investor compares his utility from becoming a controlling shareholder with the utility from diversifying his portfolio. If at the equilibrium prices the private benefits of control are too small for compensating the loss of diversification, no investor becomes controlling shareholder irrespective of the initial wealth. If instead private benefits of control are large enough and the no-borrowing constraint does not bind, the investor buys a controlling stake $\alpha^H_{CS} \geq \underline{\alpha}$.

A.1 Payoff of a large shareholder without control

To obtain the payoff of a large investor without control ($E(V|portfolio)$), we maximize the large investor's expected utility under the budget constraint and the no short-sale constraint ($\alpha^F P^* + \alpha^H P + 2c \leq W_0, \alpha^H > 0, \alpha^F > 0$). The Lagrangian associated to this problem is:

$$\begin{aligned} L &= \alpha^H_{PI}(\mu_X - B) + \alpha^F_{PI}(\mu_X - B^*) + W_0 - \alpha^H P - \alpha^F P^* - \frac{1}{2}\gamma\sigma^2_X\left(\left(\alpha^H_{PI}\right)^2 + \left(\alpha^F_{PI}\right)^2\right) + \\ &\quad + \lambda_1\left(W_0 - \alpha^F P^* - \alpha^H P - 2c\right), \end{aligned}$$

where λ_1 is the Lagrange multiplier. The first order conditions are:

$$\begin{aligned} \mu_X - B - P - \gamma\sigma^2_X\alpha^H_{PI} - \lambda_1 P &= 0 \\ \mu_X - B^* - P^* - \gamma\sigma^2_X\alpha^F_{PI} - \lambda_1 P^* &= 0. \end{aligned}$$

In solving the model, we focus on the case in which the no-borrowing constraint is not binding for a large investor who decides to diversify his portfolio.[38] Hence, his demands are $\alpha^H_{optimal} = \frac{\mu_X - B - P}{\gamma\sigma^2_X}$ and $\alpha^F_{optimal} = \frac{\mu_X - B^* - P^*}{\gamma\sigma^2_X}$.

[38] This is always true if $\overline{\overline{w}}_0$ is large. Computations are significantly more cumbersome otherwise, but the main trust of the paper would not change.

A.2 Payoff of a large shareholder with control

We obtain the payoff of a large investor with control ($E(V|control)$) by maximizing the large investor's utility under the budget constraint, the no-borrowing constraint, $\alpha^H \geqslant \underline{\alpha}$, and the constraint that implies that control is not contestable, which we derive below.

Non-contestability of control The controlling shareholder actually has control only if the other large investor has no incentive to acquire a larger stake. Since the two large investors of a country are identical, the equilibrium controlling stake, if a controlling shareholder exists, is the minimum between 50 percent and the α^H_{CS} that satisfies $E(V|control) = E(V|portfolio)$. The latter condition implies that the other large investor is indifferent between being diversified and being able to extract private benefits of control. Therefore, he has no incentive to contest control. Assume that the no-borrowing constraint is not binding for a large investor even if he acquires control. As we will prove later, if this is true, $\alpha^F_{CS} = \alpha^F_{optimal}$

The condition $E(V|control) = E(V|portfolio)$ can be written as follows:

$$\begin{aligned} & W_0 + B + \left(\frac{\mu_X - B^* - P^*}{\gamma\sigma_X^2}\right)(\mu_X - B^* - P^*) + (\mu_X - B - P)\,\alpha^H_{CS} \\ & -\frac{1}{2}\gamma\sigma_X^2\left(\left(\alpha^H_{CS}\right)^2 + \left(\frac{\mu_X - B^* - P^*}{\gamma\sigma_X^2}\right)^2\right) \\ = \; & W_0 + \left(\frac{\mu_X - B^* - P^*}{\gamma\sigma_X^2}\right)(\mu_X - B^* - P^*) + \left(\frac{\mu_X - B - P}{\gamma\sigma_X^2}\right)(\mu_X - B - P) \\ & -\frac{1}{2}\gamma\sigma_X^2\left(\left(\frac{\mu_X - B - P}{\gamma\sigma_X^2}\right)^2 + \left(\frac{\mu_X - B^* - P^*}{\gamma\sigma_X^2}\right)^2\right), \end{aligned} \tag{6}$$

where W_0 is the initial wealth of a large investor.

The previous equation can be simplified as follows:

$$-\frac{1}{2}\gamma\sigma_X^2\left(\alpha^H_{CS}\right)^2 + (\mu_X - B - P)\,\alpha^H_{CS} + B - \frac{1}{2}\frac{(\mu_X - B - P)^2}{\gamma\sigma_X^2} = 0.$$

Solving the previous equality, we obtain $\alpha^H_{CS} = \frac{(\mu_X - B - P) + \sqrt{2\gamma\sigma_X^2 B}}{\gamma\sigma_X^2}$.[39] Hence, the constraint implying non-contestability of control is:

[39] Note that the solution to our problem is the larger root of the second order equation. In fact, the smaller root implies that $\alpha^H_{CS} < \alpha^H_{optimal}$.

$$\alpha_{CS}^{H} = \min\left\{\frac{(\mu_X - B - P) + \sqrt{2\gamma\sigma_X^2 B}}{\gamma\sigma_X^2}, \frac{1}{2}\right\}. \tag{7}$$

