

**Securities laws, disclosure, and national capital markets in the age of
financial globalization**

by

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Abstract

As barriers to international investment fall and technology improves, the cost advantages for a firm's securities to trade publicly in the country in which that firm is located and for that country to have a market for publicly traded securities distinct from the capital markets of other countries will progressively disappear. However, securities laws remain an important determinant of whether and where securities are issued, how they are valued, who owns them, and where they trade. The value of public firms depends on these laws, so that identical firms subject to different laws are likely to have different values. We show that mandatory disclosure through securities laws can decrease agency costs between corporate insiders and minority shareholders, but only provided that the investors can act on the information disclosed. With financial globalization, national disclosure laws can have wide-ranging effects on a country's welfare, on firms and on investor portfolios, including the extent to which share holdings reveal a home bias. In equilibrium, if firms can choose the securities laws they are subject to when they go public, some firms will choose stronger securities laws than those of the country in which they are located and some firms will do the opposite.

If capital can move freely between countries to take advantage of the best investment opportunities, are national capital markets still relevant? If they are still relevant, why are they? Is it still in a country's national interest to have strong capital markets? Does it even make sense to talk about the competition between national capital markets¹ in an age of globalization? We attempt to make progress towards answering these questions in this paper.

A country's capital markets are the markets in which firms and government institutions raise capital publicly and where securities representing claims to capital are traded. Capital markets perform key functions of the financial system.² They allow investors to pool resources to finance firms and manage risk through diversification and hedging. They enable price discovery. However, capital markets do not have a monopoly on performing these functions. Firms can raise capital from financial intermediaries as well, so that capital markets compete with financial intermediaries. The relative importance of intermediated sources of capital versus public sources of capital for firms can change over time as technologies and regulations evolve. As capital markets perform their functions better, they displace intermediated finance and firms can raise capital more cheaply. A country's capital markets perform better than the capital markets of other countries if firms can finance themselves at lower cost on that country's markets than elsewhere.

In a world where countries are closed to international capital flows, firms can only raise capital domestically. In such a world, each country would be concerned about the performance of its national capital markets because the cost of capital for firms raising funds publicly would be determined on these markets. However, if capital can flow freely among countries, firms raise capital where it is cheapest. In a fully integrated world, we would expect national capital markets to be irrelevant. If a country's capital markets functioned poorly in such a world, firms would simply

¹ Much attention has been paid recently to the competitiveness of U.S. capital markets. See, for example, the Interim Report of the Committee on Capital Market Regulation (November 30, 2006), Zingales (2008), and Doidge, Karolyi and Stulz (2008). See also related news reports, such as "London calling" *Forbes* (May 8, 2006); "Wall Street: What went wrong?" *The Economist* (November 25, 2006); and "Is Wall Street losing its competitive edge?" *Wall Street Journal* (December 2, 2006).

² See Merton (1990) for an analysis of the functions of the financial system.

ignore these capital markets as sources of capital. The welfare consequences from having poorly functioning national capital markets would be extremely limited because firms and investors could bypass these markets freely. There would be no national interest at stake for a country in having well-functioning capital markets.

Technological changes over the last two centuries have dramatically altered the importance of location for capital markets, so that there is no operational reason to have national capital markets. Investors anywhere in the world have virtually access to the same price information at the same time. The location of the trader is irrelevant for trading on electronic exchanges. The location of the exchange itself is irrelevant. There is no operational reason for the computer systems that make possible the trading of American stocks to be located in the U.S. Economies of scale in trading imply that, in a frictionless fully integrated world the trading of securities would not be organized by countries.

The fact that portfolios of investors are still heavily biased towards securities issued and traded in their own country, a phenomenon described as the home bias, shows that, despite the free flow of capital, we are far from a fully integrated world in which countries are irrelevant for the issuance and trading of securities.³ A major reason for why countries are not irrelevant is that they have different laws and enforce them differently. The laws that apply uniquely to publicly traded securities are securities laws. By securities laws, we mean broadly the laws and regulations which affect the trading and issuance of securities in a country. La Porta, Lopez-de-Silanes and Shleifer (2006) show that these laws differ substantially across countries and that laws that mandate disclosure are strongly associated with the development of stock markets.

Otherwise identical securities subject to different securities laws are different securities. Securities laws affect capital markets in a country in at least two different ways: by imposing obligations on firms that issue securities publicly (issuer rules) and by having rules that apply to the

³ See Kho, Stulz, and Warnock (2008) for evidence that the home bias is still strong.

trading of securities (trading rules).⁴ An example of issuer rules is the requirement for firms in the U.S. to make periodic disclosures. Restrictions on trading by insiders in the U.S. are examples of trading rules. We investigate the impact of both issuer and trading rules in a world of financial globalization showing how they can affect where firms' securities are traded, the extent to which firms access public markets, firm valuation, the cost of equity capital, and investor portfolios.

With differences in securities laws, location matters. A firm located in a country will typically be affected by the securities laws of its country and will not be able to escape them costlessly. As securities laws tie firms to local capital markets, they make a country's capital markets an important, and possibly critical, determinant of the cost of external finance for firms in that country even when there are no restrictions to cross-border capital flows.

Much of the literature on mandatory disclosure evaluates whether firms disclose suboptimally because benefits from disclosure at the firm level are lower than benefits for society as a whole (see Leuz and Wysocki (2008) for a review). For instance, Zingales (2004) points out that "General Motor disclosure helps investors evaluate Ford, but GM will never internalize this benefit." Such a view assumes that it is clear that the positive externalities of mandatory disclosure outweigh the negative ones, a presumption that Romano (2001) and others have questioned. Our approach to mandatory disclosure sets aside the issue of externalities and shows that securities laws enable private parties to reduce agency costs in a way that they could not otherwise.

To examine the impact of issuer rules, we use a simple model of an all-equity firm selling shares in an initial public offering (IPO) to investigate how securities laws affect the cost of external finance in a world of financial globalization. We show that agency costs create a wedge between the cost of outside equity for the entrepreneur and the expected return on the firm's equity required by investors. We assume that investors are risk-neutral (consequently, there is no risk-sharing benefit to disclosure as there is, for instance, in Dye (1990)), so that the required expected return on equity for investors is the same for all firms. The problem the entrepreneurs face is that

⁴ See Siems (2008).

they cannot credibly commit *ex ante* to take actions in the future that are valuable to outside shareholders but are not *ex post* optimal for themselves. After the IPO, the firm's insiders would like to disclose less than they committed to disclose before the IPO. In the model, disclosure is valuable because the information disclosed can be used to force the firm to take actions that maximize shareholder wealth. If entrepreneurs cannot resolve this time-inconsistency problem, they receive less for the shares they sell than otherwise. We show that strong securities laws help resolve this problem and hence help maximize the entrepreneurs' proceeds from IPOs. However, securities laws are helpful only to the extent that they lead to credible disclosure and that outside shareholders or the state can act on the information disclosed to force the firm to pursue a course of action that is valuable to outside shareholders. We show that firm values, ownership, and cost of external finance differ across countries because securities laws affect their production decisions.⁵

In a world with free capital flows, differences in securities laws across countries can have a large impact, but these differences are mitigated when firms can choose to subject themselves to the securities laws of other countries than of their own. In some countries, firms can issue securities abroad and, in some cases, even opt out of the securities laws of their country. The resulting equilibrium of where a firm issues securities and where its common stock trades depends on the discretion firms have and the costs they bear to subject themselves to the securities laws of a different country than the one in which they are located.

If securities laws can be ranked by their strength, firms in countries with weak securities laws can benefit from choosing to subject themselves to the stronger securities laws.⁶ In the absence of cross-border trading and listing costs, new firms would only list in the country with the optimal securities laws as long as trading costs are low in that country and investors do not exhibit a preference for shares which trade locally. However, with cross-border trading costs, shares are

⁵ Shleifer and Wolfenson (2002) and Stulz (2005) derive implications for firm value and ownership when laws result in different rates of consumption of private benefits out of firm cash flows. Our results in this paper do not rely on differences in the rate of consumption of private benefits.

⁶ See Coffee (1999) and Stulz (1999) for developments of the idea that foreign firms can rent institutions, including securities laws, from other countries.

likely to trade in the home country of firms, especially when investors have a preference for shares issued by firms of their country. We show that if listing on a second exchange has costs and firms are necessarily subject to the securities laws of their country of incorporation, only the firms that suffer the most from their inability to commit will be willing to cross-list and they will choose to have a second listing in a country with stronger securities laws. These conclusions assume that securities laws from one country are equally enforced on domestic firms as they are on foreign firms; if this assumption is not correct, the benefits to firms from adopting another country's securities laws are lower.⁷

When investors evaluate investments in common stocks, they consider the net expected return of stocks. Two stocks with the same expected gross return can have very different net expected returns after expected trading costs and information acquisitions costs are taken into account. Securities laws can affect the cost of trading for investors, their information acquisition costs, the precision of their estimates of the distribution of returns, and the stocks they know. We examine the impact of securities laws on the portfolio choices of investors. To the extent that securities laws affect investors differentially, they can lead to differences in portfolios and in particular to home bias. Further, such differences can affect the expected return of securities.

If investors had no preference for securities of their home country and a country's laws left firms going public free to choose securities laws they are subject to, as proposed by the legal scholars who favor issuer choice,⁸ firms would have an initial public offering (IPO) in the country that has securities laws that entrepreneurs prefer. If entrepreneurs want to maximize proceeds at the IPO, they would choose securities laws that help them commit to maximizing the value of the shares for minority shareholders. In equilibrium, with issuer choice, all trading could still migrate to one exchange if cross-border trading costs disappear. Firms on that exchange would differ in the

⁷ Note that if securities laws cannot be ranked using a single index but instead are multi-dimensional, the securities laws of one country might be optimal for firms of a certain type from other countries, while securities laws from another country might be optimal for other types of firms.

