

ABSTRACT

Title of dissertation: **INTERNATIONAL CORPORATE GOVERNANCE:
A STUDY OF COMPLEMENTARITIES AND
CONVERGENCE**

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This thesis contributes to contemporary research in international corporate governance by investigating two related questions: (1) Is there a convergence in corporate governance towards the US model as suggested by theories of *functional convergence* and (2) How do differing regulatory environments influence the choice of corporate governance instruments?

In Part I, I examine if firms from poor investor protection regimes bond themselves to better corporate governance by listing on exchanges in more protective regimes, such as the US, thereby achieving functional convergence. I study the effect of cross-listing on ownership and control structures in a sample of 425 firms from 42 countries that cross-list on a major exchange in the US. I find the following features post cross-listing: (1) Very few firms (11 out of 262) migrate to a dispersed ownership structure, contrary to the theory that firms change their corporate governance structure by bonding to US laws (2) A significant fraction of firms experience control changes

where the original controlling shareholder sells his control block to a new owner (3) 45% of the control changes result in a foreign owner and individual firm characteristics like small size and low leverage are strong predictors of a foreign control change (4) Firms that undergo a control change significantly increase their debt capacity. The findings of this section show that foreign firms use cross-listing as a means to sell control blocks and increase debt capacity rather than as legal bonding mechanisms.

In Part II, I provide a theoretical motivation for the empirical finding in Part I, by deriving the features of an optimal governance system as a function of the level of investor protection in the economy. The model predicts that in an environment of poor investor protection, ownership, leverage and monitoring are complementary instruments of corporate governance where the use of one instrument increases the marginal benefit of the other. The model suggests that one cannot expect to see convergence in governance systems by changing only one aspect of the complementary cluster. Empirical evidence of the complementarities suggested by the model is provided using a sample of transition economy firms from the Amadeus Database.

The two parts of the thesis together show that selection of corporate governance mechanisms involves complementarities between the mechanisms and the regulatory environment and we are not likely to see a convergence in governance structures unless there is a significant convergence in legal rules shaping the governance structures.

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by

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Introduction

The subject of investor protection and corporate governance has been at the forefront of debate in both the corporate sector and in academic research. In a recent letter to the US trade representative, CEOs of several big companies voiced the need for strong investor protection rights with the following statement:

“...investment abroad is still a risky business. We often face underdeveloped legal systems and judicial systems that are not independent or impartial. To spur the necessary investment, standards of investor protection, like those afforded all investors in the United States under U.S. law, are essential...”¹

Recent academic papers have also established the importance of better legal protection of minority investors for corporate governance. In a series of papers, La Porta, Lopez-de-Silanes, Shleifer and Vishny (henceforth LLSV) and several other authors studied the link between legal origin, investor protection and finance from a comparative empirical perspective raising a range of important questions. One of the important contributions of this literature towards understanding corporate governance structures in different countries was the cross-country variation reported in ownership concentration and financing arrangements by LLSV. Their main argument, as described in Shleifer and Vishny (1997) is that when the legal

¹ CEO Letter on Importance of Maintaining High Standards of Investment Protection, Signed by Chairman and Chief Executive Officer of New York Life International, UPS, Eastman Chemical Company, American International Group, E.I. du Pont de Nemours and Company, CBS Corporation, National Foreign Trade Council, The McGraw-Hill Companies, Cargill Incorporated, Wainwright Industries and The Chubb Corporation; Chairman of Pacific Basin Economic Council-U.S. Committee, Emergency Committee for American Trade, United States Council for International Business, Procter & Gamble ; President, Automotive Trade Policy Council; Chairman of the Board of Directors National Association of Manufacturers; United States Council for International Business (March 23, 2002).

framework does not offer sufficient protection for outside investors, entrepreneurs and original owners are forced to maintain large positions themselves.

The above body of literature gave rise to the second generation of corporate governance literature where the main focus is to investigate if there is one system of corporate governance that can be advocated to all countries. Studies like Coffee (2000) argue that the globalization of financial and commodity markets and an open exchange of ideas and information would be the driving forces of convergence of basic systems of corporate governance. Convergence theorists also argue that the convergence in corporate governance will occur not at the level of corporate laws, but at the level of securities regulation. So international migration of companies to US markets should bring about a convergence *in function* to one system of corporate governance, the US model .

This thesis conducts an empirical investigation of convergence by examining the change in ownership concentration of firms that cross-list on US markets. This is one of the first studies to look at time-series changes in corporate governance structures to test the convergence theories. Chapter 1 of the thesis contains a detailed analysis of ownership changes in foreign firms that issue American depositary receipts (ADRs). The main results of Chapter 1 show that there is very little evidence of convergence-related movement to a dispersed ownership structure on cross-listing. Further, the study advances a new hypothesis for the motivation of firms to cross-list. Many of the foreign firms seem to use the ADR as a vehicle to sell the company to a new controlling owner. Intuitively, this result is similar to Zingales (1995) where he shows that firms use the IPO as a first stage in the eventual sale of the company.

Foreign firms seem to be doing something similar by cross-listing on US markets.

The second chapter of this thesis is devoted to developing a theoretical rationale for the empirical investigation in Chapter 1 and to investigate if one form of governance should really fit all. In this chapter, I design an optimal corporate governance system that is a function of the prevailing regulatory environment. The chapter shows that there are significant complementarities between different parts of a governance system and the legal and institutional environment, which help overcome the agency costs specific to that economy. The complementarities suggest that corporate governance instruments are adopted in clusters and different clusters are optimal in different regulatory environments. This has two significant implications: First, we are unlikely to observe changes in ownership concentration of foreign firms when the body of laws and enforcement that applies to these firms is very different from that which applies to US firms. Second, the existence of complementarities has strong implications for policy reform in transition economies. Reforms must recognize the complementarities between different aspects of a governance system to be fully effective.

The rest of this thesis is organized as follows. Each chapter presents a detailed introduction of the issues at hand, followed by a rigorous empirical/theoretical analysis. The implications of the analyses for corporate governance reform are discussed in the conclusion of each chapter.

Chapter 1. Does Cross-Listing lead to Functional Convergence? Empirical Evidence

1.1. Introduction

CEOs of foreign companies often cite the desire for increased corporate governance as one of the motivations for cross-listing on US exchanges.² This is supported by the Functional Convergence Hypothesis developed most broadly by Coffee (1999, 2002), which states that foreign firms incorporated in a jurisdiction with weak investor protection rights cross-list on US securities markets to “legally bond” themselves to higher disclosure standards and stricter enforcement. This helps them attract investors who would otherwise be reluctant to invest or those who would discount such stocks because of the risk of fraud and embezzlement. However, the empirical evidence on the bonding hypothesis remains mixed. While studies by Reese and Weisbach (2002) and Mitton (2002) provide empirical support for the importance of legal bonding, a more recent study by Seigel (2002) finds that US securities laws were quite ineffective in deterring or punishing insider stealing in a sample of Mexican firms.³

² Following is the statement by Mr. H. N. Sinor, the Managing Director & CEO of ICICI Bank, one of India’s largest banks and the first bank from Asia (excluding Japan) to list on the NYSE : “...we wanted to be much more transparent in our disclosures. We adopted US GAAP and the norms specified by the Securities and Exchange Commission (SEC) of the US are much stricter than the norms specified by the Indian regulators - RBI and SEBI. After the ADR issue, we have a class of investors who are more demanding as far as corporate governance and disclosures go. We wanted that we should be constantly evaluated by foreign investors and benchmarked against global companies.” <http://www.indiainfoline.com/comp/icba/2004.html>

³ Earlier studies such as Fanto (1996) even suggest that SEC requirements for foreign firms are meaningless. Most other authors including MacNeil (2001), Cheung and Lee (1995) and Licht (2001) stress the need for additional empirical work to determine the impact of a US listing on corporate governance.

In this paper, I provide an alternative approach to test the bonding hypothesis by looking at the effect of legal bonding on ownership and control structures. The seminal work in the area of law and finance by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (henceforth LLSV) (1998) has established that the extent of legal protection provided to minority shareholders in a jurisdiction determines if the firms incorporated in that country have a concentrated or a dispersed ownership structure. A cross-listing by a foreign firm on a US securities market provides a unique opportunity to test what happens to ownership structure when a firm migrates from a poor investor protection environment to one with greater protection for minority investors and better enforcement (the US market).

Recent literature suggests that there are several views on what could happen to ownership structure on cross-listing. One view, supported by theories of functional *convergence* (Coffee 1999) and by the *rent-protection theory* of ownership (Bebchuk 1999), predicts that migrating to a corporate law system that effectively limits private benefits of control can produce more efficient choices of ownership structure.

For instance, Coffee (2001) argues that dispersed ownership could arise and persist if there is significant improvement in protection of minority rights in European and transitional economies. Therefore, if cross-listing on the US market accords at least some of this improvement in investor protection for firms listing from these countries, a change in their ownership structures would be expected. John and Kedia (2000) in fact, make the prediction that firms from weak legal regimes should experience *rapid* changes in corporate governance on cross-listing.

A second view is the *path-dependence* theory of ownership, proposed by

Bebchuk and Roe (1999), which states that the ownership structure of a firm at any point is influenced by the initial ownership pattern due to complementarities, network externalities, and sunk costs. If a firm starts out with a concentrated ownership structure, the controlling owner is likely to retain control or sell the control block to a new incoming shareholder, rather than sell voting rights to a dispersed group of shareholders. Therefore, the theory predicts that the initial ownership patterns of foreign firms persist after cross-listing.

This paper tests the two theories by using a unique database of 425 firms from 42 countries that cross-listed on a major exchange in the United States. I examine time-series changes in ownership and control structures around the date of cross-listing. The aggregate picture shows that a majority of the firms that cross-list have an initial controlling shareholder (73%) and family ownership is the most dominant form of control—roughly one in two firms has a family as the controlling owner. There also exists a high degree of separation of ownership and control rights in these firms through the use of pyramidal structures and other control-enhancing features. And as expected from La Porta, Lopez-de-Silanes, and Shleifer (1999), most of the cross-listing firms that are widely held, to start with, are from English common law countries.

When I examine the change in ownership structure over time, I find that there is a small decline in the percentage of voting rights held by the controlling shareholder in cross-listing firms as compared to a benchmark sample of firms that do not cross-list. This decline is largest for firms from countries with poor investor protection (the French civil law countries) and for firms that start out with initial

owners as a state or another corporation. Interestingly, I find that the decline decreases with time. The mean voting rights held by the controlling shareholders decrease in the year of cross-listing and for three years thereafter. However, the controlling shareholders start reconsolidating their position in the fourth and fifth years after cross-listing.

The decline in voting rights around the time of cross-listing is not large enough to result in a widely-held ownership structure, suggesting little evidence of any convergence-related movement. The result holds true even for sub-samples of firms that had an initial public offering via the ADR and for state owned enterprises that privatized using ADR issues. This persistence in concentrated ownership patterns, even after listing on US markets, lends support to the path-dependence theory of ownership structures.

Although most of the companies continue to be controlled by an ultimate owner on cross-listing, I document a high incidence of changes in the identity of the controlling shareholder. Controlling shareholders in 35% of the sample of cross-listing firms approach US markets as a way to divest their stake and sell their control block. Several reasons contribute to why a US listing might facilitate such a sale, including greater visibility (Baker, Nofsinger, and Weaver (2002)), superior earnings forecasts (Lang, Lins, and Miller (2003)), and higher valuations (Doidge, Karolyi, and Stulz (2003)). I elaborate on the reasons in the next section of the paper. Many of the exiting controlling shareholders happen to be either the state or a family and the new entrants are predominantly widely held corporations. Further, I find that more than half of the control changes are to foreign controlling owners.

I then turn to firm and country-level data to get a better understanding of which characteristics influence a change of control in companies on cross-listing. I use the Worldscope database as a source of firm-level data for the cross-listing firms. I find that country-level characteristics like size and liquidity of the home country's market and the extent of legal rules and investor protection are significant predictors of a control change to domestic owners. In contrast, individual firm characteristics, such as size, leverage and market valuation are important predictors of control change to foreign owners. Additional tests show that capital control regulations and FDI restrictions in the home country decrease the probability of control changes to foreign shareholders.

Post-listing characteristics of firms that cross-list show that all firms have significantly higher foreign income growth rates. So an ADR listing is able to expand the international orientation of the foreign firms. I also find that firms that undergo control changes, especially to foreign owners significantly increase their leverage ratios.

In summary, the paper shows that the increased regulation associated with US markets is not effective enough in changing the ownership concentration of foreign firms that cross-list on US exchanges. The feature of the US corporate law system that limits private benefits of control doesn't produce an increase in dispersed ownership structures in firms issuing an ADR. However, cross-listing does provide an opportunity for existing shareholders to sell out to new owners as evidenced by the high incidence of control transfers in the study sample. The results suggest that there is little evidence to support the ownership interpretation of the bonding hypothesis.

On the other hand, there is evidence to show that certain firms use the ADR as a first step in the final sale of the company.

This chapter is organized as follows. Section 1.2 examines related literature and discusses the main hypothesis this paper tests. Section 1.3 discusses the data and summary statistics. Section 1.4 presents the main results. Section 1.5 concludes with implications for future research.

1.2. Motivation and Related Literature

In this section I identify the different ways in which foreign companies can approach the US markets and the reasons for them to do so. Section 1.2.1 discusses what an American Depositary Receipt (ADR) is and the Securities Exchange Commission (SEC) rules and regulations that a company issuing an ADR is subject to. Section 1.2.2 discusses the various reasons why a company may cross-list on a US exchange including implications of the bonding hypothesis. Section 1.2.3 lays out the main hypothesis I test in this paper regarding ownership changes around cross-listing.

1.2.1. What are ADRs?

Firms can migrate to US securities markets either by listing foreign shares through an American Depositary Receipt (ADR) on the NYSE, NASDAQ or AMEX or by listing shares directly on these exchanges. An ADR is a negotiable instrument issued by a US commercial bank acting as a depository and represents a fraction or a multiple of one or more shares of the foreign stock. The shares of foreign stock are on

deposit with the depository's correspondent bank (the custodian bank) located in the home country of the issuer. Firms seeking the benefits of ADRs can choose from four different types of sponsored ADR programs, each with its own set of benefits as well as its own set of legal and regulatory requirements: Level I, Level II, Level III, and Rule 144A/GDR.

A Level I depository receipt program is the simplest method for companies to access the U.S. and non-U.S. capital markets. Level I depository receipts are traded in the U.S. OTC market with prices published in the "Pink Sheets" and on some exchanges outside the United States. Establishment of a sponsored Level I program does not require full SEC registration and the companies do not have to report their accounts under U.S. GAAP or provide full SEC disclosure. A company cannot raise capital via a Level I ADR.

Companies that wish to raise capital or make an acquisition using securities, use Sponsored Level II or Sponsored Level III depository receipts. Level II and Level III depository receipt programs require SEC registration and adherence to applicable requirements for U.S. GAAP. Reporting requirements include Form F-6 registration statement to register the ADR, Form 20-F registration statement that contains detailed financial information about the issuer, and Form F-1 to register the equity securities underlying the ADRs and annual reports.

Foreign companies can also access the U.S. and other capital markets through Rule 144A and/or Regulation S Depository Receipt facilities without SEC registration. Rule 144A programs provide for raising capital through the private placement of Depository Receipts with large institutional investors (Qualified

Institutional Buyers or QIBs) in the United States. Regulation S programs provide for raising capital through the placement of Depositary Receipts offshore to non-U.S. investors in reliance on Regulation S.

Since I am interested in studying the effect of US laws on ownership changes for cross-listing firms, I use only Level II and Level III ADRs for this study.

1.2.2. Why do Firms Cross-List? The Bonding Hypothesis

There exist several reasons why a company might want to list abroad: to expand investor base, to increase stock liquidity, to improve the terms on which they can raise capital, to increase visibility of the company, and to achieve non-financial benefits such as increasing customer base by broadening product recognition amongst investors of the host country. These and other motivations are reviewed in detail in Karolyi (1998) and Pagano, Roell and Zechner (2002).

This section examines the investor protection and corporate governance argument applied to cross-listing. According to the Bonding Hypothesis, exchanges with strict regulation and disclosure requirements are the ones attracting foreign firms rather than exchanges with inadequate supervision. Below are some of the aspects of greater regulation that cross-listing on a US stock exchange via a Level II or Level III ADR entails:

- Issuer is subject to SEC enforcement
- Issuer is committed to providing full information and to reconciling financial statements to GAAP

- Issuer is subject to listing requirements imposed by the exchange it lists on
- Issuer is exposed to the “scrutiny of reputational intermediaries including US underwriters, auditors, debt rating agencies and securities analysts” as suggested by Coffee (2002). Lang, Lins, and Miller (2003) show that the earnings forecasts of cross-listing firms are superior to those that do not cross-list.

Cantale (1996) and Fuerst (1998) show that firms signal quality by listing on strictly regulated markets. They predict that companies that cross-list on a more demanding exchange should exhibit higher profitability than those that list on exchanges with not so severe regulatory standards. Stulz (1999) predicts that companies from countries with poor legal standards can reduce the agency costs of external finance by subjecting themselves to tighter standards.

However, empirical testing of these models has yielded mixed results. Reese and Weisbach (2002) find that once they control for firm size, firms from weak investor protection countries are less likely to list in the US. However, firms from these countries that do cross-list issue more equity on cross-listing. Another paper that provides a direct test of this hypothesis is by Doidge et. al. (2003), who find that corporate governance seems to be secondary compared to other factors that drive large firms to tap US markets. Seigel (2002) finds that US securities laws are ineffective in punishing expropriation and insider stealing especially if the foreign firm has no assets in the US. So it all comes down to the extraterritorial reach of US securities laws.

The rights accorded to holders of ADRs are determined by a complex

interplay of the issuer's home country corporate laws and the US federal securities law. Shareholder rights being the purview of corporate law, the corporate law of the foreign issuer's home country determines the rights and protections for shareholders of the foreign issuer. However, certain corporate governance issues are regulated by US federal securities laws and the rules of the national securities exchanges on which the companies are listed. This is the basis on which the bonding hypothesis presumes that US securities law deters corporate malfeasance by foreign issuers. Further, the recently instituted Sarbanes-Oxley Act of 2002, which is aimed at higher corporate accountability to shareholders, extends to all public corporations, including ADR issuers, which have their securities, listed on US exchanges.

However, several factors undermine the importance of US securities law with respect to ADR holders. I discuss some of these below:

- The laws of many countries recognize the depositary bank as the shareholder of the securities underlying the ADR program and not the ADR holders. To be recognized as the shareholder of the underlying securities, many countries require the ADR holders to remove their ADR shares from the program and receive the underlying shares, thereby becoming a registered shareholder of the foreign issuer.
- No NYSE rules regarding notice of shareholder meetings or disclosure of meeting agenda items to holders of ADRs
- Foreign issuers are not subject to the SEC's proxy rules
- Foreign issuers may obtain waivers of holding annual shareholder meetings,

including quorum requirements for these meetings

- Depository agreements: In addition to federal securities law, the depository agreements play an important role in determining voting rights of ADR holders. Under some agreements, the issuer agrees to recognize the holders of ADRS as shareholders of the underlying securities and not the depository bank. There is no difference made between holders of ADRs and domestic investors in the foreign country. However some depository agreements severely limit voting rights of the ADR holders. These include prohibiting ADR holders' voting rights other than in limited circumstances; some agreements provide that if ADR holders do not vote, shares are autoproxied to the issuer; many include a disclaimer that there is no guarantee that ADR holders will receive proxy materials in time to exercise their votes and in some agreements, a depository bank that is recognized as the shareholder may not split its vote if ADR holders provide conflicting voting.

There also exist several provisions in current SEC regulations to allow for accommodations to foreign issuers. For instance, one of the requirements of Sarbanes Oxley is that listed companies have audit committees consisting of external, independent directors. Some foreign issuers are exempt from this requirement and allowed to have internal auditors, especially when it is authorized by the issuer's home-country statutes. Foreign issuers are also exempt from Regulation Fair Disclosure (Regulation FD) which prohibits the practice of selective disclosure of material nonpublic information by U.S. public companies to securities industry professionals.

In sum, the non-uniformity in regulations that apply to domestic and foreign issuers emphasizes the need for empirical work at the firm level to establish whether legal bonding influences the corporate governance structure of the foreign firms that cross-list on US exchanges. The following section discusses the thought experiment behind this paper.

1.2.3. Legal Bonding and Ownership Structure

This paper tests the effectiveness of increased corporate governance associated with US legal rules on cross-listing firms. LLS (1999) have shown that the level of investor protection in a country is an important determinant of ownership structure of firms. Proponents of the rent-protection theory of ownership like Bebchuk (1999) argue that countries with poor investor protection like French civil law countries have concentrated ownership structures because of the high value of private benefits of control in these countries. In contrast, countries following English common law have more dispersed shareholder structure because the legal rules and enforcement mechanism in these countries limit the existence of control benefits for a large shareholder.

If the bonding hypothesis were to hold, controlling shareholders of cross-listing firms would no longer be able to consume private benefits when subject to stricter US securities laws. John and Kedia (2002) in discussing ownership as one of the instruments of corporate governance predict that firms migrating to exchanges with stricter regulation should see a “*rapid change in their existing governance structures*”. Coffee (2001) also predicts a movement towards dispersed ownership

structure when there is a reform in the extent of minority shareholder rights protection because of investors' preferences for ownership and liquidity.

The above legal hypothesis of ownership structure is supported by corporate governance convergence theories. According to Coffee (1999) and Gilson (2001), convergence in corporate norms does not always require a formal legislative amendment of corporate laws and codes in different countries. Firms listing on foreign stock exchanges opt into foreign governance standards, thus developing a functional substitute to formal convergence. Therefore cross-listing firms practice legal bonding as a form of functional convergence⁴.

Related to this is the path dependence view of ownership structure, which says that there are significant sources of path dependence in patterns of corporate ownership structure. Initial ownership structures have an effect on subsequent structures because of sunk adaptive costs, network externalities and complementarities. Further, if the initial pattern of ownership structure provides one group of players with relatively more wealth and power, this group would have a better chance to influence the corporate rules, which in turn would reinforce the initial patterns of ownership. So the question comes down to whether the regulations provided by US securities laws for cross-listing firms are strong enough to override the home country's lax regulatory system.

There seem to be other advantages associated with making the transition from a concentrated ownership structure to a dispersed form. For example, Himmelberg,

⁴ Legal theorists distinguish between "formal convergence" and "functional convergence". Formal convergence in corporate governance requires a legislative amendment of corporate codes and Coffee (1999) argues that legislative inertia and role of special interest groups actually hinder formal convergence. Functional convergence, on the other hand, doesn't require formal institutional change and is brought upon by globalization forces which compel firms to revise their governance structure.

Hubbard and Love (2002) find that ownership concentration increases the cost of capital and leads to inefficiencies in investment. A dispersed ownership structure supported by US laws would help overcome the associated under-investment problem for cross-listing companies.

Cross-listing on a US exchange may also affect ownership structure by facilitating a control transfer. Controlling shareholders who wish to sell their stakes might view issuing an ADR as a way to increase the price at which they can sell their stakes. Several factors could contribute to this: Recent work by Baker, Nofsinger and Weaver (2002) shows that a US cross-listing increases the firm's visibility in the media and among analysts. Lang, Lins and Miller (2003) show that the earnings forecasts of cross-listing firms are superior to those that do not cross-list. This increase in information associated with cross-listing is helpful in making the company attractive to more potential buyers. Further, Diodge et al (2003) have shown that there is a valuation differential associated with cross-listing firms. Finally, just listing on a US exchange could be a signal of quality and adherence to corporate governance for the cross-listing firm. All these reasons contribute to possible changes in ownership and control structure after cross-listing.

This paper is also related to existing literature on ownership changes surrounding the IPO process. Many cross-listing firms are also first-time issuers in that they IPO on US exchanges. Papers like Booth and Chua (1996), Brennan and Franks (1997) and Field and Sheehan (2000) suggest that firms disperse their shares rapidly after a US-IPO and use underpricing as a tool to generate excess demand and ownership dispersion after the IPO. Brau and Fawcett (2004) in a survey of CFOs

find that firms elect to remain private if they are motivated by preservation of decision-making control and ownership. On the other hand, Zingales (1995) and Mello and Parsons (1998) argue that the IPO is only the first stage in eventual sale of control blocks, which could occur many years after the IPO. Literature on ownership changes associated with IPOs in other countries is very limited. Rydqvist and Hogholm (1995) investigate the going public decision in a sample of family-owned corporations in Sweden and find that the original owners liquidate their stakes in a majority of the cases. In a more recent study employing a larger sample of Swedish companies, Holmen and Hogfeldt (2003) find that ownership remains controlled subsequent to an IPO offering. While several other studies examine the identity of ownership structures in different countries (including LLS 1999, Claessens et. al. (2000)), this paper is one of the first to study time series changes in ownership structure.