Stock demands The Lagrangian associated to the problem of a controlling shareholder is:

$$L = \alpha_{CS}^{H}(\mu_X - B) + B + \alpha_{CS}^{F}(\mu_X - B^*) + W_0 - \alpha^H P - \alpha^F P^* - \frac{1}{2}\gamma\sigma_X^2\left(\left(\alpha_{CS}^{H}\right)^2 + \left(\alpha_{CS}^{F}\right)^2\right)$$
$$+\lambda_1\left(W_0 - \alpha^F P^* - \alpha^H P - 2c\right) + \lambda_2\left(\alpha_{CS}^{H} - \underline{\alpha}\right) + \lambda_3\left(\alpha_{CS}^{H} - \min\left\{\frac{(\mu_X - B - P) + \sqrt{2\gamma\sigma_X^2 B}}{\gamma\sigma_X^2}, \frac{1}{2}\right\}\right),$$

where $\lambda_1, \lambda_2, \lambda_3$ are the Lagrange multipliers. The first order conditions are:

$$\begin{aligned}
\mu_X - B - P - \gamma\sigma_X^2\alpha_{CS}^{H} - \lambda_1 P + \lambda_2 + \lambda_3 &= 0 \\
\mu_X - B^* - P^* - \gamma\sigma_X^2\alpha_{CS}^{H} - \lambda_1 P^* &= 0.
\end{aligned}$$

The following considerations help to solve the above problem. First, if large investors' initial wealth is relatively low, the no-borrowing constraint ($\alpha^F P^* + \alpha^H P + 2c \leq W_0$) is not satisfied if $\alpha^H = \underline{\alpha}$. Hence, the problem has no solution with the constraint $\alpha^H \geqslant \underline{\alpha}$ and nobody can become controlling shareholder. Second, if $\alpha_{CS}^{H} < \frac{1}{2}$, either λ_2 or λ_3 are necessarily strictly greater than zero, depending on whether $\underline{\alpha} \gtreqless \frac{(\mu_X - B - P) + \sqrt{2\gamma\sigma_X^2 B}}{\gamma\sigma_X^2}$. Third, note that if $\underline{\alpha} > \frac{(\mu_X - B - P) + \sqrt{2\gamma\sigma_X^2 B}}{\gamma\sigma_X^2}$, the large investor has higher utility from being a portfolio investor. Hence, even if the above problem has solution nobody becomes a controlling shareholder. Finally, if $\underline{\alpha} < \frac{(\mu_X - B - P) + \sqrt{2\gamma\sigma_X^2 B}}{\gamma\sigma_X^2}$, the assumption that $\underline{\alpha} > \max\left\{\alpha_{optimal}^{H}, \alpha_{optimal}^{F}\right\}$ guarantees that $\lambda_3 > 0$.

Hence, if we focus on an equilibrium in which a controlling shareholder exists, $\underline{\alpha} < \frac{(\mu_X - B - P) + \sqrt{2\gamma\sigma_X^2 B}}{\gamma\sigma_X^2}$ and the no-borrowing constraint is not binding ($\lambda_1 = 0$), the solution is:

$$\begin{aligned}
\alpha_{CS}^{H} &= \min\left\{\frac{(\mu_X - B - P) + \sqrt{2\gamma\sigma_X^2 B}}{\gamma\sigma_X^2}, \frac{1}{2}\right\} \\
\alpha_{CS}^{F} &= \alpha_{optimal}^{F}
\end{aligned}$$

In general, the demand for stocks of the controlling shareholder increases in B if $B < \frac{\gamma\sigma_X^2}{2}$; $\alpha_{CS}^H - \alpha_{optimal}^H$ is weakly increasing in B for any parameter values.

A.3 Large investors' equilibrium strategies

So far, we have maximized the expected utility of large investors for given prices. Since investors compete submitting demand schedules conditional on price (limit orders), their strategy implies a level of demand for equilibrium and out-of equilibrium prices.

Define P^{eq} the equilibrium price level. The strategy of the large investor who becomes controlling shareholder involves demanding

$$\alpha_{CS}^H = \min\left\{\frac{(\mu_X - B - P) + \sqrt{2\gamma\sigma_X^2 B}}{\gamma\sigma_X^2}, \frac{1}{2}\right\}$$

for any price P.

The large shareholder who remains a portfolio investor demands $\alpha^H = \alpha_{optimal}^H$ if $P \geq P^{eq}$ and $\alpha^H = \alpha_{CS}^F$ if $P < P^{eq}$.

Finally, note that since investors compete submitting demand schedules conditional on price (limit orders), these strategies are optimal in a simultaneous-move game. For given demand of the other large investor and of small investors (to be derived in Corollary 1), the controlling shareholder anticipates that if he deviates and demands an amount of shares lower than α_{CS}^H, the equilibrium price is lower and the other large investor demands a stake large enough to acquire control.

B Proof of Corollary 1

Small investors' demand schedules are derived by solving the problem of a large investor without control, described in the proof of Proposition 1. The optimal portfolio allocation is obtained by comparing the payoff that can be achieved investing only in the risk free asset (i.e., by imposing $\alpha_{PI}^H = \alpha_{PI}^F = 0$), in the risk free asset and the domestic stocks (i.e., by imposing $\alpha_{PI}^F = 0$), in the risk free asset and the foreign stocks (i.e., by imposing $\alpha_{PI}^H = 0$), and the risk free asset and domestic and foreign stocks.

Since we assume that investors cannot borrow to invest in the risky assets, the constraint $\alpha^F P^* + \alpha^H P + 2c \leq W_0$ is binding for individuals with low levels of the initial wealth.