⁸ See, for instance, Romano (2001).

securities laws they are subject to. The case for issuer choice is strong if markets are efficient and if the externalities from applying securities laws to a specific firm are small. However, there is no convincing case to allow existing firms to escape strong securities laws without overwhelming support by shareholders because such an action would benefit insiders at the expense of minority shareholders. After the IPO, insiders may prefer securities laws that put few constraints on them even if, as a result, the share price is lower than it would be if they were subject to more constraining securities laws that would benefit minority shareholders. In a political economy context, it is therefore easy to understand why insiders of established firms would lobby to relax securities laws, but such lobbying attempts should be viewed with caution since all they might achieve is a wealth redistribution from minority shareholders to insiders at the expense of economic growth.

The paper proceeds as follows. In the first section, we explore the implications of technological progress and financial globalization for the role of national capital markets. In the second section, we develop a model which enables us to assess the role of the issuer rules of securities laws across countries in Section 3. In Section 4, we investigate the impact of securities laws on the portfolio choices of investors across countries and hence on the required expected return of investors on securities. In Section 5, we consider more broadly the advantages and disadvantages of allowing more freedom for firms to choose the laws and regulations that apply to the securities they issue and attempt to forecast how the role of national capital markets will evolve. We conclude in section 6.

1. National markets, financial globalization, and transaction costs

At the end of World War II, the financial markets of most countries were completely segmented. In most countries, resident investors could not trade securities with foreign investors and firms could not raise capital abroad. If a country's capital market is segmented from the rest of the world, the cost of capital of its firms is determined within the country. Suppose that capital markets are perfect except for insurmountable barriers to international capital flows and that

investors optimize the tradeoff between the expected return and the variance of their portfolio. In this case, the capital asset pricing model (CAPM) holds within a country. With the CAPM, the expected return on a security is equal to the risk-free rate plus the product of the security's beta coefficient and the risk premium on the market portfolio. With complete capital market segmentation, two securities that give the right to identical streams of dividends are priced differently across countries because the market portfolio, the risk-free rate, the market risk premium, and the beta coefficient of the securities all can differ across countries.

Since the end of World War II, barriers to international investment have progressively been removed. These barriers have mostly disappeared for trade in financial assets among developed countries and for a number of emerging countries. They still exist, however, in varying degrees, for a large number of emerging countries. Keeping the assumptions that capital markets are perfect, but now assuming that there are no barriers to international investment, the CAPM holds internationally.⁹ In this case, two securities that give the right to identical streams of dividends issued in different countries trade for the same price.

With perfect capital markets and free capital mobility, the expected return on a security does not depend on the country in which it trades or the country in which it was issued. There are no differences in the cost of capital across countries. The concept of a national capital market is meaningless. It would make no difference to a firm whether it issues a security in its own country or issues it in another country. Investors would require the same expected return irrespective of the country in which a security trades or is issued. If there is no risk of interruption of cross-border trade, where a security trades becomes a matter of indifference when capital markets are assumed to be perfect.

With perfect capital markets, there are no trading costs. Suppose now that the only departure from perfect markets is that it is costly to process trades. This trading cost can differ across trading

⁹ See Karolyi and Stulz (2003) for the precise conditions that have to be met for the CAPM to hold internationally.

venues, so that the selection of a trading venue for a trade is no longer a matter of indifference. Historically, when the costs of cross-border trades were high, it would have been reasonable to assume that local trades in local shares had a lower processing cost than if these trades were made abroad. However, cross-border costs are much lower now. To the extent that there are economies of scale in operating exchanges, there is a threshold level of cross-border costs such that, if cross-border costs are lower than this level, national exchanges stop making economic sense.

Consider the case where the trading technology and the cost of trading inputs are the same across countries. The demand for trading of a security as a function of the cost of trading is downward-sloping. Malkmäki (1999) investigates cost and output statistics for 37 stock exchanges and demonstrates that there are substantial economies of scale in trading activities.¹⁰ Empirical evidence shows that there are economies of scale to trading, so that the marginal cost is decreasing. Figure 1 shows the marginal cost function of the trading technology. We assume that there is perfect competition, so that the trading cost for investors is the marginal cost. We assume further that there are two countries, with similar demand curves for trading, but the locations of the demand curves differ because one country is much larger than the other. Suppose first there are no cross-border trading costs. If investors from each country trade in their own country, the investors in the small country pay C_S per trade, while investors in the large country pay C_L and, consequently, pay much less per trade than the investors in the small country. If all investors trade in one country, the cost of trading is C_{L+S} , which is lower for all investors. In the absence of cross-border costs, the trading could be located anywhere – it does not have to be located in the large country or in the home country of the firm.

Suppose now that there is a cross-border trading cost. In this case, the outcome is either that all trading takes place in the large country or trading takes place in both countries. If the cross-border

¹⁰ He distinguishes two functions of exchanges, one that is a trading function and the other that is a company-specific function. The company-specific function involves the collection of company-specific information and the management of listings. He only finds evidence of economies of scale in the trading function in his dataset. For the larger exchanges, he also finds economies of scale for total cost.

cost is small enough, investors in the small country will still trade at a lower total cost if they trade in the large country. If the cross-border cost exceeds the gains from the economies of scale, however, investors in the small country will be better off trading at home. In that case, securities would trade in both countries.

If the only departure from perfect markets is transaction costs, there would be no reason for a firm's securities to trade mostly in the country in which the firm is located. If a security were to trade in only one country, it would be much more likely that it would trade in the U.S. than in any other country because so much of world equity wealth is held in the U.S. In this case, there would be no room for a home bias if investors optimize the tradeoff between the mean and variance of the return of their portfolios. However, suppose that, following Fama and French (2007), investors have a taste for some securities. Let's assume that their taste for securities is that they have a preference for securities issued by firms of their own country that trade in their own country. In this case, we would expect that a firm's securities would trade first in the firm's home country and, if they trade elsewhere, they might trade in the U.S. because U.S. investors would most likely be the second most important source of demand for these securities.

The determination of the trading location for a security becomes more complicated if liquidity is taken into account. The literature on multi-market trading makes predictions on the location of trading. In that literature, liquidity considerations can reinforce the economies of scale of trading, making it more likely that all the trading for a security will take place in one location, in the absence of frictions in the trading process. Pagano (1989) develops a model with adverse selection in which it is possible for trade to take place on multiple exchanges when trading costs differ across exchanges. His model does not account for economies of scale in trading and assumes a fixed cost to trade. In his model, whether all trading is concentrated on one exchange or not depends on the conjectures of the traders. However, the model is one where traders choose the exchange and are stuck with their choice. If instead traders can arbitrage across exchanges, the outcome is to have all trades take place on one exchange. Chowdry and Nanda (1991) extend the models of Kyle (1985)

and Admati and Pfleiderer (1988) to allow simultaneous trading on multiple markets. In their model, liquidity clusters on one market. Domowitz, Glen, and Madhavan (1998) extend the model of Glosten and Milgrom (1985) to multi-market trading. They emphasize the importance of transparency between markets. In their model, incremental information costs make it cheaper for local investors to trade locally. As these incremental information costs disappear, trading may cluster on one market. Finally, Baruch, Karolyi, and Lemmon (2007) have no information acquisition costs. They assume, however, that the market makers on one exchange do not see the order flow on the other exchange, so that a market maker provides liquidity more cheaply if a security's return is highly correlated with the returns of other securities whose order flow he observes. This can lead to preferred trading locations for securities, but multiple exchanges remain in existence because market makers have a comparative advantage in providing liquidity for some securities on each exchange. However, with financial globalization, we would expect that all trading would eventually take place on one market in their model since integration of the market making function across exchanges for a single security would lead to the greatest liquidity.

There is a large literature which examines whether investors closer to a firm geographically are better informed. Though much of that literature shows that geography gives investors an informational advantage,¹¹ there are exceptions. For instance, Grinblatt and Keloharju (2000) find that foreign investors perform better in Finland. With physical trading, the geographic informational advantage would make it advantageous for trading to be located close to firms because the traders who receive more and better information about these firms would be located there. Gehrig (1998) therefore predicts that the informationally-sensitive trading will take place where the information is produced and aggregated. Consequently, differences in access to information could offset economies of scale in trading.

In recent years, electronic trading has become increasingly dominant. Rather than having traders congregate in a pit or at a post, the traders meet over the internet. Computers are replacing

¹¹ See Choe, Kho, and Stulz (2005) for a partial review of the international literature on this issue.

trading floors. In a world of electronic trading in which markets are perfect except for trading costs, the location of the computers is irrelevant. No investor would have reasons to care whether the computers through which trading takes place are located in one country or in another. There are no cross-border costs for electrons. Consequently, cross-border trading costs caused by distance have disappeared. As cross-border trading costs approach zero, economies of scale of trading dominate the benefits that come from having local exchanges if the only market imperfection is the existence of transaction costs. Importantly, differences in information across investors have no impact on the location of trading when the exchange is electronic. The reason is that electronic trading completely separates the location of trading from the location of traders.

With electronic trading, investors and market makers can be located anywhere where they have an internet connection. If market makers for stocks issued in a country are located in that country, they can make a market even if the exchange on which these stocks trade is located elsewhere. The fact that stocks might trade through a computer in a country that has a different currency is not a problem since the currency in which trading takes place does not have to be the currency of the country in which trading occurs. Time zones are not an issue because computers do not have to observe time zones.

We know from the field of microstructure that the organization of financial markets affects the cost of trading and the efficiency of markets. Consequently, countries might differ in how their markets are organized and trading might be cheaper in some countries than others. With free capital flows, the markets with lower transaction costs would obtain more listings. If trading costs were the only market imperfection and cross-border trading costs were trivial, there would be no reason for stocks to trade in a country when another country has better trading mechanisms. Eventually, all trading would take place on one electronic exchange.

