

Investor Protection and Equity-Holdings: An Explanation of Two Puzzles?*

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Abstract

We develop a model where wealthy investors have an incentive to become controlling shareholders because they can earn additional benefits by expropriating outside shareholders. As a consequence, in countries where minority investor rights are poorly protected, both domestic and foreign portfolio investors have a disincentive to hold stocks. The model implies that differences in stock market participation rates across countries and the pervasiveness of home equity bias depend on the degree of investor protection. We provide international evidence on stock market participation rates, and holdings of domestic and foreign stocks consistent with the predictions of the model.

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I Introduction

Why most households do not invest in stocks and especially why do households' stock market participation rates vary so much across countries? Why do investors favor domestic stocks at the expense of foreign stocks and thus give away considerable diversification benefits? These two well-established puzzles about investor behavior have generated a lot of theoretical and empirical work. The first puzzle has been named as the "participation puzzle" and the second one is known as the "home equity bias". The objective of this paper is to provide a common explanation for these two phenomena.

Our explanation for both puzzles is based on deficiencies of investor protection. Investor protection is the cornerstone of the research program in law and finance initiated by La Porta et al. (1997, 1998). By now, it is widely accepted that, if minority shareholders are not well protected, then controlling shareholders will have an incentive to expropriate part of the returns as private benefits of control. We show that extraction of control benefits can affect not only the cost of funds and investment decisions of firms, as Shleifer and Wolfenzon (2002) show, but also investors' portfolio choices.

We show that in countries with low levels of investor protection wealthy investors find it optimal to forgo diversification benefits in order to acquire control of domestic firms. Their portfolio choices are compatible with the maximization of expected utility, if we take into account that they are able to enjoy private benefits of control. The control benefits are large in some countries, depending on the quality of investor protection, as shown by Dyck and Zingales (2003) and Nenova (2003). If private benefits of control are indeed significant, then this could help to explain the findings of French and Poterba (1991), who show that observed portfolio patterns imply that investors expect returns in their domestic stock market to be several hundred basis points higher than returns in other markets. If large shareholders are more likely to enjoy private benefits of control on their domestic shareholdings than on their foreign holdings, then we do not need to recur to biased expectations of domestic stock returns in order to explain the portfolio choices of controlling shareholders.

The extraction of substantial control benefits diminishes the security benefits available to all outside investors and thus reduces the incentives to invest in stocks for those shareholders who are not able to acquire large equity stakes and to participate in the extraction of private benefits of control. Hence it is not surprising that the "participation puzzle" and "home equity bias" should be connected, since typically most of the households and foreign investors do not belong

to the coalitions of shareholders that control companies. Thus it is small individual investors and foreign investors who bear the costs of value-destroying activities that large shareholders inflict on companies that they control. This in turn may help explain not only phenomena like home equity bias and limited participation in stock markets, but also the cross-country differences in stock market participation rates, which have so far been unexplored.

In our model lack of investor protection unequivocally reduces outside investors participation in the stock market. While lack of investor protection makes all outside investors, both domestic and foreign alike, avoid a country where the expropriation of outside shareholders is easy, it is not the case that all investors are interested in investing in a country where investor rights are well protected. Wealthy domestic investors are willing to invest more in their own country if investors are not well protected compared to the situation where there is no expropriation of minority shareholders. Thus, instead of a potential "good country bias" the result is the familiar "home equity bias". As a summary, based on the idea of expropriation of portfolio investors, we can explain three phenomena at the same time:

1. Investors endowed with a small amount of wealth may want to opt out of the stock market altogether in a country where investors are poorly protected, leading to limited stock market participation;
2. Wealthy investors may want to become controlling investors by investing a large proportion of their wealth in the stock market in a country with poor investor protection, leading to home equity bias, and;
3. All investors from a country with good investor protection prefer to invest there, leading to home equity bias again.

In addition, we show that in equilibrium wealth distribution within a country is as important as the quality of its investor protection in explaining the extent of private benefits of control extraction. If only very few of the richest investors are wealthy enough to be able to acquire control, the level of private benefits of control extraction remains low even if investors are not well protected. As a consequence, more outside investors, and in particular foreign investors, would own stocks in a country where wealth distribution is more even compared to a country where there are wide inequalities of wealth.

We are also able to provide a new counterintuitive explanation why firms with more concentrated ownership structures may have higher valuations. The standard explanation for higher valuations for companies with concentrated ownership is based on partial equilibrium analysis, where large ownership stakes provide incentives to monitor either the managers or other principal shareholders and as a result firm cash flows and valuations are increased (see, for instance, Morck et al., 1988 and McConnell and Servaes, 1990). Our explanation in a general equilibrium framework is based on increased demand from wealthy investors: In order to acquire control in domestic companies and enjoy the consumption of private benefits of control, wealthy investors have an incentive to underinvest in foreign stocks and increase their demand for domestic stocks, and, as a result, stock prices may increase. Then empirically we could observe that there is a positive correlation between ownership concentrations and company valuations, even if cash flows have not increased.

As noted before, this paper is related to the large and growing strand of literature initiated by La Porta et al. (1997 and 1998).¹ They show that the size and scope of capital markets are positively related and that ownership concentration is negatively related to investor protection. Moreover, they also show that companies with controlling shareholders are very common around the world (La Porta et al., 1999). 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. There are, however, important differences between Shleifer and Wolfenzon (2002) and our paper: Shleifer and Wolfenzon (2002) focus on the implications of investor protection on corporate financing and investment, while we aim to analyze investors' portfolio choices. For this reason, we model explicitly the portfolio decisions of risk averse investors and how these are affected by the relative magnitude of security and control benefits in countries with different levels of investor protection. As a consequence in our model, controlling shareholders emerge *endogenously* in equilibrium, while less wealthy investors may opt out of the market. As a contrast, Shleifer and Wolfenzon (2002) model a going public process, where the existence of a controlling shareholder is assumed, and outside investors are risk neutral and provide funds as long as their participation constraint is satisfied. In addition, the extraction of private benefits of control is modelled differently in the two papers: Shleifer and Wolfenzon (2002) model only the incentive effect of ownership concentration and as a consequence the extraction of control benefits is decreasing in

¹For an overview of the approach and results, see La Porta et. al (2000). Typically, the literature has emphasized how minority shareholders are protected in the company law. However, securities law may be as important for the functioning of financial markets. In addition, the issue who enforces the laws (courts or regulators) may be vital as well. For both of these issues, see Glaeser et al. (2001).

the controlling owner's stake, whereas we take into account also the countervailing entrenchment effect of ownership concentration. Moreover, we allow for the existence of multiple controlling shareholders who are able to share the consumption of private benefits of control, like in Zwiebel (1995), and show that the initial distribution of wealth is as important as the quality of investor protection laws in explaining the extent of private benefits of control.

This paper is also related to a large literature that studies, separately, home equity bias and limited participation puzzle. Home equity bias is one of the least contested empirical facts in finance (for a recent 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. Empirical studies document that 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 less developed emerging markets.²

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 disappeared. Also foreign investments may be taxed more harshly than domestic investments.³ However, as argued by Ahearne et al. (2001), legal restrictions and taxes are of secondary importance in explaining the home equity bias.

In international finance, the most widely cited reason for home equity bias is based on asymmetric information. Domestic investors are assumed to know more about domestic stocks than foreign investors leading to increased investments in domestic equities.⁴ 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. Consistent with this assumption Grinblatt and Keloharju (2000) show using Finnish data that foreign investors have outperformed domestic investors.

In a recent paper Dahlquist et al. (2003) relate home equity bias to corporate governance, as we do. In their paper deficiencies in investor protection lead to larger shareholdings by inside owners. This then leads to diminished availability of shares to foreign investors. We view the

²For example, for the U.S., Ahearne et al. (2001) 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.