1.3. Sample Construction and Descriptive Statistics

To study the relationship between cross-listing, corporate governance and ownership structure, I create a sample of foreign firms that listed on a major US stock exchange since the year 1990. The complete list of cross-listing firms is obtained from the Bank of New York's ADR Index. The cross-listing year and type of issue details are also verified using Citibank's ADR Universe. In the event of a discrepancy between the Bank of New York's ADR Index and Citibank's ADR Universe, I use the information that corresponds closest to the list of cross-listing firms obtained from

the NYSE and the NASDAQ.

To be included in the final sample, the following criteria are imposed: (1) Since I am interested in testing the effect of US legal rules, I include only Level 2 ADRs and Level 3 ADRs in the sample. Firms that list via Level 1 ADRs (OTC stocks) or Rule 144a are subject to little or no SEC disclosure requirements and do not have to comply with US GAAP and so are excluded from the sample. (2) I use only those cross-listing firms that are covered by Worldscope database. Since most of the firms that cross-list are big companies with high market capitalization, there is little danger of losing out a large sample of the cross-listing firms by using Worldscope. Further, I have access to firm-level data in Worldscope only from the year 1990. So the year 1990 is the initial cut-off date for the sample. (3) Finally, I include only firms for which I can get ownership information from one year prior to cross-listing to one-year after cross-listing. So there is at least three years of ownership information for each cross-listing firm. The final sample extends from 1990 to 2002 and contains 425 firms that cross-listed on a major US stock exchange.

1.3.1. Cross-listing by Year, Exchange and Country

Panel A of Table 1.1 shows the distribution of the sample by year of listing and exchange. More number of firms list on the NYSE, which has the strictest disclosure requirements than on the NASDAQ. Very few firms list on AMEX stock exchange.

Panel B of Table 1.1 presents data on cross-listing by country of origin. Following LLSV (1998), the countries are further classified on the basis of their legal

tradition into English Common Law, French civil law, German civil law, Scandinavian civil law and Socialist Law countries. I exclude cross-listing firms from China since it does not belong to any of the legal traditions identified above. I also exclude cross-listing firms from Canada since none of them issue ADRs and all are direct cross-listings. The sample confirms the findings of Reese and Weisbach (2002) that more firms list from French civil law countries than from English common law countries and they do so disproportionately on the NYSE than on the NASDAQ. While 81% of firms from French civil law countries list on the NYSE, only 53% from the English common law countries do so.

1.3.2. Ownership Characteristics—Prior to Cross-listing

For each of the companies in the sample, I identify who the ultimate owner of the company is, what his cash flow to voting rights are and whether there has been a change in ultimate owner from two years prior to issuing an ADR to five years, post-listing.

As a starting point for the data collection, I use Worldscope, which provides annual data on the names and holdings of all owners that hold more than 5% of a company's stock. This information is supplemented with data from a variety of sources to include all owners who have more than 5% of outstanding stock and are missing in Worldscope. All the sources used are listed country-wise in Appendix 1.B.

For the years prior to ADR listing, the main sources of data are Worldscope and company annual reports filed either with the domestic stock exchange or published on the company web pages. Other data sources include country specific

company handbooks like the *Brazil Company Handbook and Venezuelan Company Handbook* and international databases such as *Mergent International*.

The ownership information for the years after ADR listing is more easily available because a large fraction of the ADRs file Form 20-F with the SEC. Section 7 of this form titled *Major Shareholders and Related Party Transactions* (prior to 1999, it was Section 4 titled *Control of Registrant*) requires the ADR issuer to list all persons known to the company to own directly or indirectly more than 5% of the issued classes of stock. Further, the company is required to mention if there have been any significant changes in ownership structure in the past three years. Consequently, many companies provide detailed time-series information on major shareholdings in their 20-F statements. The source for the 20-F filings was both Lexis-Nexis and Hoovers Online. In all cases, the ownership information is collected for the end of the fiscal year or the closest possible date. This is because ownership information typically lags by about six months in the 20-F filings and by one or two years in the Company Handbooks and Worldscope.

I include companies for which it is possible to determine that all the major shareholders are listed or if it is possible to identify the shareholder who owns 50% or more of the cash flow rights. For cases in which the shareholder owns less than 50% and the rest is held by nominee accounts, I use the 20-F statements to decide whether or not to include the company in the sample⁵.

The ADR firms are divided into firms that are widely held and those with controlling ultimate owners. The procedure for identifying the ultimate owners is

⁵ This is different from Claessens et al (2000) who actually drop such companies. My justification for including it is that I use 20-F statements to verify whether the nominee accounts are widely held or in the hands of a controlling shareholder.

similar to the one in LLS (1999) and Claessens et. al. (2000). I use two cut-off levels, 20% and 10% to identify ultimate owners. An ultimate owner is therefore defined as someone who has 20% (or 10%) or more of the control votes of the company and is not controlled by anyone else. This sometimes involves tracking down ownership along multiple chains to find the major shareholders in the major shareholders and so on till we arrive at an ultimate owner who is not controlled by anyone else. The identity of the ultimate owners is further classified into five types: widely held corporation, widely held financial institution, families (or individuals with large stake), state (or government or kingdom) and miscellaneous. The miscellaneous category typically includes cooperatives, voting trusts (as is common in Netherlands) or a business group with no single controlling investor. If a firm does not have an ultimate owner, it is classified as widely held. If a firm has multiple ultimate owners, I pick the largest ultimate owner for the analysis.

Panel A of Table 1.2 presents ownership statistics at the 20% cut-off level and Panel B presents statistics at the 10% cut-off level. The firms are classified by the legal system they belong to and by the identity of the controlling shareholder. The two panels show similar trends at the two cut-off levels. The largest fraction of cross-listing firms that are widely held are from English common law countries (61% and 49% at the 20% level and 10% levels respectively). This is to be expected since LLS (1999) have shown that dispersed ownership is a characteristic of only English common law countries.

Further, family ownership seems to be the most predominant form of control across all other legal traditions. For the whole sample, out of 425 cross-listing firms,

at the 10% cut-off level, 310 firms have a controlling owner of which 151 firms are controlled by a family. The smallest group of ultimate owners is widely held corporations (21 out of 310). The state controlled firms are typically ones that used American Depositary Receipts as a privatization vehicle.

1.3.3. Degree of Separation of Ownership and Control—Prior to cross-listing

For each firm in the sample, I make the distinction between ownership (cash flow rights) and control (voting rights) using the procedures in Claessens et al (2000) and LLSV (1999). As an example, consider the simplest case in which Firm A owns 25% of Firm B which in turn owns 60% of Firm C. Assuming that A is a widely held corporation, C is classified as being controlled by a widely held corporation, which is A, who owns 15% of the cash flow rights (product of the ownership stakes along the chain) and 25% of the voting rights (weakest control chain) of C. In many cases, the ultimate owner (here A) could have several control right chains through which he controls C. Then the ultimate control share is given by the sum of the weakest control shares along each chain. For instance if A also held 50% of Firm D which held 35% of C, then ultimate control share of A via B and D would be $= 25+35 = 60\%$ while the total cash flow rights of A would be $= 0.25*60+0.50*35 = 32.5\%$.

Panel A of Table 1.3 presents the cash flow and voting rights of the controlling shareholders for the full sample and also on the basis of the identity of controlling shareholder and legal tradition. The data are presented for the year of cross-listing. Full sample characteristics show that the percentage of voting rights held by the controlling shareholder are significantly different from the cash flow

rights at the 1% level. This separation of ownership and control is further reflected for each type of controlling owner. The separation is maximum in the case of family controlled enterprises (-5.12 % at 1% significance) and least for firms controlled by a widely held corporation. (-1.48 %). The degree of separation is also seen by looking at the ratio of cash flow rights to voting rights (C/V). The mean C/V for the whole sample is 0.89, which implies that the mean controlling shareholder can control 100% of the voting rights using only 89% of the cash flow rights. The same statistics are reported for different legal traditions. Separation is least significant for firms listing from English common law countries (-1.8%) and maximum for firms from French civil law countries (-6.8%). There does not appear to be much separation of cash flow and voting rights in the firms listing from German and Scandinavian civil law countries or from Socialist law countries.

The ratios are also significantly different from each other across different legal traditions as shown in Panel B of Table 1.3. Panel B of Table 1.3 also reports the mean ratio of cash flow to voting rights when countries are classified on the basis of Law and Enforcement, Financial Development and Transparency. To investigate if the degree of law and enforcement in the home country of the cross-listing firm affects the ratio of cash flow to voting rights, I use three alternate measures from LLSV (1998): *Shareholder Rights*, *Law and Order Score* and *Judicial Efficiency*. The countries are classified into high and low depending on the median value of each of these measures.

Shareholder Rights is a measure of shareholder rights protection in the country. It is an index of ‘anti-director’ rights ranging from 0 to 6 from LLSV (1998)

which is formed by aggregating six important shareholder rights. *Law and Order Score* is a measure of the law and order tradition in the country ranging from 1 to 10 from the International Country Risk Guide. *Judicial Efficiency* is another index scored 0 to 10 from the country-risk rating agency Business International Corporation that is an assessment of the efficiency of the legal environment from the investors' perspective.

On all three measures, I find that firms need a larger portion of cash flow rights to control 100% of the firm in countries with good legal rules and enforcement. In comparison, the ratios are significantly lower for cross-listing firms from countries that are not protective of investors.

In addition to shareholder protection variables, I investigate if the ratio of cash flow to voting rights in cross-listing firms also varies with the level of financial development of their home country. Lins, Strickland and Zenner (2003) and Reese and Weisbach (2002) show that firms from emerging markets are more likely to cross-list. I use three different but comparable measures from the Financial Structure Database constructed by Beck et. al (2000) : Higher values of *The Index of Financial Structure* indicate a more market based financial system. *Developed* is a dummy that takes the value 1 if the firm's home market is developed and 0 if it is an emerging market firm. *Overall Size* is a variable indicating the overall size of the financial system (both the stock market and the banking sector). See Appendix 1.A for a detailed description of the variables definition and their sources.

I find that ratio of cash flow to voting rights is significantly lower for emerging economies and for firms coming from countries with small financial

systems. Firms from countries with more market based economies have higher cash flow to voting rights indicating that financial structure of the home market is a significant determinant of the extent of control benefits in firms.

Finally since all firms that cross-list via a Level II or Level III ADR have to conform to US GAAP, I investigate if the cash flow to voting rights ratio varies with home country's accounting standards. I use an *Accounting* index produced by the Center for International Financial Analysis and Research Inc that is a measure of disclosure requirements and transparency in accounting statements produced by firms in different countries. Poorer the accounting standards, one would expect controlling shareholders to be better able to divert funds and expropriate requiring a lower amount of cash flow to voting rights. I find that the ratio is 0.86 for firms with poor accounting standards, which is significantly lower than the ratio of 0.95 for firms with good accounting standards.

1.3.4. Use of Control Enhancing Features --Prior to cross-listing

The ways in which cash flow rights can be different from control rights is through the use of dual classes of stock, pyramidal structures and cross shareholdings. I create dummies for each of these categories. *Dual-Class* equals one if the firm issues multiple classes of shares with different voting rights, *Pyramid* equals one if the controlling owner exercises control through at least one publicly traded company and *Cross-Shareholding* equals 1 if the company has a controlling shareholder and owns a percentage of shares in either its controlling shareholder or in any other company in that chain of control. I also define dummies to identify if there is just one

controlling owner, *Single*, and if any person from higher management is also from the controlling family, *Management*. See Claessens et al (2000) for detailed description of these variables.

Table 1.4 presents details on the prevalence of various control enhancing features in different cross-listing firms. As in Table 1.3, firms are classified on the basis of their home country's legal rules, law and enforcement, financial development and accounting standards. The use of multiple classes of shares with different voting rights is significantly higher (lower) in firms from French civil law (English common law) countries than in firms cross-listing from other countries. The use of pyramidal structures seems to be quite high (around 50%) in most of the companies irrespective of the legal system they belong to. Cross-shareholding structures are more common in Scandinavian countries in this sample.

When countries are classified on the basis of shareholder rights protection and legal enforcement, I find that pyramiding is very common in firms whose home countries are not very protective of minority shareholders (61%), have low law and order scores (57%) and rank low on the score of judicial efficiency (53%). Similar statistics hold for the use of multiple voting classes of shares. 37% of firms listing from countries with poor legal and judicial systems use multiple classes of shares as compared to only 10% of firms coming from protective legal and efficient judicial systems. Therefore, I find that the use of control enhancing structures in firms that cross-list from different countries is very representative of the overall use of these structures in those economies as discussed in LLS (1999).

I also find that firms from developed countries and firms from countries with

large financial systems and market based economies are less likely to have multiple classes of voting shares and less likely to have a single controlling shareholder. This is as expected because a growing body of research has shown that a country's set of legal rules and legal institutions is important for explaining the level of bank and stock market development (LLSV 1998). Hence one would expect ownership concentration levels and general ownership characteristics to vary with the level of financial development of the home market.

In addition, the controlling shareholder belongs to upper management in most of the firms listing from under-developed economies. On the account of level of transparency in the accounting system of the country, I find that firms that cross-list from countries with poor accounting standards have significantly higher pyramidal structures, multiple classes of shares and single controlling shareholders.

1.3.5. Econometric Issues

A potential concern with any kind of analysis using cross-listed firms is the endogeneity of the cross-listing decision. Specifically, if a firm cross-lists, it *chooses* to do so and may differ significantly from firms that do not cross-list. In fact, as discussed in Table 1.8, a look at the pre-cross-listing characteristics of the cross-listing firms shows that they are systematically different from firms that do not cross list. Hence it is important to determine whether any observed post-cross-listing changes in voting rights or performance is *caused* by cross-listing or if cross-listing is merely associated with these changes, via its correlation with firm characteristics.

One way of controlling for this self selection bias is by constructing a

matching estimator that estimates the average treatment effect on the treated, where “treatment” corresponds to the cross-listing decision. Any simple matching estimator would match each treated unit (cross-listing firm) to one/more untreated units (domestic firms that did not cross-list) with similar values of pre-treatment variables. Then the average effect of the treatment on the treated units is estimated by averaging within match differences between the treated and the untreated units. The main assumption behind constructing most matching estimators is that assignment to treatment is unconfounded, that is, based on observable pretreatment variables only, and that there is sufficient overlap in the distributions of the pretreatment variables (Rubin, 1979).

However, Abadie and Imbens (2003) show that if the control and treated groups are insufficiently comparable, then there exists a conditional asymptotic bias in the matching estimator, which makes it inconsistent. Hence, to estimate the average treatment effect, I follow the bias-corrected estimator in Abadie and Imbens (2002), that corrects for asymptotic bias arising from imperfect matching. The estimator is implemented using the Stata command *match* which is described in Abadie et. al (2001).

For the sake of brevity, only the results using this estimator are discussed in the following sections. A rigorous analysis of the construction of this estimator is given in Appendix 1.D. The estimator construction follows closely the presentation in Abadie and Imbens (2003).

1.4. Empirical results

1.4.1. Changes in Voting Rights

In this section, I document the change in voting rights of cross-listing firms after they cross-list on a major exchange in the US via a Level II or Level III ADR program. I first examine these changes by classifying firms by their home country's legal tradition. Table 1.3 shows that there is a significant difference in cash flow and voting rights, prior to cross-listing, between firms belonging to different legal traditions and levels of shareholder protection. It is therefore worthwhile to examine if the changes in the legal and regulatory environment that cross-listing firms are subject to, upon issuing an ADR, translate into changes in ownership concentration as predicted by the rent protection theory of ownership. Finally, I also assess if the changes in voting rights are different for different groups of shareholders. The purpose is to examine if a US listing affects certain groups of controlling shareholders more than other groups.

Panel A and B of Table 1.5 report the percentage changes in voting rights at the two cut-off levels of 20% and 10% ownership concentration during a six-year period (-1,+5) around the cross-listing year. The statistics reported are group means for different groups of home countries of the cross-listing firm classified on the basis of legal origin. I also report statistics for a comparison sample of benchmark firms from each country that do not cross-list.

A perfect control sample would be the Level I ADRs that trade on OTC markets because while these firms cross-list, they are not subject to SEC enforcement

or exchange listing rules. However, the lack of SEC filings of these companies makes it extremely difficult to find their ownership information. To construct the comparison sample, for each cross-listing firm, I find matching firms by industry (four-digit SIC) and nearest asset size from Worldscope that did not undertake an ADR issue. If there is no match at the four-digit SIC level, I look at three or two-digit SIC codes before applying the size criterion. The final restriction for the non cross-listing firm to be included in the sample is the availability of good ownership information from Mergent International and country specific sources. In about 20% of the cases, the availability of ownership information over-rides the size criterion. Further, to minimize the data collection without losing out on the representative-ness of the comparison sample, I adopt the following sampling method: If a country has ten or less than ten firms issuing ADRs, I try to identify a match for each of the ten firms. However, if the country has more than 10 firms cross-listing in the US, then I randomly sample 10 of them and identify comparison firms for each of those. I track ownership details for the comparison firms for only two years, the year prior to cross-listing (of the firm that it is a match to) and four-five years after cross-listing.

One of the sample selection issues here is that the cross-listing firms are very different from the home country firms that do not cross-list. To address this issue, I compare the ownership characteristics of the domestic firms to the cross-listing firms prior to their listing in the US. I find that both samples have high concentration of ownership structures and family ownership is predominant in both the domestic non-crosslisting firms and the cross-listing sample. In addition, the mean separation of cash flow and voting rights is similar in both samples. For instance, family owned

firms that cross-listed in the US had a mean ratio of 0.85 in the year prior to cross-listing compared to a mean ratio of 0.83 for family owned firms in the control sample. Cross-listing firms from French civil law countries had a ratio of 0.86 compared to 0.84 for control sample firms from these countries. Test of means reveals all statistics to be significant at the 1% level. Though these tests show that the ownership profile and the potential for private benefits of control is similar in the domestic control sample firms and the firms that cross-listed it is difficult to make any causal inferences without tackling the endogeneity of the cross-listing decision.

Both panels A and B of Table 1.5 report negative but insignificant decreases in the year prior to cross-listing (-2, -1). There are highly significant but small decreases in voting rights in the year of the cross-listing and thereafter. The largest decrease in voting rights in both panels occurs during the (-1, +3) period and this is slightly reduced during the (-1, +5) period. For example at the 10% level, voting rights decrease by 6.03% during the period (-1, +3) and only by 5.46% during the period (-1, +5). Similar results are obtained when the sample size is kept fixed over all periods (results not reported). In contrast, for the comparison sample, the results show a slight but insignificant decrease of -2.96% (-3.45%) at the 20% (10%) ownership concentration level.

The cross-listing firms have chosen to cross-list and so it is difficult to see if the decline in voting rights can be really attributed to cross-listing. Note that these firms could have cross-listed and diluted only their cash flow rights without diluting their voting rights. This endogeneity of the cross-listing decision can be handled by estimating a treatment effect. The last row in each panel of Table 1.5 contains the

results of applying the estimators in Abadie and Imbens to the sample of cross-listing firms. The values reported are the estimated declines in voting rights over the period (-1, +3) relative to the decline in voting rights in the control group. The values reflect that there is a significant decline in voting rights in the sample of cross-listing firms around the date of cross-listing with the largest being for firms from French civil law countries.

The results suggest that issuance of an ADR is accompanied by a decrease in control rights held by the concentrated shareholder when compared to firms from the same country that do not issue an ADR. However, the decrease is definitely not of a large enough magnitude to result in a change to a widely held ownership structure. In fact, in the fifth year after cross-listing there is actually a slight increase in percentage of control rights.

Table 1.5 also reveals that the firms from French civil law countries experienced the largest decrease in voting rights (-9.38% at 20% level and -9.31% at 10% level) over the period (-1, +3). These changes are significantly different from zero at the 1% level. In comparison, corresponding numbers for firms from English common law countries were -2.52% and -3.39% respectively. The latter firms also registered a slight increase in voting rights over the period (-1, +5). Ownership changes seem to be the least in Scandinavian and Transition economies.

In Table 1.6, I examine the change in voting rights for different types of controlling shareholders. The table reports changes in voting rights for the original controlling shareholder over different periods of time surrounding the year of cross-listing. If the original controlling shareholder loses control during the period of study,

then he is no longer included in the observations.

Table 1.6 reveals some important differences between family and state controlled firms. I find that family controlled firms experience only a small decline of 5.8% over the period (-1, +3), which reduces to 3.9% over the period (-1, +5). This suggests that family controlled firms reduce their control rights up to year three after cross-listing but actually start increasing control thereafter. This could reflect one of two things: The controlling shareholders reduce their stake at the time of cross-listing to signal their interest in corporate governance and attract more investors but tend to reconsolidate soon after. Alternatively, it could also mean that they take advantage of the valuation premium associated with cross-listing (Doidge et. al (2003)) and sell a part of their stake only to buy back after year three when valuations have returned to normal.

State controlled firms, on the other hand, experience significant and large declines of 17.2% and 22% over the periods (-1, +3) and (-1, +5) respectively. So unlike the family controlled firms' state controlled firms continue to divest their stake in year four and five. The large decline in voting rights experienced by state controlled enterprises is not very surprising because a lot of privatizations of state-owned assets have been carried out by issuing American depositary receipts. This is especially true for countries in Latin America. The best example is that of the Brazilian telecommunication giant Telebras, a \$37 billion company. When the Brazilian government decided to privatize Telebras in 1998 and break it up into 12 smaller units, 12 separate ADR issues were established on the New York Stock Exchange. One of the reasons why governments decide to use global equity markets

for privatization, apart from wanting to increase investor base is that in many countries, the home market is unable to absorb such a large tranche. Hence they are compelled to look at international markets to raise capital. On going privatizations could also explain the finding that unlike family controlled firms, state controlled firms continue to divest their stake in year four and five.

Table 1.6 also shows that companies controlled by corporations and widely held financial institutions exhibit a similar pattern as family controlled firms. Firms controlled by corporations and financial institutions experience large declines in control over the period (-1, +3) of 26.7% and 14.5% respectively which reduces when over a longer period of (-1, +5). This seems to suggest that cross-listing firms controlled by corporations and financial institutions also do a lot of selling and buy-back around the cross-listing date to take advantage of valuation premiums. The larger decline in the case of corporations and financial institutions could reflect the lower use of multiple classes of shares in these types of firms. Family owned firms, on the other hand, would prefer to use shares with low or no voting rights to take advantage of the valuation premium since they value control more. Hence the study shows only a small decline in voting right shares in the case of family owned firms. These results are robust to the endogeneity of the cross-listing decision as evidenced by the last row in each panel. The treatment effect estimators show the largest decline for state owned enterprises and some of the least declines for family owned firms.

While the decline in voting rights is not significant to result in a widely-held ownership structure, there exist other changes in ownership structures as described in the section below.

1.4.2. Changes in Control of Cross-listing Firms

In this section, I examine the incidence of control changes taking places in the sample of firms that cross list on a major exchange in the United States. A change in control is registered when the original shareholder completely divests his stake to a new party or if the original controlling shareholder sells a sufficient portion of his stake such that he no longer has the maximum percentage of voting rights. A change in control is also registered if a widely held firm sees the emergence of a controlling shareholder within five years after cross-listing.

Appendix 1.D shows an example of control change associated with an ADR listing in the case of Vimpel-Communications (VimpelCom), which in 1996 became the first Russian company to trade on the New York Stock Exchange. The controlling shareholder of the company in the year prior to ADR issuance (1995) was the founder of the company, Dr Dmitri Zimin, who was also president and CEO. Dr Zimin owned 45% of the cash flow rights of VimpelCom and controlled 58.6% of the company's voting stock. By 2001, VimpelCom had two new majority shareholders: Alfa group who controlled 25% plus two shares of VimpelCom's voting stock via the company EcoTelecom Ltd. and Telenor, Norway's leading telecommunications company which controlled 25% plus 13 shares of VimpelCom's voting stock.