With the analysis of this section, when cross-border costs are trivial, the benefits to a country from having the most efficient exchange are limited. All trading will take place on that exchange. However, firms from all countries will benefit equally from the efficiency of that exchange. As a

result, firms in another country will not suffer from being in a country that does not have the most efficient exchange. From this perspective, there would be no national interest in having the most competitive capital markets.

A prediction of the transaction costs model is that firms that list in another country besides the country they come from would list in the U.S. The reason for this prediction is straightforward: that's where the biggest amount of trading besides home-country trading would be if investors optimize the mean and variance tradeoff of their portfolio after taking into account a preference for home-country shares because there is more equity wealth in the U.S. than in any other country. Yet, many firms that list outside of their country do not list in the U.S. Doidge et al. (2008b) show that in 2005 the U.S. exchanges had 30% of the world's cross-listings. Further, most firms do not have a cross-listing.¹² It follows therefore that other considerations must affect the listing decision.

2. Going public and the role of securities laws

The previous section ignores the agency conflict between corporate insiders, such as managers and controlling shareholders, and the outside shareholders. We now extend our analysis to incorporate this conflict. To simplify and focus the analysis, we analyze a firm's IPO. We assume that an entrepreneur has a project. The project is scalable, so that the entrepreneur may gain more from the project by raising outside equity. The agency problem is that, after the IPO, the entrepreneur or her successors running the firm maximize their own welfare and can take actions that reduce the value of the shares they sold to outside investors. This agency problem can be so extreme that a firm with a positive NPV project may not be able to go public. We argue that securities laws can help mitigate these problems and therefore reduce the cost of external finance for entrepreneurs.

¹² See Doidge, Karolyi, and Stulz (2005).

2.a. A model of the IPO firm

To make these arguments clearer and more precise, we build on the models developed in Shleifer and Wolfenzon (2002) and Stulz (2005). Our model has three dates: 0, 1, and 2. For simplicity, no time elapses between dates 0 and 1. We consider an entrepreneur with wealth W_0 at date 0 who has an investment opportunity available at date 0. With this opportunity, an investment of capital K will return μK , where μ is a random variable. The size of the investment opportunity has an upper-bound of Ω , so that $K \leq \Omega$. There is a risk-free asset which has a gross return of r from date 1 to date 2. The entrepreneur can sell shares to outside shareholders. The outside shareholders and the entrepreneur are assumed to be risk-neutral for simplicity.

At date 0, outside investors know $E_0(\mu)$, which is the expected value of μ before the entrepreneur raises funds. The entrepreneur learns $E_1(\mu)$ at date 1, after raising funds but before the investment becomes irreversible. After $E_1(\mu)$ becomes known to the entrepreneur, she can either start production or not. If she does not start production, the firm liquidates and shareholders receive a liquidating dividend in proportion to their ownership. The outside shareholders receive no information about $E_1(\mu)$, except for the information that the entrepreneur decides to reveal to them. The distribution of $E_1(\mu)$ is such that, with probability p , μ is lognormally distributed with mean μ^+ and with probability $(1 - p)$ it is lognormally distributed with mean μ^- . We assume that $\mu^+ > r > \mu^-$. Note that the assumption can be satisfied if $E_0(\mu) < r$. The standard deviation of μ , σ^2 , does not depend on the realization of $E_1(\mu)$. If the expected value of μ turns out to be μ^- , the project is expected to return less than the risk-free asset. Consequently, if markets were perfect, production would not take place if $E_1(\mu) = \mu^-$.

At date 2, production is realized and the entrepreneur can extract private benefits at the rate f which she chooses optimally. Consumption of private benefits has a cost for the entrepreneur which is a convex function of f , $0.5b\mu f^2 K$. The entrepreneur is assumed to pay this cost out of her own pocket. This cost may arise, for instance, from enforcement actions when the entrepreneur is caught consuming private benefits or may be incurred when the entrepreneur has to take expensive steps to

disguise consumption of private benefits. The cash flow left in the firm after extraction of private benefits, $(1 - f)$, is distributed as a liquidating dividend.

In a neo-classical world, the entrepreneur would raise outside equity to invest Ω at date 0, and at date 1 the entrepreneur would start production if $E_1(\mu) > r$ and would return the money to the investors otherwise. We call a project that has $E_1(\mu) \geq r$ ($E_1(\mu) < r$) a project with a positive (negative) NPV at date 1. If the entrepreneur can consume private benefits out of the cash flows generated by the project at date 2 and benefit from starting production in the project when it has a negative NPV, the size of the investment in the project may be limited by the entrepreneur's wealth because the entrepreneur has to co-invest with outside investors. In this model, co-investment by the entrepreneur reduces the incentives of the entrepreneur to start production at date 1 when production has a negative NPV and to extract private benefits at date 2. The entrepreneur will choose the rate of expropriation at date 2 after the realization of the cash flows. She chooses her co-investment before going public at date 0. As the entrepreneur's proportional ownership of the firm, α , increases, the gain to the entrepreneur from expropriation at date 2 falls. To see this, note that the entrepreneur only gains $(1 - \alpha)$ from increasing expropriation marginally, but incurs a marginal cost equal to bf . The gain from expropriation falls as ownership increases, but the cost does not decrease. We take Ω to be large enough that it is not binding when the entrepreneur consumes non-trivial private benefits in equilibrium.

The entrepreneur consumes her wealth at time 2. Wealth not invested in the firm is invested in the market. However, in equilibrium, the entrepreneur has no reason not to invest all her wealth in the firm if the firm goes public. If production takes place, the entrepreneur's wealth at date 2, W_2 , is given by:

$$W_2 = \alpha(1 - f)\mu K + f\mu K - 0.5b\mu Kf^2 \quad (1)$$

If production does not take place, W_2 is equal to αKr . The entrepreneur maximizes $E(W_2)$. She does so backwards by first solving for f at date 2. The optimum amount of expropriation is given by:

$$f = \frac{1-\alpha}{b} \quad (2)$$

At date 1, the entrepreneur solves for the decision of whether to keep the money of investors or abandon production and return money to investors. Solving the condition that has to be met for production to take place, we have that production takes place provided that:

$$\alpha(E_1(\mu) - r) + 0.5 \frac{(1-\alpha)^2}{b} E_1(\mu) \geq 0 \quad (3)$$

Note first that the neo-classical rule is to produce only if $E_1(\mu)$ is equal to or higher than r . With the neo-classical rule, the size of the firm is given by Ω . It immediately follows from equation (3) that if the firm goes public, so that $\alpha < 1$, the neo-classical rule holds only if $b = \infty$. As long as the entrepreneur can consume private benefits at date 2 at the expense of outside shareholders, she has an incentive to start production even if the project has a negative NPV at date 1 because she would not be able to extract private benefits if she were to liquidate the firm at date 1.

At date 0, the entrepreneur chooses the scale of the project, K , and her ownership, α . For the sake of brevity, we only discuss the entrepreneur's optimization problem for the case where production always takes place at date 1. In this case, the entrepreneur's optimization problem can be written as:

$$\begin{aligned} \max_{K,\alpha} & \left[\alpha + 0.5 \frac{(1-\alpha)^2}{b} \right] KE_0(\mu) \\ \text{s.t.} & (1-\alpha)(1-f^*)E_0(\mu)K \geq (K - W_0)r \end{aligned} \quad (4)$$

The rationality constraint implies that outside shareholders require their expected return to be at least equal to the riskless interest rate. There is no reason for the entrepreneur to choose a solution where the rationality constraint is not binding since the entrepreneur could increase her welfare by

making the constraint binding. Substituting the solution for the rate of diversion into the rationality constraint, we obtain:

$$(1-\alpha)\frac{E_0(\mu)K}{r} - \frac{(1-\alpha)^2}{b}\frac{E_0(\mu)K}{r} = K - W_0 \quad (5)$$

The first term in this equation is the price at which the shares not retained by the entrepreneur would be sold in a world without consumption of private benefits at date 2. The second term is the amount by which the shares are discounted because of the consumption of private benefits. The proceeds from the sale of shares to outside investors are equal to the amount of outside funds invested in the project. Remember that b is the parameter which affects the cost of consuming private benefits for the entrepreneur. As b becomes small, the discount becomes large. For small enough b and/or small enough $E_0(\mu)$, the rationality constraint cannot be satisfied, so that the entrepreneur cannot sell shares to outside shareholders. A lower b requires higher ownership by the entrepreneur, which can only be achieved by decreasing the scale of the project.

The entrepreneur faces a tradeoff in choosing ownership. A greater α reduces the extent to which outside shareholders discount the value of the firm and therefore allows management to raise external funds at a higher price. However, at the same time, a greater α limits the scale of the project since the entrepreneur's co-investment is limited by her wealth. The entrepreneur chooses her ownership so that the marginal cost and the marginal benefit from ownership equate. Given optimal ownership, the following Proposition characterizes the production decision of the entrepreneur at date 1.

Proposition 1

Assuming that the entrepreneur sells shares to outside shareholders:

- 1) If $\alpha^*(\mu^- - r) + 0.5\frac{(1-\alpha^*)^2}{b}\mu^- \geq 0$, where α^* is the optimal value of α and satisfies

$(1 - f^*)(r - (1 - \alpha^*)(1 - f^*)E_0(\mu)) = (\alpha^* + 0.5bf^{*2})(1 - 2f^*)E_0(\mu)$, production starts at date 1 even if the project is a negative NPV project.

2) If $\alpha^*(\mu^- - r) + 0.5\frac{(1 - \alpha^*)^2}{b}\mu^- < 0$ and $\alpha^*(\mu^+ - r) + 0.5\frac{(1 - \alpha^*)^2}{b}\mu^+ \geq 0$, where α^*

satisfies $(1 - qf^*)(r - (1 - \alpha^*)(1 - f^*)p\mu^+) = (\alpha^* + 0.5bqf^{*2})(1 - 2f^*)p\mu^+ + (1 - 0.5bqf^{*2})(1 - p)r$ and

$q = \frac{p\mu^+}{p\mu^+ + (1 - p)r}$, then production starts only if $E_1(\mu) = \mu^+$ as with the neoclassical rule.