³Black (1974) and Stulz (1981) model barriers to international investments as taxes paid on foreign holdings.

⁴Gehrig (1993) derives the optimal portfolio when foreign investors know less than domestic investors and shows that this leads to overweighing domestic stocks. Kang and Stulz (1997) provide evidence consistent with this model.

Dahlquist et al.'s (2003) paper as complementary to ours. Dahlquist et al. (2003) concentrate on the supply of stocks and on the agency conflict between managers and all investors. We, on the contrary, concentrate on the demand of stocks and on the agency conflict between inside and outside investors. Most importantly, Dahlquist et al. (2003) focus on explaining the lack of international diversification. In addition to this, we are also able to explain the lack of diversification of domestic households' portfolios and why some investors prefer to opt out of the stock market.

Limited participation in stock markets has also been widely studied in the asset pricing literature (see, for instance, Mankiw and Zeldes, 1991; Vissing-Jorgensen, 2002; and Brav et al., 2002).⁵ All papers in this literature, however, explore the implications of low degree of household participation in the stock market within a single country. Only recently, Guiso et al. (2001, 2003a and 2003b) have showed that there are significant 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.

The paper is organized as follows. Section 2 presents the model and section 3 describes the equilibrium implications. Section 4 provides some cross-country empirical evidence supporting the implications of the model. Section 5 concludes.

II The model

In our model, there are two countries that differ on their quality of investor protection. For simplicity, we have only one risky asset with a random payoff in each country in addition to a riskless asset. In both countries there are heterogenous investors that differ on the amount of wealth they have been endowed with. The initial wealth distributions, the quality of investor protection and the distribution of asset returns in both countries are common knowledge. Investors are risk averse and are free to invest in risky assets in both countries after having paid a fixed participation fee. There is no participation fee when investors invest in the risk free asset. No short sales or borrowing are allowed. When investing, all investors take prices as given. Investors can become controlling investors by acquiring a large enough ownership stake in their domestic risky asset. No investor

⁵In a recent paper Hong et al. (2002) provide an interesting explanation how social interaction affects investment patterns. In their model, there are two kinds of investors, social and non-social investors. Social investors find it more attractive to invest, if a lot of other people are interested in investing, whereas the returns from investing for non-social investors are independent of other investors' behavior. This may lead to variations in participation rates in stock markets across countries and also to preference for local stocks. However, it cannot explain why sophisticated foreign investors, like financial institutions, are reluctant to invest abroad.

can acquire a controlling stake in a foreign risky asset. No short sales and no borrowing imply that only investors endowed with a lot of wealth can become controlling investors. If investors choose to become controlling investors they are able to extract private benefits of control. The incentive to become a controlling investor depends on how easy it is to extract private benefits of control, in other words how well other investors' cash flow rights are protected. The extraction of private benefits of control reduces the amount of cash flows that are available to all investors and, therefore, affects less wealthy domestic investors' and foreign investors' decisions to hold risky assets. In what follows, we describe the model in detail.

A Timing

- At $t=0$, domestic and foreign investors make their portfolio decisions.
- At $t=1$, before the random payoffs are realized, investors who have acquired control rights have the opportunity to extract private benefits of control.
- At $t=2$, payoffs net of private benefits of control are distributed to all investors.

B Investment opportunities

There are two symmetric countries, called Home and Foreign. The following describes the Home economy. Foreign economy is to be considered completely symmetric, unless stated otherwise. Foreign variables will be denoted with an asterisk. A risky asset with gross random payoff \tilde{X} (\tilde{X}^* in Foreign) is available in both countries. The expected payoff of the domestic (foreign) risky asset is μ_X (μ_X^*) and the variance is σ_X^2 (σ_X^{*2}). The payoffs of the two assets are positively correlated and the correlation coefficient ρ is positive but strictly less than 1. The price of the domestic (foreign) risky asset is denoted by P (P^*) and is determined endogenously in equilibrium. All assets are available in fixed supply, which we normalize to be 1, and are owned initially by the domestic investors of the two countries. Investors have also access to a risk-free storage technology, identical in both countries, which provides zero return. We think of this as cash and deposits and will generally refer to it as the risk free asset.

C Investors

Both countries have heterogeneous investors, who differ in the amount of their initial wealth, W_0 . We assume that their wealth consists of a share of w_0 of the domestic wealth. Total domestic wealth

is $1 + P$ in Home and $1 + P^*$ in Foreign. The initial share of wealth w_0 is distributed between 0 and \bar{w}_0 , and satisfy the condition $\int_0^{\bar{w}_0} w_0 dF(w_0) = 1$, where F is the cumulative density function of the distribution of initial wealth. 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 assume that investors cannot borrow in order to invest in the stock market, nor can they sell stocks short.

Following the existing literature (see, for example, Vissing-Jorgensen, 2002) we assume that buying the risky asset, which in our model is equivalent to participating in the stock market, involves a fixed participation cost. This cost can be thought of comprising of transaction costs, costs of getting informed about how the stock market operates, and other costs involved in having to keep track of one's own stocks. We assume that investing in the domestic country is cheaper than investing abroad. Specifically, we define c_d as the cost that an investor must pay in order to be able to invest in the domestic stock market and c_a the *additional* cost she has to bear in order to be able to invest abroad. Thus an investor, after having first paid c_d when investing in the domestic market, pays a further fee of c_a when investing abroad. Note that, if $c_a = 0$, any investor who participated in the domestic stock market would also buy foreign equity. As it will be made clear in the next section, the model would have the feature of home equity bias in equilibrium even if $c_a = 0$, provided that wealthy investors have an incentive to become controlling shareholders in their domestic markets.

Investors who own a large stake in domestic companies may enjoy private benefits of control in addition to the security benefits, which are shared equally by all investors. We assume that in order to divert cash flows and enjoy private benefits of control, shareholders have to own a fraction α of the shares that is larger than a threshold of $\underline{\alpha}$, i.e. $\alpha \geq \underline{\alpha}$. Since we have normalized the supply of the risky assets to be 1, α denotes both the fraction of shares held in a company and also the quantity invested in the company. We also assume that $\underline{\alpha}$ is larger than the share an investor would find it optimal to invest in the absence of control benefits. We refer to the investors who own more than $\underline{\alpha}$ as the *controlling shareholders (CS)* and denote their domestic and foreign shareholdings as α_{CS}^H and α_{CS}^F ($\alpha_{CS^*}^F$ and $\alpha_{CS^*}^H$ for the controlling shareholders in Foreign). The emergence of controlling shareholders will be determined endogenously. Under our assumptions, a company may have several controlling shareholders, who, like in Zwiebel (1995), are able to enjoy private benefits of control besides the security benefits that accrue indistinctly to all shareholders.

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 the portfolio investors in Foreign country). Note that we only allow investors to become controlling shareholders in their domestic companies, so when controlling shareholders invest abroad they act like ordinary portfolio investors. We do not consider that also foreign investors could acquire control and be able to extract private benefits of control. We think that this is somehow less likely because dealing with local courts and corrupted bureaucrats may be easier for domestic investors. Indeed, consistent with this assumption there is empirical evidence that the flow of foreign direct investments, i.e. investments that involve control by a foreign investor by definition, is significantly lower in countries with poor investor protection (Wei, 2000 and Wei and Wu, 2001). Furthermore, in countries with high level of corruption and poor rule of law, foreign direct investments are generally carried out as joint ventures with local partners (see Smarzynska and Wei, 2000).