The full sample characteristics show that roughly 35% of the firms that had an original controlling shareholder experience a change in control within five years of cross-listing in the US. Panel A of Table 1.7 provides a detailed breakdown of control changes by type of controlling shareholder. The first column of Table 1.7 provides

the number of control changes taking place for each type of original controlling shareholder and the last row of Table 8 shows the emergence of new controlling shareholders. Out of the 78 control changes in the study, most occurred in cases where the original controlling shareholder was a family (26 out of 78) or the state (22 out of 78). The 26 families that exited, transferred control to 7 new families, 8 public corporations, one state, 4 widely held financial institutions and 3 changes were classified as miscellaneous. Three of the 26 families completely divested their stake resulting in a widely held corporation. Overall, 11 of the 78 control changes resulted in the original firm becoming widely held.

Table 1.7 also shows that the largest number of new controlling shareholders are widely held corporations and widely held financial institutions. Only 16 of the 78 control changes resulted in a new family being in control compared to 38 changes to a widely held corporation or financial institution.

Panel B of the table provides a better sense of net changes in controlling shareholder types. The table shows the change in controlling shareholder type from prior cross-listing to post cross-listing for the sample of firms that underwent control changes. There is a total decrease of 11.7% and 24.2% in the presence of family controlled and state controlled firms respectively, over the period (-1, +5) indicating that these types of controlling shareholders are most likely to sell their stakes on cross-listing. On the other side, the controlling shareholder that emerges most after a control change is a widely held corporation or a widely held financial institution. This implies there is a degree of movement away from state and family ownership in some companies cross-listing in the US.

An interesting result from panel B is that 45.3 % of control changes result in a foreigner being in control. This seems to indicate that a US cross-listing provides a way for the domestic controlling shareholder to divest his stake to a foreign owner. Empirical studies have shown that cross-listing on a highly liquid market like the US increases visibility (Merton's (1987) investor recognition hypothesis) and also sends out a good signal that the firm believes in good corporate governance because it is bonding to greater transparency (Coffee (1999) and Stulz (1999)). These two features would make it easier for a controlling shareholder to sell his control block to a foreign owner.

Table 1.8 presents a comparison of the pre-listing characteristics of companies that cross-list with those that do not cross-list. While Panel A presents results for the complete sample, panel B splits the cross-listing sample into firms that undergo a control change and those that do not. Both the panels table compute the difference in median values for some important balance sheet variables such as leverage, total assets, return on assets, total asset growth and foreign income growth. The differences are computed by estimating a median quantile regression (LAV) on a constant, a time dummy variable which captures time relative to the year of cross-listing as well as control dummies for calendar year, industry and country. I investigate two relative time periods: PRELISTING (year before cross-listing) and CLYEAR (year of cross-listing).

Panel A of Table 8 reveals some significant differences between cross-listing firms and domestic firms both in the year prior to cross-listing and the year of cross-listing. ADR issuing firms are larger, more levered and have higher asset and foreign

income growth rates than non ADR issuing firms. The table also shows them to have higher ROAs and Tobins Q ratios. On doing treatment effects with the Abadie-Imbens estimator, it is observed that while the pattern in assets, leverage and growth rates is maintained, the ROA and Tobins Q results are much weaker. Panel B reveals interesting patterns for the firms that undergo a control change and those that don't. All cross-listing firms seem to be significantly larger than companies that do not cross-list. This finding is consistent with Pagano, Roell and Zechner (2002) who argue that there exist economies of scale in cross-listing which increases with company size. The company growth variables show that there cross-listing is associated with high growth rates for the firms. Total asset growth peaks in the year before (or in the year of) cross-listing for both samples of companies that undergo a control change and those that do not. The foreign income growth variable is also significantly larger for all cross-listing companies compared to the control group. There is also some evidence linking international presence to a control change because the foreign growth rates for the firms that undergo a control change are larger than the growth rates for companies that do not undergo a control change, and this is borne out by the treatment effects estimator.

The table also shows the difference in leverage ratios for the two samples relative to the control sample. A significant finding of the table is that the leverage ratios of the firms that undergo a control change are significantly higher in the year of the cross-listing and five years later, indicative of a different ex-ante selection story. One would normally expect that firms with low leverage are more profitable and hence undergo a control change. The table however suggests that some of the cross-

listing firms who also undergo a change in control structure experience an increase in their debt capacity.

Tobin's Q ratios are significantly higher for all cross-listing firms in the year prior to cross-listing but this difference remains only for firms that do not undergo a control change. In fact, firms that undergo a control change in this sample are found to have a decreased Tobin's Q ratio in the year of the cross-listing. Finally, the return on asset measure is significantly higher for all cross-listing firms only in the year of cross-listing. This is suggestive of window dressing by the ADR issuing firms. When we look at the treatment effects for the ROA and Tobins Q measure, only the high Tobins Q of the no control change firms persists. While earlier research (Pagano, Roell and Zechner (2002), Doidge et. al. (2003)) document an increased ROA and Tobins Q in all cross-listing firms vis-à-vis domestic firms, this table shows that on controlling for endogeneity of the cross-listing decision, only the firms that do not undergo a control change exhibit increased Q ratios.

1.4.3. Predicting Control Change from Company Characteristics

The descriptive statistics discussed in the last two sections provide some evidence that there is a change in the identity of the controlling shareholder in firms that cross-list in the US. In this section I turn to more rigorous regression analysis to investigate the control changes in detail. I use duration analysis to determine which company characteristics predict a control change and multinomial logit analysis to predict when control change results in a foreign shareholder. I also use multinomial logit analysis on a smaller sub sample of OECD countries to study the effect of

restrictions on foreign direct investment on control change.

In Table 1.9, the determinants of a control change occurring within five years of cross-listing are analyzed using a Cox proportional hazard rate model. This methodology is useful in predicting discrete events (recorded as failures) in a panel setting and has been used by Pagano et. al (2002) in examining the decision by firms to cross-list. It estimates the effects of a set of covariates X influencing the probability of undergoing a control change at time t (the probability is referred to as the hazard rate $h(t)$). The model is written as:

$$h(t)=h_0(t) \exp (X'\beta) \quad (1)$$

where β is a vector of coefficients and $h_0(t)$ is the baseline hazard rate (that is the hazard rate when all X variables are set to 0). The Cox proportional hazard rate estimator is a semi parametric estimator and is referred to as proportional hazard because it assumes that the hazard ratio $h(t)/h_0(t)$ is constant for any two firms at any point in time.

Table 1.9 reports the estimates as exponentiated coefficients ($\exp(\beta_1)$, $\exp(\beta_2), \dots$) rather as coefficients (β_1, β_2, \dots), because exponentiated coefficients can be readily interpreted as the effect of unit change in independent variable X on the hazard ratio $h(t)/h_0(t)$.

The set of determinants include both firm-level characteristics and characteristics of the home country of the cross-listing firm. One of the important predictors of control change is the capital structure of the company. Mitchell and Mulherin (1996) argue that changes in the firm's growth opportunities or leverage

could make adjustments in ownership necessary. Consistent with this view, are empirical studies that document a takeover or exit when the firm is faced with increasing leverage and financial pressure (Zingales, 1998; Powell, 1997). Therefore I investigate to what extent TASTGR (total asset growth), FINCGR (foreign income growth) and LEVERAGE predict the probability of a control change. A highly levered foreign company facing financial pressures is more likely to go bankrupt than to find buyers in the international market.

Another determinant of control change associated with cross-listing is the SIZE of the firm. Shleifer and Vishny (1992) argue that the market for corporate control is less liquid as firm size increases. Bethel et al. (1998) and Mulherin and Boone (2000) provide empirical evidence that smaller firms are more likely to become takeover targets. Therefore size of the cross-listing firm could be an important determinant of whether or not it undergoes a control transfer. Recent evidence, not associated with cross-listing, shows that control transfers are more likely when the performance of the company or business unit is below the industry benchmark (Bethel et al., 1998; Denis and Sarin, 1999; Maksimovic and Phillips, 2001). Therefore I include Tobin's Q Ratio to investigate if low valued firms undergo more control transfers than high Q firms.

I also include AGE of the firm as a determinant variable of ownership changes, where age is defined as the year of cross-listing-year the company was founded in. On one hand, older firms have more entrenched owners and are less likely to completely divest their control stake via an ADR compared to younger firms. On the other hand, state-owned enterprises privatizing through an ADR issue, are

typically much older than younger firms and could drive the result in the opposite direction. The identity and complexity of ownership structure also poses a barrier to control transfers. For instance, state owned enterprises in the course of privatization may be mostly interested in cross-listing because of the possibility of control transfers unlike manager-owned firms where selling the control stake amounts to a loss of organizational capital and private benefits. Further, existence of structures like dual-class equity and cross ownership could deter control changes (Bebchuk et. al., 2000) . Hence I include dummy variables for identity of the owner (FAMILY, STATE, CORPORATION, FINANCIAL INSTITUTION and MISCELLANEOUS) and a dummy variable called CONTROL which takes the value 1 if there is the use of a control enhancing feature such as dual-class equity, pyramidal ownership, or cross-shareholding

Finally, recent law and finance literature has emphasized the importance of legal origin, financial development and property rights protection in determining the prevalence of ownership structures in a particular country (LLSV 1997, 1999). Hence, I also use lagged values of the following country-level variables: GDPCAP is the log of GDP per capita of the home economy, TVT_GDP is stock market total value-traded to GDP which is defined as total shares traded on domestic stock market exchange to GDP, COMMON is a legal origin dummy which takes the value 1 for English common law countries and 0 otherwise, PROPERTY is the property rights regulation index from LLSV (1999) and the Index of Economic Freedom, and is a measure of the degree to which the government protects private property, and CAPCONTROL is an index of capital control regulations, as in Harrison et. al.

(2004), constructed from the International Monetary Fund's annual report, Trade and Exchange Restrictions. This is a composite index constructed by taking into account five types of control restrictions on international transactions. Thus, this measure is reflective of the openness of a country's economy. The standard errors and p-values are adjusted for clustering on companies to allow for dependence of errors concerning the same company.

Table 1.9 shows that the variables that have the greatest impact on a control change occurring are size of the company and leverage. A unit increase in leverage decreases the relative hazard of a control change by 78.7 % and a unit increase in size increases the probability of a control change by 19.3% respectively. This suggests that larger companies and companies with less debt are more likely to undergo a control change. While consistent with the theory that investors are reluctant to buy control blocks in highly levered companies, the result also questions the hypothesis that larger firms are less likely to undergo control changes. But this result is probably reflective of the fact that it is the larger companies who are able to cross list outside the home market and take advantage of increased visibility to facilitate a control change.

When we look at the identity of the original controlling shareholder, the table shows that state-owned enterprises and family owned firms are highly likely to undergo a control transfer on cross-listing (35.3% and 21.2% respectively). Surprisingly, the presence of control enhancing features is not a strong deterrent to the likelihood of control transfer.

An increase in Tobin's Q ratio decreases the probability of a control change

by just 0.8% (significant at 0.001 level). This seems surprising at first because one would expect investors wanting to buy control blocks in companies with high market valuation. But a high market valuation also implies that the concentrated shareholder is more reluctant to sell his control block and hence there are a lesser number of control changes in these companies. It is also consistent with findings for US companies that control transfers occur mainly in poorly performing companies. I also find that foreign income growth enters significantly into the regression. An increase in foreign income growth results in an increase in the probability of a control change by 7.8%. The table however doesn't reveal if the foreign income growth predicts a control change to domestic or to foreign shareholders. This issue is addressed in Table 1.10.

Among the country-level characteristics, I find that the economic size and liquidity of the home country's economy have a large positive and significant effect. This suggests that it is easier to sell control blocks if the home country's economy is big and the stock exchange is very liquid. Further, control change is less likely in English common law countries, which is to be expected because most of the cross-listing firms from these nations do not have a concentrated shareholder and Table 1.7 reveals very few changes from a widely held ownership structure to concentrated ownership on cross-listing. The extent to which a government protects private property and enforces laws to protect private property also seems to be determining factor of control changes. Cross-listing firms are less likely to sell their control blocks to a new controlling owner on cross-listing if their home market is protective of property rights. So control changes following ADR issuance are more common in

countries that have poor property rights protection. I also find the interesting result that a unit increase in capital control restrictions decreases the probability of a control change by almost 8.8%. Therefore probability of a control change on issuing an ADR is decreased if the home country's economy is not very open and is subject to severe capital control restrictions. Firms from such economies are not very attractive to investors even after they issue an ADR.

1.4.4. Emergence of a new foreign controlling shareholder

This section investigates if control changes result in a foreign controlling shareholder. Multinomial logit is used to predict whether a company is more likely to experience a control change resulting in a new domestic owner, or in a foreign owner, or becomes widely held or does not experience a control change at all. The regressors are lagged as before and standard errors are adjusted to allow for clustering.

Table 1.10 reports the relative risk ratios when control change results in a new domestic owner, a new foreign owner, or in the firm becoming widely held. The base line case is when there is no control change. The set of independent variables used are the same firm and country-level characteristics used in Table 1.9 with one change. I substitute capital control regulations with the level of foreign direct investment, FDI, taken from the IMF's Balance of Payment Statistics and YEARS_LIBER which is the number of years since the official date of liberalization of the country (from Bekaert and Harvey 2000). FDI is a measure of foreign direct investment in the recipient country scaled by aggregate gross domestic investment.

There exist interesting dis-similarities between the three groups. Country

characteristics like GDP per capita and TVT_GDP are significant predictors of control change to a new domestic controlling owner. Odds that a controlling shareholder sells his stake to another domestic shareholder rather than retaining his stake is 1.14 times higher if his company is located in a developed economy and is 13.68 times higher if the stock exchange of the home country has high liquidity. So greater the financial development of the home country's economy and greater the liquidity of the home country's stock exchange, more companies sell their stakes to a domestic controlling owner on cross-listing. On the other hand, odds that the controlling shareholder sells his stake to a foreign owner decrease by 98% with each 1-unit increase in the liquidity of the home market's stock exchange. This suggests that the size and liquidity of the home country's stock exchange is a significant determinant of whether control is transferred to a domestic owner or a foreign owner.

Table 1.10 also reveals that increased property rights regulation increases the odds of a dispersed ownership structure after cross-listing and decreases the odds of a control change to a domestic controlling owner. It has a positive but insignificant effect on odds of a foreign controlling owner emerging post cross-listing. This suggests that use of an ADR to sell a control block to another shareholder is rare in countries that are protective of property rights. This is broadly consistent with recent evidence on privatizations. Megginson, Nash, Netter and Poulsen (2001) find that the sale of control blocks is easier where governments respect property rights. Hence firms in these countries do not need to approach global markets to sell their control blocks.

The level of foreign direct investment into the home country also has a

significant effect on the sale of a control block to a foreign owner. This seems to suggest that a foreign sale is easier when the home country is already open to foreign investors. I don't find any of the country level characteristics to be significant predictors of the emergence of dispersed ownership structures on cross-listing.

Firm-level characteristics, on the other hand, serve as important predictors for control change to a widely held ownership structure. Odds of a controlling shareholder completely divesting his stake, resulting in a widely held company, are higher for companies with higher market valuations. Further, age comes in as a significant predictor only for companies moving from a concentrated ownership to a dispersed ownership structure (ages decreases the odds by 71%). Further, larger the company, less likely it is to move to a dispersed ownership structure.

Table 1.10 also shows the firm level characteristics that predict control change to a foreign owner. Size and leverage of the cross-listing are highly significant indicators of a control change to a foreign owner. The odds are decreased by 37% and 70% for large firms and highly levered firms respectively. This seems to suggest that only small companies and companies with low debt are attractive to foreign investors. This both supports and contrasts a recent study by Freund and Djankov (2000) who find that foreign investment in Korea is focused on larger firms and firms with low debt ratios. However, the authors in that study focus on direct foreign investment and not on firms issuing ADRs. In addition, I find that the odds of a new foreign controlling owner are 1.15 times higher (increases about 151%) among firms with high foreign income growth. The number of years since official liberalization of the country does not enter significantly into any of the regressions. In summary, Table

1.10 reveals that individual firm characteristics are important if a firm wishes to use the ADR route to divest to a new foreign owner.

One of the main policies that governments use to discriminate between foreign and domestic investors is the use of foreign direct investment (FDI) restrictions. Hence, a good measure to determine the emergence of a foreign controlling shareholder would be to use a measure of restrictions on foreign direct investment and foreign ownership of equity in different countries. However, data on this is available only for a small sample of OECD countries. Golub (2003) presents a score of overall restrictiveness indicators, RESTRICTION, for OECD countries based on regulations in three areas: restrictions on foreign ownership, screening and approval procedures used by countries to limit FDI and other restrictions (that include constraints on the ability of foreign nationals to manage or work in foreign companies, operational requirements, stipulations on nationals forming a majority of the board of directors and so on). The score ranges from 0 to 1 with 1 being the case when no foreign equity is allowed.

Table 1.11 uses the RESTRICTION measure in a multinomial logit regression to study its effect on emergence of a foreign controlling shareholder. I find that greater the level of FDI restrictions in the country, probability of a control change to a foreign owner on issuing an ADR drops by 94%.

In summary, sale of control blocks on cross-listing, to shareholders in the same country, is largely dictated by the home-country's stock market development and legal environment. However, sale of control blocks to a foreign owner seems to be more influenced by firm-level characteristics than country-level characteristics of

the home country. The tables show that an ADR issuance helps small, young firms with low debt and a high foreign income growth rate leapfrog the drawbacks of their home-country environment and complete a successful block sale on the global market.

1.4.5. Ex-Post Characteristics

In this section, I examine the effects of cross-listing and control change on the subsequent performance of companies. Each variable to be estimated y_{it} (eg: the leverage ratio of a company i at time t) is regressed on a set of cross-listing dummies as shown below:

$$y_{it} = \alpha_0 + \alpha_1 f_i + \beta_1 CLYEAR_{it} + \beta_2 YEAR3_{it} + \beta_3 YEAR5_{it} + \varepsilon_{it} \quad (2)$$

where f_i denotes a company fixed effect, $CLYEAR_{it}$ is a dummy intended to capture the impact of cross-listing of company i , $YEAR3_{it}$ is a dummy corresponding to the three years after listing, and $YEAR5_{it}$ is a dummy capturing the permanent shift in the dependent variable after cross-listing (takes the value 1 after year3 of cross-listing). To eliminate fixed effects, I difference both sides of the equation and estimate Least Absolute-Value (LAV) regressions to distinguish between the various impacts. The specification on first-differencing is now:

$$\Delta y_{it} = \beta_1 \Delta CLYEAR_{it} + \beta_2 \Delta YEAR3_{it} + \beta_3 \Delta YEAR5_{it} + \Delta \varepsilon_{it} \quad (3)$$

Panel A of Table 1.12 presents the treatment effects calculated using the Abadie and Imbens (2002) estimator for the matched sample of cross-listing firms. The post cross-listing characteristics show that cross-listing firms have higher total

asset and foreign income growth rates, and higher Tobins Q ratios than non-cross-listing. Most of these results on post cross-listing characteristics are consistent with several performance studies of ADRs after cross-listing, including Pagano, Roell, and Zechner (2002) and Doidge et. al (2003). However, once the endogeneity of the cross-listing decision is controlled for, only the foreign income growth rate and Tobins Q effect remains. This is shown in the second column of Panel A, where the treatment effects are reported following the procedure discussed in section 1.3.5. Tobins Q ratios are higher in the cross-listing sample but the effect is much lower after controlling for endogeneity bias. Foreign income growth rates on the other hand show a marked increase even after including treatment effects. Panel A presents the comparisons between cross-listing and domestic firms only in the third year after cross-listing because of the data restriction with the control sample. Surprisingly, the changes in profitability (ROA) and total assets are not robust to self selection.

Panels B and C report the LAV-regression results for cross-listing firms that do not undergo a control change and for firms that do undergo a control change respectively. The two panels reveal that all firms irrespective of control change experience a big increase in total asset growth in the year of the cross-listing. The similarities however end here. Total asset growth is seen to reduce in companies that do not undergo a control change but increases in companies that do. The companies that undergo a control change experience a 23.6 % reduction in total assets accompanied by a very high increase in leverage ratios. Companies that do not report a control change, on the other hand, experience a 1.4% increase in total assets and a 2% decrease in leverage, both of which are not significant.

Both samples of cross-listing firms show a peak in total asset growth in the year of cross-listing but this growth rate is not sustained in the long run. Foreign income growth, on the other hand, is significantly higher for the long-term. This is consistent with evidence from Pagano et al (2002) that cross-listing is pursued by more export oriented firms and firms wishing to expand in international markets.

There is also a significant difference in leverage ratios of firms that cross-list and undergo control changes and those that don't. Table 1.12 reveals that firms that undergo control changes raise significant amounts of debt in the years after cross-listing. Two factors could be responsible for this result. The high leverage ratios could be associated with foreign firms which issued an ADR as part of privatization. Recent privatization literature (Frydman et al 2000) has shown that massive restructuring is associated with firms that privatized and sold stakes to foreign owners and raising debt could be part of this restructuring process. Another factor that could contribute to this is the identity of the new owners. The transition matrix in Table 1.7 shows that control changes resulted in more financial institutions and corporations being in control than a state or a family. So it could be that foreign equity investors such as banks also lend to the firm thereby driving the result that firms with control changes raise more debt on cross-listing. This is consistent with evidence presented in a recent paper by Aggarwal and Klapper (2003) where they report a similar symbiotic relationship between foreign ownership and lending in a sample of Indian IPOs.

Further, companies that undergo a control change also show an increase in ROA and a decrease in Tobin's Q ratio, which is not exhibited by firms that do not undergo a control change. This seems to suggest that the increase in Tobins Q

documented for the whole sample of cross-listing firms in this study (and several other studies like Doidge et. al. (2003), Lang, Lins, and Miller (2003)) is generated entirely by firms that do not sell their control stakes on cross-listing. In fact, the table shows that while the accounting profitability measures shows an increase in profitability in companies that undergo a control change, the market valuation of the company is seen to reduce. A possible explanation for this could be that if the original controlling shareholder is better informed of the future value of the company and he uses the amount of equity retained as a signal of company's value, the divestment on the part of the owner is interpreted as a negative signal by the market Leland and Pyle (1977). With respect to other firm characteristics, companies that undergo a control change after cross-listing seem to become more export-oriented and increase their debt capacity substantially

1.4.6. Special Cases: IPOs and Privatizations

In this section, I consider two special cases: ADR issuing firms that have never traded publicly before their IPO on the US market and state owned enterprises that privatized through an ADR issuance. Firms that IPO on the US market have generated a lot of interest since a spate of IPOs in the early 1990s by Israeli high-tech companies on the NASDAQ. As regards privatization, Telefonos de Chile pioneered the use of the US securities market for privatization in the year 1990. The following subsections present sample characteristics in each case and also discuss changes in ownership structure and performance after the ADR issuance.

i. Level III ADR-IPOs

While there has been extensive literature on the decision to go public and the performance of the company after the IPO, there is limited empirical evidence on ownership changes associated with foreign IPOs in the US. 34% of the firms that issued Level III ADRs in the sample were initial public offerings.

A dominant theory about the IPO process is that the owners in control use the IPO as an exit option, and as a first stage in the process of selling the company. Zingales (1995) argues that the initial owner uses the IPO to optimize his ownership structure so as to maximize his total proceeds from the eventual sale of the company. Pagano, Panetta and Zingales (1998) provide evidence of this theory by finding that there is a high rate of turnover in control in the three years following an IPO in a sample of Italian companies. Holmen and Hogfeldt (2003) apply a law and finance perspective to the IPO process and document that while institutionally controlled firms use the IPO as an exit option, a majority of Swedish IPOs use dual class shares to form control blocks at the IPO to secure and protect valuable private benefits on control. Black and Gilson (1998) also show that the exit option offered by an IPO is crucial for the development of the venture capital industry.

All of these studies are based on the domestic IPO market in the country. Rock (2001) is one of the first papers to explore the possibility of using an international market as an exit option in the context of Israeli companies going public on the NASDAQ. The reasons why a firm issues an ADR, as discussed in section 1.2.2, also apply to a foreign firm doing an initial public offering in the US via an ADR. Most of the ADR issuing firms are amongst the largest firms in their domestic

market. If the IPO were being used as an exit option, the benefits associated with an ADR listing like greater liquidity and investor recognition would make an IPO in the US market an attractive option to foreign firms. In the context of this paper, it would be particularly interesting to see if IPO issuing firms decrease their voting rights more than non-IPO issuing firms and if the majority of control changes occurring in the sample is due to the IPO firms.