With our model, an entrepreneur with a positive NPV project at date 0 may be unable to undertake the project because the entrepreneur consumes private benefits at date 2 and may choose to produce at date 1 even when the project is revealed to be a negative NPV project at that date. If the entrepreneur could commit to only produce at date 1 if $E_1(\mu) = \mu^+$, she might be able to raise funds. Though the entrepreneur would find it advantageous to commit not to produce if $E_1(\mu) = \mu^-$, such a commitment is not credible in our model because *ex post* the entrepreneur is always made better off by starting production as long as μ^- is not too low. In this model, the inability to commit to produce only if the project is a positive NPV project always decreases the proceeds from the IPO and hence decreases the size of the firm.

We assume that investors are rational. Consequently, they discount the value of shares sold to them to reflect their expected losses because of moral hazard. No investor protection is required to insure that investors are treated fairly: their expected payoff is exactly the one they anticipate. However, the fact that investors protect themselves against some outcomes by reducing the price they are willing to pay for shares is extremely costly to entrepreneurs and to economic welfare because some good projects are not implemented. Laws that protect investors by excluding some investment outcomes can be welfare-enhancing if, by excluding these outcomes, they raise the price that investors are willing to pay for shares and make it possible for entrepreneurs to undertake

positive NPV projects. Paradoxically, in this model, the investor protection of securities laws benefits the entrepreneur.

2.b. The limits of private solutions

We assume that the entrepreneur wishes to maximize the proceeds from the IPO. The entrepreneur could raise the most funds and hence maximize her profit from the project if she could commit to consume no private benefits at date 2 and to start production only if she has a positive NPV project at date 1. Though it is ex ante optimal for the entrepreneur to make this commitment, it is not ex post optimal for her to do so in the setting of our model. Consequently, investors cannot rely on promises by the entrepreneur – they would not be time consistent.

The entrepreneur has incentives to find ways to make it more likely that she will not consume private benefits and follow the neo-classical rule at date 1. Grossman (1981) shows that a firm will disclose information provided that it cannot lie, investors know it has the information, and disclosure is costless. In our model, the firm can lie and disclosure is costly to the insiders. Generally, the entrepreneur could choose bonding mechanisms and governance mechanisms that would make it more difficult for her to renege on her commitments. In particular, she could enter contracts that impose large penalties if she reneges and that require her to post a bond. There are problems with such an approach, however. First, the entrepreneur will always have incentives to state that she has a positive NPV project at date 1. To enforce the contract, therefore, outsiders will have to be able to verify that the firm indeed has the positive NPV project, which may be expensive. Second, as emphasized in Grossman and Hart (1986) and Hart and Moore (1988), it may be difficult to write such a contract because not all possible situations that the entrepreneur might face after the IPO can be defined at the time of the IPO. Third, such a contract has value only if it can be enforced, so that ultimately the private solution requires the use of the power of the state.

Fourth, the posting of a bond involves transaction costs¹³ and also means that the entrepreneur has fewer resources to invest in the firm. If the entrepreneur is in a country in which enforcement of contracts is expensive, she may just ignore the contract at dates 1 and 2. Fifth, any plausible contractual mechanism requires enforcement actions by shareholders. Such a mechanism may therefore be incompatible with dispersed ownership.

A complementary approach for the entrepreneur is to devise governance mechanisms that limit her ability to take advantage of minority shareholders. The obvious difficulty with such mechanisms is that they have to be credible. With good laws and good enforcement of these laws, the governance mechanisms are more credible to investors. Aggarwal, Erel, Stulz, and Williamson (2008) show that firm-level governance mechanisms are complementary mechanisms with good country-level investor protection. In their paper, firms from common law countries are more likely to adopt governance attributes which restrict the discretion of insiders.

Private solutions for the production problem at date 1 require that the entrepreneur disclose truthfully the realization of $E_i(\mu)$. Once $E_i(\mu)$ is disclosed, shareholders could prevent the entrepreneur from starting production. For a private solution to work, however, the disclosure at date 1 has to be credible and the shareholders should be able to take actions cheaply to prevent production if it is not optimal. The entrepreneur could commit to hire an auditor who will verify the realization of $E_i(\mu)$. The auditor would be costly. Ex post, the entrepreneur would renege on her decision to hire an auditor because by doing so she would save the cost and would produce regardless of the realization of $E_i(\mu)$.

One often hears that reputation will make it suboptimal for the entrepreneur to take advantage of the minority shareholders. In our model, there is no role for reputation because the entrepreneur has nothing to gain from behaving. Reputation can make it optimal for the entrepreneur not to take advantage of minority shareholders provided that there is some chance that the entrepreneur will

¹³ See Klein, Crawford, and Alchian (1978) for some of the problems involved in posting a bond.

raise more funds in the future, in which case building a reputation would pay off when she subsequently raises funds.¹⁴

2.c. Securities laws.

We now consider the role of securities laws. In our model, the critical issue facing the entrepreneur is that she would like to commit to take actions that maximize shareholder wealth, but she can't do so credibly. As a result, if she finds it worthwhile to raise outside finance, the price of the shares is discounted to reflect the expectation that she will take actions ex post that decrease the payoff to the minority shareholders. Even though the entrepreneur finds it optimal ex post to take such actions, ex ante the entrepreneur would be willing to pay to eliminate the possibility of such actions since they have deadweight costs. Securities laws can help resolve some – but not all – of the problems the entrepreneur faces in credibly committing to the buyers of equity through mandatory disclosure. We restrict our attention to the benefits to the entrepreneur of disclosure at date 1 and ignore the role of laws and regulations on the cost of consumption of private benefits, b , which have been examined both theoretically and empirically already.¹⁵ It is important to note, however, that disclosure laws do affect the ability of insiders to consume private benefits, so that b is likely to be higher in countries with stronger securities laws (see Ferrell (2007)).

Suppose that the securities laws requires that the entrepreneur has to disclose $E_1(\mu)$ at date 1 and that the disclosure is credible because the disclosure requirement is strictly enforced. Upon disclosure, the state or investors could act to prevent production if production is not optimal. With such a law, production would be less likely to take place if $E_1(\mu) = \bar{\mu}$. Whether the neo-classical rule would be followed would depend on the mechanisms that investors have to constrain corporate insiders from pursuing negative NPV policies. In fact, if the law worked extremely well, so that the entrepreneur can never produce if $E_1(\mu) = \bar{\mu}$, such a law would eliminate the time consistency

¹⁴ See Gomes (2000).

¹⁵ See, for instance, Shleifer and Wolfenzon (2002), La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2002), Durnev and Kim (2005), Doidge, Karolyi, and Stulz (2004), and Stulz (2005).

problem and would increase firm value by eliminating suboptimal production. It is important to note that enforcement by investors does not have to involve legal action. Any mechanism which permits outside investors to affect the production decision in the state of the world where $E_I(\mu) = \mu$ increases firm value – for instance, a hostile bid or the threat of such a bid could lead insiders to not produce in that state of the world. If enforcement by investors is costly, there will be cases where insiders pursue negative NPV projects. If enforcement is extremely costly, the law has no benefit in reducing suboptimal production. Forcing disclosure is therefore not enough.

Could such a law do harm? Not if enforcement is costless and if the only disclosure required is the one that the entrepreneur would like to credibly commit to but cannot do so without the help of the law. However, the law might impose costs on firms by forcing firms to disclose other items or by punishing the entrepreneur when she should not be. In general, public enforcement of laws is not costless. As a result, investors will have to be taxed to pay for the enforcement.

Why could a law work better than private solutions? It can only do so if bonding, governance, and reputation mechanisms do not work more cheaply and more effectively. In our model, reputation does not work since the entrepreneur has nothing to gain from building one. The entrepreneur would always want to renege on governance mechanisms if production has a negative NPV at date 1. Therefore ex-ante commitment to good governance is not credible. Consequently, the only mechanism left is the posting of a bond. The bond has to be posted by the entrepreneur out of her own money. Even if there were no problems with the bonding mechanism, it would reduce the size of the entrepreneur's co-investment. Implementation of a bonding mechanism requires dispersed shareholders to find a way to speak with one voice in enforcing the mechanism. This requirement adds additional costs to the mechanism.

3. Securities laws and financial globalization.

We now investigate the role of securities laws in a world of integrated financial markets. In this section, we focus on firms' supply of equity and assume a perfectly elastic demand for equity as

before. To simplify the analysis, we assume that investors discount expected cash flows from shares at the risk-free rate irrespective of where the shares are issued or traded. Risk-neutral investors would discount expected cash flows that way in a world where there are no restrictions or costs to cross-border trades in securities. To emphasize that our results do not come from differences in the cost of consuming private benefits across countries, as determined by b , we assume b to be the same across countries unless we say otherwise.

To analyze the impact of securities laws, we consider two countries. We assume that country G has better securities laws than country B in that, at date 1, $E_1(\mu)$ is disclosed in country G but not in country B and the disclosure enables investors to costlessly enforce the neo-classical investment policy. We investigate later the case where enforcement costs are positive. There are no barriers to international investment. Both countries have exactly the same distribution of projects. In each country, there is a continuum of projects. Each project has the same characteristics as the project analyzed in Section 2, so that the project of firm i has an expected return of $E_0(\mu_i)$ as of date 0. $E_0(\mu_i)$ is a monotone function of i , with $i \in [0, U]$, and, for any firm i , $(1/\lambda)\mu_i^+ = E_0(\mu_i) = \lambda\mu_i^-$, with $\lambda > 1$. In the following, we drop the subscript i to simplify the notation.