We assume that the extraction of private benefits of control reduces the cash flow available to all investors. We define B as the amount of cash flows a controlling shareholder diverts. The private benefits that controlling shareholders can enjoy depend on their ownership shares of the risky asset and the quality of investor protection, λ . Let $g(\lambda, B)$, where $g(\lambda, B) > 1$, denote the function that describes the technology of private benefit extraction. For one unit of cash flow diverted, the amount of private benefits that is consumed is $g(\lambda, B)\alpha_{CS}^H$ with the following properties:

1. The extraction of private benefits of control is inefficient, $g(\lambda, B)\alpha_{CS}^H < 1$.
2. The better protected investor rights are (the higher is λ), the lower is the fraction of private benefits controlling shareholders can enjoy, $g_\lambda(\lambda, B) < 0$, for given ownership stake. This may be due to the fact that more precautions must be taken in order not to be caught.
3. The more cash flows are diverted, the more inefficient the extraction technology becomes, $g_B(\lambda, B) < 0$.
4. It is more difficult to consume high levels of private benefits of control in countries with better investor protection laws, $g_{B\lambda}(\lambda, B) < 0$.
5. The higher is the ownership share of the controlling shareholders α_{CS}^H , the more they can enjoy private benefits of control. This captures the entrenchment effect: if the ownership stake of a controlling shareholder is large, it is very hard to stop her from extracting private benefits of control.⁶

⁶These assumptions are similar to Zwiebel (1995), who derives a theory of divisible control benefits.

The entrenchment effect, which has so far being neglected in the theoretical literature, may be at least as important as the incentive effect of ownership concentration. In fact, the empirical literature has failed to find a stable relation between ownership concentration and firm value (Denis and McConnell, 2003) and the opposite effects of incentive and entrenchment effects on firm value may be the reason for this empirical ambiguity.

All investors maximize the expected utility from final period wealth, and have an utility function that is quadratic in the monetary wealth \widetilde{W} . The utility also depends positively on the private benefits of control that controlling shareholders can enjoy. From the point of view of the Home investor, the expected utility can be expressed as:

$$U(\alpha^H, \alpha^F, B) = \widetilde{W} - \frac{\widetilde{W}^2}{2\gamma} + I_{\alpha^H > \underline{\alpha}}(\alpha^H)g(\lambda, B)\alpha_{CS}^H B, \quad (1)$$

where γ is the risk aversion parameter and $I_{\alpha^H > \underline{\alpha}}(\alpha^H)$ is the 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 shares, α^H and α^F , to be allocated to the domestic and foreign risky assets, respectively, and the amount of private benefits of control to be extracted, B , if the investor is a controlling shareholder. Investors' expected utility depends on the expected final period wealth and its variance, which can be written as follows:

$$E(\widetilde{W}) = W_0 - \alpha^H P - \alpha^F P^* + \alpha^H (\mu_X - B) + \alpha^F (\mu_{X^*} - B^*) - I_{\alpha^H > 0}(\alpha^H)c_d - I_{\alpha^F > 0}(\alpha^F)c_a \quad (2)$$

$$Var(\widetilde{W}) = (\alpha^H)^2 \sigma_X^2 + (\alpha^F)^2 \sigma_{X^*}^2 + 2\rho\sigma_X\sigma_{X^*}\alpha^H\alpha^F, \quad (3)$$

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.

D Equilibrium

Home and Foreign controlling shareholders and portfolio investors maximize their expected utility, taking other agents' choice variables and prices as given. The markets for both risky assets clear.

III Portfolio choices and extraction of private benefits of control

A Main results

The optimal level of private benefits extracted by controlling shareholders maximizes their expected utility and satisfies the first order condition. For controlling shareholders at Home the first order condition is:

$$\alpha_{CS}^H [g(\lambda, B) + g_B(\lambda, B)B - 1] = 0. \quad (4)$$

The intuitive interpretation of the first order condition is the following: On the one hand, a larger ownership stake aligns the incentives of controlling shareholders and portfolios investors, as the controlling shareholders internalize the effect of destroying a fraction of the cash flow to a larger extent. This is what is commonly indicated as *incentive effect* of ownership concentration. On the other hand, controlling shareholders with a larger ownership stake can secure control and enjoy a larger fraction of diverted cash flows. To put it differently, there is an *entrenchment effect* of ownership concentration. Since in this specification the ability to extract private benefits of control conferred by a controlling stake and alignment effect of that ownership stake have opposite effects on the utility for controlling shareholders, the two effects cancel out and the optimal extraction level depends only on quality of investor protection laws. This specification of the technology for the extraction of private benefits is compatible with the empirical evidence, which provides conflicting results on whether the incentive or the entrenchment effects of ownership concentration prevail (Denis and McConnell (2003) provide a detailed survey of the empirical evidence).

Equation (4) implies that multiple controlling shareholders agree on the level of private benefits of control that can be extracted in equilibrium and allows us to abstract from the strategic interactions among several controlling shareholders.⁷ We can thus focus on the effect of investor protection on the demand for stocks of individuals with different levels of initial wealth, under the assumption that the amount of private benefits of control consumed is proportional to the ownership share.

For simplicity, we also assume that $B_{\max}(\lambda_{\min}) < X_{\min}$, where B_{\max} is the maximum level of cash flow that is possible to divert when the level of investor protection is the lowest possible, λ_{\min} , and X_{\min} is the lower bound of the support for the payoffs from the risky technology. This assumption implies that even when the realized payoffs are low there is always some output that

⁷See Bennedsen and Wolfenzon (2000) on how the coalitions of controlling shareholders are formed.

can be extracted by the controlling shareholders. Hence, there is always an internal solution to the previous first order condition. The assumptions on the function $g(\lambda, B)$ and the second order condition, which is satisfied globally only if $g_{BB}(\lambda, B) < 0$, imply that $\frac{dB}{d\lambda} = -\frac{g_\lambda + g_{\lambda B}B}{2\alpha_{CS} + B\alpha_{CS}^2} < 0$. The higher is the level of investor protection, the lower is the level of private benefit extraction. Now we are ready to state the first proposition.

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

1. If $W_0 \leq \underline{W}(\lambda, \lambda^*, P, P^*)$, then $\alpha_{PI}^H = \alpha_{PI}^F = 0$
2. If $\underline{W}(\lambda, \lambda^*, P, P^*) \leq W_0 < \overline{W}(\lambda, \lambda^*, P, P^*)$, then $\alpha_{PI}^H = W_0$ and $\alpha_{PI}^F = 0$
3. If $\underline{W}(\lambda, \lambda^*, P, P^*) \leq W_0 < \overline{W}(\lambda, \lambda^*, P, P^*)$, then $0 < \alpha_{PI}^H \leq \alpha_{optimal}^H$, $0 < \alpha_{PI}^F \leq \alpha_{optimal}^F$
4. If $\overline{W}(\lambda, \lambda^*, P, P^*) \leq W_0$, then $\alpha_{CS}^H \geq \underline{\alpha} > \alpha_{optimal}^H$ and $0 \leq \alpha_{CS}^F \leq \alpha_{optimal}^F$

Proof. See the Appendix. ■

Proposition 1 shows that due to the existence of participation costs and the possibility of extracting private benefits of control, individuals have different incentives to diversify their portfolios depending on the level of initial wealth. It is important to observe that controlling shareholders emerge endogenously and the emergence is determined by two factors, investor protection and the wealth distribution. In particular, very wealthy individuals have an incentive to over-invest in domestic stocks and become controlling shareholders due to the possibility of enjoying private benefits of control. The incentive is stronger where investor protection is weak. The incentive to over-invest in domestic stocks by wealthy investors is the mechanism that leads to home equity bias in a country where investors are poorly protected. Without the incentive to over-invest in order to acquire control there would be a "good country bias" in investor behavior as countries with high investor protection provide higher returns to portfolio investors. The assumption $c_a > 0$ is therefore not important for the existence of home equity bias in equilibrium. If $c_a > 0$, as we assume, the propensity of domestic investors to hold foreign equity varies with the quality of investor protection both on the intensive (i.e., on the decision to participate) and the extensive (i.e., the amount invested) margin. If $c_a = 0$, it would vary only on the intensive margin: all investors who participated in the stock markets would hold both domestic and foreign stocks, which would imply that $\underline{W}(\lambda, \lambda^*, P, P^*) = \overline{W}(\lambda, \lambda^*, P, P^*)$ in Proposition 1.