If $\lambda_1 > 0$ and it is optimal to invest in both the domestic and foreign risky asset, then both first

order conditions must be satisfied and therefore $\frac{\mu_X - B - P - \gamma\sigma_X^2 \alpha_{PI}^H}{P} = \frac{\mu_X - B^* - P^* - \gamma\sigma_X^2 \alpha_{PI}^F}{P^*}$. Together with the binding no-borrowing constraint this implies:

$$\begin{aligned} \alpha_{PI}^H &= \frac{1}{P^2 + P^{*2}} \left[P\left(W_0 - 2c\right) + P^{*2} \frac{\mu_x - B}{\gamma\sigma_X^2} - PP^* \frac{\mu_x - B^*}{\gamma\sigma_X^2} \right] \\ \alpha_{PI}^F &= \frac{1}{P^2 + P^{*2}} \left[P^*\left(W_0 - 2c\right) + P^{2} \frac{\mu_x - B^*}{\gamma\sigma_X^2} - PP^* \frac{\mu_x - B}{\gamma\sigma_X^2} \right] \end{aligned}$$

Similarly, if $\lambda_1 > 0$ and it is optimal to invest in only one risky asset, say the domestic risky asset, the demand schedule is:

$$\alpha_{PI}^H = \frac{W_0 - c}{P}.$$

Since the optimal portfolio shares α_{PI}^H and α_{PI}^F are weakly increasing in W_0, for low levels of the initial wealth, the payoff from investing in risky assets may be very low. Therefore, it is always possible to find a lower bound for the initial wealth $\underline{\underline{W}}(B, B^*, P, P^*)$ such that if $W < \underline{\underline{W}}(B, B^*, P, P^*)$ it is optimal to choose $\alpha_{PI}^H = \alpha_{PI}^F = 0$ to save the fixed participation cost c.

Individuals with initial wealth larger than $\underline{\underline{W}}(B, B^*, P, P^*)$ find it optimal to invest in the domestic or foreign equity market depending on which one offers higher security benefits, and spend c (but not $2c$). If $\mu_X - B - P - \gamma\sigma_X^2 \alpha_{CS}^H \geq \mu_X - B^* - P^* - \gamma\sigma_X^2 \alpha_{CS}^H{}^*$, the investor demands $\alpha_{PI}^H = \min\left\{\frac{W_o - c}{P}, \alpha_{optimal}^H\right\}$ and $\alpha_{PI}^F = 0$. Similarly, if $\mu_X - B - P - \gamma\sigma_X^2 \alpha_{CS}^H < \mu_X - B^* - P^* - \gamma\sigma_X^2 \alpha_{CS}^H$, the investor demands $\alpha_{PI}^H = 0$ and $\alpha_{PI}^F = \min\left\{\frac{W_o - c}{P^*}, \alpha_{optimal}^F\right\}$. This is the case for individuals who due to the wealth constraint cannot invest a large amount of wealth in the risky assets and therefore have initial wealth lower than the upper bound $\underline{W}(B, B^*, P, P^*)$.

Individuals with initial wealth larger than $\underline{W}(B, B^*, P, P^*)$ invest in both risky assets and may eventually reach the optimal level of diversification of their portfolios.

Finally, note that small investors being less wealthy cannot contest the control from large investors.

C Proof of the existence of the equilibrium

In our economy, individual demands have several discontinuities because of the fixed participation costs and the discontinuity in payoffs due to the possibility of becoming controlling shareholders. Nevertheless,

we can prove the existence of the equilibrium if the functions at the left-hand-side of equations (4) and (5) are continuous, as this guarantees the existence of a fixed point.

Note that the left-hand-side of (4) is the sum of the equilibrium demand of the controlling shareholder (7), $\alpha^H_{optimal}$, $\alpha^F_{optimal}$, and the demands derived in Corollary 1. Only the demands of small investors with wealth $\underline{W}(B, B^*, P, P^*)$ and $\underline{\underline{W}}(B, B^*, P, P^*)$ are discontinuous. However, since we assume that the cumulative density function F is continuous, this implies that only the demands of a set of individuals with zero measure is discontinuous.

Hence, a vanishingly small proportion of investors displays a discontinuity (cfr. Mas-Colell, Whinston and Green, 1995, p.122-123 and p. 629). Formally, the aggregate demands in (4) and (5) are equal to the sum of products of continuous functions. Hence, the aggregate demands for assets –which are the average demand of a continuum of small investors plus the continuous demand functions of large investors[40]– are continuous. This ensures that an equilibrium exists.

It is straightforward to show that our aggregate excess demands –defined as the aggregate demand minus the initial endowment– go to ∞ if any of the prices go to zero and they are bounded below at -1. Hence, a Walrasian equilibrium exists (cfr. Mas-Colell, Whinston and Green, 1995, p. 585).

D Proof of Proposition 2

As proved in Proposition 1, for given prices, the demand of investors with control is weakly increasing in B. The demand of domestic and foreign investors without control instead weakly decreases in B.

The aggregate demand for the domestic risky asset is a weighted sum of the demand of investors with and without control. As B increases, the aggregate demand increases if there is a positive effect on the demand of the controlling shareholder, and this prevails over the negative effect on the demand of portfolio investors. Hence, a necessary condition for the aggregate demand for stocks to increase as B goes up is $B < \frac{\gamma\sigma_X^2}{2}$, which guarantees that the controlling shareholder's demand for stocks is increasing in B. In this case, it is always possible to find a wealth distribution for which the positive demand effect prevails.