We use our model to compare the cost of external finance, firm creation, valuation, and insider ownership in the two countries. We first discuss the case where a firm domiciled in a country is subject to the securities laws of that country. We then turn to the case where a firm can choose to be subject to stricter or weaker securities laws and where stricter securities laws have a deadweight cost for firms. In the last part of the section, we discuss some important limitations to our analysis.

3.a. Firms are subject to the securities laws of their country only.

In our model, investors have the same expected return irrespective of securities laws. For an all-equity firm, it might be tempting to conclude therefore that the cost of external finance is the same for all firms when viewed from the entrepreneurs' perspective. However, this would not be correct.

The agency problems we focus on create a wedge between the cost of capital for the entrepreneur and the expected rate of return required by investors.

The entrepreneur's perspective on the cost of capital differs from the investors' perspective. The entrepreneur focuses on how much she has to pay to secure the outside financing she seeks. Outside financing has costs for the entrepreneur. These costs differ between countries G and B. In country B, the entrepreneur starts production at date 1 even if the project has a negative NPV and consumes private benefits which incur costs at date 2. Outside investors discount the price of the shares for the loss due to suboptimal production at date 1 and the consumption of private benefits at date 2, which are exactly the entrepreneur's costs from her inability to commit to the neo-classical rule and to not consuming private benefits. In country G, these costs are lower because the entrepreneur never produces suboptimally at date 1 and therefore there is no consumption of private benefits at date 2 if the project turns out to be a negative NPV project. It follows that outside finance is cheaper for the entrepreneur in country G than in country B. In addition:

Proposition 2

Assuming that (1) countries B and G differ only in securities laws, so that b is the same in both countries, (2) a firm in country B and a firm in country G have exactly the same project, and (3) production always takes place for the firm in country B irrespective of $E_0(\mu)$, it follows from the fact that country B has worse securities laws than country G that:

- (1) The firm in country B will be smaller than the firm in country G because external finance is more expensive for the entrepreneur in country B than in country G.
- (2) The firm in country B will have lower output on average before managerial diversion than the firm in country G since the entrepreneur in country B will invest in the

negative NPV project whereas the firm in country G will only invest in positive NPV projects.

- (3) Tobin's q will be higher for the firm in country G than in country B.
- (4) The entrepreneur in country G will retain fewer shares than the entrepreneur in country B.
- (5) Foreign investors will hold a larger fraction of shares in country G than in country B.

It is important to note that in the model developed so far, securities laws benefit entrepreneurs but not investors. Despite this, it turns out that the portfolios of individual investors depend on the securities laws of the countries they invest in. In fact, individual investors invest a larger share of their portfolios in securities of the country that has better securities laws. However, individual investors do not invest more in country G because they care about securities laws. Remember that in our model investors are risk-neutral and have rational expectations. The expected return of shares is the same for firms irrespective of their country. The greater weight of securities of country G in the portfolios of individual investors simply results from the fact that in countries with better securities laws the entrepreneurs can sell a larger fraction of their firms to the public at the IPO. There is evidence that insiders have higher ownership in countries with weaker investor protection.¹⁶

In our model, country G has better securities laws than country B. Consider now the portfolio of an individual investor who is not a corporate insider. First, assume that the individual investor resides in country G. For a firm with a given market capitalization, a larger fraction of shares will be available to individual investors if the firm is from country G than from country B.

¹⁶ See La Porta et al. (1999) for an analysis of ownership across the world. Stulz (2005) provides evidence on insider ownership as a fraction of a country's market portfolio, using Worldscope data (see Dahlquist, Pinkowitz, Stulz, and Williamson (2003)) for a discussion of the weaknesses of the Worldscope data) and provides references to alternative explanations. An obvious difficulty with ownership measures is that institutional investors unrelated to insiders can have large stakes in the U.S., giving the appearance of concentrated ownership for firms where insiders control a small fraction of shares.

Consequently, if an individual investor holds the world market portfolio of shares available for trading by portfolio investors (i.e., the world market portfolio constructed from shares not held by insiders, as in Dahlquist et al. (2003)), she will overweight country G compared to the weight of market capitalization of that country in the world market portfolio of all shares. An individual investor from country B would behave in the same way. It follows from this that individual investors will appear to overweight shares from countries with better securities laws. Assuming that corporate insiders are local residents, a larger fraction of shares from country B will be held by resident insiders than shares from country G. As a result, residents in country B will appear to overweight shares from country B and residents in country G will appear to overweight shares from country G. It follows that variation in the quality of securities laws can worsen the home bias even though individual investors have no preference for better securities laws in our model.¹⁷

The analysis conducted so far assumes that there are no costs to stricter securities laws and their enforcement is costless. Suppose first that securities laws in country G are costly, so that participation in public markets has a deadweight cost of c . It immediately follows that raising outside funds is now more costly for a firm in country G. Firms which have an investment opportunity that has low productivity will now decide not to raise outside funds. Consequently, fewer firms will go public in country G.

Consider next the case where there is a fixed cost for investors to enforce good policies following disclosure by a firm that $E_1(\mu) = \mu^*$. In this case, the entrepreneur will start production when $E_1(\mu) = \mu^*$ as long as μ^* is high enough so that it is not worth it for investors to expend enforcement costs. If μ^* is lower than this threshold, production will not start because investors would incur enforcement costs to prevent wasteful production. If investors expect to have to pay costs of enforcement, the expected rate of return they require to invest in firms will reflect expected

¹⁷ Dahlquist et al. (2003) show how different levels of insider ownership can help explain the home bias. Koh et al. (2008) extend this analysis to account for existence of a comparative advantage in monitoring for local investors. In their analysis, poorer laws imply a greater role for monitoring local investors, so that even fewer shares are available for foreign investors.

enforcement costs. Lombardo and Pagano (2002) develop a model where monitoring costs affect the expected return on equity and where these costs depend on laws and their enforcement. The enforcement costs discussed here are part of the monitoring costs they posit in their model. In the absence of a mechanism of collective action, there would be no enforcement by atomistic shareholders. Consequently, in the absence of such a mechanism, firm values would be higher if a large monitoring outside shareholder emerged who would find it worthwhile to pay the cost of enforcement.

3.b. Firms can choose securities laws they are subject to.

Suppose now that financial globalization makes it possible for a firm in country B to choose to be subject to the securities laws of country G. We assume that a firm from country B subjects itself to the securities laws of country G by going public in country B as well as in country G. As a result, the firm will be subject to the securities laws of both countries. Given the assumed difference in securities laws between countries B and G, any firm going public would choose to be subject to the securities laws of country G if there were no cost to do so. The reason is that the outside investors rationally discount the share price to reflect the *ex-post* incentive problems. Therefore, the entrepreneur bears all the costs of being unable to tie her hands *ex ante* and will benefit from a credible commitment not to start production when $E_1(\mu) = \mu^-$.

The situation changes if there is a fixed listing cost L for a firm from country B to become subject to the securities laws of country G. With such a cost, some firms from country B will choose to be subject to the securities laws of country B only. It is interesting to investigate which entrepreneurs from country B will choose to IPO in country G if there is a fixed cost L for a firm in country B to list in country G. There are both direct and indirect benefits to a listing in country G for a firm in country B. We explore these two benefits in turn.

We define the direct benefits as the benefits that accrue to the entrepreneur if she changes nothing in her actions except that the firm is liquidated at date 1 in the bad state of the world, i.e.,

the state where $E_1(\mu) = \mu^-$. There are two direct benefits. First, the entrepreneur now pays the deadweight costs of private benefits only in the good state where $E_1(\mu) = \mu^+$, so that these costs fall. Second, firm value increases, so that the IPO proceeds increase. The increase in firm value keeping f and K constant is:

$$\text{Direct gain in firm value} = (1-p)K - (1-p)(1-f)\frac{\mu^-}{r}K - L \quad (6)$$

It immediately follows from this expression that the direct gain in value (1) falls as the probability $(1-p)$ of the bad state decreases, (2) increases as the rate of consumption of private benefits increases, (3) falls as the expected return to production in the bad state increases, and (4) falls as the listing cost increases.

The indirect gain from the listing is that the entrepreneur can raise more funds and hence benefits more from the investment opportunity in the good state. To see this, note that as firm value increases keeping f constant, more funds are raised. The entrepreneur will want to invest these funds in production, so that K will increase. The benefit from increasing K increases with the expected return of production in the good state. Consequently, everything else equal, firms that have higher productivity will benefit more from listing in country G.

We now have the following result:

Proposition 3

Compared to firms from country B that do not list in country G, the firms from country B that list in country G have the following characteristics:

- (1) Cross-listed firms are larger.
- (2) Cross-listed firms have better operating performance.
- (3) Cross-listed firms have a higher Tobin's q .
- (4) Cross-listed firms will have more diffused ownership.

(5) Foreign investors will hold a larger fraction of the cross-listed firms.

See appendix for proof.

Karolyi (2006) reviews the evidence on cross-listed firms. This evidence shows that cross-listed firms are larger firms and have higher valuations. There is now substantial empirical evidence that foreign firms listed in the U.S. have a greater Tobin's q than foreign firms that are not listed in the U.S. Doidge, Karolyi, and Stulz (2008) show that this valuation difference holds from 1990 to 2006. Foreign firms that list on an U.S. exchange become subject to U.S. securities laws. However, these firms also become subject to monitoring from information intermediaries, so that this monitoring may contribute to the valuation difference.

Doidge et al. (2004) also predict that cross-listed firms have a higher Tobin's q . In that paper, the mechanism that leads to a higher Tobin's q for cross-listed firms is different from here. In Doidge et al. (2004), a firm cross-lists because it has good investment opportunities that it cannot finance because of excessive consumption of private benefits by the controlling shareholders. Through cross-listing, the firm subjects itself to laws that constrain the consumption of private benefits and can raise additional funds to finance the growth opportunity. Here, the rate of consumption of private benefits at date 2 is the same in both countries, so that securities laws do not reduce the rate of consumption of private benefits at date 2. Instead, by subjecting itself to the securities laws of country G, a firm from country B bonds itself to a legal regime where it will not be able to overinvest at date 1. Hence, the cross-listed firm makes decisions that are better for shareholders notwithstanding their consumption of private benefits at date 2.