Investor protection does not only affect the portfolio choices of wealthy individuals. The following two corollaries summarize the effects of changes in the quality of investor protection in Home and Foreign on the demand for risky assets for given price levels.

Corollary 1 *The quality of investor protection at Home*

1. *The higher is the quality of investor protection, the higher is the stock market participation:*

$$\frac{d\underline{W}(\lambda, \lambda^*, P, P^*)}{d\lambda} < 0$$

2. *The higher is the quality of investor protection, the larger is the home equity bias for portfolio investors:* $\frac{d\underline{W}(\lambda, \lambda^*, P, P^*)}{d\lambda} > 0$

3. *The higher is the quality of investor protection, the lower is the ownership concentration, and the home equity bias for controlling shareholders:* $\frac{d\overline{W}(\lambda, \lambda^*, P, P^*)}{d\lambda} > 0$

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. Some individuals, who previously found it optimal to stay out of the domestic risky asset market, are now willing to pay the fixed participation cost c_d , implying that $\frac{d\underline{W}(\lambda, \lambda^*, P, P^*)}{d\lambda} < 0$. Better domestic investor protection also increases the incentives to invest in the domestic risky asset compared to investing abroad. Wealthier investors are now willing to forego the benefits of international diversification, implying that $\frac{d\underline{W}(\lambda, \lambda^*, P, P^*)}{d\lambda} > 0$. Finally, better investor protection also means that is less lucrative to become controlling investor, because it is harder to enjoy private benefits of control implying that $\frac{d\overline{W}(\lambda, \lambda^*, P, P^*)}{d\lambda} > 0$. Note that, even though the set of individuals who only invest in the domestic risky asset, $[\underline{W}(\lambda, \lambda^*, P, P^*), \underline{W}(\lambda, \lambda^*, P, P^*)]$, is now unambiguously larger, the home equity bias does not necessarily become more severe. In fact, the very wealthy have now stronger incentives to diversify internationally. Finally, since an increase in λ improves payoffs at Home, the demand for the Home risky asset from foreign investors increases.

Corollary 2 *The quality of investor protection in the Foreign country*

1. *The higher is the quality of investor protection in the Foreign country, the lower is the home equity bias of portfolio investors at Home:* $\frac{d\underline{W}(\lambda, \lambda^*, P, P^*)}{d\lambda^*} < 0$

2. The higher is the quality of investor protection in the Foreign country, the lower is the ownership concentration and the home equity bias for controlling shareholders at Home:

$$\frac{d\overline{W}(\lambda, \lambda^*, P, P^*)}{d\lambda^*} > 0$$

If investor protection improves in the Foreign country, then all domestic investors have more incentives to invest abroad in the risky asset market. Some of the relatively less well off, who previously only invested at home, are now willing to pay the cost c_a for investing abroad. This implies that $\frac{d\underline{W}(\lambda, \lambda^*, P, P^*)}{d\lambda^*} < 0$. Also, the very wealthy do not have as strong incentives to become controlling investors at Home, because international diversification now gives higher security returns. This implies that $\frac{d\overline{W}(\lambda, \lambda^*, P, P^*)}{d\lambda^*} > 0$. So better investor protection abroad increases the set of portfolio investors $[\underline{W}(\lambda, \lambda^*, P, P^*), \overline{W}(\lambda, \lambda^*, P, P^*)]$, who are willing to invest both in the domestic and foreign risky markets. Hence improvements in investor protection abroad diminish the home equity bias. Interestingly, private benefits of control at Home may be reduced because of improved investor protection in Foreign.

Until now, we have taken prices as given. Differences in investor protection of course affect the demand of investors with different wealth levels. As a consequence, prices of risky assets at Home and in Foreign are also affected. We need to consider this to determine the equilibrium ownership structure and the level of international diversification.

The prices are determined from the following market clearing conditions:

$$\int_{\underline{W}}^{\overline{W}} W_o dF(W_0) + \int_{\underline{W}}^{\overline{W}} \alpha_{PI}^H(W_o, P, P^*) dF(W_0) + \int_{\underline{W}^*}^{\overline{W}^*} \alpha_{PI^*}^H(W_o, P, P^*) dF^*(W_0) + \int_{\underline{W}}^{\infty} \alpha_{CS}^H(W_o, P, P^*) dF(W_0) + \int_{\underline{W}^*}^{\infty} \alpha_{CS^*}^H(W_o, P, P^*) dF^*(W_0) = 1 \quad (5)$$

$$\int_{\underline{W}^*}^{\overline{W}^*} W_o dF^*(W_0) + \int_{\underline{W}^*}^{\overline{W}^*} \alpha_{PI^*}^H(W_o, P, P^*) dF^*(W_0) + \int_{\underline{W}}^{\overline{W}} \alpha_{PI}^H(W_o, P, P^*) dF(W_0) + \int_{\underline{W}^*}^{\infty} \alpha_{CS^*}^H(W_o, P, P^*) dF^*(W_0) + \int_{\underline{W}}^{\infty} \alpha_{CS}^H(W_o, P, P^*) dF(W_0) = 1. \quad (6)$$

It is not possible to derive prices in closed form without assuming a specific functional form for the distribution of wealth. However, we can derive interesting implications on the relation between equilibrium prices and the level of investor protection, and on stock market participation.

Proposition 2 *The relation between the price of the risky asset and quality of investor protection*

is non-monotonic. If most of the shares are held by wealthy domestic investors, P (P^) is decreasing (increasing) in λ .*

Proof. See the Appendix. ■

La Porta et al. (2002) provide evidence that firms are valued more in countries where minority shareholders are well protected. At first sight, this result would imply that the price of the domestic risky asset, P , would increase monotonically in the degree of investor protection λ . However, more careful reading of La Porta et al. (2002) reveals that investor protection affects corporate valuations positively only after controlling for the ownership stake of the controlling shareholder. This is exactly what Proposition 2 would imply: the relationship between corporate valuations and investor protection is ambiguous without controlling for the ownership structure, but after controlling for the amount that large shareholders hold (i.e. the demand from the controlling shareholders) valuations are positively related to investor protection.

The proposition also underlines that the consideration of general equilibrium effects may be very important for the analysis of the relationship between ownership structure and firm valuation. For instance, several influential empirical papers (see, for instance, McConnell and Servaes, 1990) have interpreted the positive correlation between company market valuation and existence of blockholders, other than the controlling shareholders, as evidence that these large shareholders limit the extraction of private benefits of control by monitoring the controlling shareholders.⁸ Analogously, a large equity share owned by the first shareholder has been thought to increase market valuation because it would increase the incentives for the controlling shareholder to maximize future cash flows (Morck et al., 1988). In our model there is no role for monitoring and the alignment effect of ownership cancels out with the amount of private benefits of control that controlling shareholders can enjoy. Nonetheless, ownership concentration may increase stock prices because of a general equilibrium effect: for some wealth distributions, the demand for a risky asset increases if extracting private benefits of control becomes easier.

The results of Proposition 2 do not depend on the assumption that private benefits of control can be shared among several controlling shareholders, but can be generalized to a context in which there is an unique controlling shareholder in equilibrium. To show the argument, assume that private benefits of control cannot be shared and that in equilibrium the controlling shareholder is

⁸In a recent paper Lins (2003) shows that non-management blockholders increase firm valuations especially in countries with weak investor protection laws. Lins (2003) interprets this finding as a evidence that blockholders limit the extraction of control benefits. The alternative interpretation would be that increased firm valuations are due to increased demand from large shareholders.

the one with the highest share of the equity of a firm. To have control, such an investor will have to acquire a share of equity marginally larger than the share a relatively less wealthy investor would find it optimal to acquire. The last would again be decreasing in the quality of investor protection λ , and could originate the non-monotonic relation between equity prices and degree of investor protection, as explained in Proposition 2.