Prior to conducting an IPO in the US, firms had concentrated ownership patterns similar to other firms that did not issue IPOs, only much higher. Most of the IPOs in the sample were family controlled and had a high percentage of mean voting rights (65 %) prior to the ADR listing as compared to firms that did not IPO as part of their ADR issue (47 %). Further, most of the IPOs were from French civil law countries. Post cross-listing, the mean decline in voting rights for IPO issuing firms is about 14.25 percentage points over the period (-1, 5), which is much higher than the declines for the non-IPO issuing firms. Probit regressions of the probability of decline in voting rights on an IPO dummy after controlling for firm size and the original owner's voting rights in t-1 show that the coefficient of the IPO dummy comes in positive but insignificant. This suggests that while controlling shareholders of IPOs divest by a larger amount on an ADR listing, they are not more likely to do so than non-IPO issuing firms.

When we look at the change in controlling shareholder of ADRs that were initial public offerings, 22 of the 78 control changes happened in IPO issuing firms, 9 of which were originally state-owned enterprises. 13 of these control changes were to foreign entities. These results show that about 28% of the firms that use an ADR as a

potential exit option are initial public offerings. The controlling shareholder dynamics of IPOs are shown in Panel C of Table 1.7.

The post listing characteristics of the IPOs show that ADR IPOs are followed by a significant increase in foreign income growth rate in the year of cross-listing which persists over the longer term, albeit to a smaller extent. The return on assets measure shows a decline but is not significant in any of the regressions. Panel D of Table 1.12 shows that the ADR-IPOs exhibit a significant decline in leverage suggesting that the new capital raised on US equity markets is being used to decrease leverage in these firms. Comparing ADR-IPOs that underwent a control change to other ADR issuing firms that underwent a control change, there seems to be no evidence of an increase in leverage in the former sample unlike the case in the latter.

ii. Privatizations

Privatization, defined as the deliberate sale by a government of state-owned enterprises or assets to private economic agents, became the forefront of economic policy in many countries during the 1990s following the perceived success of the British privatization program in the early 80s. One of the important privatization programs was the one adopted by Chile where for the first time, Telefonos de Chile used a large American depositary receipt share tranche targeted towards US investors, thus opening up an important pathway for developing country governments to access US capital markets. Since then, ADRs have been increasingly used in the Share Issue Privatization process (SIP) by privatizing governments both in developed and developing countries. A lot of the privatization literature has indicated that domestic

financial market development is often an explicit objective of privatization programs. In this regard, approaching a foreign market like the US seems to be a paradox. However there are several reasons why foreign governments may choose to use the ADR market as a vehicle for privatization. Privatizing governments that are trying to establish credibility of their privatization programs may seek certification through international offerings. Foreign governments are also drawn to the ADR market both because of its sophisticated market infrastructure and also because their domestic markets are not liquid enough to absorb the large tranches of shares that are issued as part of the privatization process. Bortolotti, Fantini, and Scarpa (2000) conduct an exclusive analysis of foreign governments' motivations to sell equity abroad. While there have been some studies comparing the performance of ADR privatizations with other ADRs, this is the first study to look at corporate governance related changes in these companies.

The companies that underwent privatizations through their ADR issues are identified from the deals listed in Privatization International Yearbooks. This data is also confirmed from William Megginson's webpage⁶ that contains a detailed list of share issue privatizations from 1961-2000 including those that issued ADR securities as part of their privatization process. There are 25 companies that privatized via the ADR market in our sample.

A look at the post-listing characteristics shows that there is a significant decline in mean voting rights (-32%) over the period (-1, +5) and an even greater decline in mean cash flow rights (-59%). Despite the huge declines, only five of the

⁶ Appendix Detailing Share Issue Privatization Offerings, 1961-2000 <http://faculty-staff.ou.edu/M/William.L.Megginson-1/>

25 companies underwent control changes within five years after the ADR issuance (start of privatization) and none of the 25 companies sold their shares piecemeal as part of the ADR listing.

On the other hand, in the majority of the companies, the state continues to be a controlling shareholder with a majority stake. In addition, most of the governments continue to hold on to a 'golden share' that allows them to counter management decisions and block business moves. A classic example is the case of the largest privatization in Hungary and in Central and Eastern Europe. One of the successors of the Hungarian Post was MATAV whose shares were traded simultaneously on the Budapest and New York stock exchanges. While MATAV was eventually sold to MagyarCom (currently owned by Deutsche Telekom), the Hungarian government continued to hold a golden share in MATAV.

Panel E of Table 1.12 shows the effect of privatization via an ADR issue on the performance characteristics for the firms from the year of cross-listing to five years later. The post cross-listing performance of the privatized companies shows that there is a significant increase in ROA and Tobin's Q measures that persists over the long run. This is consistent with recent evidence on the increase in profitability reported in privatizations across the world (D'Souza and Megginson (1999)). The privatized companies also exhibit an increase in foreign income growth rates, similar to other ADR issuing firms. An interesting pattern emerges with the leverage. While leverage ratios are seen to decrease significantly in the year of cross-listing, the long term effect actually shows an increase in leverage ratios. There is also a significant decline in total assets in the first three years after cross-listing which does not persist

over the long term.

1.5. Conclusions

This paper examines if cross-listing on a US exchange results in a change of ownership and control structure for foreign firms. The paper tackles this issue in two parts. First it examines if there is a movement from concentrated ownership structures to dispersed ownership structures as predicted by recent literature in law and finance. The bonding hypothesis by Coffee (1999) predicts that foreign firms cross-list on US exchanges to bond themselves to higher disclosure standards and stricter enforcement. This implies that cross-listing should be associated with some change in governance structure for the foreign firms. The paper shows that there is no such mass transformation of ownership structures. Most of the firms that cross-list have concentrated shareholdings and continue to do so after cross-listing. This finding questions the hypothesis that legal protections provided by cross-listing are effective enough to cause firms to change their governance structure.

Second the paper examines if there any changes in composition of the shareholders on cross-listing. The paper finds that an ADR listing facilitates a control transfer in a large fraction of firms and 45% of these transfers results in a foreign controlling owner on cross-listing. The finding suggests that the ADR is used as a vehicle by the controlling shareholder to sell his control block. A listing on a US exchange provides him with increased visibility and an increased investor base required for selling the control block, both in the home country and to a foreign

owner.

The post listing characteristics of the cross-listing firms reveals that the firms that undergo a control change have a large foreign income growth and significantly increase their debt capacities post cross-listing. While their return on assets shows a permanent positive increase, these firms have a slightly negative Tobin's Q ratio in the long run. On the other hand, companies that do not undergo a control change do not increase their leverage ratios and have high Tobin's Q ratios in all years after cross-listing.

A possible explanation for the absence of a change in ownership concentration is the presence of complementarities between a firm's selection of governance structure and the prevailing institutional environment. As long as foreign issuers are still held more accountable to home country laws and are subject to different governance standards than domestic US firms, the institutional environment that these firms operate in on cross-listing is not very different and hence there is unlikely to be a transformation in their governance structures. I turn to a theoretical exploration of these issues in Chapter 2.

Table 1.1
Descriptive Statistics

The table presents summary statistics on the number of cross-listings in the United States by year and by country of incorporation. The sample consists of foreign firms that listed their shares on one of the major US exchanges (Amex, NASDAQ or NYSE) via Level II or Level III ADR Programs. Only exchange listed ADRs are considered because they require specific accounting and disclosure information for a firm to cross-list. Panel A shows cross-listing statistics by year. Panel B shows the number of firms that were cross-listed from each country. The countries are also divided into five categories depending on the legal regime they belong to—English Common Law, French Civil Law, German Civil Law, Scandinavian Civil Law and Socialist Law

Panel A: Cross-Listing Statistics by Year

Year	Cross-Listings			
	AMEX	NASDAQ	NYSE	Total
1990	0	2	3	5
1991	0	1	10	11
1992	0	5	5	10
1993	1	3	19	23
1994	1	6	25	32
1995	0	6	15	21
1996	0	16	25	41
1997	0	18	36	54
1998	0	11	37	48
1999	1	21	23	45
2000	0	30	48	78
2001	0	9	29	38
2002	1	4	14	19
<i>Total</i>	<i>4</i>	<i>132</i>	<i>289</i>	<i>425</i>

Panel B: Cross-Listing by Country

Legal Origin	Nation	Cross-Listings			
		AMEX	NASDAQ	NYSE	Total
English Common Law	Australia	0	7	6	13
	Ghana	0	0	1	1
	Hong Kong, China	0	5	3	8
	India	0	3	8	11
	Ireland	0	8	5	13
	Israel	0	5	3	8
	New Zealand	0	1	4	5
	Singapore	0	2	0	2
	South Africa	0	5	4	9
	United Kingdom	3	30	41	74
<i>Total</i>		<i>3</i>	<i>66</i>	<i>75</i>	<i>144</i>
French Civil Law	Argentina	0	3	9	12
	Belgium	0	0	1	1

Legal Origin	Nation	Cross-Listings			Total
		AMEX	NASDAQ	NYSE	
	Brazil	0	1	29	30
	Chile	0	0	20	20
	Colombia	0	0	1	1
	Dominican Republic	0	0	1	1
	France	0	12	21	33
	Greece	0	2	3	5
	Indonesia	0	0	2	2
	Italy	0	1	10	11
	Luxembourg	0	4	2	6
	Mexico	1	1	24	26
	Netherlands	0	7	18	25
	Peru	0	0	2	2
	Philippines	0	1	1	2
	Portugal	0	0	3	3
	Spain	0	1	5	6
	Turkey	0	0	1	1
	Venezuela	0	0	2	2
	<i>Total</i>	<i>1</i>	<i>33</i>	<i>155</i>	<i>189</i>
	Austria	0	0	1	1
	Germany	0	7	14	21
	Japan	0	10	11	21
German Civil Law	Korea, Rep.	0	3	5	8
	Switzerland	0	2	10	12
	Taiwan	0	2	3	5
	<i>Total</i>	<i>0</i>	<i>24</i>	<i>44</i>	<i>68</i>
	Denmark	0	1	1	2
	Finland	0	0	4	4
Scandinavian Law	Norway	0	1	3	4
	Sweden	0	6	1	7
	<i>Total</i>	<i>0</i>	<i>8</i>	<i>9</i>	<i>17</i>
	Hungary	0	0	1	1
	Poland	0	1	0	1
Socialist Law	Russian Federation	0	0	5	5
	<i>Total</i>	<i>0</i>	<i>1</i>	<i>6</i>	<i>7</i>

Table 1.2
Ownership Characteristics of the Cross-Listing Firms

The table classifies foreign firms that listed their shares on one of the major US exchanges (Amex, NASDAQ or NYSE) on the basis of their country of incorporation and their ownership structures. The countries are divided into five categories depending on the legal regime they belong to—English Common Law, French Civil Law, German Civil Law, Scandinavian Civil Law and Socialist Law. The ownership details are reported for the year the firm cross-lists in the US. A firm is classified as widely held if it does not have a controlling shareholder in that year. A firm is classified as having a controlling shareholder if it has an ultimate owner who controls at least 20% (10%) of the firm's votes. Panel A (B) presents statistics for the 20% (10%) cutoff level. The identity of the controlling shareholder is presented using the classification scheme in La Porta et. al (1999). Panel A also reports the mean age of the firms that cross-list. Detailed variable definitions and the sources of ownership data are presented in the Appendix.

Panel A: At the 20% cut-off level

Legal Origin	Number of countries	Number of firms	Age	Widely Held	Identity of Controlling Shareholder				
					Family	State	Widely held corporation	Widely held financial	Miscellaneous
English Common Law	10	144	22	88	32	9	3	8	4
French Civil Law	19	189	31	35	77	29	16	4	28
German Civil Law	6	68	28	36	10	8	4	1	9
Scandinavian Law	4	17	11	7	5	4	1	0	0
Socialist Law	3	7	24	1	2	4	0	0	0
<i>Full Sample</i>	<i>42</i>	<i>425</i>		<i>167</i>	<i>126</i>	<i>54</i>	<i>24</i>	<i>13</i>	<i>41</i>

Panel B: At the 10% cut-off level

Legal Origin	Number of countries	Number of firms	Age	Widely Held	Identity of Controlling Shareholder				
					Family	State	Widely held corporation	Widely held financial	Miscellaneous
English Common Law	10	144	22	71	45	8	7	10	5
French Civil Law	19	189	31	18	79	36	6	16	33
German Civil Law	6	68	28	22	17	8	7	1	11
Scandinavian Law	4	17	11	3	7	5	1	1	0
Socialist Law	3	7	24	0	3	4	0	0	0
<i>Full Sample</i>	<i>42</i>	<i>425</i>		<i>115</i>	<i>151</i>	<i>61</i>	<i>21</i>	<i>28</i>	<i>49</i>

Table 1.3
Cash Flow and Voting Rights of Controlling Shareholders

The table presents the mean cash flow rights, voting rights and ratio of cash flow to voting rights of all firms that had a controlling shareholder in the year in which they cross-listed on a major exchange in the United States. A firm is classified as having a controlling shareholder if it has an ultimate owner who controls at least 20% of the firm's votes. Panel A presents statistics for firms classified on the basis of (1) Identity of controlling shareholder: The ultimate owner could be a family (or individual), the state, a widely held corporation, a widely held financial institution or could be miscellaneous, which includes business groups, voting trusts, foundations et. Al) (2) Legal origin: The firms are classified according to the legal system they belong to into English common law, French civil law, Scandinavian civil law, German civil law and Socialist law. The last column presents the difference of means test between cash flow rights and voting rights.

Panel B presents the mean ratio of cash flow to voting rights for countries classified into several categories: (1) *Legal Origin*: Countries are classified on the basis of English Common Law (dummy=1), French civil law (dummy=1) and German and Scandinavian Civil Law (dummy=1) (2) *Law and Enforcement* : Countries are sub-classified on the basis of (a) High vs. Low Shareholder Rights-The Anti-director rights index (scored 1-6) is an index aggregating shareholder rights and is used to distinguish between countries that are protective of shareholders and those that are not. (b) High vs. Low Law & Order Score-Law and Order is an index scored 1-10 where higher score implies strong law and order tradition and lower score implies weak law and order tradition. The countries are classified into high and low based on median values of the Law and Order Scores for the countries in the sample (d) High vs. Low Judicial Efficiency-A high score implies a country with a well functional judicial system and a low score implies a poor judicial system. (3) *Financial Development*: Countries are sub-classified on the basis of (a) Index of Financial Structure-Higher Values of this Index imply a more market based financial system. (b) Large vs. Small Financial System-Overall size of the financial system is measured as deposit money bank assets and stock market capitalization as a share of GDP. The countries are classified into high and low based on median values of the overall size variable for the countries in the sample. (c) Developed vs. Under-developed-Develop is a dummy variable which takes the value zero if both priv (claims on private sector by deposit money banks as a share of GDP) and tvt (Total Value traded on the stock market as a share of GDP) are below the period mean, 1 otherwise. (3) *Transparency*: Countries are classified on the basis of the Accounting Standards Index, scored from 0 to 90, where a higher score indicates greater disclosure requirement in the countries.

Panel A: Cash Flow and Voting Rights

	Category	Cash Flow Rights (%)	Voting Rights (%)	Ratio	Test of Means
	Full Sample	44.76	50.23	0.89	-6.82***
	ADR-IPO	59.78	64.97	0.92	-4.36***
Identity of controlling shareholder	Family	45.67	49.79	0.85	-5.12***
	State	54.64	57.37	0.94	-2.68***
	Corporation	47.13	50.38	0.94	-1.80*
	Financial	21.96	28.97	0.83	-1.48
	Miscellaneous	40.21	45.87	0.88	-3.23***
Legal Origin	English Common Law	34.86	35.78	0.97	-1.87*
	French Civil Law	49.55	57.47	0.86	-6.76***
	German Civil Law	42.21	42.26	1.00	-0.05
	Scandinavian Civil Law	42.26	55.36	0.70	-2.09*

*, ** and *** represent significance at 10%, 5% and 1% level respectively

Panel B: Ratio of Cash Flow to Voting Rights

Legal Origin

	Dummy=0	Dummy=1	Test of Means
English Law	0.87	0.97	-2.39**
French Civil Law	0.95	0.86	2.95***
Scandinavian Civil Law	0.91	0.70	2.55**

Law and Enforcement

	Low	High	Test of Means
Shareholder Rights	0.86	0.95	-2.82***
Law & Order	0.85	0.94	-2.80***
Judicial Efficiency	0.85	0.94	-3.07***

Financial Development

	Low	High	Test of Means
Index of Financial Structure	0.86	0.96	-3.39***
Overall Size	0.83	0.95	-3.61***
Develop	0.80	0.95	-4.77***

Transparency

	Low	High	Test of Means
Accounting	0.86	0.94	-2.41**

*, ** and *** represent significance at 10%, 5% and 1% level respectively

Table 1.4
Control Enhancing Features of Cross-Listing Firms

The table classifies countries into two groups in each of four categories: (1) *Legal Origin*: On the basis of legal origin, countries are further classified into (a) English Common Law countries or others (b) French civil countries or others and (c) Scandinavian civil law countries or others. (2) *Law and Enforcement*: Countries are sub-classified into (a) High vs Low Shareholder Rights-The Anti-director rights index (scored 1-6) is an index aggregating shareholder rights and is used to distinguish between countries that are protective of shareholders and those that are not. (b) High vs. Low Minority Rights-Minority Rights is a dummy variable which takes the value 1 if the Company Law or Commercial Code of the country grants minority shareholders a judicial venue to challenge management decisions, 0 otherwise. (c) High vs. Low Law & Order Score-Law and Order is an index scored 1-10 where higher score implies strong law and order tradition and lower score implies weak law and order tradition. The countries are classified into high and low based on median values of the Law and Order Scores for the countries in the sample (d) High vs. Low Judicial Efficiency-A high score implies a country with a well functional judicial system and a low score implies a poor judicial system. (3) *Financial Development*: Countries are sub-classified on the basis of (a) Market vs. Non-market based-Market is a dummy which equals one if country has a market based financial system, 0 otherwise. (b) Large vs. Small Financial System-Overall size of the financial system is measured as deposit money bank assets and stock market capitalization as a share of GDP. The countries are classified into high and low based on median values of the overall size variable for the countries in the sample. (c) Developed vs. Under-developed-Develop is a dummy variable which takes the value zero if both priv (claims on private sector by deposit money banks as a share of GDP) and tvt (Total Value traded on the stock market as a share of GDP) are below the period mean, 1 otherwise. (4) *Transparency*: Countries are classified on the basis of the Accounting Standards Index, scored from 0 to 90, where a higher score indicates greater disclosure requirement in the countries. In all cases, N represents the number of firms with controlling shareholders in the category, Cross-Shareholding represents the percentage of firms which have cross-holdings (if the company owns any amount of shares in its controlling shareholder or in another company in its chain of control), Pyramids represents the percentage of firms which have pyramidal ownership structures (where controlling owner exercises control through at least one publicly traded company), Single represents the percentage of firms which have only one controlling shareholder, Management represents the percentage of firms which have the CEO, board chairman, or vice-chairman from the controlling family and Multiple Shares represents the percentage of firms which have multiple classes of shares with different voting rights

Category	N	Cross Shareholding	Pyramid	Single	Management	Multiple classes	
Legal Origin	English Common Law	57	0.04	0.47	0.21	0.42	0.05
	Others	205	0.07	0.50	0.42	0.30	0.29
	<i>Test of Means</i>		-0.96	-0.43	-3.05***	1.57	-3.87***
	French Civil Law	157	0.06	0.52	0.44	0.32	0.34
	Others	105	0.07	0.47	0.28	0.34	0.09
	<i>Test of Means</i>		-0.31	0.71	2.72***	-0.41	4.91***
	Scandinavian Law	10	0.30	0.40	0.20	0.40	0.40
	Others	252	0.05	0.50	0.38	0.33	0.23
	<i>Test of Means</i>		3.22***	-0.69	-1.20	0.44	1.19

Category	N	Cross Shareholding	Pyramid	Single	Management	Multiple classes	
Law and Enforcement	Low Shareholder Rights	152	0.07	0.61	0.43	0.32	0.30
	High Shareholder Rights	110	0.04	0.41	0.29	0.34	0.15
	<i>Test of Means</i>		0.38	3.26^{***}	2.41^{**}	-0.23	3.01^{***}
	Low Law & Order Score	134	0.04	0.57	0.37	0.33	0.37
	High Law & Order Score	128	0.08	0.42	0.38	0.33	0.10
	<i>Test of Means</i>		-1.14	2.25^{**}	-0.08	-0.04	5.25^{***}
	Low Judicial Efficiency	129	0.05	0.53	0.46	0.30	0.37
	High Judicial Efficiency	133	0.07	0.47	0.29	0.35	0.11
	<i>Test of Means</i>		-0.47	0.88	2.74^{***}	-0.92	5.31^{***}
Financial Development	Small Financial System	112	0.05	0.50	0.49	0.38	0.40
	Large Financial System	145	0.07	0.49	0.29	0.29	0.11
	<i>Test of Means</i>		-0.50	0.22	3.23^{***}	1.20	5.58^{***}
	Under-developed	97	0.07	0.59	0.46	0.41	0.46
	Developed	158	0.06	0.43	0.33	0.28	0.09
	<i>Test of Means</i>		0.42	2.17^{**}	1.97^{**}	2.04^{**}	7.23^{***}
	Non-Market Based	105	0.04	0.41	0.37	0.28	0.17
Market based	157	0.08	0.55	0.38	0.36	0.28	
<i>Test of Means</i>		-1.24	-2.26^{**}	-0.03	-1.39	-1.98^{**}	
Transparency	Low Accounting Standards	131	0.05	0.55	0.46	0.32	0.36
	High Accounting Standards	131	0.07	0.44	0.29	0.34	0.11
	<i>Test of Means</i>		-0.46	1.88[*]	3.01^{***}	-0.13	4.98^{***}

*, ** and *** represent significance at 10%, 5% and 1% level respectively

Table 1.5
Changes in Voting Rights Surrounding Cross-Listing-Comparison by Country

The table shows the changes in voting rights of the largest controlling shareholder for the sample of foreign firms that cross-listed on one of the major US exchanges during the years 1990 to 2001. Each firm's ownership structure is tracked from the year before it lists in the U.S. to five years after the cross-listing. A minimum of three years of ownership data is used as a constraint to include a firm in the sample. $\Delta VR (-2,-1)$ is the change in mean voting rights of the controlling shareholder in the years prior to cross-listing year (from two years prior to on year prior), $\Delta VR (-1,0)$ is the change in mean voting rights of the controlling shareholder from year -1 to the year of cross-listing, $\Delta VR (-1,1)$ is the change in mean voting rights of the controlling shareholder from year -1 to one year after cross-listing, $\Delta VR (-1,3)$ is the change in mean voting rights of the controlling shareholder from year -1 to three years after cross-listing and $\Delta VR (-1,5)$ is the change in mean voting rights of the controlling shareholder from year -1 to five years after cross-listing. Changes in voting rights are also calculated for a comparison sample for the period $\Delta VR (-1,3)$. For each country in the sample, if the number of firms cross-listing is less than 5, then for each firm, ownership statistics are reported for a matching firm in the same industry (four-digit SIC) and nearest asset size which does not cross-list. If the number of firms cross-listing is greater than 5, then the comparison sample is generated for a random selection of five cross-listing firms in the country. Results are presented for all firms at the 20% cut-off level and at the 10% cut-off level. A mean test is used to test whether the mean change in voting rights is significantly different from zero. The last row in each panel also calculates the treatment effects using the procedure in Abadie and Imbens (2002). The values are the estimated changes in voting rights *relative* to changes in voting rights in the control group. Detailed variable definitions and sources are given in the appendix.