Empirical evidence on foreign ownership of shares in companies with ADR programs is consistent with our predictions. In particular, Ammer, Holland, Smith, and Warnock (2006) show that firms with ADR programs have greater ownership by U.S. investors than other firms from the same countries. The impact of cross-listing on share ownership by foreign investors results simply

from the fact that more shares of cross-listed firms are available to portfolio investors because the entrepreneur retains fewer shares at the IPO. Doidge, Karolyi, Lins, Miller, and Stulz (2008) show that cross-listed firms have lower insider ownership. Further, Ayyagari and Doidge (2008) provide some evidence that insider ownership falls after a cross-listing.

If the securities laws of country G impose no costs on firms, firms from country G will not list in country B at the IPO. However, suppose that there is a cost c to being subject to the securities laws of country G and that this deadweight cost applies as well to firms in country B that choose to list in country G. We assume that there is a listing cost L for a firm to list outside its country. With these assumptions, some firms in country G will list at the IPO in country B as long as the listing cost is less than c . The firms from country G that list in country B will be firms for which preventing investment in the bad state has little value compared to saving the cost $c - L$. The type of firm that would not list in country G is therefore a low productivity firm.

We assumed throughout the analysis that the constraint on the size of the investment opportunity is not binding when consumption of private benefits is an issue. It is useful to relax this assumption in our discussion of foreign listings. Suppose that the constraint is binding for a firm even when the entrepreneur consumes non-trivial private benefits. In this case, there is no indirect benefit to a firm from country B in listing in country G. Further, when a firm from country G lists in country B, it does not suffer from losing the indirect benefit of good securities laws, which is to enable firms to raise more outside funds. With this extension, it therefore follows that firms whose investment opportunities are not easily scaleable have less to gain from good securities laws. We would therefore expect small firms from country G to be more likely to IPO in country B.

As mentioned in the introduction, there has been much debate on the costs of regulation in the U.S. and how these costs affect the competitiveness of the U.S. capital markets. In our model, if the U.S. is country G, an increase in the cost of securities laws necessarily reduces the fraction of foreign firms that list in the U.S. The impact of an increase in c on U.S. firms depends on the cost of listing abroad for U.S. firms. If that cost is prohibitive, then an increase in c means that fewer

U.S. firms go public. Alternatively, however, consider the case where the cost on U.S. firms of listing abroad is the same as listing in the U.S. In that case, if there is no increase in deadweight cost abroad, some of the firms that would not have gone public in the U.S. had the foreign listing cost been prohibitive may now choose to list abroad. The U.S. firms that would list abroad would be similar to those firms from country B that choose not to list in the U.S.

3.c. Some important limitations of the analysis.

The analysis in this section relied implicitly on the assumption that securities laws can be ranked, so that some countries have better securities laws than others. With the model developed here, better securities laws are those that reduce the likelihood of overinvestment at date 1. There can be good reasons why, for some firms, better disclosure is more costly than for others. Our model does not account for these costs explicitly. The literature on disclosure has focused on the costs to firms of divulging information that could be helpful to competitors (see Leuz and Wysocki (2008) for a review). Recently, Almazan, Suarez, and Titman (2007) have shown that under some circumstances transparency can reduce firm-specific investments by stakeholders. Transparency can also have political costs (see, for instance, Leuz and Oberholzer-Gee (2006) and Durnev and Fauver (2007)). Further, as shown by Hermalin and Weisbach (2007), better disclosure can be costly for managers, so that in equilibrium firm value can be maximized for shareholders with less than complete disclosure. All these disclosure costs can lead to a situation where a firm in country B might maximize shareholder wealth by not listing in country G.

Our analysis assumes that the entrepreneur chooses the firm's charter to maximize IPO proceeds. It is legitimate to question this assumption for several reasons. First, variables that proxy for agency costs seem to be at best only weakly related to insider ownership in the U.S. (see, for instance, Hellwege, Pirinsky, and Stulz (2007)). Second, there are good reasons to believe that some entrepreneurs value control for its own sake rather than to divert cash flows for their own consumption (Hart (2004)). In the U.S., as shown by Field and Karpoff (2002) firms often choose

to go public with anti-takeover charter provisions, which may reduce IPO proceeds. In this case, our model would have less predictive power because ownership would also depend on the preferences of the entrepreneur for control.

We emphasized earlier that enforcement costs are a critical component of the efficacy of securities laws. For the mechanism we have focused on in our analysis of securities laws to work, it is necessary that the information disclosed can be used to change the actions of firms. It is also necessary that the securities laws themselves are enforced effectively. It may well be that information disclosed by a firm in country B has different implications than the same information disclosed by a firm in country G. For instance, information disclosed by a firm in country G might be used by bidders in the market for corporate control, but there might be a much more limited market in country B. Information disclosed in country G might be effectively used to prevent a firm in country G from taking some actions through legal channels, but the judiciary might be inefficient in country B or the corporate laws might limit legal recourse drastically.

Finally, it could be that the securities laws of country G can be enforced more effectively on firms from that country than on firms from country B. Siegel (2005) provides some evidence of differential enforcement of U.S. securities laws between U.S. firms and foreign firms. In this case, the gain from cross-listing would be smaller and fewer firms from country B would obtain a listing in country G.

4. The investors' demand for equity.

In this section, we examine how securities laws can affect the expected return required by investors on equity. In a world of financial globalization, we claim that securities laws can lead to market segmentation in that securities with identical expected cash flows that trade on different markets can have different expected returns. We consider first laws that affect insider trading and the importance of private information in the flow of information concerning a firm's stock. We then

examine how securities laws affect monitoring and information gathering by investors. Finally, we consider the marketability restrictions often present in securities laws.

4.a. Securities laws, insider trading, and disclosure.

There is a vast literature on the economic consequences of insider trading. Though some argue for the removal of penalties on insider trading on a variety of grounds, there is generally broad support in finance for the view that insider trading affects adversely the cost of trading and market liquidity. The argument is straightforward: In the presence of insider trading, market makers have to widen the bid-ask spread to be compensated for losses made to insiders.¹⁸

Amihud and Mendelson (1986), in their seminal paper, show that investors optimally focus on their return on securities net of expected transaction costs. Everything else equal, we would therefore expect securities that have higher transaction costs to have higher expected returns before transaction costs. There is some debate in the literature as to whether it is so. For instance, Spiegel and Wang (2005) conclude that, after controlling for idiosyncratic volatility, the relation between transaction costs and expected returns is at best weak.

Rather than looking at transaction costs, some authors investigate whether stocks for which a greater fraction of the information flow consists of private information have greater expected returns. Diamond and Verrechia (1991) show that disclosure can lead to a lower cost of capital by attracting large investors to a firm because its stock becomes more liquid, but that an adverse effect of disclosure is that it reduces the risk-bearing capacity of market makers, so that complete disclosure is not optimal in their model. More recently, Easley and O'Hara (2004) develop a model in which firms with more private information have a higher expected return because uninformed investors are disadvantaged with such stocks. As it becomes more costly to trade on insider information, we would expect more of the information flow to be composed of public information. Relatedly, laws that require more disclosure also increase the share of public information in the

¹⁸ See, for instance, DeMarzo, Hagerty, and Fishman (1998).

information flow. In the Easley and O'Hara (2004) model, investors who have no private information in a stock will underweight that stock.

Greater disclosure affects the information available to investors when they form expectations about variances and covariances of securities. Ex ante, a portfolio will be less risky as investors can estimate variances and covariances more precisely.¹⁹ Investors who can forecast variances and covariances of certain securities better than others are likely to overweight these securities on average.

It follows that the composition of the information flow about securities affects their expected return and the holdings of investors. Everything else equal, firms would want to reduce the share of private information in the information flow of their securities that could be disclosed by the firm at low or no cost to the firm. Through such a disclosure policy, firms would reduce the opportunities for insider trading or trading on private information, lower trading costs, and enable investors to more accurately estimate the variances and covariances of the stocks they hold.²⁰ Such an optimal disclosure policy would not, however, eliminate all insider trading, so that there would still be value to laws that limit insider trading. For reasons already discussed, a discretionary disclosure policy that is optimal ex ante is not necessarily optimal ex post for insiders. Securities laws can make the optimal disclosure policy time-consistent by punishing firms that depart from that policy.

The considerations discussed in this section have several important empirical implications. First, differences in securities laws could lead to differences in expected returns across countries even if securities markets are fully integrated in that there are no barriers to international investment. In fact, these differences could persist even if all investors hold the world market portfolio. Existing evidence on insider trading shows that countries where insider trading laws are

¹⁹ Lambert, Leuz, and Verrecchia (2007) show that greater disclosure has a direct effect which is to increase the precision with which investors estimate variances and covariances. They also document an indirect effect, which is that disclosure changes firm investment policy, which can increase or decrease the precision of estimates of variances and covariances.

²⁰ The relationship between firm disclosure and insider trading profits is not necessarily monotonically decreasing. Bushman and Indjejikian (2005) show that firm disclosures can increase the trading profits of insiders at the expense of other informed traders.

enforced have a lower cost of equity (Bhattacharya and Daouk (2002)) and that insider trading laws are associated with more information production by analysts (Bushman, Piotroski, and Smith (2005)). Hail and Leuz (2006) provide evidence that stronger securities laws are associated with lower expected returns on equity. Strikingly, their evidence shows that the adverse impact of weaker securities laws on firms' cost of equity capital is reduced by capital market integration. In this paper, capital market integration has such an impact to the extent that firms can subject themselves to stronger securities laws. Second, differences in securities laws can give preferred habitats in shares to investors. Access to private information about a firm makes it a more attractive investment for an investor, so that the investor is expected to overweight that firm in her portfolio (Easley and O'Hara (2004)). Securities laws affect the relative importance of private information in the information flow of a firm. It seems reasonable to believe that resident investors have greater access to private information. Countries where the laws are such that private information's share in the information flow is higher will have higher expected returns and a greater home bias on average.