An important consequence of Proposition 2 is that the wealth distribution is important in determining which equilibrium prevails in a country.

Corollary 3 *The equilibrium level of extraction of private benefits of control depends not only on the quality of investor protection, but also on the wealth distribution.*

As an illustration, let's consider a country with very low level of investor protection, but very even distribution of wealth and low average level of wealth. We then could have an equilibrium in which no individual is wealthy enough to acquire control rights. Equilibrium prices would be such that individuals would 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 for this 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.

The model has also other implications. First of all, households' stock market participation is lower in countries with low investor protection, since the security benefits from investing in the domestic risky asset are lower. This is proved in Proposition 3.

Proposition 3 *Domestic investor stock market participation decreases as domestic investor protection gets weaker.*

Proof. See the Appendix. ■

The intuition behind Proposition 3 is the following: The demand for equity from controlling shareholders increases when investor protection gets weaker, because it becomes easier to extract private benefits of control. If prices have increased as a consequence of the increased demand from controlling shareholders, then the incentive to invest for portfolio investors has unambiguously decreased. As a consequence some portfolio investors must have ceased to invest altogether. If prices have, however, decreased, then the total demand for equity must have decreased. Since we know that, for given prices, controlling shareholders always increase their demand when investor protection gets weaker, then portfolio investors must have decreased their demand. Again this

implies that investors to a larger extent than before have decided not to invest in stocks. Hence stock market participation rates decrease, no matter what happens to stock prices. In another words, Proposition 3 implies that ownership concentration always increases, if investor protection worsens.

Since domestic and foreign portfolio investors are alike, the following corollary follows immediately from Proposition 3.

Corollary 4 *Foreign investors hold less equity in a country with poor investor protection.*

Corollary 4 also implies that portfolio investors in countries with poor investor protection are more likely to invest in foreign countries compared to portfolio investors in countries where investors are well-protected. To put it differently, they exhibit a *good country bias*, even though there is *home bias* in the aggregate. The lower c_a is, the more pronounced the good country bias of domestic portfolio investors is. The home equity bias, however, still holds, because in countries with poor investor protection the wealthiest investors have stronger incentives to forgo the benefits of international diversification and over-invest in domestic stocks. It is also interesting to note that all our results and, in particular the implications of Proposition 3 on domestic investor stock market participation would hold, if there where two participation costs per market, \tilde{c}_d and \tilde{c}_a , that had to be paid separately when investing in a market and that could be equal.

Interestingly, changes in investor protection at Home affect ownership structure also in Foreign. Depending on the initial wealth distribution, this may bring convergence in ownership structures. Let's consider the consequences of an improvement in investor protection at Home. Some investors will give up the possibility of enjoying private benefits of control and will begin to diversity their portfolio internationally to a larger extent. If the group of such investors is large enough, the demand for foreign stocks will increase. Prices of foreign stocks will increase as a consequence and ownership concentration will decrease in Foreign like in Home, since enjoying private benefits of control has become more expensive also in Foreign. Convergence in ownership structure, however, it is not the only possible outcome of financial reform in a country. Depending on the initial wealth distribution divergence in ownership structures is possible as well. Assume that the wealth distribution before the improvement in investor protection is such that there are few rich controlling shareholders, whose portfolio share is well above $\underline{\alpha}$. After a marginal improvement in investor protection they may well decide to remain controlling shareholders and will increase their holdings of the foreign risky asset to a smaller extent than in the previous case. On the other hand, the portfolio investors,

who were initially diversifying their portfolio to a large extent because security benefits in the Home country were lower, will decrease their demand for foreign assets. Some of them may even stop investing in the foreign stock market. If the amount of this type of investors is sufficiently large, demand for the foreign risky asset may decrease following an improvement in investor protection at Home. Consequently, the price of the foreign risky asset will decrease and ownership concentration may increase. Therefore, divergence in ownership structures is also a possible outcome of financial reforms in one country.

The model also helps to analyze the effects of financial reforms on the welfare of different investors. Assume that the simple model was extended with one identical period and further assume that investor protection unexpectedly improves at Home in the intermediate period, after investors have made their portfolio choices but before payoffs are realized. An improvement in investor protection at Home would certainly benefit domestic and foreign portfolio investors, who would have access to higher payoffs and could diversify better their portfolios. The individuals who *ex ante* did not participate in the financial market and begin to do so after the financial reform also would gain for the same reasons. Interestingly, controlling shareholders would not necessarily lose. Obviously, they would be able to extract less private benefits of control in equilibrium and this would affect negatively their expected utility. However, if the distribution of wealth is such that the demand for shares increases enough, the controlling shareholders could benefit from the capital gains on their current holdings.

B Discussion

The main assumption driving the results of our model is that the payoff on stock investments is non-linear in the equity stake for domestic investors: Domestic investors who own a large enough fraction of the equity of a company gain control and can extract private benefits of control in addition to security benefits. This makes the payoff from investment for large shareholders higher than the payoff from investment for portfolio investors who can enjoy only security benefits, and explains their different behavior. There is empirical evidence supporting this assumption. Barclay and Holderness (1989) show that in block trades the premium that the buyer is willing to pay is increasing in the percentage of the stock that is purchased, suggesting that the payoff is increasing in the size of the block as well. We believe that it is appropriate to assume that only domestic investors can acquire control because the empirical evidence on international investment suggests

that foreign investors seldom acquire control positions in countries with poor rule of law (Wei, 2000). These are the only assumptions that we really need to explain why controlling shareholders invest too much in domestic stocks and, at the same time, the domestic and foreign portfolio investors invest too little in domestic equity.

All the other assumptions we make are not essential for the results, and are done only for simplicity. All our results would still hold with different utility functions. More importantly, we could assume a different technology for the extraction of private benefits of control. In our specification, both security and control benefits depend linearly on the ownership stake, α_{CS}^H , so that the optimal level of extraction of private benefits of control does not depend on the ownership stake of the controlling shareholders. In other words, the incentive and entrenchment effects of ownership cancel out each other in determining the level of control benefits to be extracted. This assumption simplifies significantly our computations, without driving our results⁹. If the technology for the extraction of private benefits were non-linear in α_{CS}^H , the optimal level of private benefits of control extracted in equilibrium would be a function of α_{CS}^H . The payoff from investing in domestic equity, however, would be higher for controlling shareholders than for the remaining domestic investors, and the incentives to underdiversify portfolios would still be present. Moreover, there is clear empirical evidence (see Claessens et al., 2002) that both the incentive and entrenchment effects of ownership are important, so that including the entrenchment effects into the analysis of extraction of control benefits is perhaps a more realistic way of modelling the issue than considering only the incentive effects of ownership concentration, like Shleifer and Wolfenzon (2002) do.

We also assume that investors take prices as given when they make their portfolio choices. In contrast the existing literature (see again, Shleifer and Wolfenzon, 2002) generally assumes that a controlling shareholder already exists and chooses the amount of equity to sell to outside investors internalizing the effect on the stock price. Our assumption allows us to analyze under what conditions controlling shareholders emerge in equilibrium.¹⁰ Moreover, it allows the set of shareholders who are able to extract private benefits of control to vary with the level of investor protection and the initial distribution of wealth, under the assumption that several controlling shareholders can share the private benefits of control, like in Zwiebel (1995). According to our assumptions, the extraction of private benefits by several controlling shareholders is non-competitive. For a given

⁹Without this assumption we could not determine α_{CS}^H explicitly.