Panel A: At the 20% cut-off level

Year Relative to Cross-Listing Year	Full Sample	Comparison	English Common Law	French Civil Law	German Civil Law	Scandinavian and Socialist Law
$\Delta VR (-2,-1)$	-0.41		0.05	-0.82	-0.43	.
$\Delta VR (-1,0)$	-2.63***		-2.25**	-3.63***	-1.01*	-2.36
$\Delta VR (-1,1)$	-3.92***		-2.42**	-5.98***	-2.77	-2.76
$\Delta VR (-1,3)$	-5.76***	-2.96	-2.52*	-9.38***	-4.46	-1.16
$\Delta VR (-1,5)$	-5.15***		1.96	-9.11***	-8.87	-2.83*
Treatment Effect	3.20**	-	0.00	4.56**	0.34*	0.01

*, ** and *** represent significance at 10%, 5% and 1% level respectively

Panel B: At the 10% cut-off level

Year Relative to Cross-Listing Year	Full Sample	Comparison	English Common Law	French Civil Law	German Civil Law	Scandinavian and Socialist Law
$\Delta VR (-2,-1)$	-0.48		0.13	-1.01	-0.45	.
$\Delta VR (-1,0)$	-2.33***		-1.71*	-3.41***	-0.81**	-2.28
$\Delta VR (-1,1)$	-3.65***		-1.96**	-5.72***	-2.72*	-2.75
$\Delta VR (-1,3)$	-6.03***	-3.45	-3.39***	-9.31***	-4.09	-2.2
$\Delta VR (-1,5)$	-5.46***		1.08	-9.03***	-9.28*	-2.16
Treatment Effect	3.50**		0.56	7.89***	1.26*	0.23*

*, ** and *** represent significance at 10%, 5% and 1% level respectively

Table 1.6

Changes in Voting Rights Surrounding Cross-Listing-Comparison by Shareholder Type

The table shows the changes in voting rights of the *original* controlling shareholder for the sample of foreign firms that cross-listed on one of the major US exchanges during the years 1990 to 2001. Each firm's ownership structure is tracked from the year before it lists in the U.S. to five years after the cross-listing. A minimum of three years of ownership data is used as a constraint to include a firm in the sample. $\Delta VR (-2,-1)$ is the change in mean voting rights of the controlling shareholder in the years prior to cross-listing year (from two years prior to one year prior), $\Delta VR (-1,0)$ is the change in mean voting rights of the controlling shareholder from year -1 to the year of cross-listing, $\Delta VR (-1,1)$ is the change in mean voting rights of the controlling shareholder from year -1 to one year after cross-listing, $\Delta VR (-1,3)$ is the change in mean voting rights of the controlling shareholder from year -1 to three years after cross-listing and $\Delta VR (-1,5)$ is the change in mean voting rights of the controlling shareholder from year -1 to five years after cross-listing. Changes in voting rights are also calculated for a comparison sample for the period $\Delta VR (-1,3)$. For each country in the sample, if the number of firms cross-listing is less than 5, then for each firm, ownership statistics are reported for a matching firm in the same industry (four-digit SIC) and nearest asset size which does not cross-list. If the number of firms cross-listing is greater than 5, then the comparison sample is generated for a random selection of five cross-listing firms in the country. Results are presented for all firms at the 20% cut-off level and at the 10% cut-off level. A median test is used to test whether the median change in voting rights is significant. The last row in each panel also calculates the treatment effects using the procedure in Abadie and Imbens (2002). The values are the estimated changes in voting rights *relative* to changes in voting rights in the control group. Detailed variable definitions and sources are given in the appendix.

Panel A: At the 20% cut-off level

Year Relative to Cross-Listing Year	Full Sample	Comparison	Family	State	Widely held Corporation	Widely held Financial	Miscellaneous
$\Delta VR (-2,-1)$	-0.41		0.03	-2.55	1.66	0.85	-1.13
$\Delta VR (-1,0)$	-2.63***		-2.60**	-7.67***	-6.57	-5.82	-2.31**
$\Delta VR (-1,1)$	-3.92***		-2.80**	-11.38***	-17.89**	-12.54	-3.65
$\Delta VR (-1,3)$	-5.76***	-2.96	-5.78***	-17.16***	-26.74***	-14.50	-3.161
$\Delta VR (-1,5)$	-5.15***		-3.89*	-21.99***	-23.76	-0.68	-6.69
Treatment Effect	3.20**		2.19	9.89***	7.89*	3.42	1.93

*, ** and *** represent significance at 10%, 5% and 1% level respectively

Panel B: At the 10% cut-off level

Year Relative to Cross-Listing Year	Full Sample	Comparison	Family	State	Widely held Corporation	Widely held Financial	Miscellaneous
$\Delta VR (-2,-1)$	-0.48		0.003	-2.88*	1.37	0.62	-0.85
$\Delta VR (-1,0)$	-2.33***		-1.75**	-7.06***	-4.25	-4.31	-1.55*
$\Delta VR (-1,1)$	-3.65***		-2.01**	-10.47***	-16.12**	-5.31	-2.74
$\Delta VR (-1,3)$	-6.03***	-3.45	-4.82***	-16.21***	-21.57**	7.80	-2.36
$\Delta VR (-1,5)$	-5.46***		-3.09*	-20.59***	-17.92	-6.27*	-4.81
Treatment Effect	3.50**		2.45*	10.67***	9.86*	2.31	0.81

*, ** and *** represent significance at 10%, 5% and 1% level respectively

Table 1.7
Controlling Shareholder Dynamics Surrounding Cross-Listing

The table shows the changes in identity of the controlling shareholder upon cross-listing on a major US exchange during the years 1990 to 2001. Each firm's ownership structure is tracked from the year before it lists in the U.S. to five years after the cross-listing. The original controlling shareholder could be a family (or individual), the state, a widely held corporation, a widely held financial institution or miscellaneous, which includes business groups, voting trusts and foundations. A change of control is registered in one of the following cases: when the original controlling shareholder divests his entire stake; when the original controlling shareholder sells his stake such that a new ultimate owner now has maximum percentage of the voting rights; if there is no original controlling shareholder but a controlling shareholder emerges post cross-listing. The new controlling shareholder could again be one of five types: a family (or individual), the state, a widely held corporation, a widely held financial institution or miscellaneous, which includes business groups, voting trusts and foundations. Panel A presents the dynamics in the identity of the controlling shareholder prior to and post cross-listing. Panel B presents the percentage change in each type of controlling shareholder. Foreign is a dummy variable identifying if the controlling shareholder of a firm belongs to a country different from the country of incorporation of the firm. Panel C presents the dynamics for Level III ADRs that were also IPOs. Results are presented for all firms at the 10% cut-off level. Detailed variable definitions and sources are given in the appendix.

Panel A: Controlling Shareholder Dynamics

		Total Number of Control Changes	Post Cross-Listing					No Controlling Shareholder
			Family	State	Widely-held corporation	Widely-held financial	Miscellaneous	
Prior to Cross-Listing	Family	26	7	1	8	4	3	3
	State	22	2	1	9	4	4	2
	Widely-held corporation	9	2	0	2	3	0	2
	Widely-held financial	9	1	0	1	4	0	3
	Miscellaneous	7	2	1	0	2	1	1
	No Controlling Shareholder	5	2	1	0	1	1	0
	Total	78	16	4	20	18	9	11

Panel B: Percentage Changes in Ownership Type from prior to post cross-listing

Controlling Shareholder Type	Percentage Change
Family	-11.7
State	-24.2
Corporation	17.5
Financial	14.5
Miscellaneous	3.8
Foreign	45.3

Panel C: Controlling Shareholder Dynamics for Level III ADR-IPOs

		Total Number of Control Changes	Post Cross-Listing					No Controlling Shareholder
			Family	State	Widely-held corporation	Widely-held financial	Miscellaneous	
Prior to Cross-Listing	Family	6	2	0	2	1	1	0
	State	9	0	1	3	1	1	3
	Widely-held corporation	2	1	0	0	1	0	0
	Widely-held financial	3	0	0	1	1	0	1
	Miscellaneous	2	1	0	0	1	0	0
	No Controlling Shareholder	0	0	0	0	0	0	0
	Total	22	4	1	6	5	2	4

Table 1.8
Cross Listing versus Domestic Companies

The table compares cross-listing companies versus domestic companies that do not cross-list. Panel A presents results for the whole sample of ADRs relative to the control sample while Panel B reports the differences in medians of companies that cross-list and undergo a control change, relative to the control sample, and of companies that cross-list but do not undergo a control change, relative to the control sample. The differences are calculated using quantile median regressions (LAV) where the dependent variable is regressed on a time dummy controlling for calendar year, industry and country effects. The time dummies used are: PRELISTING is a dummy variable that takes value 1 for observations taken 1 year before the company cross lists and CLYEAR is a dummy capturing the timing of the cross-listing (1 in the year of cross-listing and 0 elsewhere). Each cell in the table below represents a separate LAV regression and presents the coefficients of the time dummies, which is the difference in medians. TOTAL ASSETS is the Total Assets of the firm, LEVERAGE is the leverage ratio of the firm, Q is Tobin's Q ratio given by (market value of assets divided by replacement cost), TASTGR is total asset growth, FINCGR is growth in foreign income and ROA is return on assets. Each Panel also reports the treatment effects calculated using the procedure in Abadie and Imbens (2002). Detailed variable definitions and sources are given in the appendix.

Panel A: ADRs vs Non ADRs

<i>Full Sample</i>			
	PRELISTING	CLYEAR	TREATMENT EFFECTS
TOTAL ASSETS	1.17***	1.62***	1.51**
TASTGR	5.07**	5.30**	3.23**
LEVERAGE	2.71**`	3.59**	0.32*
FINCGR	18.32***	18.15***	7.34**
ROA	1.23*	0.91*	0.34
Q	5.98**	3.3**	0.21

Panel B: Control Change vs No Control Change

	<i>Control Change</i>			<i>No Control Change</i>		
	PRELISTING	CLYEAR	TREATMENT EFFECTS	PRELISTING	CLYEAR	TREATMENT EFFECTS
TOTAL ASSETS	1.65***	0.97**	1.14**	1.13***	1.07***	1.23**
TASTGR	4.49**	2.79**	2.16*	3.67***	5.43***	4.53**
LEVERAGE	1.86**`	5.58**	0.45	6.67**	2.86	1.56*
FINCGR	14.68***	15.14***	10.65***	10.99**	11.00***	5.68**
ROA	1.91	0.91*	0.32	-0.31	0.98*	0.23
Q	6.70**	-1.30**	0.26	11.87***	13.10***	6.78**

*, ** and *** represent significance at 10%, 5% and 1% level respectively

Table 1.9
Predicting Control Change in Cross-Listing Firms

The table presents the Cox estimates of the hazard ratio of a control change occurring within five years of foreign firms cross-listing on a major US exchange. The dependent variable takes the value one in the year of the first control change and zero otherwise. A change of control is registered in one of the following cases: when the original controlling shareholder divests his entire stake; when the original controlling shareholder sells his stake such that a new ultimate owner now has maximum percentage of the voting rights; if there is no original controlling shareholder but a controlling shareholder emerges post cross-listing. The independent variables are as follows: AGE is the age of the firm from its year of incorporation to the year of cross-listing, SIZE is log of firm's sales, LEVERAGE is the leverage ratio of the firm, Q is Tobin's Q ratio given by (market value of assets divided by replacement cost), TASTGR is total asset growth, FINCGR is growth in foreign income, GDPCAP is log of GDP per capita, TVT is total value traded as a percentage of GDP, COMMON is the legal origin dummy which takes the value 1 for common law countries and 0 otherwise, STATE takes the value 1 if the original owner is a state-owned enterprise, 0 otherwise, FAMILY takes the value 1 if the original owner is a family or 0 otherwise, CONTROL takes the value 1 if there are control enhancing features used such as dual-class equity, cross-shareholding or pyramidal ownership structures. PROPERTY is the Property Rights Regulation Index from The Index of Economic Freedom. CAPCONTROL is index of capital controls from the IMF's Trade and Exchange Restrictions Report. Lag values of all independent variables are used. Standard errors and resulting p-values are adjusted for clustering on companies. Detailed variable definitions and sources are given in the appendix

No. of subjects	: 1284		
No. of failures	: 78		
Log Likelihood	: -265.96		
Wald χ^2 (11)	: 48.23		
Prob> χ^2 (11)	: 0.000		
	Hazard Ratio	Z	P>Z
AGE	0.926	-1.46	0.125
SIZE	1.193	3.56	0.000
LEVERAGE	0.213	-1.98	0.033
Q	0.992	-2.45	0.000
TASTGR	1.109	1.65	0.113
FINCGR	1.078	5.53	0.000
GDPCAP	1.362	2.43	0.011
TVT_GDP	16.123	4.65	0.000
COMMON	0.195	-2.03	0.041
STATE	1.353	2.56	0.000
FAMILY	1.212	4.03	0.003
CONTROL	0.889	2.52	0.061
PROPERTY	0.045	-1.44	0.000
CAPCONTROL	0.923	-2.19	0.087

Table 1.10**Predicting the Emergence of Foreign Controlling Owners on Cross-Listing**

The table shows results from a multinomial logit regression that predicts the probability of a control change taking place to a new controlling shareholder who is foreign. The dependent variable is a dummy variable that takes one of four values: 1 (for no control change), 2 (when there is a control change to a new domestic controlling owner), 3 (when there is a control change to a foreign controlling owner) and 4 (when the firm becomes widely held after cross-listing). Group 1 (no control change) is the comparison group. The explanatory variables used are described as follows: Q is Tobin's Q ratio given by (market value of assets divided by replacement cost), SIZE is log of firm's sales, LEVERAGE is the leverage ratio of the firm, AGE is the age of the firm from its year of incorporation to the year of cross-listing, TASTGR is total asset growth, FINCGR is growth in foreign income, GDPCAP is log of GDP per capita, TVT_GDP is total value traded as a percentage of GDP, FDI is the level of foreign direct investment taken from IMF's Balance of Payments Statistics, PROPERTY is Property Rights Regulation Index, YEARS_LIBER is the number of years since the official date of liberalization of the country (from Bekaert and Harvey 1999). Lag values of all independent variables are used. The coefficients reported are the relative risk ratios. Significance levels of the Z-statistics are also reported. Standard errors and resulting p-values are adjusted for clustering on companies. Detailed variable definitions and sources are given in the appendix.

Number of observations: 1987

Log Likelihood: -135.17

Wald χ^2 (38): 194.60

Prob> χ^2 : 0.00

Pseudo R²: 0.42

	<i>Relative Risk Ratios</i>		
	<i>Change to a new controlling owner (domestic)</i>	<i>Change to a new controlling owner (foreign)</i>	<i>Change to widely held</i>
Q	0.999	0.999	1.002*
SIZE	1.046*	0.588**	0.025**
LEVERAGE	0.873	0.295***	1.022
AGE	0.992	0.982	0.295**
TASTGR	0.998	0.999	0.984
FINCGR	1.003	1.151**	1.002
GDPCAP	3.321***	2.518	1.381
TVT_GDP	13.685**	0.003***	0.013
PROPERTY	0.726***	1.101	1.587***
FDI	1.121	1.828***	1.231
YEARS_LIBER	0.903*	0.884	0.948

*, ** and *** represent significance at 10%, 5% and 1% level respectively

Table 1.11**Effect of FDI Restrictions on Control Change in OECD Countries**

The table shows results from a multinomial logit regression that predicts the effect of restrictions on foreign direct investment on control change in OECD countries. The dependent variable is a dummy variable that takes one of four values: 1 (for no control change), 2 (when there is a control change to a new domestic controlling owner), 3 (when there is a control change to a foreign controlling owner) and 4 (when the firm becomes widely held after cross-listing). Group 1 (no control change) is the comparison group. The explanatory variables used are described as follows: Q is Tobin's Q ratio given by (market value of assets divided by replacement cost), SIZE is log of firm's sales, LEVERAGE is the leverage ratio of the firm, AGE is the age of the firm from its year of incorporation to the year of cross-listing, TASTGR is total asset growth, FINCGR is growth in foreign income, GDPCAP is log of GDP per capita, TVT_GDP is total value traded as a percentage of GDP, FDI is the level of foreign direct investment taken from IMF's Balance of Payments Statistics, YEARS_LIBER is the number of years since the official date of liberalization of the country (from Bekaert and Harvey 1999), RESTRICTION is a composite OECD measure of restrictions on foreign direct investment which includes restrictions on foreign equity ownership (from Golub 2003). Lag values of all independent variables are used. The coefficients reported are the relative risk ratios. Significance levels of the Z-statistics are reported. Standard errors and resulting p-values are adjusted for clustering on companies. Detailed variable definitions and sources are given in the appendix.

Number of observations:

Log Likelihood: -67.349

Wald χ^2 (20): 75.39

Prob> χ^2 : 0.00

Pseudo R²: 0.36

	<i>Relative Risk Ratios</i>	
	<i>Change to a new controlling owner (domestic)</i>	<i>Change to a new controlling owner (foreign)</i>
Q	0.999**	0.999
SIZE	1.389***	0.531
LEVERAGE	0.876	0.583
AGE	1.009	0.966
TASTGR	0.978	0.998
FINCGR	1.001	1.063*
GDPCAP	2.629***	1.09
TVT_GDP	18.409***	1.335
PROPERTY	0.586***	0.726
FDI	1.625*	1.873**
YEARS_LIBER	0.459***	0.705
RESTRICTION	5.303	0.061**

*, ** and *** represent significance at 10%, 5% and 1% level respectively

Table 1.12
Ex-post listing characteristics

The table shows the estimates of the ex-post effects of cross-listing distinguishing between firms that underwent a control change and those that did not experience a control change. Panel A presents the treatment effects calculated using the procedure in Abadie and Imbens (2002) for cross-listing companies vis-à-vis non-cross-listing companies. Panel B presents results for companies that did not have any control changes and Panel C presents results for companies that underwent a control change. Panel D presents results for ADR issues that were also initial public offerings and Panel E presents results for ADR-privatizations. Each column gives the results of a LAV regression for a dependent variable. The explanatory variables are CLYEAR which is a dummy capturing the timing of the cross-listing (1 in the year of cross-listing and 0 elsewhere), YEAR3 which is a dummy taking the value 1 in the three years after cross-listing and YEAR5 which is a dummy taking the value 1 after the third year). A constant, country on incorporation and calendar year dummies are also included but the coefficients are not reported here. First differences of all variables are taken to eliminate fixed effects. Detailed variable definitions and sources are given in the appendix.

Panel A: ADR vs Non-ADR Sample

	1	
	<i>Full Sample</i>	
	POST CROSS- LISTING	TREATMENT EFFECTS
<i>Total Assets</i>	0.521	0.321
<i>Total Assets Growth</i>	3.14*	0.003
<i>Foreign Income Growth</i>	0.22**	4.567**
<i>Leverage</i>	-0.11	0.246
<i>Return on Assets</i>	0.14**	-0.050
<i>Tobin's Q</i>	4.612***	1.423**

*, ** and *** represent significance at 10%, 5% and 1% level respectively

Panel B: No Control Change

	1	2	3	4	5	6
	<i>Total Assets</i>	<i>Total Assets Growth</i>	<i>Foreign Income Growth</i>	<i>Leverage</i>	<i>Return on Assets</i>	<i>Tobin's Q</i>
Year of Cross-Listing	0.045	6.790***	0.225**	-0.090***	0.53	0.987
Three-year effect	-0.016	0.06	0.312**	0.002	-0.33***	1.023*
Five-year effect	0.014	-2.35	0.556**	-0.025	-0.12	2.194**
Pseudo R-squared	0.00	0.02	0.00	0.05	0.00	0.00
N	1567	1470	1362	1293	1436	1171

*, ** and *** represent significance at 10%, 5% and 1% level respectively

Panel C: Control Change

	1	2	3	4	5	6
	<i>Total Assets</i>	<i>Total Assets Growth</i>	<i>Foreign Income Growth</i>	<i>Leverage</i>	<i>Return on Assets</i>	<i>Tobin's Q</i>
Year of Cross-Listing	0.035	7.880***	2.178**	-0.086	0.42	0.235
Three-year effect	0.057	0.16	1.222**	1.003*	1.07	-1.246
Five-year effect	-0.236**	1.14	2.289***	2.669***	0.580*	-1.632***
Pseudo R-squared	0.01	0.00	0.00	0.04	0.01	0.00
N	412	351	368	406	365	325

*, ** and *** represent significance at 10%, 5% and 1% level respectively

Panel D: Level III ADR IPOs

	1	2	3	4	5	6
	<i>Total Assets</i>	<i>Total Assets Growth</i>	<i>Foreign Income Growth</i>	<i>Leverage</i>	<i>Return on Assets</i>	<i>Tobin's Q</i>
Year of Cross-Listing	0.023	1.55**	1.280***	-0.069	-0.059	0.139
Three-year effect	0.057	-2.45	1.295***	-0.094**	-0.21	0.176
Five-year effect	0.063	-3.75	2.729**	-0.135**	-0.15	0.124
Pseudo R-squared	0.03	0.01	0.00	0.04	0.03	0.00
N	137	132	131	137	135	125

*, ** and *** represent significance at 10%, 5% and 1% level respectively

Panel E: Privatizations

	1	2	3	4	5	6
	<i>Total Assets</i>	<i>Total Assets Growth</i>	<i>Foreign Income Growth</i>	<i>Leverage</i>	<i>Return on Assets</i>	<i>Tobin's Q</i>
Year of Cross-Listing	-0.102*	0.234	1.230**	-0.078*	0.130**	0.957**
Three-year effect	-0.219**	0.678	2.300***	1.023*	0.250**	1.260*
Five-year effect	0.028	1.140	1.456***	1.357**	0.45*	1.450*
Pseudo R-squared	0.01	0.00	0.02	0.02	0.04	0.03
N	25	25	25	25	25	25

*, ** and *** represent significance at 10%, 5% and 1% level respectively

Appendix 1.A Variable Definitions

Variable	Definition
<i>Ownership Variables</i>	
Widely held	Equals 1 if there is no controlling shareholder. Control is measured following LLSV (???)
Family	Equals 1 if a person or family is controlling shareholder, and zero otherwise
State	Equals 1 if domestic or foreign state is controlling shareholder, and zero otherwise
Widely-held corporation	Equals 1 if a widely held non-financial company is controlling shareholder, and zero otherwise
Widely-held financial	Equals 1 if a widely held financial company is controlling shareholder, and zero otherwise
Miscellaneous	Equals 1 if above five categories are zero. Includes pension funds, voting trusts, groups, non-profit organizations and employees
Cross-Shs	Equals 1 if firm has a controlling shareholder and owns shares in its controlling shareholder or in firm that belongs to the chain of control, zero otherwise
Pyramid	Equals 1 if controlling shareholder exercises control through at least one publicly traded company, and zero otherwise
Single	Equals 1 if firm has a 20% (or 10%) controlling shareholder and no other shareholder has control of at least 10 percent of the votes
Management	Equals 1 if controlling shareholder is also CEO, Chairman, Vice-Chairman of the Board, and zero otherwise
<i>Firm-level Variables</i>	
AGE	Time since the date of incorporation of the company
SIZE	Log of Sales. Source: <i>Worldscope</i>
LEVERAGE	Total Assets/ Shareholder's Equity. Source: <i>Worldscope</i>
TASTGR	Total Asset Growth. Source: <i>Worldscope</i>
FINCR	Foreign Income Growth. Source: <i>Worldscope</i>
Q	Tobins Q Ratio ((Market Value of Equity+Long Term Debt)/Replacement Value(Net property, plant & equipment+Inventory). Source: <i>Worldscope</i>
ROA	Return on Assets. Source: <i>Worldscope</i>

Variable	Definition
<i>Country-level Variables</i>	
GDPGROWTH	Growth in GDP per capita. Source: <i>World Development Indicators</i>
TVT_GDP	Total Value of Stocks Traded as a percentage of GDP. Source: <i>World Bank Financial Structure Database</i>
FDI	Foreign Direct Investment. Source: <i>IMF Balance of Payments Statistics</i>
YEARS_LIBER	Time elapsed since the official liberalization date of the country. The official liberalization dates are reported in
PROPERTY	The degree to which property rights are protected in the economy. Source: <i>Heritage Foundation</i>
RESTRICTION	OECD Measure of FDI restriction for each country. The total score ranges from 0 to 1 and is based on regulations in each of three areas: (1) Restrictions on foreign ownership (2) Obligatory screening and approval procedures used to limit FDI (3) Other formal restrictions including constraints on the ability of foreign nationals to manage or work in affiliates of foreign companies and other operational controls on these businesses. Source: <i>Golub (2003)</i>
CAPITAL CONTROLS	Index of Capital Controls. Source: <i>IMF Trade and Exchange Restrictions Report; Harrison, Love and McMillan(2002)</i>
ACCOUNTING	Index created by examining and rating companies' 1990 annual reports on their inclusion or omission of 90 items in balance sheets and income statements and published by the Center for International Financial Analysis & Research Inc. the maximum is 90, the minimum is 0.
SHAREHOLDER RIGHTS	An index aggregating the shareholder rights. The index is formed by adding 1 if: (1) the country allows shareholders to mail their proxy to the firm; (2) shareholders are not required to deposit their shares prior to the General Shareholders' Meeting; (3) cumulative voting or proportional representation of minorities in the board of directors is allowed; (4) an oppressed minorities mechanism is in place; (5) the minimum percentage of share capital that entitles a shareholder to call for an Extraordinary Shareholders' Meeting is less than or equal to 10 percent; or (6) shareholders have preemptive rights that can only be waived by a shareholder's vote. Source: <i>LLSV 1999</i>
RULE OF LAW	Measure of the law and order tradition of a country. Ranges from 1(weak) to 10(strong). Source: <i>International Country Risk Guide</i>
JUDICIAL EFFICIENCY	Assessment of the efficiency and integrity of the legal environment as it affects business. Scale from 0-10. Source: <i>LLSV 1999</i>
OVERALL SIZE	Overall size of the financial system (Deposit money bank assets and stock market capitalization as share of GDP). Source: <i>World Bank Financial Structure Database</i>
MARKET	Index of Financial Structure. Higher values indicate a more market based system. Source: <i>Beck et. al(2000)</i>
DEVELOPED	Equals zero if both priv(claims on private sector by deposit money banks as a share of GDP) and tvt_gdp are below the period mean