To see this, consider the following example. There is an economy with n investors holding $\alpha^H_{optimal}$ and a controlling shareholder (with less than 50 per cent of the stocks). The aggregate demand for

[40] Note that for the purpose of finding the fixed point (P^{eq}), the demand of the large shareholder without control is continuous.

stocks is: $D_{agg} = \frac{(n+1)(\mu_X - B - P) + \sqrt{2\gamma\sigma_X^2 B}}{\gamma\sigma_X^2}$. The aggregate demand is increasing in B if $\frac{\partial D_{agg}}{\partial B} = -\frac{n+1}{\gamma\sigma_x^2} + \frac{1}{2}\frac{1}{\gamma\sigma_x^2}\frac{\sqrt{2\gamma\sigma_X^2}}{\sqrt{B}} > 0$. The latter inequality is satisfied if $\sqrt{B} < \frac{\sqrt{2\gamma\sigma_X^2}}{2(n+1)}$. Ceteris paribus, this condition is more likely to be satisfied for small n (i.e., for low number of portfolio investors).

Also note that for given participation decision, the demand of portfolio investors who hold less than $\alpha^H_{optimal}$ does not depend on B, as it can be written as $\frac{W_o - c}{P}$. Nevertheless, depending on the distribution of wealth, decisions not to buy domestic stocks may decrease the aggregate demand.

In conclusion, if portfolio investors hold relatively little domestic equity, an increase in B may require an increase in P to bring the aggregate excess demand to zero in the market for the domestic risky asset.

E Proof of Corollary 2

The proof follows readily from the discussion in the text.

F Proof of Proposition 3

From Proposition 2, we know that the relation between domestic asset prices and quality of law is non-monotonic. This implies that stock prices may either increase or decrease when investor protection becomes weaker. Assume first that P increases as investor protection becomes weaker. In this case, the expected security return from investment, $\mu_X - B - P$, decreases unequivocally. Therefore, the wealth of the marginal investor who is indifferent between buying domestic stocks or not increases.

Consider now the case in which P decreases as investor protection gets weaker. By contradiction, assume that $\mu_X - B - P$ increases and therefore portfolio investor participation increases. This implies that demand for the domestic risky asset by portfolio investors increases. Since when investor protection gets weaker, the demand for stocks from the controlling increases with respect to portfolio investors, this would imply that all investors increase their demand for domestic stocks. In equilibrium, the price for domestic stocks would therefore increase. Since this is a contradiction, we can conclude that portfolio investor participation in the domestic market decreases and $\mu_X - B - P$ decreases as well.

From an analytical point of view the fact that security benefits are decreasing in B is easily seen if the aggregate demand is $D_{agg} = \frac{(n+1)(\mu_X - B - P) + \sqrt{2\gamma\sigma_X^2 B}}{\gamma\sigma_X^2}$ (as in the example presented in the proof of Proposition 2). In this case, the equilibrium condition for the domestic risky asset implies that equilibrium security returns are equal to $\frac{\gamma\sigma_X^2 - \sqrt{2\gamma\sigma_X^2 B}}{n+1}$, which for given investor participation is decreasing in

B. Also note that, as argued above, a decrease in investor participation can only follow from a decrease in security returns.

The second part of the Proposition derives from the fact that for given wealth distribution, demand from the controlling shareholder is lower in the strong investor protection country for any price level. In equilibrium, either the risky asset price is lower in the strong investor protection country making security benefits clearly higher or the risky asset price is higher. If the risky asset price is higher, then the demand for the risky asset from portfolio investors must be larger in the strong investor protection country (because the demand from the controlling shareholder is lower). But this can be true in equilibrium only if security returns are higher in the strong investor protection country.

G Proof of Corollary 3

The proof follows readily from Proposition 3 and the discussion in the text.

H Proof of Proposition 4

The non-contestability constraint and the optimization problems are derived like in Proposition 1. In particular, condition (6) has to be slightly modified to account for the fact that control may be contested by a large investor from another country with a lower level of wealth. If Δ is the difference in wealth between the two investors competing for control, the richest investor acquires control in equilibrium with a stake:

$$\alpha_{CS}^{H} = \min \left\{ \frac{(\mu_X - B - P) + \sqrt{2\gamma\sigma_X^2 (B - \Delta)}}{\gamma\sigma_X^2}, \frac{1}{2} \right\}.$$

Since the functional form of individual demands for stocks does not change, points 1, 2 and 3 of Proposition 4 are proved like in the version of the model with segmented markets for control.

By contradiction, assume that demand for equity from the controlling shareholder is larger in Foreign than at Home. Under our assumptions this may only be optimal if $P^* < P$ because the lower price must compensate for lower private benefits of control. If this were true also the demand for equity from portfolio investors should be higher in Foreign as security benefits would definitively be larger. However, this would imply that the aggregate demand for the foreign risky asset is larger than the aggregate demand for the domestic risky asset making $P^* < P$ a contradiction. Hence, in equilibrium,

the aggregate demand from the controlling shareholder must be larger at Home for any price level. Similarly, since $B > B^*$ in equilibrium the demand from portfolio investors is larger in Foreign than at Home and $\mu_X - B - P < \mu_X - B^* - P^*$.