¹⁰If we had a controlling shareholder who internalizes the effect on prices when selling equity, there would be another force leading to ownership concentration, due to the fact that an increase in supply of stocks depresses prices (see Martin and Rey, 2002 on this point).

level of cash flow that is extracted, B , the controlling shareholders are able to enjoy more private benefits of control the larger is the sum of their control rights. As we explain discussing Proposition 2, this assumption is not essential to our analysis. It captures, however, the idea that if several controlling shareholders are present it may be easier to tunnel funds out of the firm, because there is a more stable controlling coalition that cannot be easily challenged. Moreover, it may be easier to tunnel funds out of a firm using overpayment for goods and services, if multiple controlling shareholders can collude and exchange favors.¹¹ In this context, we are able to show that both security and control benefits affect the demand for equity. Stock prices may be higher when several blockholders are present just because the demand for equity is higher, and not because they prevent the principal shareholder from extracting 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 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. Khorana, Servaes and Tufano (2003) provide empirical evidence consistent with this.

Finally, we have framed this model as an analysis of two countries with separate stock markets. Another interpretation of this model would be that it deals with different risky assets in a single country. According to this interpretation all outside investors should avoid stocks where extraction of control benefits would be likely because of firm-level corporate governance problems. Interestingly, using individual shareholdings in Swedish companies, Giannetti and Simonov (2003) indeed find that outside investors invest a smaller proportion of their portfolios in companies where extraction of private benefits of control is expected to be larger.

IV Empirical evidence

Our model has several implications on the portfolio holdings of different categories of investors in relation to the quality of investor protection. These can be summarized as follows:

1. Ownership is more concentrated in countries with poor investor protection;
2. Foreigners hold less equity in countries with poor investor protection;

¹¹See Johnson et al. (2000) for descriptions of mechanisms shareholders use to tunnel funds out of firms.

3. Households' investor participation rate is lower in countries with poor investor protection;
4. In countries with low investor protection, portfolio investors hold relatively more foreign equity.

The existing literature offers plenty of evidence on the first two points. In particular, the relation between investor protection and ownership concentration has been widely studied. La Porta et al. (1998) provide detailed empirical evidence on the negative relation between ownership concentration and investor protection and also document that countries with more inequality have higher ownership concentration, as we would expect. Although this empirical evidence is compatible with our model, there exist other explanations in the literature that help to rationalize it. Ownership concentration can be a substitute for legal protection, when the conflict of interest is between managers and investors, and thus ownership concentration can be optimal in countries where investors are poorly protected.

There exists empirical evidence also in support of the second implication of our model. 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 stock 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 who enjoy only security benefits must be lower as a consequence.

The most original implications of our theory derive from the fact that we attempt to explain jointly the portfolio decisions of domestic and foreign investors. Unfortunately, there is hardly any international comparisons of households' portfolio choices. This is mainly due to lack of data, as aggregate financial accounts do not allow to distinguish between the decision of participating in the stock market and the amount invested conditional on participation. On the other hand, the microeconomic data available in national households' surveys may provide heterogeneous information for different countries, because the samples do not represent equally the population and because the surveys have been done for different purposes. Guiso et al. (2001, 2003a, and 2003b) make a first attempt to compare cross-country differences in stock market participation decisions. Using the household surveys of six countries (France, Germany, Italy, Sweden, U.K., U.S.), they show that there are sizable differences in stock market participation rates across countries and that these differences do not depend on households' characteristics. Differences across countries are actually

even larger if households' socioeconomic characteristics that are known to affect the participation decision are controlled for. Moreover, as our model would predict, Guiso et al. find that the main differences in stock market participation between continental Europe and the U.S. are among the poor and middle-wealth households, who are significantly less inclined to hold stocks in Europe. Rich households have high participation rates in all countries.

In order to analyze whether the empirical evidence is compatible with the results of our model, we gather data for a larger set of countries, and then analyze whether differences in participation rates are related to differences in investor protection. Our main source of data 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 1999 for Australia, Austria, Canada, Denmark, Finland, Hong Kong, Japan, New Zealand, Norway, Sri Lanka, the UK, and the US. The data on France, Italy, the Netherlands, and Sweden are taken from Guiso et al. (2003b), which in turn use the national household surveys. The data for Belgium, Germany, Greece, India, Singapore, Taiwan, and Turkey are from the June 2002 Factbook published by the Deutches Aktieninstitut. Finally, the data on Switzerland, Portugal and Ireland are from national private investment reports, which are respectively: a report of the Marktforschungsinstitut Demoscope, which surveyed a representative sample of 3242 people on their shareholdings activities in 1998, the "Survey into the profile of the Portuguese private investor" from the Comissão do Mercado de Valores Mobiliários, and the report "Private share ownership in Ireland", published in 2000 by Goodbody Stockbrokers.

[INSERT TABLE I]

These data measure domestic investors' participation to the domestic stock market. Their main drawback is that we do not have information on indirect holdings, which obviously have an important impact on the diversification of investors' portfolios. Moreover, the data refer to different years: the survey of the World Federation of Exchanges refers to 1998, the data from Guiso, Haliassos and Jappelli (2003b) to 1997 or 1998, the Deutches Aktieninstitut' data to 2000, the report on Switzerland to 1998, and the reports on Portugal and Ireland to 1999. Although these caveats will have to be kept in mind, we believe that it is valuable to provide some empirical evidence on cross-country differences in household stock market participation rates. Moreover, the lack of information on indirect stockholdings should not bias our results, since Guiso et al. (2003b) find that financial intermediaries are less developed in countries where stock market participation

is low. Guiso et al. (2003b) even argue that the low level of intermediation may explain the low stock market participation rates.

[INSERT FIGURE 1]

Figure 1 shows the correlation between stock market participation and shareholder rights measured by the antidirector rights index¹² constructed by La Porta et al. (1998) is positive in our sample. Furthermore, not only the impact of investor protection on stock market participation is positive and significant, but it also explains 48 percent of the variance in stock market participation across countries. The results (not reported) are similar if we also control for the quality of law enforcement. Both high level of law enforcement and shareholder protection increase significantly households' stock market participation. This is in accordance to the implications of our model and compatible with the existence of a joint explanation for the limited investor participation puzzle and the home equity bias. Moreover, our model implies that wealth distribution matters. We try to control for this effect using the Gini coefficient of income.¹³ The coefficient of this variable (not reported) is negative as expected: Investor participation is lower in countries with higher inequality. However, the coefficient is not significant. Perhaps more importantly, the coefficient of the quality of investor protection remains positive and significant, even after controlling for the income distribution.

Even more compelling empirical evidence is obtained from the holdings of foreign equity in countries with poor investor protection. According to our model, the home bias of investor portfolios in these countries comes from the large amounts of wealth invested in domestic equity by investors who are able to enjoy private benefits of control. In contrast, the portfolio investors who enjoy only security benefits should have a strong incentive to invest in foreign stocks in countries where domestic investments are poorly protected. Due to a new dataset compiled by Lane and Milesi-Ferretti (2001) we can check whether the data support this implication of our model. They construct estimates of foreign assets and liabilities and the equity and debt subcomponents for a cross-section of 67 industrial and developing countries. In particular, Lane and Milesi-Ferretti distinguish portfolio equity investments from foreign direct investments, which involve control of production and have very different motivations. We use the measures constructed by Lane and Milesi-Ferretti

¹²The index ranges from 0 to 5 and higher numbers indicate better shareholder protection.

¹³The data on the Gini coefficient of income we use have been compiled by Deininger and Squire (1996). Ideally, we would like to use the Gini coefficient of wealth. However, we have not been able to find that for a large cross-section of countries.

of foreign equity assets (i.e. domestic holdings of foreign equity) and liabilities (i.e. foreign holdings of domestic equity), which include only portfolio investment. To measure the portfolio shares of investors who enjoy only security benefits, we also need a measure of their holdings of domestic risky assets. From Dahlquist et al. (2003), we get a measure of the percentage of market capitalization that is closely held. Therefore we can proxy the holdings of domestic and foreign portfolio investors using the percentage of the stock market capitalization that is not closely held. At this point, the share of foreign equity in the portfolios of domestic investors who are not controlling shareholders can be proxied as follows:

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

Note that the main bias in our estimate of $\widehat{\alpha}_{PI}^F$ is that it also includes the foreign holdings of controlling shareholders. We must keep this in mind in the interpretation of the empirical evidence.