The preferred habitat theory makes it possible to make sense of empirical results by Leuz, Lins, and Warnock (2008). They show that non-resident investors hold portfolios more heavily weighted towards countries with better securities laws. Any impact of differences in securities laws that affects resident and non-resident investors equally cannot explain their finding. For their finding to be explained with rational investors, it must be that some investors require a lower compensation for holding securities from countries with weaker securities laws and that these investors are resident investors.

There are at least two difficulties with the private information explanation of the home bias, however. First, at times private information is bad, so we would expect that at times domestic investors are underweight in domestic firms because they have bad information. Second, some

empirical evidence indicates that foreign investors trade more than domestic investors.²¹ If domestic investors receive better signals than foreign investors, we would expect them to trade more, not less. The solution to this problem is that it may be optimal for privately informed investors to become monitoring shareholders. Such shareholders monitor the actions of the firm and influence them, but for them selling shares is a last resort.²²

Securities laws which regulate disclosure can do so based on where a firm is incorporated or on where it trades. To the extent that the securities laws of a country require disclosure from firms that trade within a country, they might lead firms from other countries where disclosure is less regulated to choose to list in that country. A country's laws that restrict insider trading can only be laws that restrict insider trading within the country. As a result, such laws make the location of trading relevant. However, a firm that chooses to cross-list in a country that has good insider trading laws does not get the full benefit of these laws unless it can and does give up its listing in its home country if that country has poor insider trading laws. Otherwise, insiders could just choose to trade in the home country of the firm and not in the country where the firm is cross-listed. However, if investors prefer securities trading in their own country, it will generally not be optimal for a firm to give up its domestic listing.

A cross-listing that commits a firm to better disclosure reduces the flow of private information for its shares. We would therefore expect that the expected return on cross-listed firms to be lower than the expected return on comparable firms that do not have a cross-listing. Hail and Leuz (2006) find evidence of a lower cost of equity for firms that cross-list on U.S. exchanges. The lower expected return implies a higher Tobin's q .

²¹ See Tesar and Werner (1995).

²² For an analysis of monitoring shareholders and their impact on the home bias, see Koh et al. (2008).

4.b. The impact of marketing restrictions.

Securities laws can restrict the marketing of shares to investors in a country. For instance, U.S. firms that choose to IPO abroad to avoid U.S. securities laws have to do so in a way that will keep their shares from being acquired by U.S. investors over an initial period. Specifically, Regulation S provides a safe harbor for firms that IPO abroad, but only to the extent that they have less than 500 U.S. shareholders.²³ When a firm has more than 500 U.S. shareholders, it becomes subject to U.S. securities laws even if it had its IPO abroad. Consequently, in our analysis of Section 3, if the U.S. is country G, a U.S. firm that has an IPO abroad would have to proceed so that U.S. investors cannot acquire its shares. In this section, we study the impact of such restrictions.

Suppose first that there are no cross-border transaction costs. In this case, a U.S. firm would not be affected by the marketing restrictions as long as foreign investors can reasonably hedge their holdings of the U.S. firm and that the cost of doing so is trivial. The foreign investors would hold the outstanding supply of the shares of the U.S. firm and would hedge their holdings partly. The U.S. firm would not suffer from the marketability restriction. If there are cross-border transaction costs, hedging would be more expensive, so that there would be a cost for the U.S. firm to face marketability restrictions. Generally, investors will not be able to hedge the full risk of the shares. In this case, that risk will not be shared optimally across the world when there are marketability restrictions. Consequently, there will be a greater risk premium for shares that are subject to such restrictions.²⁴ This risk premium will increase if domestic investors have a taste for shares issued by domestic firms trading locally or have, for any other reasons, a comparative advantage at holding these shares.

It may well be, however, that the main problem faced by firms that seek to escape U.S. securities laws is simply that they are hard to escape for firms that want their shares to have a liquid market. There is probably no effective way for firms to list shares abroad in a way that will

²³ See Fox (1997).

²⁴ For evidence of such a risk premium see, for instance, Stulz and Wasserfallen (1995).

guarantee that the majority of the shares are not held by U.S. investors, in which case firms become subject to the periodic disclosure requirements.

5. Issuer choice and the future of national capital markets.

The legal literature has debated the question of issuer choice intensely, with a number of scholars arguing that a firm should be able to pick the country whose securities laws it wants to follow.²⁵ In this section, we examine the implications of our analysis for the issuer choice question and raise some additional considerations that are relevant for answering this question.

In much of the analysis in this paper, the main benefit of securities laws is that they facilitate a firm's commitment to policies that are *ex ante* optimal for the firm. These laws benefit the entrepreneurs and the economy. Their benefit to investors is through their impact on the economy as a whole. With our model, if securities laws are well-conceived, new firms would pay to be subject to those laws. There is therefore no reason, with this model, for firms not to have the right to choose the securities laws they are subject to.

If securities laws reduce the importance of private information in the flow of information about a firm, a firm would want to commit to reduce the importance of private information in the flow of information and the obstacle of doing so would be the credibility of the commitment. In this case, entrepreneurs would want to be subject to securities laws if they helped them achieve the commitment they seek. The case for letting firms choose the securities laws that help them the most would seem strong under that scenario. However, if securities laws lead to disclosures that enable investors to obtain more precise estimates of variance and covariances, this benefit increases when more firms are subject to securities laws. In this case, one might argue that there is an argument not to have issuer choice within a country and to subject all securities trading in a country to its securities laws.

²⁵ See Fox (2002) for a review.

The benefit of securities laws for a firm does not depend on how many other firms are subject to these laws in the model developed in Section 2. Rather, it depends on the difficulty that firms face in changing the securities laws they are subject to and on the belief that these laws will keep constraining firms rather than be weakened. As long as the main benefit of securities laws is to enable entrepreneurs to make commitments they would not be able to make credibly otherwise, there is considerable value to firms if they cannot exit securities laws. Recent regulatory developments in the U.S. that make it easier for foreign firms to exit U.S. securities laws are not helpful to foreign firms from this perspective because they reduce the value of the commitment they make when deciding to subject themselves to U.S. securities laws.²⁶

To the extent that securities laws are a commitment device for entrepreneurs, they are always subject to pressure from incumbent corporate insiders to be weakened. From that perspective, it seems likely that issuer choice leads to less credible securities laws. After all, if some firms are not subject to securities laws, incumbent insiders can argue that they are at a disadvantage to those firms. Further, there are economies of scale in enforcing such laws, so that if they cover a large number of firms the costs of enforcement are lower.

Little attention has been paid in the issuer choice debate on the issue of whether stock market participation is affected by having all firms trading in a country subject to the same securities laws. It is true that in an efficient market firm value would reflect the securities laws that affect the firm, so that investors who do not know all the implications of securities laws would still buy fairly priced securities. However, willingness to participate in the stock market is likely to depend on investors believing that stock market investment is a fair game. It seems difficult to believe that such a belief could thrive in a world where local firms are subject to different securities laws.

²⁶ See Fernandes, Lel, and Miller (2007) find that the market reacted negatively to the announcement of the change in regulation.

6. Conclusion.

Historically, the trading of securities on organized capital markets has been close to the geographic location of the issuer. Reasons for this phenomenon include the fact that cross-border trade was restricted and expensive. With financial globalization, barriers to cross-border trade in securities have decreased dramatically. Transaction costs reasons for trading of securities to stay local have largely disappeared. Economies of scale in trading are becoming a more compelling reason for trading not to be organized according to geography. Yet, securities issued in a country typically are subject to some or all of the laws of that country. Consequently, securities differ by their country of issuance. When it comes to firms, their value, the distribution of their ownership between insiders and outsiders, the extent of ownership by foreign investors, and the expected return of their equity all depend on the securities laws these firms are subject to.

We show that a critical contribution of securities laws is to help corporate insiders to commit to policies that maximize shareholder wealth that are not optimal ex post for corporate insiders. With this view of securities laws, these laws are only valuable to the extent that they are properly enforced, that they do not impose excessive costs on firms, and that investors can use the disclosures they force firms to make to prevent firms from taking actions that diminish shareholder wealth. Importantly, the function of securities laws we emphasize has no necessary impact on the expected rate of return on equity from the perspective of investors but it reduces the cost of external finance for entrepreneurs because it enables them to sell equity to the public at a higher price. With this function of securities laws, better securities laws lead to more firms going public, to firms taking fuller advantage of investment opportunities, to firms having more ownership by dispersed shareholders including foreign shareholders, and to firms being valued more highly. Though good securities laws are associated with greater foreign ownership in our model, this is not because investors have a preference for investments in firms subject to better securities laws, but rather because more shares from such firms are available to the public. Other functions of securities laws,

such as those that decrease the relative importance of private information in the information flow of securities, affect directly the expected rate of return on equity and portfolio holdings.

Firms can choose to subject themselves to better securities laws by having their securities trade in countries which have such laws. There is ample empirical evidence that firms behave that way. As long as some countries have better securities laws than others, both in terms of the laws themselves as well as their enforcement and the opportunities investors have to act on information disclosed because of the laws, national capital markets will stay distinct because securities that trade on them differ in the laws they are subject to.