Table 1. Main Data

Our main data source for the domestic investors' participation rates in the domestic stock market is the 1999 Share Ownership Survey conducted by the World Federation of Exchanges, which provides data on the fraction of households who directly hold stocks in 1998 for Australia, Austria, Canada, Denmark, Finland, Hong Kong, Japan, New Zealand, Norway, Sri Lanka, the UK and the US. The data for France, Italy, the Netherlands and Sweden are from Guiso et al. (2003), who use national household surveys for 1997 or 1998. The data for Belgium, Germany, Greece, India, Singapore, Taiwan and Turkey are from the June 2002 Factbook published by the Deutsches Aktieninstitut and refer to the year 2000. Finally, the data on Switzerland, Portugal and Ireland are from the following national private investment reports, respectively: a report of the Marktforschungsinstitut Demoscope, which surveyed a representative sample of 3242 individuals in 1998, the "Survey into the profile of the Portuguese private investor" from the Comissão do Mercado de Valores Mobilliáros, and the report on "Private share ownership in Ireland" from Goodbody Stockbrokers. Data on Portugal and Ireland refer to 1999. The estimate for foreign equity holdings of domestic investors relative to their stock market wealth uses data from the 2002 IMF Coordinated Survey of Portfolio Investment. Anti-director rights is an index of shareholder protection from La Porta et al. (1998). Private enforcement is an index obtained by averaging indicators of disclosure requirements and liability standards that make easier for investors to recover damages when information is wrong or omitted and is from La Porta et al. (2006). Stock market capitalization is from the World Federation of Exchanges as of December 31, 2002. % Closely held market capitalization is calculated as the percentage of closely held stocks for all firms reported in Worldscope in 2002.

Country	Domestic investors' participation rates in the domestic stock market	Foreign equity holdings by domestic investors	Anti-director rights	Private enforcement	Stock market capitalization in billion $	% Closely held market capitalization
Argentina		0.507	4	0.36	16.549	60.16
Australia	0.404	0.243	4	0.71	380.087	42.06
Austria	0.056	0.708	2	0.18	33.578	62.99
Belgium	0.05	0.666	0	0.43	115.224	53.91
Brazil		0.054	3	0.29	126.762	67.28
Canada	0.25	0.302	5	0.96	570.223	27.75
Chile		0.214	3	0.46	49.828	66.64
Denmark	0.28	0.457	2	0.68	76.750	46.95
Egypt		0.034	2	0.36	26.330	51.67
Finland	0.187	0.220	3	0.58	138.833	41.49
France	0.15	0.387	3	0.49	825.070	62.37
Germany	0.089	0.572	1	0.21	686.014	63.86
Greece	0.102	0.057	2	0.39	66.040	60.43
Hong Kong	0.138	0.319	5	0.79	463.055	55.84
India	0.033		5	0.79	242.844	53.57
Indonesia		0.005	2	0.58	55.739	66.79
Ireland	0.17	0.791	4	0.61	59.938	33.78
Israel		0.101	3	0.67	40.774	61.89
Italy	0.07	0.507	1	0.44	477.075	49.57
Japan	0.297	0.155	4	0.71	2095.516	45.18
Korea		0.02	2	0.71	246.911	35.60
Malaysia		0.026	3	0.79	122.892	47.83
Netherlands	0.14	0.495	2	0.75	395.560	43.92
New Zealand	0.31	0.458	4	0.55	21.715	49.45
Norway	0.21	0.599	4	0.51	68.103	45.61
Philippines		0.024	4	0.92	18.183	73.44
Portugal	0.145	0.358	3	0.54	41.931	63.81
Singapore	0.083	0.418	4	0.83	101.554	57.70
Sri Lanka	0.023		3	0.60	1.680	48.00
South Africa		0.379	4	0.75	116.544	51.97
Spain		0.162	2	0.58	461.560	50.24
Sweden	0.22	0.452	3	0.46	179.117	37.44
Switzerland	0.176	0.428	2	0.55	547.020	46.62
Taiwan	0.125		3	0.79	261.311	27.11
Thailand		0.004	3	0.71	45.406	58.34
Turkey	0.012	0.003	2	0.36	34.217	62.38
UK	0.3	0.311	5	0.75	1800.658	33.93
US	0.26	0.163	5	1.00	11055.578	39.53
Venezuela		0.004	1	0.19	3.980	37.94

Table 2. Domestic Investors' Participation in the Domestic Stock Market

The dependent variable is the domestic investors' participation rate in the domestic stock market. Gini income is the Gini coefficient of income from Deininger and Squire (1996). Schooling is the average years of schooling of the total population over 25 in 1990 from Demirguc-Kunt and Levine (2001). Anti-director rights is an index of shareholder protection from La Porta et al. (1998). Market cap. to GDP is the ratio of market capitalization to GDP. Log GDP per capita is the logarithm of GDP per capita. GDP and GDP per capita are from the IMF. Rev. anti-director is the revised index of shareholder protection presented in Djankov et al. (2008). Anti-selfdealing is the index capturing laws aiming to limit selfdealing by company insiders as computed by Djankov et al. (2008). Private enforcement is an index obtained by averaging indicators of disclosure requirements and liability standards that make it easier for investors to recover damages when information is wrong or omitted and is from La Porta et al. (2006). Public enforcement is an index of public enforcement as presented in La Porta et al (2006). Law and order is an indicator of law and order tradition, constructed by the International Country Risk Guide. Spamann's shareholder rights is an index of shareholder rights calculated by Spamann (2006) following the methodology suggested by la Porta et al (1998), but considering only mandated laws. In columns (1) to (4) of Panel A and Panel B estimates are obtained by ordinary least squares. In column (7) of Panel A, estimates are obtained using instrumental variables. The instruments are three dummy variables capturing whether the country has French, English or German legal origin as defined in La Porta et al. (1998). In columns (5) and (6) of Panel A, estimates are obtained using a robust regressions to detect outliers as suggested by Huber (1964). Robust standard errors corrected for heteroskedasticity are in parentheses. ***, **, * denote that a coefficient is significant at the 1%, 5%, and 10% levels, respectively. The constant is included in all regressions but parameter estimates are omitted.