Appendix 1.B Sources of Ownership Data

Country	Years	Sources
<i>All Countries</i>	1990-2002	Worldscope, Hoovers Online, Lexis-Nexis, ISI Emerging Markets Database
<i>Country Specific Sources</i>		
Argentina	1995	Major Companies of Latin America and the Caribbean 1997, Graham and Whiteside Publication
Argentina		Argentina Company Handbook 1995-1996
Argentina		Emerging Markets Handbook 1997
Australia		Asia Pacific Handbook 1999, Primark Publication
Australia		Major Companies of Far East and Australasia 2002, Graham & Whiteside Gale Group
Australia		Jobson's Year Book of Public Companies 99-00
Austria	1998, 1999	European Handbook 2000, Primark Publication
Austria		Major Companies of Europe 2002
Austria		www.transnationale.org
Belgium		Major Companies of Europe 2002
Brazil	1995	Major Companies of Latin America and the Caribbean 1997, Graham and Whiteside Publication
Brazil		Brazil Company Handbook 97/98, 01/02
Chile	1995	Major Companies of Latin America and the Caribbean 1997, Graham and Whiteside Publication
Colombia	1995	Major Companies of Latin America and the Caribbean 1997, Graham and Whiteside Publication
Denmark	1998, 1999	European Handbook 2000, Primark Publication
Denmark		Major Companies of Europe 2002
Dominican Republic	1995	Major Companies of Latin America and the Caribbean 1997, Graham and Whiteside Publication
Finland	1998, 1999	European Handbook 2000, Primark Publication
Finland		Major Companies of Europe 2002
Finland		Guide to Nordic Stock Markets
Finland		Europe's Top Quoted Companies
France	1998, 1999	European Handbook 2000, Primark Publication
France		Major Companies of Europe 2002
France		Europe's Top Quoted Companies
Germany	1998, 1999	European Handbook 2000, Primark Publication
Germany		Major Companies of Europe 2002
Germany		Europe's Top Quoted Companies

Country	Years	Sources
Greece		Major Companies of Europe 2002
Greece		Europe's Top Quoted Companies
Hong Kong	1996, 1997	Asian Company Handbook 1999, Toyo Keizai Publication
Hong Kong		Asia Pacific Handbook 1999, Primark Publication
Hong Kong		Major Companies of Far East and Australasia 2002, Graham & Whiteside Gale Group
India	1996, 1997	Asian Company Handbook 1999, Toyo Keizai Publication
India		
Indonesia	1996, 1997	Asian Company Handbook 1999, Toyo Keizai Publication
Indonesia		Major Companies of Far East and Australasia 2002, Graham & Whiteside Gale Group
Indonesia		Emerging Markets Handbook 1997
Ireland		Europe's Top Quoted Companies
Israel		Major Companies of Europe 2002
Italy		Europe's Top Quoted Companies
Italy		Major Companies of Europe 2002
Japan		Asia Pacific Handbook 1999, Primark Publication
Japan		Morningstar Japan, July 1992, 1994
Japan		Major Companies of Far East and Australasia 2002, Graham & Whiteside Gale Group
Luxembourg		Major Companies of Europe 2002
Malaysia		Asia Pacific Handbook 1999, Primark Publication
Malaysia		Kuala Lumpur Stock Exchange Annual Companies Handbook 1996
Mexico	1995	Major Companies of Latin America and the Caribbean 1997, Graham and Whiteside Publication
Mexico		Mexico Company Handbook 1995-96
Netherlands		Europe's Top Quoted Companies
Netherlands		Dutch Company Handbook 1998-99
New Zealand		Major Companies of Far East and Australasia 2002, Graham & Whiteside Gale Group
New Zealand		Jobson's Year Book of Public Companies 99-00
Norway	1998, 1999	European Handbook 2000, Primark Publication
Norway		Europe's Top Quoted Companies
Norway		Guide to Nordic Stock Markets
Peru	1995	Major Companies of Latin America and the Caribbean 1997, Graham and Whiteside Publication
Philippines	1996, 1997	Asian Company Handbook 1999, Toyo Keizai Publication
Philippines		Major Companies of Far East and Australasia 2002, Graham & Whiteside Gale Group

Country	Years	Sources
Portugal		Major Companies of Europe 2002, Portuguese Stock Exchange 1993
Portugal		Europe's Top Quoted Companies, Emerging Markets Handbook 1997
Russia		Russian Equity Guide 96-97, Brunswick Brokerage'
Russia		Russian Equity Guide 2000-01
Singapore	1996, 1997	Asian Company Handbook 1999, Toyo Keizai Publication
Singapore		Asia Pacific Handbook 1999, Primark Publication
Singapore		Major Companies of Far East and Australasia 2002, Graham & Whiteside Gale Group
South Africa	1996, 1997, 1998	McGregors's Who Owns Whom in South Africa, 1998 Listed and Unlisted Companies, McGregor Publication
South Africa	1994, 1995, 1996	McGregors's Who Owns Whom in South Africa, 1996 Listed and Unlisted Companies, McGregor Publication
South Korea	1996, 1997	Asian Company Handbook 1999, Toyo Keizai Publication
South Korea		Major Companies of Far East and Australasia 2002, Graham & Whiteside Gale Group
South Korea		Korea Company Handbook Investment Guide, Daewoo Securities Co., Ltd.
South Korea		Emerging Markets Handbook 1997, Korea Company Handbook 2000
South Korea		Asia Pacific Handbook 1999, Primark Publication
Spain	1998, 1999	European Handbook 2000, Primark Publication
Spain		Major Companies of Europe 2002, Europe's Top Quoted Companies
Sweden	1998, 1999	European Handbook 2000, Primark Publication
Sweden		Europe's Top Quoted Companies
Sweden		Major Companies of Europe 2002
Switzerland	1998, 1999	European Handbook 2000, Primark Publication
Switzerland		Major Companies of Europe 2002
Switzerland		Europe's Top Quoted Companies
Taiwan	1996, 1997	Asian Company Handbook 1999, Toyo Keizai Publication
Taiwan		Major Companies of Far East and Australasia 2002, Graham & Whiteside Gale Group
Taiwan		Emerging Markets Handbook 1997
Thailand		Asia Pacific Handbook 1999, Primark Publication
UK	1998, 1999	European Handbook 2000, Primark Publication
UK		Europe's Top Quoted Companies
UK		Major Companies of Europe 2002
Venezuela		Venezuela Company Handbook 1992-93

Appendix 1.C Country Characteristics

GDP per capita is the real GDP per capita averaged over the period 1990-1999. TVT_GDP is Total Value of Stocks Traded as a percentage of GDP averaged over 1990-99. COMMON is a dummy variable which takes the value 1 for English common law countries and 0 for others. PROPERTY is the Property Rights Regulation Index from The Index of Economic Freedom. CAPITAL CONTROL is index of capital controls from the IMF's Trade and Exchange Restrictions Report, averaged over 1990-96. FDI is the level of foreign direct investment taken from IMF's Balance of Payments Statistics, averaged over 1990-99. RESTRICTION is a composite OECD measure of restrictions on foreign direct investment which includes restrictions on foreign equity ownership (from Golub 2003).

Nation	GDP/CAP (US \$)	TVT_GDP	COMMON	PROPERTY	CAPITAL CONTROL	LEVEL OF FDI	(OECD) FDI RESTRICTION
Argentina	7440.86	0.04	0	4	3.00	2.59	.
Australia	20498.74	0.29	1	5	0.08	1.82	0.33
Austria	29344.73	0.07	0	5	0.55	1.07	0.43
Belgium	27304.92	0.09	0	5	0.40	2.20	0.29
Brazil	4298.29	0.13	0	3	2.43	1.58	.
Chile	4389.20	0.08	0	5	2.75	5.19	.
Colombia	2289.70	0.01	0	3	3.89	2.14	.
Denmark	34167.82	0.20	0	5	0.40	2.47	0.16
Dominican Republic	1588.07	.	0	2	.	2.89	.
Finland	26289.28	0.23	0	5	0.50	1.96	0.46
France	26986.50	0.23	0	4	1.40	1.66	0.23
Germany	30004.38	0.27	0	5	0.08	0.58	0.17
Ghana	373.57	0.00	1	3	.	1.34	.
Greece	11455.06	0.24	0	4	.	0.96	0.33
Hong Kong, China	21994.46	1.15	1	5	0.00		.
Hungary	4526.60	0.10	0	4	.	4.65	.
India	375.75	0.08	1	3	3.50	0.39	.
Indonesia	966.93	0.09	0	3	1.00	1.06	.
Ireland	18767.87	0.28	1	5	1.30	5.22	0.25
Israel	15343.58	0.18	1	4	2.00	1.24	.
Italy	19050.73	0.14	0	4	1.40	0.35	0.26
Japan	42285.18	0.29	0	5	0.09	0.06	0.24

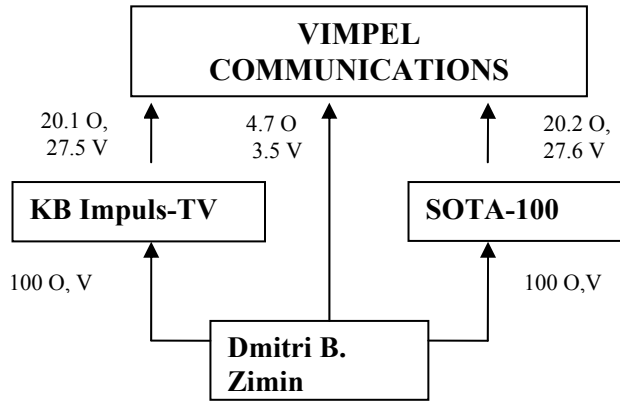
Nation	GDP/CAP (US \$)	TVT_GDP	COMMON	PROPERTY	CAPITAL CONTROL	LEVEL OF FDI	(OECD) FDI RESTRICTION
Korea, Rep.	10261.01	0.58	0	5	1.89	0.67	.
Luxembourg	44015.98	0.03	0	5	.		.
Mexico	3346.84	0.12	0	3	2.08	2.21	.
Netherlands	27063.04	0.58	0	5	0.00	4.12	0.24
New Zealand	16165.58	0.13	1	5	0.00	4.05	0.24
Norway	33227.32	0.18	0	5	1.50	1.74	0.47
Peru	2121.17	0.04	0	3	2.43	3.07	.
Philippines	1090.42	0.16	0	4	3.00	1.72	.
Poland	2880.74	0.04	0	4	.	2.39	.
Portugal	10980.78	0.13	0	4	1.38	2.02	0.22
Russian Federation	2630.33	0.02	0	3	.	0.53	.
Singapore	22510.88	0.75	1	5	0.00	10.44	.
South Africa	3921.59	0.21	1	3	4.00	0.96	.
Spain	15025.36	0.42	0	4	1.54	1.89	0.23
Sweden	27400.20	0.44	0	4	0.70	5.35	0.34
Switzerland	44520.43	1.22	0	5	.	2.04	0.28
Taiwan, China	12141.17	2.62	0	.	.		.
Turkey	2782.34	0.21	0	4	3.63	0.46	0.39
United Kingdom	19360.10	0.60	1	5	0.00	2.77	0.17
Venezuela	3519.88	0.03	0	3	2.44	2.60	.

Appendix 1.D
Example of change in ownership structure

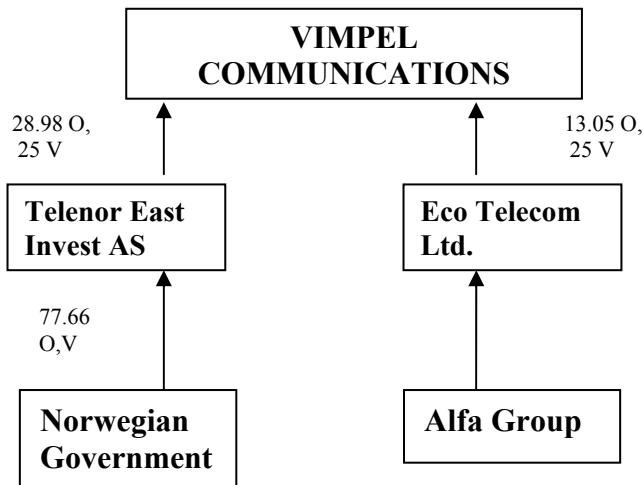
VIMPEL COMMUNICATIONS

Date of incorporation: 1992
 ADR Listing: 11/01/1996
 Listed on NYSE as Level III ADR
 Depository: Bank of New York

Ownership Structure prior to ADR Listing (Dec 1995) i.e. at t-1



Ownership Structure post ADR Listing (Dec 2001) i.e. at t+5



Appendix 1.E

Bias-Corrected Matching Estimator

The following section describes the use of the matching estimator in Abadie and Imbens (2002) to examine the effect of cross-listing. For firm i , $i=1, \dots, N$, let $(Y_i(0), Y_i(1))$ denote the potential outcomes, where $Y_i(0)$ is the change in firm performance when the firm is not exposed to the treatment (does not cross-list) and $Y_i(1)$ is the change in firm performance when the firm cross-lists:

$$Y_i = Y_i(W_i) = \begin{cases} Y_i(0) & \text{if } W_i = 0 \\ Y_i(1) & \text{if } W_i = 1 \end{cases}$$

where W_i , $W_i \in (0,1)$ indicates whether the firm cross-listed.

If both $Y_i(0)$ and $Y_i(1)$ are observable, then the effect of the treatment on firm i would be $Y_i(1) - Y_i(0)$. However for a given firm, either $Y_i(0)$ or $Y_i(1)$ will be observable. The average treatment effect on the treated i.e. the average effect of cross-listing on performance for the sample of firms that cross-lists is given by:

$$\tau|_{W=1} = E[Y(1) - Y(0)|_{W=1}],$$

Since $\tau|_{W=1}$ is inherently unobservable, to obtain a consistent estimate, matching estimators assume that assignment to treatment is unconfounded, that is, assignment to treatment is independent of the outcomes, conditional on the pre-listing covariates. More rigorously, W is independent of $(Y_i(0), Y_i(1))$ conditional on $X=x$. Here is the construction of a simple matching estimator:

Let $\|x\|_V \equiv (x'Vx)^{1/2}$ be the vector norm with positive definite weight matrix

V. Let $d_M(i)$ be the distance from the covariate value for firm i , X_i to the M^{th} nearest match. Allowing for the possibility of ties, this is the distance such that fewer than M firms are closer to firm i than $d_M(i)$, and at least M firms are as close as $d_M(i)$. If there are no ties there would be exactly M matches as close to X_i as $d_M(i)$.

Let $\zeta_M(i)$ denote the set of indices for the matches for firm i that are at least as close as the M^{th} match. If there are no ties the number of elements in $\zeta_M(i)$ is M . Let the number of elements of $\zeta_M(i)$ be denoted by $\# \zeta_M(i)$. Finally, let $K_M(i)$ denote the number of times firm i is used as a match given that M matches per firm are used, divided by the total number of matches. $\sum K_M(i) = N$, the total number of observations in the sample, including both cross-listing firms and non control sample firms.

The first estimator, the simple matching estimator, uses the following approach to estimate the pair of potential outcomes. For each firm i the observed outcome gives us one of the two potential outcomes. The other, unobserved, potential outcome is estimated by averaging over its matches. More formally,

$$\hat{Y}_i(0) = \begin{cases} Y_i & \text{if } W_i = 0 \\ \frac{1}{\# \zeta_M(i)} \sum_{l \in \zeta(i)} Y_l & \text{if } W_i = 1 \end{cases}$$

and

$$\hat{Y}_i(1) = \begin{cases} Y_i & \text{if } W_i = 1 \\ \frac{1}{\# \zeta_M(i)} \sum_{l \in \zeta(i)} Y_l & \text{if } W_i = 0 \end{cases}$$

The simple matching estimator for the average treatment effect for the treated is given by

$$\tau|_{W=1} = \frac{1}{N_1} \sum_{i=1}^N [\hat{Y}_i(1) - \hat{Y}_i(0)],$$

where N_1 is the number of treated units.

The following example with just four firm observations illustrates the construction of the matching estimator. Assume that matching is on the basis of the size of the firm (total assets in millions of dollars). Therefore, $X_i = \{60, 40, 70, 10\}$ for each of the four firms. The cross-listing dummy plays the role of W_i in identifying the treatment and the control variables. The dependent variable, Y_i is the profitability in year 3 after cross-listing (year 0). The $\hat{Y}_i(0)$ for the treatment firm is essentially the Y_i of the matched control firm and the $\hat{Y}_i(1)$ for the treatment firm is the same as Y_i . Following this the average treatment effect can be calculated as the average of the differences.

Firm i	Cross-Listing Dummy $\{W_i\}$	Size $\{X_i\}$	ROA $\{Y_i\}$	The Match $\{j(i)\}$	# of times firm is used as a match $\{K_i(i)\}$	$\hat{Y}_i(0)$	$\hat{Y}_i(1)$	$T_i \{ \hat{Y}_i(1) - \hat{Y}_i(0) \}$
1	1	60	10	Firm 3	2	8	10	2
2	0	40	5	Firm 1	1	5	10	5
3	0	70	8	Firm 1	1	8	10	2
4	1	10	5	Firm 2	0	5	5	0

The estimated average treatment effect is $=(2+5+2+0)/4=9/4$

The above estimator is biased in finite samples when matching is not exact. A bias corrected estimator adjusts the difference within the matches for the difference in their covariate values. The adjustment is based on the estimate of the regression of

conditional mean of $Y(W)$, $m_w(x)$ on X .

$$m_w(x) = b_0 + b_1x$$

Since we are interested in estimating the sample average treated effect for the treated, we need to estimate the above regression only for the control observations, $m_0(x)$. If $\hat{m}_w(x)$ be the fitted value of $m_w(x)$ using (\hat{b}_0, \hat{b}_1) , then the bias adjusted estimates of $(Y_i(0), Y_i(1))$ are given by:

$$\bar{Y}_i(0) = \begin{cases} Y_i & \text{if } W_i = 0 \\ \frac{1}{\#\zeta_M(i)} \sum_{l \in \zeta_M(i)} (Y_l + \hat{m}_w(X_i) - \hat{m}_w(X_l)) & \text{if } W_i = 1, \end{cases}$$

and

$$\bar{Y}_i(1) = \begin{cases} Y_i & \text{if } W_i = 1 \\ \frac{1}{\#\zeta_M(i)} \sum_{l \in \zeta_M(i)} (Y_l + \hat{m}_w(X_i) - \hat{m}_w(X_l)) & \text{if } W_i = 0 \end{cases}$$

Therefore, an estimate of the average treatment effect for the treated is given by:

$$\tau|_{W=1} = \frac{1}{N_1} \sum_{i=1}^N [\bar{Y}_i(1) - \bar{Y}_i(0)]$$

Chapter 2. Effect of Investor Protection and Strategic Complementarities on Organizational Design

2.1. Introduction

Recent academic papers in law and finance have established the importance of better legal protection of minority investors for corporate governance. In a series of papers, La Porta, Lopez-de-Silanes, Shleifer and Vishny (henceforth LLSV) and several other authors show that the level of investor protection influences ownership concentration (LLS 1999, Claessens et al. 2000), amount of external equity financing (LLSV 1997) and debt-equity ratios (Friedman, Johnson and Mitton 2003).

This significant and enormous literature has however proved inadequate on three fronts, each of which is addressed by this paper. First, to fully assess the impact of investor protection and to design an optimal corporate governance mechanism, we need to jointly consider the incentives of not just shareholders but also managers and creditors. Hence, the policy implications from existing empirical literature has been limited since it focuses on only “one group of actors, small outside investors” in the corporate governance problem (Berglof and Von-Thadden 2000). This paper addresses this issue by looking at several agency conflicts simultaneously.

Second, and surprisingly, this literature hasn’t examined if there is any kind of clustering between the choices of corporate governance in different countries. For instance, why do countries with poor investor protection have firms with concentrated ownership structures *and* low dependence on external financing *and* low dividend payout rates. Are these complementary decisions, where the adoption of one strategy

influences the adoption of the other and vice versa? There exists enough empirical evidence to suggest that this is an important question. For instance, Friedman et. al (2000) show that during the East Asian crisis, firms with a pyramidal ownership structure performed better if they also issued more debt. This paper uses a lattice theoretic model that allows us to examine if there exists a monotone relation between a firm's choices of ownership structure and leverage and the firm's regulatory environment.

Finally, the current literature has examined the effect of legal protection on the ability of managers and entrepreneurs to divert profits from outsiders at a cost. But poor legal protection refers not only to poor shareholder and creditor rights but also to poor accounting standards and the lack of transparency. This paper presents a new approach to thinking about investor protection by examining its effect on the monitoring costs and incentives of the different investors in the firm. Poorer the accounting standards and transparency, greater the monitoring costs borne by investors in terms of auditing costs and implementing mechanisms to reduce information asymmetry. Focusing on this aspect of investor protection, in contrast to earlier studies that model investor protection as a cost of stealing technology, is important for corporate governance reform because it provides a more implementable measure of reform (Alba, Claessens and Djankov (2003)). Recent empirical evidence has also emphasized the importance of this channel by showing that the effect of investor protection on monitoring costs is important for new business creation (Hytinen and Takalo 2001) and risk sharing (Giannetti 2002).

The main prediction of the analysis in this chapter is that concentrated

ownership, leverage and creditor monitoring are complementary instruments⁷ in corporate governance in an environment of poor investor protection. In an environment of poor regulation and poor accounting standards and no transparency, costly monitoring is a way to tackle the problem of managerial moral hazard. However, in a diffusely held corporation, no individual finds it worthwhile to monitor. So a model of costly monitoring requires shareholders to hold large ownership stakes.

But while concentrated ownership encourages monitoring activities by large investors, it leads to a potential loss in risk-sharing benefits that are realized when ownership is diffuse (Admati, Pfleiderer, and Zechner 1994). Greater the ownership stake in the firm, greater is the owner's exposure to avoidable idiosyncratic risk (Shleifer and Vishny 1997)⁸. Therefore, the flip side to concentrating ownership is that it comes at the opportunity cost of making the owner (risk averse) more sensitive to firm-specific risk. To counteract this effect of ownership concentration⁹, the paper proposes an addition of debt to the capital structure. Higher leverage would allow the owners to share the downside risk of the firm with creditors, while allowing them to retain any increase in upside potential due to increased monitoring (Jensen and Meckling 1976). Leverage therefore encourages the owners to take on larger stakes in the firm, which, in turn, enables them to internalize more of the benefits of

⁷ To say that two or more instruments are Edgeworth complements is to say that the marginal benefit derived from a given instrument is an increasing function of the extent to which complementary instruments are employed together with it. Consequently, complementary instruments tend to reinforce and support each other.

⁸ Concentrated ownership structures are very prevalent through most of Europe and Asia. For instance, Reliance Industries Ltd., a \$12 billion company headquartered in India is 70% owned by the Ambani family. The Ambanis would be the most affected, compared to other shareholders if the performance of this company were to decline.

⁹ Most studies with the exception of Huddart (1993) and Himmelberg et al (2001) have concentrated on how a large ownership stake makes the return more significant to the shareholder without discussing its impact on the risk sensitivity of the large shareholder. Maug (1998) calls this a *lock-in effect* which commits the large shareholder to undertake more monitoring. This paper tries to address this gap by considering risk-aversion in the model.

monitoring. In other words, the marginal benefit of concentrating ownership increases at higher levels of debt and creditor monitoring in an environment of poor investor protection.