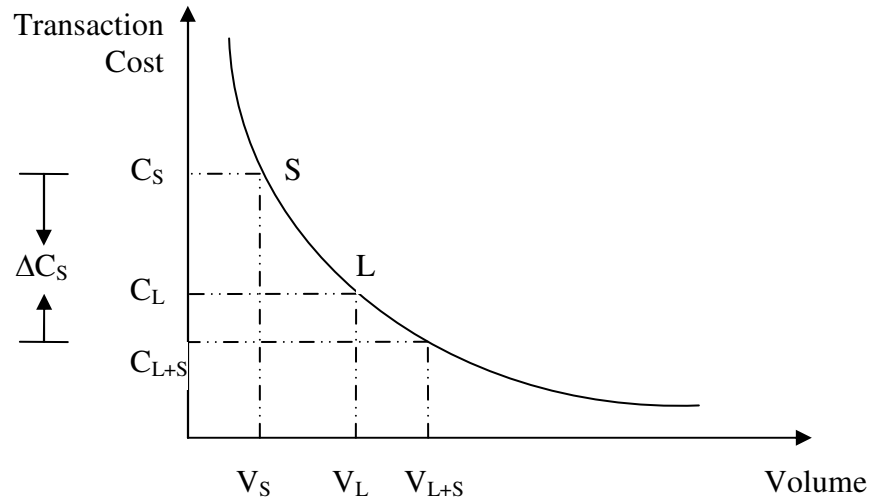


Figure 1. Countries S and L both face the same transaction technology which has economies of scale as the volume of transactions increases. The lowest transaction cost is attained if there is only one market as long as there are no cross-border transaction costs. By trading in country L, the investors from country S save ΔC_S . If they incur a cross-border trading cost greater than ΔC_S , they will not move.

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Appendix

Proof of Proposition 1

(1) When production always takes place at date 1, we solve for K using the rationality constraints of the outside shareholders

$$K = \frac{W_0}{1 - (1 - \alpha) \frac{E_0(\mu)(1 - f^*)}{r}}$$

Then we can rewrite the entrepreneur's problem to be

$$\max_{\alpha} \frac{\alpha + 0.5bf^{*2}}{r - (1 - \alpha)(1 - f^*)E_0(\mu)} E_0(\mu)W_0r$$

The F.O.C of this problem is given by

$$(1 - f^*)(r - (1 - \alpha^*)(1 - f^*)E_0(\mu)) = (\alpha^* + 0.5bf^{*2})(1 - 2f^*)E_0(\mu).$$

Let $G(\alpha) = \frac{\alpha + 0.5bf^{*2}}{r - (1 - \alpha)(1 - f^*)E_0(\mu)}$, in order to show that the second order condition for a

maximum holds, we need to show that $G''(\alpha) < 0$.

$$G''(\alpha) = \frac{1}{b} \{ [r - (1 - \alpha)(1 - f)E_0(\mu)] - 2(\alpha + .5bf^2)E_0(\mu) \} \leq \frac{1}{b} \left(-\frac{W_0}{K} r \right) < 0$$

(2) When production only takes place if $E_1(\mu) = \mu^+$, we solve for K using the rationality constraints of the outside shareholders

$$K = \frac{W_0}{1 - (1 - \alpha) \frac{((1 - f^*)p\mu^+ + (1 - p)r)}{r}}$$

Then we can rewrite the entrepreneur's problem to be

$$\max_{\alpha} \frac{\alpha(p\mu^+ + (1 - p)r) + 0.5bf^{*2}p\mu^+}{r - (1 - \alpha)((1 - f^*)p\mu^+ + (1 - p)r)} W_0r$$

The F.O.C of this problem is given by:

$$(1 - qf^*)(r - (1 - \alpha^*)(1 - f^*)p\mu^+) = (\alpha^* + 0.5bf^{*2})(1 - 2f^*)p\mu^+ + (1 - 0.5bf^{*2})(1 - p)r$$

Where $q = \frac{p\mu^+}{p\mu^+ + (1 - p)r}$.

Let $H(\alpha) = \frac{\alpha(p\mu^+ + (1 - p)r) + 0.5bf^{*2}p\mu^+}{r - (1 - \alpha)((1 - f^*)p\mu^+ + (1 - p)r)}$, in order to show that the second order condition

for a maximum holds, we need to show that $H''(\alpha) < 0$.

$$H''(\alpha) = \frac{q}{b} \left\{ [r - (1 - \alpha)(1 - f)p\mu^+ - 2(\alpha + .5bf^2)p\mu^+ - (1 + \alpha)(1 - p)r] \leq 0 \right.$$

Proof of Proposition 2

- (1) For ease of presentation, we abuse notation slightly here. Let $K_G(\alpha)$ and $K_B(\alpha)$ denote the project size given insider ownership, respectively in country G and country B. From the rationality constraints in the two countries, we have the following:

$$K_B(\alpha) = \frac{W_0 r}{r - (1 - \alpha)(1 - f^*)E_0(\mu)}$$

$$K_G(\alpha) = \frac{W_0 r}{r - (1 - \alpha)(1 - f^*) \left(p\mu^+ + \frac{(1 - p)}{(1 - f^*)} r \right)}$$

Clearly, $K_G(\alpha) > K_B(\alpha)$.

Furthermore, $K'_B(\alpha) < 0$.

To see why it is the case, we only need to show that $\partial \frac{(1 - \alpha)(1 - f^*)}{\partial \alpha} = 2f^* - 1 < 0$

We'll show below that $\alpha^G < \alpha^B$. Therefore, $K_G(\alpha^G) > K_B(\alpha^G) > K_B(\alpha^B)$.

- (2) The firm in country B has lower output before manager diversion, since the average output in country G is μ^+ , whereas in country B, the average output is $E_0(\mu)$.

(3) Tobin's q in this model is given by $(1 - f^B)E_0(\mu)$ for country B and

$(1 - f^G)p\mu^+ + (1 - p)r$ for country G. Since we show below that $\alpha^G < \alpha^B$ and

$f = \frac{1 - \alpha}{b}$, $f^B < f^G$. I.e., the entrepreneur diverts more when she has less cash

flow ownership. However this effect on q is second order when compared to the other two more dominant effects. First, she diverts cash flow only when the state is good, i.e. $E_I(\mu) = \mu^+$ in country G; whereas in country B she always expropriates. Second, she will not invest in negative NPV projects in country G but she will in country B.

(4) From proof of proposition I, we can obtain F.O.C for the maximization problem the entrepreneur faces in country B and country G, respectively:

$$L_B(\alpha) = (1 - f^*)(r - (1 - \alpha^*)(1 - f^*)E_0(\mu)) - (\alpha^* + 0.5bf^{*2})(1 - 2f^*)E_0(\mu)$$

$$\begin{aligned} L_G(\alpha) &= (1 - f^*)(r - (1 - \alpha^*)(1 - f^*)p\mu^+) - (\alpha^* + 0.5bf^{*2})(1 - 2f^*)p\mu^+ - (1 - 0.5bf^{*2})(1 - p)r \\ &= (1 - f^*)(r - (1 - \alpha^*)(1 - f^*)E_0(\mu)) - (\alpha^* + 0.5bf^{*2})(1 - 2f^*)E_0(\mu) - \\ &\quad (1 - 0.5bf^{*2})(1 - p)(r - \mu^-) - f(\alpha^* + 0.5bf^{*2})(1 - p)\mu^- \end{aligned}$$

It's easy to see that $L_B(\alpha) > L_G(\alpha)$.

By definition, $L_B(\alpha^B) = 0$ and $L_G(\alpha^G) = 0$. It follows $L_G(\alpha^B) < 0 = L_G(\alpha^G)$

From second order condition, $L'_B(\alpha) < 0$ and $L'_G(\alpha) < 0$, we obtain $\alpha^G < \alpha^B$

(5) Since all firms raise capital in our setup and firms in country G has lower insider ownership $\alpha^G < \alpha^B$, it follows that more shares are available to outside shareholder in country G.

Proof of Proposition 3

$$G(\alpha^*, b) = \frac{\alpha^* + 0.5 \frac{(1-\alpha^*)^2}{b}}{r - (1-\alpha^*) \left(1 - \frac{1-\alpha^*}{b}\right) E_0(\mu)}$$

$$\text{Let } L(\alpha^*, b) = \alpha^* + 0.5 \frac{(1-\alpha^*)^2}{b}, \text{ then } L_2(\alpha^*, b) = -0.5 \frac{(1-\alpha^*)^2}{b^2} = \frac{\alpha}{b} - \frac{L(\alpha^*, b)}{b}$$

$$\text{Let } M(\alpha^*, b) = r - (1-\alpha^*) \left(1 - \frac{1-\alpha^*}{b}\right) E_0(\mu), \text{ then}$$

$$M_2(\alpha^*, b) = -\frac{(1-\alpha^*)^2}{b^2} E_0(\mu) = \frac{r - (1-\alpha^*)}{b} E_0(\mu) - \frac{M(\alpha^*, b)}{b}$$

Thus,

$$G_2(\alpha^*, b) = \frac{[\alpha^* - L(\alpha^*, b)] \left[\frac{M(\alpha^*, b)}{b} \right] + L(\alpha^*, b) \left[\frac{r - (1-\alpha^*)}{b} E_0(\mu) - \frac{M(\alpha^*, b)}{b} \right]}{\left[r - (1-\alpha^*) \left(1 - \frac{1-\alpha^*}{b}\right) E_0(\mu) \right]^2}$$

After canceling out terms, we get:

$$G_2(\alpha^*, b) = \frac{0.5(1-\alpha^*)^2 [E_0(\mu) - r]}{\left[br - (1-\alpha^*)(b - (1-\alpha^*))E_0(\mu) \right]^2} > 0$$

Let $\underline{A} = \frac{c}{\left[G(\alpha^*(b'), b') - G(\alpha^*(b), b) \right] Wr}$, thus $\frac{\partial \underline{A}}{\partial c} > 0$. Since only the entrepreneur with a

project such that $E_0(\mu) \geq \underline{A}$ cross-list, the number of cross-listed entrepreneurs is given by

$N_{CL} = \left(1 - \frac{\underline{A}}{A}\right) N$. It follows that $\frac{\partial N_{CL}}{\partial c} < 0$. The average quality of the cross-listed

entrepreneur can be written as $\frac{\underline{A} + A}{2}$, which can be shown increasing in c .