Panel A. Basic specifications

Explanatory variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Anti-director rights	0.035***	0.051***	0.029***	0.041***	0.039***	0.036***	0.029*
	(0.012)	(0.011)	(0.009)	(0.009)	(0.014)	(0.011)	(0.015)
Gini income		0.003	0.003	0.006*		0.003	0.006**
		(0.003)	(0.004)	(0.003)		(0.003)	(0.003)
Market cap. to GDP		-0.113*		-0.112**		-0.087*	-0.088
		(0.054)		(0.046)		(0.047)	(0.06)
Log GDP per capita		0.123***	0.039	0.062**		0.052*	0.049*
		(0.024)	(0.023)	(0.026)		(0.028)	(0.027)
Schooling			0.025**	0.025**		0.022**	0.028***
			(0.011)	(0.009)		(0.008)	(0.008)
Observations	26	21	21	21	26	21	21
R-squared	0.23	0.69	0.73	0.81	0.26	0.76	0.79
F-test of excluded instruments							7.97
(p-value)							(0.07)
Test of overidentifying restrictions							0.23
(p-value)							(0.88)

Panel B. Alternative indexes of investor protection

Explanatory variable	(1)	(2)	(3)	(4)	(5)	(6)
Rev. anti-director	0.033*					
	(0.017)					
Private enforcement		0.199*	0.235*			
		(0.109)	(0.131)			
Public enforcement			-0.036			
			(0.077)			
Anti-selfdealing				0.166*		
				(0.086)		
Law and order					0.042**	
					(0.015)	
Spamann's shareholder rights						0.040***
						(0.012)
Gini income	0.007	0.006	0.006	-0.006	0.009*	0.011*
	(0.005)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)
Market cap. to GDP	-0.094	-0.103	-0.107	-0.017	-0.065	-0.067
	(0.060)	(0.061)	(0.063)	(0.054)	(0.055)	(0.054)
Log GDP per capita	0.054	0.014	0.014	0.025	0.003	0.001
	(0.037)	(0.035)	(0.038)	(0.031)	(0.030)	(0.024)
Schooling	0.027**	0.039***	0.038***	0.020*	0.030***	0.040***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.009)	(0.011)
Observations	21	21	21	21	21	21
R-squared	0.66	0.71	0.71	0.70	0.72	0.72

Table 3. Descriptive statistics

This table presents descriptive statistics related to institutional investors' holdings of foreign equity and the explanatory variables that are used in the regressions in Table 4. Portfolio share is the proportion of equity invested in the target country relative to the total equity holdings of institutional investors from the origin country as of December 31, 2002. Home bias – world market capitalization is 1 minus the ratio of the weights of the target country in the portfolio of institutional investors from the origin country relative to the target's weight in the world market capitalization. Home bias – free-float world market capitalization is 1 minus the ratio of the weights of the target country in the portfolio of institutional investors from the origin country relative to the target's weight in the free-float world market capitalization. The free-float of the country has been calculated as the fraction of market capitalization of the target country that is not closely held, as suggested by Dahlquist et al. (2003). Free float weight-target (origin) is calculated as the ratio of the free-float of the target (origin) country to the free-float world market capitalization as of December 31, 2002. Market cap. weight-target (origin) is the stock market capitalization of the target (origin) country divided by the world stock market capitalization as of December 31, 2002. Private enforcement-target (origin) is an index obtained by averaging indicators of disclosure requirements and liability standards that make easier for investors to recover damages when information is wrong or omitted in the target (origin) country and is from La Porta et al. (2006). Public enforcement-target (origin) is an index of public enforcement in the target (origin) country and is from La Porta et al (2006). Anti-director rights-target (origin) is an index of shareholder protection in the target (origin) country and is from La Porta et al. (1998). Rev. anti-director-target (origin) is the revised index of shareholder rights in the target (origin) country and is from Djankov et al. (2008). Law and order-target (origin) is an indicator of law and order tradition in the target (origin) country, constructed by the International Country Risk Guide. Market cap. to GDP-origin is the stock market capitalization divided by the GDP in the origin country. Log distance is the natural logarithm of the distance between the domicile of the main stock exchange in the origin country and the domicile of the main stock exchange in the target country and is from Gande and Parsley (2005). Foreign capital restr.-target are restrictions to access foreign capital in the target country from the World Economic Forum, 2003. Access to foreign cap.-origin measures the lack of restrictions to access foreign capital markets in the origin country and is from World Economic Forum, 2003. Previous year return-target (origin) is the stock market return during the previous year in US Dollar in the target (origin) country and is from Datastream. Return correlation is the correlation of monthly returns from 1995 to 2001 between target country j and origin country i. GDP growth-target (origin) is the previous year per capita GDP growth in the target (origin) country in US Dollar. Log GDP per capita-target (origin) is the natural logarithm of GDP per capita in US Dollar in 2002. GDP per capita is from the CIA World Factbook. Gini income-origin is the Gini coefficient of income in the origin country from Deininger and Squire (1996). Same legal origin is a dummy that takes value equal to 1 if origin and target country have same legal origin as defined in La Porta et al. (1998). Cultural proximity is a dummy variable that takes value equal to 1 if target and origin country share the language or if the target (origin) has colonized the origin (target) country and is from Sarkissian and Schill (2003). Trade openness-target (origin) is the sum of the country's imports and exports as a percentage of GDP in the target (origin) country in 2001 and is from the World Bank. Corporate tax rate-target (origin) is corporate tax rate in the target (origin) country and is from Cooper and Lybrand International Tax Summaries. In the regressions, we exploit investments from 31 origin countries to 34 target countries for a maximum of 1023 observations. The weight of the target country in the portfolio of institutional investors from a given country is equal to zero in 11 cases. Sample composition varies due to missing observations for the independent variables.