The paper also shows that high ownership concentration and high leverage give rise to low dividend payouts when the regulatory system is not very protective of minority shareholders. Therefore, the dividend policy of a firm is influenced by not just the extent of investor protection in the country as LLSV (1998) establish but is jointly determined with the firm's selection of its ownership and capital structure.

Further, the paper extends the recent LLSV results in examining the effect of investor protection on the contracting mechanism of a firm. Why is the Asian business landscape dotted with business groups and network structures like the *chaebol*, *keiretsu* and *quanxi*¹⁰ unlike the formal organizations found in the west? The paper shows that a complementary cluster of high ownership concentration, high leverage and low dividend payouts is also associated with reliance on business groups and network structures rather than on formal contracting mechanisms. Thus, this paper extends the reach of the law and finance literature in showing how these complementarities predict organizational form.

To test some of the implications of the complementarity hypothesis in this paper, I use data from Amadeus Database that provides balance sheet information for European firms. Using the correlations based approach described in Arora (1996) and implemented by Arora and Gambardella (1990) and Barclay, Marx and Smith (2003), I show that ownership concentration and leverage are complementary instruments in

¹⁰ The road ahead for Asia's leading conglomerates, McKinsey Quarterly(1997).

the transition economies. The downside of using the Amadeus database is the lack of variables to proxy for monitoring undertaken by creditors. Hence the paper is restricted to testing the complementarity hypothesis between ownership and leverage. However, lattice theory mathematics allows us to focus on a subsystem of decisions to study complementary relations while taking the rest of the organizational variables as given.

The complementary relationships studied in this paper have significant implications for government policy on corporate governance reform which is elaborated in Section 6. By establishing the *systemic* nature of corporate governance, the paper shows that regulators need to tackle all dimensions of the organizational form for their reforms to have full effect. In the presence of complementarities, changing one policy variable may have no effect or an undesirable effect if other policy variables remain unchanged. This explains why one-dimensional policies such as the Transparency Directive adopted by the European Commission have been ineffective (ECGN 1998).

The rest of the paper is organized as follows. Section 2.2 places the paper in context of recent work in this area. Sections 2.3 describes the model and the methodological approach. Section 2.4 discusses extensions to the basic model. Section 2.5 presents the empirical evidence and discusses additional empirical predictions. Section 2.6 concludes with policy implications.

2.2. Related Literature

Over the past decade, researchers have generated a large amount of

international evidence to show that cross-country differences in corporate governance, and more broadly in financial systems are shaped by the quality of legal rules protecting investor rights. In a multitude of empirical studies, various authors have shown that common law countries provide better investor protection than civil-law countries (LLSV 1998), are more dependent on external equity financing than civil-law countries (LLSV 1997). In contrast, countries with poor investor protection are associated with concentrated ownership (LLS 1999, Claessens 2000), higher private benefits of control (Zingales 1994, Nenova 1999) and low dividend payouts (LLSV 2000a).

Despite the enormous amount of empirical evidence discussed above, theoretical work in this area is still in its infancy. Shleifer and Wolfenzon (2002) present a market equilibrium model of owner-managers and consider the relationship between legal protection and inside equity. Himmelberg et. al. (2002) theoretically and empirically study the relationship between investor protection, ownership, and the cost of capital. Other studies model ownership structure to explain concentration of ownership and control. Wolfenzon (1999) and Bebchuk et. al. (1999) argue that pyramids, cross shareholding structures, and dual class shares are conducive to the extraction of private benefits and are more common in environments with poor investor protection. Burkart et. al. (2002) analyze the influence of law on the founder's decision to hire a professional manager.

However this first generation of corporate governance papers fails to study inter-dependencies between the various results. The main focus in these papers has been the problem of the minority investor which critics argue is too small to have any

policy implications (Berglof and Von Thadden 2000). John and Senbet (1998) also advocate considering the role of creditors to broaden the focus of corporate governance to include additional agency problems.

In this paper, I examine the inter relationships between these various results and their impact on corporate governance. I model several agency conflicts simultaneously, allowing for the fact that any one governance instrument can mitigate an agency problem at the expense of aggravating others. This gives rise to complementary and substitution relationships between the various instruments. The paper is closest, in this respect to John and Kedia (2002) who design an optimal governance system using managerial ownership, large shareholders and bank monitors and the takeover market. However, in contrast to them, I use a lattice theoretic model to obtain an exact formalization of complementarities without considering takeover mechanisms.

This paper is also closely related in modeling strategy to Burkart and Panunzi (2001) who analyze the interaction between legal shareholder protection, blockholder's incentives to monitor and managerial incentives. While the Burkart and Panunzi (2001) paper speaks of a initiative effect, in that concentrated ownership stifles managerial initiative in increasing net shareholder return, our paper speaks of a risk altering effect of ownership concentration. Increased ownership stake in the firm exposes the owner to increased idiosyncratic risk reducing his monitoring incentive. Himmelberg et. al. (2002) also investigate the risk shifting effect but examine its implications for cost of capital.

One of the important contributions of this paper is in presenting a new

approach towards understanding the effects of investor protection—on the monitoring incentives of various investors. Most other papers model investor protection as a punishment technology for stealing by the manager. But investor protection not only refers to shareholder and creditor rights but also to the presence of good accounting standards and transparency in the country. In fact, policy makers refer to strengthening the monitoring mechanism in place when they speak of improving investor protection.¹¹ Alba, Claessens and Djankov (2003), in assessing Thailand's policy options for improving corporate governance recommend improving bank monitoring of enterprise management. This paper therefore follows recent work by Giannetti (2002) in modeling monitoring costs as a function of investor protection.

Further, while the other models acknowledge the link with the incomplete contracting literature, this model is one of the first to link the results on investor protection with the kind of contracting mechanisms that firms adopt. Thus the paper also contributes to the transaction cost literature (Williamson 1985) and the more recent literature on the business group style contracting mechanisms in emerging markets (Khanna and Palepu (2000a), Kali (1999), Khanna and Yafeh (2000)). Table 2.1 provides a brief summary comparison of some of the theoretical models in the area of law and corporate governance.

¹¹ The SEC's Advisory Committee on Capital Formation and Regulatory Processes in crafting a system that enhanced investor protection incorporated measures that improved monitoring by outside directors, underwriters, and auditors. <http://www.sec.gov/news/studies/capform/transmit.txt>

2.3. The Model

In this section, I present a framework for simultaneously examining the agency conflicts between shareholders, creditors and managers. To begin with, assume each firm makes decisions on ownership structure, λ , leverage ratio, d , and the level of investor monitoring, m . The regulatory environment of the firm is represented by the variable parameter T . The firm faces the following maximization problem:

$$\max_{\lambda, d, m} \Pi(\lambda, d, m; T) \quad (2.1)$$

where Π is a general specification of firm value. For different values of the parameter T , the firm selects its decision variables (λ, d, m) to maximize value.

The agency issues that this model is intended to address are as follows: The central problem in corporate governance is managerial moral hazard. Managers can be motivated to exert high effort and not steal by giving them incentive compensation. However, designing of incentive contracts involves a risk-incentive trade-off (Hart and Holmstrom (1987)) for the shareholder, with the source of risk being the imperfect measurement of managerial effort. This can be reduced by using monitoring to acquire a true signal of managerial effort. So monitoring by the owners is intended to shift risk away from the managers to themselves while leaving total firm risk (exogenous in our model) unchanged.

The costs of monitoring are obviously dependent on the severity of the agency problem and therefore on the regulatory parameter T . The costs are higher when there is no transparency and the owner has to use additional mechanisms to monitor the

manager. In addition, monitoring being a public good is associated with free rider problems. The solution to free-rider problem in the case of costly monitoring is concentrated ownership. However, concentrated ownership comes at an opportunity cost of making the owner (risk averse) more sensitive to firm-specific risk, which decreases his incentives to monitor. This paper proposes the use of leverage as a risk sharing partner for the large owner. Specifically, creditors share in the downside risk of the firm and also play an important monitoring role in the system. Therefore the model predicts that in countries with poor investor protection, firms with concentrated ownership structures issue more debt and allow for a stronger monitoring role by the creditors.

The above model of firm behavior includes more generality than can be used to capture the various agency problems discussed and to exhibit complementarities. Subsections 2.3.1-2.3.3 below contain a specialization of the model in (1) and subsection 2.3.4 analyzes the specialized model under hypotheses that yield monotone optimal solutions.

2.3.1. Distribution of Cash Flows

This subsection formulates a model of a value maximizing firm that operates over two time periods. At date 0, the firm is set up by the owners and contracts are drawn up between the owners, managers and the creditors.

Consider an investment project that requires an initial outlay of funds, I at date 0, in order to purchase some physical assets. The firm has two sources of

finance: the contribution from the owners, I_o and the money raised from the creditors in the debt market, I_d . The total funds invested in the firm is given by $I = I_o + I_d$. Each owner also has an ownership stake given by $\lambda_i, i = 1, \dots, n, \sum_1^n \lambda_i = 1$, where n is the number of owners. Ownership concentration is measured by λ which is the largest λ_i . The manager is assumed to have no equity stake in the firm. At date 0, the manager issues debt of face value D . The timeline of cash flows is shown in Figure 1.

The manager chooses to exert an effort e_1 in choosing a particular investment project. Effort is unobservable. The project has a life of two periods. At date 1, the states of nature are realized and the project yields a return of X with probability α and a return 0 with probability $1 - \alpha$. At date 2, return Y is realized. The date 1 cash flow is observable but not verifiable. A court could therefore not enforce a contract contingent on these realized cash flows. This assumption is meant to capture the idea that managers have some ability to divert the corporate resources towards perquisite consumption or unprofitable investment projects at the expense of the owners.

As shown in Bolton and Scharfstein (1990, 1996) and Gertner, Scharfstein and Stein (1994), the optimal contract calls for a repayment of debt D at date 1; if the manager has the cash flow X and chooses not to make the payment D , the creditor has the right to liquidate the project. In this case, the manager would have to forfeit his share in the third period payoff Y .

The project can also be liquidated if date 1 cash flow is 0 instead of X . The manager's effort choice in the first period is assumed to affect the liquidation value.

Therefore, liquidation yields a value $L(e_1)$, where $L(e_1) < Y$. Given that liquidation is always assumed to be inefficient, the manager and creditor are expected to renegotiate to avoid liquidation. The possibility of ex-post renegotiation is recognized at the initial contracting stage. So any outcome that could be achieved through renegotiation is anticipated and implemented in the original contract. Therefore the value of D that must be repaid is renegotiation proof. The proceeds from liquidation are distributed between the managers and the creditors. It is assumed that employee claims are satisfied before residual shareholder claims and that owners get nothing in this model.

At the end of the first period, a decision is made whether to continue the project or to liquidate it. Continuation means that the project has an economic value at date 2, Y , and this date 2 value depends on managerial effort in periods 1 and 2, e_1 and e_2 . Further, Y is a random payoff which can be described by its mean $y(e_1, e_2)$ and variance, $\sigma_y^2 : Y \sim N[y(e_1, e_2), \sigma_y^2]$. Since Y is observed with some noise, it is not a true estimate of managerial effort. Hence the owner is reluctant to base the manager's compensation on Y . Instead, he undertakes monitoring to acquire a more precise signal of managerial effort.

2.3.2. Investor Protection and Monitoring Incentives

The owner expends resources m_o in monitoring the manager at per unit cost c_o to obtain an informative signal Z of managerial effort. Monitoring is intended to decrease the information asymmetry between the owner and the manager. This allows

the owner to tailor the manager's pecuniary award more closely to actual performance than to profits. From Holmstrom's "informativeness principle" (Holmstrom 1979, 1982), the manager's compensation contract should be based on the more informative signal Z rather than on Y . So managers get θZ and owners get $Y - \theta Z$.

One of the intended consequences of monitoring here is to increase the share of risk borne by the owner and to decrease the risk borne by the manager without changing the total firm risk (which is treated as exogenous in this model). This allows incentive compensation to achieve its true goal of motivating the manager to exert high effort. To see this, suppose the signal Y could be represented as

$$Y = y(e_1, e_2) + (1 - m_o)\eta_1 + m_o\eta_2 \equiv Z + m_o\eta_2$$

where $\eta_1, \eta_2 \sim N(0, \sigma_\eta^2)$ and are iid. The owner, by expending resources m_o , is able to decrease the randomness of the signal Z (i.e. σ_z^2). This effect of monitoring is represented as $\frac{\partial \sigma_z^2}{\partial m_o} < 0$.

Unlike previous literature where monitoring costs are assumed to be constant, I assume that the monitoring costs, c_o incurred by the owner is a function of the owner's ownership concentration, λ and the level of legal shareholder protection, T . The parameter T captures the regulatory environment in the country. Following LLSV (1998), T could be considered a proxy for the extent of shareholder and creditor rights protection, the quality of accounting standards and the enforcement mechanism in the country. A high value of parameter T ¹² corresponds to a highly

¹² Note that T could very easily have been interpreted as a parameter vector, so it could include all regulations pertaining to shareholder rights, creditor rights, property rights protection, stock market regulation, even intellectual property rights protection. So in general, T is best thought of as a proxy for the laws and enforcement mechanism prevailing in the country.

transparent market with stringent accounting rules and disclosure requirements and regulations protecting the rights of the minority shareholders while low values of the parameter T correspond to markets where disclosure rules, accounting standards and investor protection are less stringent. As LLSV (1998) show, high values of T are typically associated with common law countries and low values of T are associated with civil law countries.

Creditors also undertake monitoring resources m_d at a cost $c_d(T)$. A weak bankruptcy law combined with poor accounting standards could mean managers can conceal the true financial situation of the firm implying a higher monitoring cost to creditors. Therefore, c_o and c_d may be interpreted as the cost of gathering and processing information about the firm and that is inversely related to the quality of accounting standards in the country. Monitoring costs have been modeled similarly in Giannetti (2002) and Hyytinen and Takalo (2001). This gives us our first assumption:

Assumption A1: Monitoring costs are decreasing with better investor protection.

$$\frac{\partial c_o}{\partial T} < 0 \text{ and } \frac{\partial c_d}{\partial T} < 0.$$

Creditor monitoring and investor protection also affect the liquidation value. Greater the monitoring resources spent by the creditor, m_d , the better able he is to ensure that more is left in the firm on liquidation and not everything is stolen by the manager. Alternatively, greater creditor monitoring can be thought of as ensuring more collateral to be safe. Also greater the investor protection, higher the share in liquidation value that creditors get. LLSV (1999) show that in their sample of 49 countries, in the event of bankruptcy, “nearly half of the countries do not have an

automatic stay in assets, over half restrict the managers' right to seek protection from creditors unilaterally, and 45% remove management in reorganization proceedings". This implies that both the level of bankruptcy regulation (proxied by parameter T in this model) and the amount of monitoring undertaken by the creditor, m_d determines what the creditors receive on liquidation. This is easily modeled by assuming the following functional form for L .

$$L = L_o(m_d)\delta(T)$$

such that $L_o(0) = L_o, \delta(0) = 0$ and $\delta(1) = 1$. The level of investor protection affects the share in liquidation value that creditors get and the amount of creditor monitoring affects the base liquidation value. Therefore, we have the following assumption:

Assumption A2: Liquidation value accruing to creditors is increasing in the extent of creditor monitoring and the level of investor protection in the country.

Mathematically, $\frac{\partial L}{\partial m_d} > 0$ and $\frac{\partial L}{\partial T} > 0$.

2.3.3. Design of a Corporate Governance System

Following sub-sections 2.3.1 and 2.3.2, I now discuss the utility payoffs for each of the parties involved. I assume that both the principal (owner) and the agent (manager) are risk averse with constant absolute risk aversion:

$$U(P) = -\exp(-RP) \tag{2.2}$$

$$U(A) = -\exp(-rA) \tag{2.3}$$

where r and R are the coefficients of risk aversion for the agent and the principal respectively. Since both P and A are normally distributed, their utility measures can

be written in certainty-equivalent form. The expected certainty equivalent payoffs of the various stakeholders are as follows:

$$\begin{aligned} \text{Manager : } & \alpha[X - D + \theta Z - e_2] + (1 - \alpha)(1 - \gamma)L(e_1, m_d, T) \\ & - \frac{1}{2}r\text{Var}(\theta, d, m_d, m_o, \lambda) \end{aligned} \quad (2.4)$$

The first term reflects the manager's payoff if the project yields a return X in the first period and Y in the second period. The manager makes debt payment D from the first period payoff, receives share θZ of the second period payoff and action in the second period is assumed to be costly. The second term reflects the manager's payoff in the event of liquidation. The last term is the risk premium, R . I do not write out the expression for R : it is a function of the coefficient of risk aversion, r ; the manager's share in third period payoff, θ ; his share in the liquidation value, $1 - \gamma$; and the variance of third period payoff, $\sigma_{y^2}(m_d, m_o)$. The variance is in turn a function of the monitoring intensity m_d and m_o .

The certainty equivalent of the owner is given by:

$$\text{Owners : } \quad \alpha[Y - \theta Z] - c_o(\lambda, T)m_o - I_o - \frac{1}{2}R\text{Var}(\theta, d, m_d, m_o, \lambda) \quad (2.5)$$

The owner receives his share $Y - \theta Z$ of second period payoff with a probability α . He also expends some cost on monitoring the manager, $c_o(\lambda, T)$ and invests I_o in the firm. The creditors don't share in either of the two project returns X and Y . Instead their payoff is completely determined by the debt repayment and the liquidation value. In the event the project gives a return X , the creditor gets his debt repaid and in the event of liquidation, he receives a share γL . So the certainty

equivalent of the creditor is given by:

$$\text{Creditor: } \alpha D + (1 - \alpha)\gamma L(e_1, m_d, T) - c_d(\lambda, T)m_d - I_d \quad (2.6)$$

When value is expressed using certain equivalents, this is a *transferable utility* model, so an arrangement is efficient if and only if it maximizes total value. That is, regardless of the other terms of the contract, it is possible to take a dollar of utility from one party and transfer it to the other party just by transferring a physical dollar. And Holmstrom and Milgrom (1990) show that with such a transferable utility model, any efficient contract must maximize the sum of the individual utilities or the *joint surplus*¹³. Therefore the objective function being maximized is the total certainty equivalent given by:

$$\text{Total CEQ} = \text{CEQ}_{\text{Manager}} + \text{CEQ}_{\text{Owner}} + \text{CEQ}_{\text{Creditor}} \quad (2.7)$$

$$\begin{aligned} \max \Pi_{\text{CEQ}}[e, \theta, m_d, m_o, d, \lambda] = & \alpha[X + y(e_1, e_2) - e_2] + (1 - \alpha)L(e_1, m_d, T) - c_o(\lambda, T)m_o \\ & - c_d(\lambda, T)m_d - \frac{1}{2}R\text{Var}(\theta, d, m_d, m_o, \lambda) - \frac{1}{2}r\text{Var}(\theta, d, m_d, m_o, \lambda) - I_o - I_d \end{aligned}$$

subject to the manager's optimal choice of effort.

The manager's effort choice will be characterized by a set of first-order conditions that uniquely define the agent's response function, denoted $e(\theta, m_d, m_o, d, \lambda)$. When this response function is substituted into the objective Total CEQ, the problem is reduced to an unconstrained optimization over the organizational choice variables $(\lambda, m_d, m_o, d, \theta)$.

¹³ Note that the cited result applies to any model with constant absolute risk aversion (including risk neutrality of all parties). Further one could as well maximize the agent's objective function subject to the principal getting zero profits (or any other individual rationality restriction). It still leads back to total surplus maximization, because the only feasible welfare weight is one. The solution will not be first best because it is chosen subject to the incentive constraints which force it to be second-best.

Therefore, the objective function being maximized is Π_{CEQ} which is a function of the design variables conditional on parameters reflecting the institutional environment. The *design variables* in our problem are

- (i) the ownership concentration, λ
- (ii) capital structure, d
- (iii) and monitoring levels m_d and m_o .
- (iv) the incentive compensation parameter θ

The *parameter* T captures the regulatory environment.

2.3.4. Comparative Statics

Our general objective is to determine how the design instruments in $(\lambda, d, m_o, m_d, \theta)$ co-vary across a set of agency relationships. This requires that explicit parameters of CEQ_{Total} be introduced that characterize the heterogeneity of the firms being studied. The parameter I consider is T , a proxy for the legal and regulatory environment in which the firm operates. I am interested in performing comparative statics to characterize how the choice of $(\lambda, d, m_o, m_d, \theta)$ varies with T .

The most common method for comparative statics analyses is based on applying the implicit function theorem to first order conditions. To do this, one usually needs to make some assumptions on convexity of sets or conditions regarding the positive or negative definiteness of the Hessian. Milgrom and Shannon (1994) argue that these assumptions ‘play as servants to a method and they couldn’t be necessary for any meaningful comparative statics’. In fact they argue that monotone

comparative statics are fundamentally statements of order-statements of the form that an increase in some variable leads to increases in other variables. They propose an order-theoretical method of doing comparative statics. In particular, they show that in a problem with a lattice structure¹⁴, having complementarities among the variables is sufficient for the monotonicity of a firm's choice variables in its exogenous characteristics. And a function which exhibits complementarity between its arguments is termed as a supermodular function.

For a function $f(x, y)$, supermodularity is equivalent to the condition $\frac{\partial^2 f}{\partial x \partial y} > 0$. (See Appendix 2.B for some of the results on supermodularity from Topkis (1998) that we need for our analysis) In this form, supermodularity reflects complementarities between the variables: when one goes up, the marginal return from increasing the other variables also goes up. Supermodularity also implies that if all the variables of a supermodular function are increased simultaneously, the function value increases by more than if we were to sum up the value changes from increasing the variables one at a time.

This implies that to establish complementarity between the various decision variables, we need to show that $CEQ_{total}(\lambda, d, m_o, m_d, T)$ is supermodular. Representing (λ, d, m_o, m_d) by x , if $CEQ_{total}(x, T)$ is supermodular, then an increase in T (or any component of T if T is a vector) will trigger a sequence of upward adjustments in the components of x , all of which reinforce each other. The only requirement needed here is to impose some kind of ordering on the variables. For ownership structure, I focus on two possibilities, concentrated or dispersed, denoted

¹⁴ A lattice is a partially ordered set in which every subset containing exactly two elements has a greatest lower bound or intersection and a least upper bound or union.108

by $\lambda \in \Lambda \equiv \{\lambda_c, \lambda_d\}$ such that $\lambda_d > \lambda_c$. For all other variables, I define low and high levels. So, for instance, the amount of leverage d could be either low, d_{lo} or high, d_{hi} . Similarly for the monitoring intensities m_o, m_d .

To establish complementarity (supermodularity), the cross partial of the function in pairs of these variables is to be shown to be positive. Therefore, in this model to establish complementarity, I need to show that the total certainty equivalent revenue function, Π_{CEQ} is *pair-wise* supermodular in $(\lambda, d, m_d, -T)$ by showing that the pair-wise cross partial of Π_{CEQ} in $(\lambda, d, m_d, -T)$ is positive. Deriving the cross-partials of the above objective function involves a careful application of the chain rule to each of the terms as shown in Appendix 2.A. The simplified expressions for the cross-partials in Appendix 2.A show that the sign of the cross-partials depend on the following terms:

$\frac{\partial \sigma_z^2}{\partial m_o \partial m_d}$: This term captures the effect of owner and creditor monitoring on the variance of the signal of the managerial effort. A discussion of the sign of this term is crucial as it enables us to sign the effect of investor protection and creditor monitoring on the risk premium parameters and therefore on Π_{CEQ} . As discussed before, monitoring in this model is intended to decrease the randomness in the signal Z . This assumption, referred to as the *Monitoring Intensity Principle* is standard fare in most models of incentive compensation (Milgrom and Roberts (1990)). By monitoring, the investors want to acquire as precise a signal as possible of managerial effort so that they can base management compensation on it. They want

to increase managerial incentive to exert effort while reducing his share of the risk (the risk-incentive trade-off). This is represented as $\frac{\partial \sigma_{\varepsilon_2}}{\partial m_o} < 0$ and $\frac{\partial \sigma_{\varepsilon_2}}{\partial m_c} < 0$. Hence it seems reasonable to build a trade-off between owner and creditor monitoring based on duplication of effort. The returns from monitoring to the owner (or creditor) decreases with an increase in monitoring action by the creditor (owner).

Assumption A3: Owner and creditor monitoring are substitutes in reducing third-period return. Therefore $\frac{\partial^2 \sigma_{\varepsilon_2}}{\partial m_o \partial m_c} > 0$.