[INSERT FIGURE 2]

As an implication of our model we expect $\widehat{\alpha}_{PI}^F$ to be larger in countries with low level of investor protection. Figure 2 shows the mean level of foreign equity shares and the participation rate in countries with different levels of investor protection.¹⁴ The figure shows that indeed $\widehat{\alpha}_{PI}^F$ is lower in countries with high investor protection. Interestingly, in the countries with the lowest investor protection (Belgium, Germany, and Italy), the portfolio share of foreign equity is slightly lower. This does not contrast the implications of our model. In these countries, very few portfolio investors participate in the stock market and the holdings of controlling shareholders are dominant. Consequently, the measure $\widehat{\alpha}_{PI}^F$, which also includes the foreign holdings of controlling shareholders, is lower. However, as stock market participation increases, for intermediate level of investor protection, $\widehat{\alpha}_{PI}^F$ increases as well. According to our interpretation, this may be due to the fact that the equity holdings of portfolio investors become a more significant fraction of the equity assets of a country. As we would expect on the basis of our model, the portfolio share of foreign equity is significantly lower in countries with high level of investor protection.

¹⁴We include Belgium, the only country in the sample for which the index of shareholder protection is equal to 0, in the same group of the countries with index of shareholder protection equal to 1.

Alternative explanations have a hard time in reconciling these empirical findings. Guiso et al. (2003b), 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. However, a difference in participation costs cannot explain why in countries with low level of investor protection domestic investors hold more foreign equity than in countries with high investor protection, without making an assumption that in countries where investors rights are well protected, the fixed costs associated to buying foreign equity are higher than in countries with lower investor protection. Our explanation based on the relative payoff from domestic and foreign investments allows a more coherent explanation of these different aspects of portfolio choices.

Of course, this empirical evidence is only suggestive due to limited amount of data. However, differences emerge also from more rigorous statistical testing even with so few observations. The difference in the portfolio share of foreign equity between the countries with low investor protection (index of investor protection strictly less than 3) and the countries with high investor protection (index of investor protection higher or equal to 3) is statistically significant. Despite of the low number of observations, we can reject the null hypothesis that the mean of the share of foreign equity in the two groups is equal with a confidence level of 1%.

V Conclusions

To our knowledge, this is the first paper that provides a joint explanation for the pervasiveness of home equity bias and why investor participation rates differ so much across countries. Our explanation is based on differences in investor protection. Low degree of investor protection leads directly to lower participation rate in the stock market: In countries where investors are not well protected, investors endowed with low amount of wealth have an incentive to stay out of the stock market or at least invest a smaller proportion of their wealth in the stock market compared to countries where investors are well protected. The reason is that it is relatively easy for controlling shareholders to expropriate outside investors. This in turn leads to lower security benefits when minority shareholders are not well protected. Less obviously, deficiencies in investor protection can also explain home equity bias. It is easy to understand that all foreign investors have an incentive to avoid investing in a country where expropriating minority shareholders is easy, but this is not enough for home equity bias to exist: if this were the only explanation, we would talk about "good

country bias". In order to explain home equity bias, we also need that wealthy investors have an incentive to become controlling investors by investing a large proportion of their wealth in the stock market in a country with poor investor protection. Our model has both of these features. An interesting additional result is that better investor protection does not necessarily lead to higher stock prices, since improved minority investor protection leads to a situation where controlling shareholders have less incentives to hold domestic equity and as a consequence total demand for domestic stocks may decrease. This also implies that ownership concentration and firm valuation may be positively correlated, because wealthy investors have an incentive to pay a high price for stocks when gaining private benefits of control is easy, not because ownership concentration leads to higher security benefits as normally assumed in the literature.

Our model has several testable implications. Previous research has clearly established that ownership is more concentrated in countries that have lower level of investor protection (La Porta et al., 1998). This empirical fact is consistent with our model. Another implication of our model is that foreigners should invest less in stocks in countries with poor investor protection provision. In a recent paper studying the investment patterns of U.S., investors, Dahlquist et al. (2002) find that American investors avoid countries with poor investor protection. In this paper we provide original empirical evidence for two other implications from our model. We find that household stock market investor participation rates are lower in countries with poor investor protection and that in countries with low investor protection, portfolio investors hold relatively more foreign shares compared to countries with good investor protection provisions.

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A Appendix

A Proof of proposition 1

Solving for the optimal portfolio in the mean-variance framework we easily get:

$$\alpha_{optimal}^H = \frac{\mu_X - B - P - \rho \frac{\sigma_{X^*}}{\sigma_X} (\mu_{X^*} - B^* - P^*)}{\gamma \sigma_X^2 (1 - \rho^2)}$$

and

$$\alpha_{optimal}^F = \frac{(\mu_{X^*} - B^* - P^*) - \rho \frac{\sigma_X}{\sigma_{X^*}} (\mu_X - B - P)}{\gamma \sigma_{X^*}^2 (1 - \rho^2)}.$$

This portfolio allocation can be achieved if investors can borrow to invest in the foreign and domestic stock market or if $\alpha_{optimal}^F P^* + \alpha_{optimal}^H P + c_d + c_a \leq W_0$ and the expected utility associated with the optimal allocation is larger than the one from investing either only in the risk free asset or only in the risk free asset and the domestic risky asset, notwithstanding the participation costs. However, since we assume that investors can not borrow to invest in the stock market, the constraint $\alpha_{optimal}^F P^* + \alpha_{optimal}^H P + c_{domestic} + c_{abroad} \leq W_0$ is binding for individuals with low levels of the initial wealth. In this case, the optimal portfolio allocation is obtained solving the constrained optimization problem and comparing the expected utility that can be achieved investing only in the risk free asset, in the risk free asset and the domestic stocks, and the risk free asset and domestic and foreign stocks. Some tedious algebra shows that the optimal portfolio shares α_S^H and α_S^F are weakly increasing in W_0 . This implies that 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 $\underline{W}(\lambda, \lambda^*, P, P^*)$ such that it is optimal to choose $\alpha_S^H = \alpha_S^F = 0$ to save the fixed participation costs, $c_d + c_a$. Individuals with initial wealth larger than $\underline{W}(\lambda, \lambda^*, P, P^*)$ find it optimal to invest in the domestic risky asset, but not in the foreign asset. This is optimal because the benefit from investing a small amount of wealth in the foreign risky asset does not exceed the extra participation cost, c_a . 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 $\underline{W}(\lambda, \lambda^*, P, P^*)$. In this case, $\alpha_{PI}^H = W_0$. Individuals with initial wealth larger than $\underline{W}(\lambda, \lambda^*, P, P^*)$ invest in both risky assets and may eventually reach the optimal level of diversification of their portfolios. However, it is possible to find another lower

bound on the level of the initial wealth $\overline{W}(\lambda, \lambda^*, P, P^*)$, such that individuals with initial wealth larger than $\overline{W}(\lambda, \lambda^*, P, P^*)$ maximize utility by forgoing the diversification benefits in favor of the extraction of private benefits of control. In this case they obtain a marginal payoff on the domestic risky asset equal to $\mu_X - (1 - a(\lambda, B))B$ instead of $\mu_X - B$. If the wealth constraint is binding, the investors who choose to acquire control find it optimal to invest all their wealth in the domestic asset. Otherwise, the optimal portfolio shares in domestic and foreign risky assets are, respectively:

$$\alpha_{CS}^H = \frac{\mu_X - (1 - a(\lambda, B))B - P - \rho \frac{\sigma_{X^*}}{\sigma_X} (\mu_{X^*} - B^* - P^*)}{\gamma \sigma_X^2 (1 - \rho^2)}$$

and

$$\alpha_{CS}^F = \frac{(\mu_{X^*} - B^* - P^*) - \rho \frac{\sigma_X}{\sigma_{X^*}} (\mu_X - (1 - a(\lambda, B))B - P)}{\gamma \sigma_{X^*}^2 (1 - \rho^2)}$$

Even if the wealth constraint is not binding the portfolio shares satisfy $\alpha_{CS}^H \geq \alpha_{optimal}^H$ and $\alpha_{CS}^F \leq \alpha_{optimal}^F$.