Variable	Median	Standard deviation	1st quartile	4th quartile
Portfolio share	0.0001	0.06	0.00001	0.0003
Home bias – world market capitalization	0.99	2.92	0.95	1.00
Home bias – free-float world market capitalization	0.55	81.81	-0.66	0.85
Market cap. weight - target	0.01	0.08	0.001	0.02
Market cap. weight - origin	0.01	0.10	0.002	0.02
Free float weight - target	0.01	0.04	0.004	0.03
Free float weight - origin	0.02	0.04	0.01	0.03
Private enforcement - target	0.58	0.23	0.42	0.75
Private enforcement - origin	0.54	0.24	0.42	0.75
Public enforcement - target	0.50	0.26	0.29	0.69
Public enforcement - origin	0.46	0.28	0.25	0.69
Anti-director rights-target	3	1.36	2	4
Anti-director rights-origin	3	1.54	2	4
Rev. anti-director - target	3.5	1.09	3	4
Rev. anti-director - origin	3.5	1.04	3	4
Law and order-target	5	1.42	4	6
Law and order-origin	5	1.16	4.5	6
Market cap. to GDP-origin	0.79	0.59	0.48	1.10
Log distance	8.82	1.13	7.43	9.18
Foreign capital restr.- target	6.79	3.36	1.54	8.46
Access to foreign cap.- origin	9.12	0.83	8.91	9.70
Previous year return - target	-0.16	0.15	-0.21	-0.04
Previous year return - origin	-0.16	0.12	-0.22	-0.06
Return correlation	0.38	0.22	0.22	0.52
GDP growth - target	1.24	2.40	0.32	2.73
GDP growth - origin	1.42	1.88	0.73	2.73
Log GDP per capita - target	9.91	9.07	9.08	10.14
Log GDP per capita - origin	10.12	0.72	10.03	10.21
Gini income - origin	33.28	8.16	29.78	37.07
Same legal origin	1	0.42	1	1
Cultural proximity	0	0.29	0	0
Trade openness - target	56.20	61.45	40.81	72.36
Trade openness - origin	63.78	75.36	43.54	74.48
Corporate tax - target	0.39	0.08	0.35	0.43
Corporate tax - origin	0.40	0.08	0.34	0.43

Table 4. Institutional Investors' Foreign Equity Holdings

In column (1) of Panel A, the home bias is calculated as 1 minus the ratio of the weights of the target country in the portfolio of institutional investors from the origin country relative to the target's weight in the world market capitalization. In all remaining specifications, the home bias is calculated as 1 minus the ratio of the weights of the target country in the portfolio of institutional investors from the origin country relative to the target's weight in the free-float world market capitalization. All explanatory variables are defined in Table 3. In column (7) of Panel B, only countries of origin that belong to the OECD are included. All estimates in Panels A and B are obtained by ordinary least squares (OLS). Estimates in Panel C are obtained by instrumental variables. The instrumented variables are investor protection in target and origin countries. In columns (1) to (3), the instruments are six dummy variables capturing whether the origin (target) country has French, English or German legal origin as defined in La Porta et al. (1998). In columns (4) to (6), the instruments are settlers' mortality rates in European colonies as defined in Acemoglu et al. (2001). Standard errors between parentheses are corrected for heteroskedasticity and clustering at the country of origin level. ***, **, * denote that a coefficient is significant at the 1%, 5%, and 10% levels, respectively.

Panel A. Basic specifications with different measures of investor protection

Explanatory variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Home bias – world market capitalization	Home bias – free-float world market capitalization					
Private enforcement - target	-0.005**	-0.050	-0.101	-0.684			
	(0.002)	(0.072)	(0.075)	(2.228)			
Private enforcement - origin	0.008***	0.234***	0.344***	10.436*			
	(0.002)	(0.072)	(0.092)	(6.120)			
Public enforcement - target				-0.665			
				(0.895)			
Public enforcement - origin				-7.761*			
				(3.961)			
Law and order - target					0.628		
					(0.452)		
Law and order - origin					0.772*		
					(0.410)		
Anti-director rights - target						-0.021	
						(0.067)	
Anti-director rights - origin						0.025*	
						(0.012)	
Rev. anti-director - target							-0.049***
							(0.014)
Rev. anti-director - origin							0.325***
							(0.092)
Market cap. weight - target	-0.011**						
	(0.006)						
Market cap. weight - origin	-0.001						
	(0.005)						
Free float weight - target		-0.759*	-0.282	10.065	10.235	-0.391	-0.192
		(0.439)	(0.479)	(8.304)	(6.434)	(0.461)	(0.434)
Free float weight - origin		0.640	0.652	3.641	26.918***	1.136***	0.539
		(0.401)	(0.439)	(16.880)	(8.286)	(0.431)	(0.437)
Log distance	0.009***	0.304***	0.294***	0.287	0.557	0.320***	0.318***
	(0.000)	(0.015)	(0.016)	(0.798)	(0.717)	(0.017)	(0.016)
Market cap. to GDP - origin			-0.095***	-0.288	0.308	-0.090***	-0.087***
			(0.032)	(0.994)	(0.669)	(0.030)	(0.032)
Foreign capital restr. - target			-0.012**	0.008	-0.090	-0.001	-0.016***
			(0.005)	(0.274)	(0.167)	(0.006)	(0.005)
Access to foreign cap.-origin			-0.053***	0.414	-0.193	0.014	-0.054***
			(0.020)	(1.094)	(0.404)	(0.012)	(0.020)
Observations	930	930	930	930	1023	930	930
R-squared	0.37	0.36	0.37	0.38	0.36	0.36	0.40