B Proof of proposition 2

If the initial level of investor protection and the distribution of wealth at Home and in Foreign are such that most of the demand for the risky asset comes from wealthy domestic investors, $W_0 \in [\overline{W}(\lambda, \lambda^*, P, P^*), \infty)$, a decrease in investor protection increases the demand for domestic risky assets by the controlling shareholders, who are not wealth constrained, and increases the amount of domestic portfolio investors, who will want to become controlling shareholders as $\frac{d\overline{W}(\lambda, \lambda^*)}{d\lambda} > 0$. The remaining investors, who find it optimal not to acquire control will, of course, reduce their demand for the domestic risky asset. However, depending on the wealth distribution, the net demand for the domestic risky asset at current prices increases if ex ante portfolio investors were demanding a sufficiently low amount of domestic stocks. It is always possible to find a wealth distribution such that this is true. In this case, P will increase in equilibrium, if investor protection worsens. Also, the demand for the foreign risky asset from domestic investors, who now become controlling shareholders, decreases. If foreign investors held a negligible amount of domestic assets before the decrease in investor protection, their demand for foreign assets does not increase significantly, and therefore P^* decreases.

C 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 marginal payoff from investment, $\mu_X - B - P$, decreases unequivocally. Therefore, the wealth of the marginal investor who is indifferent between participating in the stock market or not, $\underline{W}(\lambda, \lambda^*, P, P^*)$, 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 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 stock from controlling investors increases and more individuals wish to become controlling 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 investor participation decreases.

Table I. Data

Investor stock market participation rates are from 1999 Share Ownership Survey by the World Federation of Exchanges, Guiso et al. (2003b), June 2002 Factbook published by the Deutches Aktieninstitut, Marktforschungsinstitut Demoscope, Comissão do Mercado de Valores Mobiliários, and Goodbody Stockbrokers. Antidirector rights and efficiency for judicial system indexes are from La Porta et al. (1998). Stock market capitalizations are from Demirgüç-Kunt and Levine (2001). Percentages for closely held stocks are from Dahlquist et al. (2003). The estimate for foreign equity holdings by domestic investors relative to their stock market wealth uses data for foreign equity assets and liabilities from Lane and Milesi-Ferretti (2001).

Country	Investor Stock Market Participation Rates	Antidirector Rights Index	Efficiency of Judicial System	Stock Market Capitalization to GDP	Percentage Of Market Capitalization Closely Held	Foreign Equity Holdings by Domestic Investors
Australia	0.404	4	10	0.431048	24.85	0.009168
Austria	0.056	2	9.5	0.07132	54.85	0.0890267
Belgium	0.05	0	9.5	0.258044	47.14	0.0799656
Canada	0.25	5	9.25	0.455363	48.82	0.0255211
Denmark	0.28	2	10	0.223052	25.1	0.0362815
Finland	0.187	3	10	0.184352	23.49	0.009845
France	0.15	3	8	0.197739	37.98	0.0205537
Germany	0.089	1	9	0.186379	44.74	0.0489564
Greece	0.102	2	7	0.081025	75.18	
Hong Kong	0.138	5	10	1.28219	42.73	
India	0.033	5	8	0.132123	40.32	
Ireland	0.17	4	8.75	0.265648	13.06	
Italy	0.07	1	6.75	0.118725	37.54	0.0205104
Japan	0.297	4	10	0.730083	38.38	0.0058784
Netherlands	0.14	2	10	0.409205	37.74	0.0393687
New Zealand	0.31	4	10	0.404699	77.48	0.0088756
Norway	0.21	4	10	0.151912	41.07	
Portugal	0.145	3	5.5	0.077534	35.04	0.0089229
Singapore	0.083	4	10	1.23063	57.1	
Sri Lanka	0.023	3	7	0.129598	19.15	
Sweden	0.22	3	10	0.380937	20.99	0.029502
Switzerland	0.176	2	10	0.705946	25.73	0.0566265
Taiwan	0.125	3	6.75	0.4886	22.26	
Turkey	0.012	2	4	0.061429	70.86	
UK	0.3	5	10	0.762871	9.93	0.0149091
US	0.26	5	10	0.581779	7.94	0.0051064

Figure 1. Antidirector Rights vs. Investor Participation

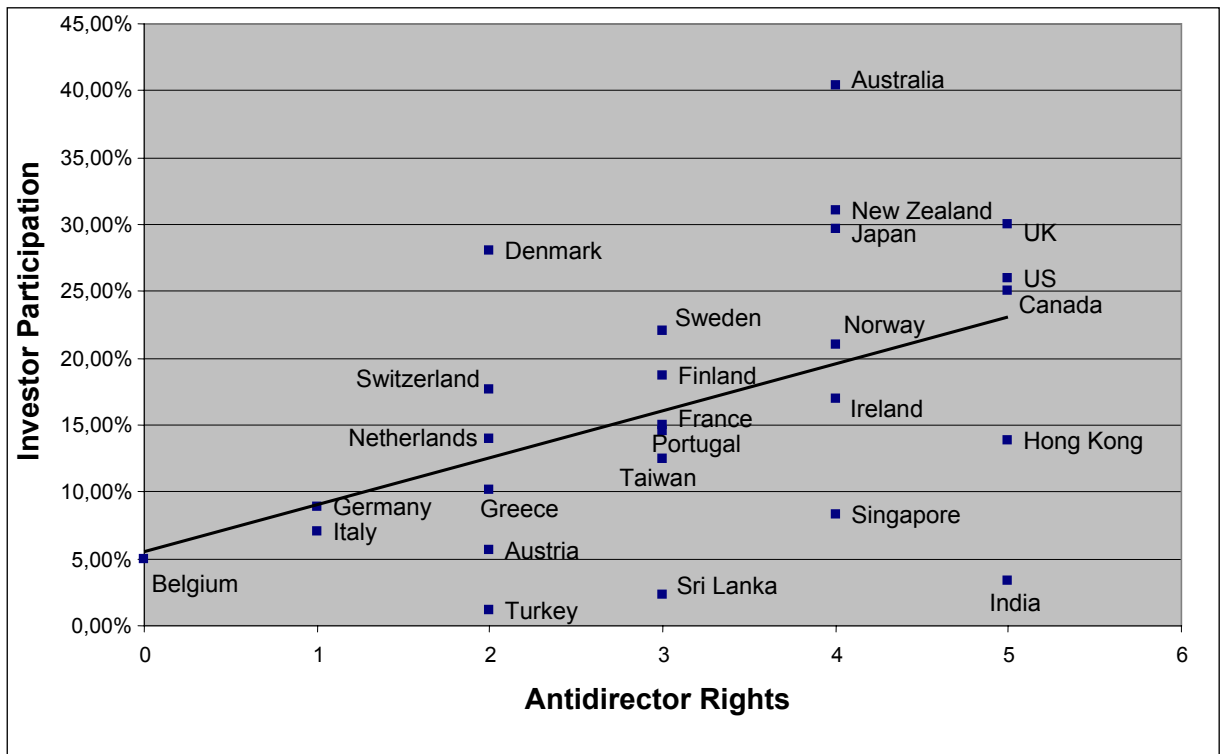


Figure 2 Participation Rates, Foreign Equity Holdings and Antidirector Rights