Panel B. Different sets of controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Private enforcement – target	-0.059	-0.081	-0.043	-0.110	-0.170**	-0.099	-0.128
	(0.067)	(0.069)	(0.076)	(0.069)	(0.080)	(0.078)	(0.086)
Private enforcement – origin	0.374***	0.372***	0.403***	0.198**	0.349***	0.382***	0.568***
	(0.083)	(0.085)	(0.093)	(0.089)	(0.094)	(0.093)	(0.125)
Free float weight-target	-0.254	-0.038	-0.330	-0.407	0.102	-0.324	-0.238
	(0.432)	(0.467)	(0.479)	(0.444)	(0.510)	(0.492)	(0.556)
Free float weight-origin	0.174	1.450***	0.587	0.636	0.534	0.346	-0.159
	(0.388)	(0.428)	(0.440)	(0.391)	(0.476)	(0.457)	(0.509)
Log distance	0.240***	0.263***	0.297***	0.276***	0.289***	0.309***	0.299***
	(0.017)	(0.015)	(0.016)	(0.016)	(0.016)	(0.017)	(0.019)
Market cap. to GDP - origin	-0.081***	-0.070**	-0.088***	-0.047	-0.083**	-0.059*	-0.267***
	(0.028)	(0.030)	(0.032)	(0.036)	(0.034)	(0.036)	(0.054)
Foreign capital restr. - target	-0.006	-0.001	-0.012**	-0.011**	-0.015***	-0.010*	-0.011*
	(0.005)	(0.007)	(0.006)	(0.005)	(0.006)	(0.006)	(0.006)
Access to foreign cap.- origin	-0.026	0.027	-0.061***	-0.062***	-0.050**	-0.032	0.107
	(0.018)	(0.024)	(0.020)	(0.019)	(0.020)	(0.021)	(0.091)
Previous year return - target	-0.426***						
	(0.114)						
Previous year return - origin	-0.679***						
	(0.123)						
Return correlation	-0.580***						
	(0.094)						
Gdp growth - target		-0.018***					
		(0.006)					
Gdp growth - origin		0.017**					
		(0.008)					
Log GDP per capita - target		-0.102***					
		(0.027)					
Log GDP per capita - origin		-0.302***					
		(0.055)					
Same legal origin			0.059				
			(0.078)				
Cultural proximity			-0.197***				
			(0.049)				
Gini income - origin				-0.004**			
				(0.002)			
Trade openness - target					0.000*		
					(0.000)		
Trade openness - origin					-0.000		
					(0.000)		
Corporate tax - target						0.036	
						(0.212)	
Corporate tax - origin						0.776***	
						(0.242)	
Observations	930	930	930	840	930	930	720
R-squared	0.44	0.41	0.39	0.38	0.37	0.38	0.40

Panel C. Instrumental variable estimates

	(1)	(2)	(3)	(4)	(5)	(6)
	Legal origin			Settlers' Mortality		
Private enforcement – target	-2.780			48.792		
	(3.303)			(39.403)		
Private enforcement – origin	2.157***			53.529***		
	(0.586)			(13.167)		
Rev. anti-director - target		0.489			8.167	
		(0.880)			(5.983)	
Rev. anti-director - origin		2.093***			36.980***	
		(0.573)			(13.036)	
Law and order – target			0.784			5.350
			(0.611)			(3.598)
Law and order - origin			2.151**			13.756***
			(0.990)			(4.558)
Free float weight - target	16.461	7.718	9.282	-53.496	170.865**	80.847
	(12.451)	(8.396)	(13.450)	(118.093)	(69.827)	(74.481)
Free float weight - origin	25.014***	25.749***	25.376**	-28.306	376.783***	50.261
	(6.843)	(7.058)	(11.930)	(53.950)	(111.186)	(59.224)
Log distance	0.618	0.446	0.595	5.671**	5.903**	5.503*
	(0.532)	(0.592)	(0.497)	(2.263)	(2.963)	(3.069)
Market cap. to GDP - origin	0.420	0.450	0.426	-1.414	-27.028**	3.478
	(0.656)	(0.677)	(0.830)	(3.369)	(12.006)	(4.019)
Foreign capital restr. - target	0.076	0.129	-0.111	-1.260	0.339	-1.096
	(0.244)	(0.298)	(0.232)	(1.134)	(0.956)	(1.107)
Access to foreign cap.- origin	-0.395	-0.388	-0.403	-1.625	12.959**	-7.045**
	(0.427)	(0.419)	(0.412)	(2.216)	(5.674)	(3.225)
Observations	930	930	1023	120	120	120
R-squared	0.01	0.01	0.02	0.33	0.10	0.11
F-test of excluded instruments	33.18	33.40	87.59	6.03	15.77	18.00
(p-value)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
Test of overidentifying restrictions	3.92	12.87	2.89			
(p-value)	(0.42)	(0.01)	(0.58)			