$\frac{\partial^2 c_o}{\partial \lambda \partial T}$: This term is really the effect of ownership structure and the prevailing legal system on the monitoring costs borne by the owner. To recap, ownership structure could be either concentrated or dispersed and the parameter T could be either high (associated with good investor protection) or low (associated with poor investor protection). Monitoring costs are assumed to be increasing as investor protection gets worse. However in these countries, an increased ownership stake reduces the effect of investor protection on monitoring costs since the large owner is more closely able to monitor the manager. This implies that the most plausible sign for the cross-partial is to have $\frac{\partial^2 c_o}{\partial \lambda \partial T} > 0$.

Assumption A4: Increased ownership concentration makes the monitoring costs less sensitive to investor protection $\frac{\partial^2 c_o(\lambda, T)}{\partial \lambda \partial T} > 0$.

$\frac{\partial^2 L}{\partial m_c \partial T}$: This term examines the impact of increased creditor monitoring on the effect of investor protection on L. As investor protection decreases, L also decreases. But increased creditor monitoring could actually override the effects of this decrease. This

is the principle behind distressed lending and loan guarantees in the poor investor protection countries. Creditors like Citibank and the World Bank provide loans under the condition that they be given a seat on the board of directors or be involved actively in monitoring. This ensures that they will be to recover more if the project is liquidated. So the most plausible sign of this derivative is $\frac{\partial^2 L}{\partial m_d \partial T} < 0$.

Assumption A5: Increased creditor monitoring makes liquidation value less sensitive to investor protection.

Following assumptions A1-A5, supermodularity of the function Π_{CEO} in $(\lambda, d, m_d, -T)$. can be easily established as stated in the first theorem:

Theorem 1: *High ownership concentration and high leverage are complementary instruments in an environment of poor shareholder protection.*

Proof: Appendix 2.A.

Intuitively, designing of incentive contracts for management by owners involves a risk-incentive trade-off (Hart and Holmstrom (1987)). The source of risk is the imperfect measurement of managerial effort. According to “the informativeness principle” (Milgrom and Roberts (1990)), performance measures should be selected to reduce the variance in estimating managerial effort. The same can be achieved through costly monitoring. Monitoring by the owners enables them to shift risk away from the managers to themselves while leaving total firm risk (exogenous in our model) unchanged. Incentives to monitor are further strengthened when the owner has a concentrated shareholding. However, concentrated ownership comes at an opportunity cost of making the owner (risk averse) more sensitive to firm-specific

risk, which decreases his incentives to monitor.

To counterbalance this risk-shifting effect produced by concentrated ownership, the model proposes the use of leverage so that creditors can share in the downside risk of the firm without gaining in the upside (the third period return). This establishes the result in Theorem 1 that concentrated ownership and increased leverage are complementary instruments in an environment of weak investor protection.

Theorem 2: *Increased creditor monitoring is complementary to ownership concentration and leverage in an environment of poor shareholder protection*

Proof: Appendix 2.A.

The theorem implies that the marginal benefit derived from increased creditor monitoring increases with an increase in ownership concentration and leverage. Therefore, we would expect to see creditors play an active monitoring role in firms with high ownership concentration and debt ratios and located in environments which are not very protective of investors. Theorems 1 and 2 both yield testable empirical predictions which are further discussed in Section 2.5.

Corollary 1: *A change in legal investor protection in a particular direction would cause all the complementary instruments to move in the same direction.*

Following Theorem 4 of Milgrom and Roberts (1990), the set of optimizers of Π_{CEQ} , (λ, d, m_d) form a sublattice that rises with the parameter $(-T)$. Supermodularity implies that if it becomes desirable to increase $(-T)$, i.e. as the level

of investor protection becomes weaker, then it becomes desirable to increase the level of ownership concentration, leverage and the amount of creditor monitoring. Conversely, if the extent of shareholder protection were to be increased, then we would see dispersed ownership and low debt equity ratios.

Further, T could be interpreted as a parameter vector, so it could include all regulations pertaining to investor rights, property rights protection, stock market regulation, even intellectual property rights protection. So T is best thought of as a proxy for the laws and enforcement mechanism prevailing in the country. And supermodularity also implies that if it becomes desirable to increase any one element of the above *parameter vector*, then it becomes desirable to increase all elements of the vector. This then implies:

Corollary 2: *For corporate governance reforms to have full effect, all aspects of the organizational form should be considered.*

The complementarity approach in this paper advocates that the focus of corporate governance be on examining several dimensions of the agency problem simultaneously rather than focusing on one isolated conflict at a time. The approach implies that any change in the economy's structure cannot be jump started with piecemeal reforms. Rather the focus should be on institution building, efficient corporate governance, the development and implementation of the laws necessary for a market economy, examination of several corporate governance instruments simultaneously, all of which inevitably take time. An example of the failure of piecemeal legislation is the failure of the Transparency Directive undertaken by the

European Commission. This was a directive undertaken to increase transparency of corporations in the EU but has been met with little success (ECGN 1998).

Discussion: A graphical representation of supermodularity between variables can be shown by the single crossing property (a necessary and sufficient condition for monotone comparative statics). For simplicity, I restrict the variable set to ownership structure and leverage in the graph below. Let ownership structure be either concentrated or dispersed denoted by $\lambda \in (\lambda_{con}, \lambda_{dis})$; define an ordering on $(\lambda_{con}, \lambda_{dis})$ so that λ_{dis} is greater than λ_{con} , $\lambda_{dis} > \lambda_{con}$. Define high and low levels for the variable leverage and for the legal parameter T : $d \in (d_{lo}, d_{hi})$ and $T(T_{lo}, T_{hi})$. For the purpose of demonstrating the single crossing property, consider the simplest case of concentrated ownership and a poor legal system being complements. Formally this implies that the function Π_{CEQ} satisfies the single-crossing property in ownership structure given a legal environment if for any d ,

$$\Pi(\lambda_{dis}, d; T_{lo}) - \Pi(\lambda_{con}, d; T_{lo}) > [\geq] 0 \quad (2.8)$$

implies that

$$\Pi(\lambda_{dis}, d; T_{hi}) - \Pi(\lambda_{con}, d; T_{hi}) > [\geq] 0 \quad (2.9)$$

The latter condition is satisfied if either dispersed ownership decreased the value for a firm operating in environments of low T or if dispersed ownership increased value for firms operating in both high-T and low-T¹⁵. This restriction on the direct effect of legal system T on ownership structure is called the single-crossing property because it

¹⁵ In other words, the condition is satisfied either if the precedent did not hold or if both the precedent and the antecedent did hold.

requires that the difference $\Pi(\lambda_{dis}, d; T_{hi}) - \Pi(\lambda_{con}, d; T)$, viewed as a function of T , crosses zero at most once and only from below.

Referring to Panel A of Figure 2, if the magnitudes of the differences $\Pi(\lambda_{dis}, d; T_{lo}) - \Pi(\lambda_{con}, d; T_{lo})$ and $\Pi(\lambda_{dis}, d; T_{hi}) - \Pi(\lambda_{con}, d; T_{hi})$ are given by the pairs of points v, w, x, y or z , then the single-crossing property is satisfied. For the points labeled z , the difference is negative for a firm operating in a poor legal environment and positive for one operating in an environment with good investor protection; hence concentrated ownership is appropriate for poor legal systems but dispersed ownership is more appropriate for good legal systems. In this case, the optimal ownership structure is increasing (getting more dispersed) in legal environment. For w and x , the differences are positive, so dispersed ownership is optimal for both types of firms and for v and y , both differences are negative, so concentrated ownership is optimal for both types of firms. The single-crossing property would not be satisfied if the difference were positive for poor legal systems and negative for good legal systems as in the pair of points labeled u in Panel B of Figure 2.

2.4. Extensions

2.4.1. Dividend Policy, Ownership Structure and Leverage

The previous section focused on leverage and the monitoring role of debt as complementary instruments to concentrated ownership in corporate governance. In this section, I focus on the expropriation by the manager and the role of investor protection, ownership and leverage in determining how much of the project return is

expropriated as private benefits and how much is paid out as security benefits by the manager.

Agency theory has put forth several explanations for why firms pay dividends. According to the free cash flow theory put forth by Easterbrook (1984), Jensen (1986), dividends present a way of eliminating free cash flow. This leaves lesser funds for the insiders for their personal use. LLSV (1998) add to this literature with the finding that in common law countries, where investor protection is typically higher, firms make higher dividend payouts than firms in civil law countries. Glen, Karmokolias, Miller and Shah (1995) also note that dividend levels in developing countries are substantially lower compared with developed countries and that emerging market firms place more emphasis on dividend payout ratios than on the level of dividends. Easterbrook (1984) shows that payment of dividends increases the frequency of external capital raising and so dividends provide a way that outside shareholders can have some control over the actions of insiders and thus also allows for increased monitoring of the investors. Another popular theory of dividends is that firms can signal future profitability by paying dividends (Miller and Rock 1985).

Given the various theories on the determinants of dividend policies of firms, this section examines the effect of the complementarities discussed in Section 3 on the dividend policies of a firm. On one hand, the professional manager prefers to divert corporate revenues as private benefits to himself rather than pay them out as dividends to shareholders. And this is possible in an environment where laws allow stealing on the part of the manager. In this section, I show that dividend policy of the firm not only depends on the quality of investor protection in the country (LLSV

1998) but also depends on the company's choice of ownership and capital structure. Specifically, I show that in markets of poor investor protection, concentrated ownership structure, high leverage and a low dividend payout policy are complementary variables.

In the model presented, the manager diverts fraction δ as private benefits from the first period return X . From the second period return Y , the manager receives a share $(1-\theta)$ while the large shareholder receives a share proportional to his ownership stake, $\lambda\theta y$. The creditors receive no part of this third period payoff. Therefore the dividend payments in this model are essentially $\lambda\theta y$. The various complementary instruments have different effects on the amount of this dividend payment. For one, as the quality of investor protection declines, the manager is able to divert a greater fraction of the return as his private benefits which reduces the overall return in the third period. Thus we have the following proposition:

Proposition 1: *The level of dividends is declining in investor protection, $\frac{\partial Div}{\partial (-T)} < 0$*

The extent of ownership concentration has a direct and an indirect effect on the level of dividends paid out. The direct effect of an increase in ownership concentration, λ results in an increase in the level of monitoring resources expended by the owner, which increases the gross expected payoff θy . However, as discussed earlier, ownership concentration also exposes the firm to greater idiosyncratic risk and leverage acts as a complementary instrument in diminishing this effect. However, with increased leverage and increased creditor monitoring, monitoring by the owner decreases as m_o and m_d act as substitutes. This leads to a lesser share in the third

period return for the large shareholder, θy . This indirect effect coupled with the motivation of the manager to keep θ low dominates the direct effect resulting in a net decrease in dividends. Thus we have the following theorem:

Theorem 3: *High ownership concentration, high leverage, low dividend payouts and high creditor monitoring are complementary with an unregulated stock market.*

Proof: Once each of the variables are constrained as in Theorem 1 and 2, this theorem follows as a direct consequence of the two theorems and proposition 1. The supermodularity of (λ, d, m_d) has already been established in the proofs of Theorem 1 and 2. Mathematically the above theorem is equivalent to stating that the dividend payments to the shareholders, $Div(-T, \lambda, d, m_d)$ is pair-wise submodular in $(-T, \lambda, d, m_d)$

This finding subscribes to the outcome model of dividends proposed by LLSV (1998) which says that low dividends are an outcome of poor legal protection of minority shareholders. This paper qualifies the theory saying that both concentrated ownership and a low value of parameter T , which is our proxy for the legal system contribute to the firm establishing a low dividend policy.

2.4.2. Contracting

Given the complementarities established in the previous sections between a firm's selection of its ownership structure, capital structure and dividend policy, what predictions does this yield for the kind of contracting relations a firm engages in. Can

the same method of discovering strategic complements in a firm's corporate finance policies explain why the Asian business landscape is dotted with business groups and network structures like the *chaebol*, *keiretsu* and *quanxi*¹⁶ unlike the more molecular organizations found in the west?

Economics and management literature has grappled with issues about organization and contracting for a long time now. A dominant paradigm used to explain make-or-buy decisions is based on efficiency considerations of Transaction Cost literature (Williamson 1985) which assumes that specialized assets have lower transaction costs within the firm. On the basis of this assumption, when high asset specificity is involved or when there is high degree of uncertainty, a hierarchical mode of governance (vertical integration) is preferred over external sourcing (markets) to avoid supplier's opportunism.

The "hold-problem" is central to the definition of firm boundaries in the transaction-cost literature. This problem is introduced through a cost function in the original model set-up. Assume that the entrepreneur in the model possesses a unique critical resource, which can be combined with an intermediate product from another firm (intermediate agent) to produce the second stage output Y . The firm is vulnerable to hold-up by the other party. Two ways of overcoming the hold-up problem is either through a formal mechanism (formal contracts or merger) or through relational contracting.

Let c_i be the cost of transacting in the market or in other words the cost of the hold-up problem. This cost is a function of the legal rules prevailing in the country

¹⁶ The road ahead for Asia's leading conglomerates | McKinsey Quarterly (1997)

(parameter T), the ownership stake λ . It is also affected, in albeit different ways, by the extent of network formation, ν (relational contracting)¹⁷. These costs include those of drafting, negotiating and safeguarding the terms of a sale or purchase, payment and settlement, and the costs incurred to enforce contracts or to correct and resolve contract disagreements.

Assumption A6: The marginal cost of formal contracting mechanisms increases in a poor legal system i.e. $\frac{\partial^2 c_i}{\partial(-T)\partial\nu} \geq 0$.

The above assumption asserts that the cost of drawing up a formal contract increases when the institutional environment doesn't have proper formal authority or enforcement to back the contract. It formalizes the idea that if the intermediate party were to renege on the contract, there would be no legal recourse for the entrepreneur to get the terms of his contract enforced. So a poor legal system reduces the marginal value of the formal contracting process.

Proposition 2: The marginal cost of transaction decreases with an increase in the extent of network formation, ν , and in ownership concentration, λ , in an environment of poor legal protection and enforcement.

Mathematically, this states that $c_i(\lambda, \nu, -T)$ is submodular in $(\lambda, \nu, -T)$ ¹⁸. In other words, the cost of doing business via a relational contract decreases in an environment of poor legal system when the extent of network formation is large and when the firm belongs to a concentrated ownership structure. These trends are

¹⁷ For the purposes of this study, I abstract away from asset specificity, technological uncertainty and frequency of transaction, the main determinants of transaction costs according to Williamson (1975). But it can be shown that inclusion of any of these variables doesn't alter the results, and in fact adds in to the complementarity effect. Even with uncertainty, one would not expect different results because expectation of a supermodular function is supermodular.

¹⁸ If a function $-f(x)$ is supermodular, then $f(x)$ is said to be submodular. A (strictly) submodular function $f(x)$ on X has (strictly) decreasing differences on X .

captured in the inequalities $\frac{\partial^2 c_i}{\partial(-T)\partial x} \leq 0, x = \nu, \lambda$. The proposition is easy to prove when we consider the different interactions between the determinants of transaction cost parameter. As the legal environment decreases or with an increase in ownership concentration, a first order effect would be an increase in transaction costs. A family-owned concentrated ownership enterprise would be looked upon with suspicion as a vehicle of expropriation and the cost of doing business would be large. But this cost decreases when the firm is part of a business group or network which doesn't rely on formal mechanisms but more on informal relationships and intangibles like trust and reputation. And this effect is further enhanced when the firm is a family controlled enterprise, which on the basis of its reputation and family controls is allowed to be a part of the network. Another interpretation for the ν parameter would be to view it as a measure of market thickness (McLaren (2000)) in terms of the number of firms depending on relational contracting. The above proposition would then imply that greater the market thickness or greater the number of unintegrated firms, greater is the opportunity for cost reduction through relational contracting.

Several recent empirical studies on business groups corroborate the above proposition but all speak of different influencing factors for the dominance of relational contracting in areas of poor legal systems. Khanna and Palepu (2000a) in a study of Indian firms find that social links among member firms reduces transaction costs due to better information dissemination¹⁹. McMillan and Woodruff (1999a, b) find that relational contracting within a business network is of considerable

¹⁹ If a function $-f(x)$ is supermodular, then $f(x)$ is said to be submodular. A (strictly) submodular function $f(x)$ on X has (strictly) decreasing differences on X .

importance in allowing contracts without adequate institutions in Vietnam. Similar results are obtained by Johnson, McMillan and Woodruff (2000) in Russia.

An interesting exercise at this point would be to see how belonging to a group structure influences the dividend policies of the firm. Would it continue to be low because the firm would want to expropriate in other ways rather than paying out a dividend or would the responsibility arising out of belonging to a network determine the dividend policy. A testable hypothesis would be that more than shareholder-minority investor relations, the cash needs of the group would dictate dividend policy. The reason being that when the firm is part of a conglomerate structure, the dividend policy of each subsidiary, which may be publicly listed, is often determined by the central holding company.

2.5. Empirical Results

This section tests the hypothesis presented in Section 2.3 that a firm's decisions about ownership structure and leverage are complementary with one another. In this section, I describe the data set and present some simple tests based on unconditional and conditional correlations to establish complementarity. This approach based on revealed preference has been analyzed theoretically in Holmstrom and Milgrom (1994), Arora and Gambardella (1990) and Arora (1996). See Athey and Stern (1996) for an excellent discussion of the various approaches used to test complementarity and the biases in using each approach.

2.5.1 The Data

The econometric analysis uses data on individual firms taken from the Amadeus Database (Analyze Major Database from European Sources) by Bureau Van Dijk. Amadeus provides balance sheet information on European firms having minimal size requirements (sales greater than ten million Euros or total assets greater than ten million Euros) over the 1990s. It also identifies the major shareholders of these firms and their direct and indirect stakes in the firm.

For the purpose of this study, I obtain information on 140195 manufacturing firms in 13 Transition economies over the period 1990 to 1999. For each firm, I obtain two measures of ownership concentration suggested by Demsetz and Lehn (1985) and used in several other studies—the ownership stake of the five largest shareholders ($o5$) and the Herfindahl index of ownership concentration (HI). We also construct a measure of firm leverage, lev , defined as total debt to total assets of the firm.

Although the data allows testing of the model with a large number of firms, there are some limitations. There is no information on the monitoring activities of the creditors and the owners and hence we are restricted to testing complementarity for a subset of the decision variables—ownership and leverage. However, an important empirical implication of the lattice theoretical approach used in this paper is that optimizing only on a subset of decision variables does not alter the complementarity relations among the rest of the decision variables of the theoretical model. This result justifies that we study only a subset of the complementary strategies of the firms.

The firm level data from Amadeus is matched with country-level information.

I obtain data on the shareholder and creditor rights in the country from La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997) and Pistor et. al (2000). I also obtain data on property rights regulation from the Heritage Foundation and a measure of institutional environment in which firms operate from Kaufman, Kraay and Mastruzzi (2003). The variables are described in detail in Table 2.2.

2.5.2. Unconditional Correlations

A direct test of the theory developed in Section 2.3 would be to test supermodularity of the value function Π in (1), which is difficult to estimate. Since one cannot observe the firm's objective function, one is constrained to testing the implications of the theory. In particular, the theoretical model of Section 2.3 implies that if the endogenous variables are complements, then one would expect them to be positively correlated. In Table 1, I test the null hypothesis that a pair of variables is uncorrelated with a standard Pearson correlation coefficient. In addition, one of the main properties of supermodular functions is that the results are unchanged by monotone transformations of the variables. This suggests that rank based tests such as the Spearman's rank correlation coefficient and the Kendall rank correlation would also be appropriate measures.

Table 3 presents all three measures of the correlation coefficient. Both the measures of ownership concentration are positively correlated with leverage with a high degree of significance on the basis of all three measures. Therefore, the data suggests that firms with concentrated ownership structures in Transition economies also employ higher leverage.

However, positive correlations are only a necessary but not sufficient condition for complementarity. Arora (1996) shows that positive correlations could arise due to omitted variable bias or due to indirect effects through other strategies. A stronger test of complementarity would require controlling for firm-specific factors that may affect these governance instruments. After controlling for these specific effects that may reflect forces outside this model, the complementary forces underlying the model should be the dominant ones and one would expect the residual of the regressions to be complementary, at least weakly. Arora and Gambardella (1990) introduce a formal analysis of conditional correlations as a test for complementarity. Further, this approach has been the predominant approach followed by recent empirical papers about complementarity, including Brickley (1999), Barclay, Marx and Smith (2003) and Arrunada, Garciano, and Vasquez (1999). The following section describes the results from the residual based correlations.

2.5.3. Conditional Correlations

In this subsection, I test the hypothesis that the covariance between ownership and leverage, conditional upon a set of firm characteristics, is non-negative. In other words, complementarity between ownership and leverage also implies that conditional correlation coefficients are positive (Arora 1996).

Conditional correlation coefficients are calculated based on the residuals from reduced form regressions of ownership and leverage on all observable exogenous variables, estimated equation by equation. Measuring the correlation of the residuals instead of the actual decision variables takes into account the differences in firm

characteristics. The decision variables used are percentage holding of the five largest shareholders, (*o5*) as a measure of ownership concentration and the leverage ratio, (*lev*) of the firm. I also experimented with Herfindahl index as a measure of ownership concentration and obtained similar results. Only the results with *o15* are reported in Table 3.

As part of the conditioning set, I include the usual suspects that have been established in the corporate finance literature as the basic determinants of debt and ownership structure. In addition to industry dummies at the 2-digit SIC code level (sic codes 20-39), I include several firm-specific variables. Firm size is represented by *SIZE*, which is measured by the log of the total sales of the firm. Firm size has been found to be an important determinant for both ownership (Demsetz and Lehn 1985) and leverage (Titman and Wessels 1988). In addition to firm size, following Friedman, Johnson and Mitton (2003), I also include firm growth, *GROWTH*, which is calculated as the growth in firm sales and firm profitability, *ROA*, which is calculated as the return on assets. I also include firm age, *AGE*, which is the number of years since the date of incorporation of the firm.

Recent empirical literature has also established country specific law and institutional factors to be important determinants of ownership and leverage ratios. I use four country-level variables: *SHRIGHTS* is the level of shareholder rights protection in the country and *CRRIGHTS* is the extent of creditor rights protection in the country and both are taken from LLSV (1998) and Pistor et al. (2000). The shareholder and creditor rights indices were originally developed by LLSV (1998) for

49 countries which did not include the Transition economies. Pistor et. al (2000) builds on and extends the work of LLSV (1998) to develop the investor rights indices for the Transition countries. *PROPERTY* is a measure of property rights from The Heritage Foundation which indicates the degree to which property rights are protected in the economy. *KK* is a summary variable of the institutional environment in which firms operate from Kaufman, Kraay and Mastruzzi (2003) that averages six indicators proxying for voice and accountability, regulatory quality, political stability, rule of law, control of corruption and effectiveness of government. An ideal country-specific variable that could be used would be a measure of accounting standards described in LLSV (1998) but this variable is not available for the Transition economies. However, studies have shown a high degree of correlation between the legal variables described above and the extent of accounting standards in the country.

As a first step, I regress the two decision variables, *o5* and *lev* on the above control variables. So the regression equations to be estimated are:

$$o5 = \alpha + \beta_1 SIZE + \beta_2 GROWTH + \beta_3 ROA + \beta_4 AGE + \beta_5 SHRRIGHTS + \beta_6 PROPERTY + \beta_7 KK + \beta_8 INDUSTRY DUMMIES \quad (2.10)$$

$$lev = \alpha + \beta_1 SIZE + \beta_2 GROWTH + \beta_3 ROA + \beta_4 AGE + \beta_5 CRRRIGHTS + \beta_6 PROPERTY + \beta_7 KK + \beta_8 INDUSTRY DUMMIES \quad (2.11)$$

As a second step, I perform a correlation analysis of the residuals from the regressions above. Panel A of Table 3 presents the OLS regression results and Panel B presents the correlation analysis of the residuals. Panel A shows that firm size is indeed a significant determinant of both ownership and leverage. Larger firms have

lower leverage ratios and lower ownership concentration.

Panel B shows that the Pearson correlation coefficient is 0.0265 and the Spearman correlation coefficient is 0.3905, both of which are significant at the 1 percent level. This shows that ownership and leverage ratios are pair-wise complementary in environments of poor regulation such as the Transition economies.

However, it should be noted that the results in this section need to be substantiated with a more rigorous empirical study. The residuals based correlations in this section capture the effect of the existence of complementarity conditional only on the observed firms' characteristics. But Athey and Stern (1996) show that this approach is still subject to bias due to unobserved heterogeneity. Developing a stronger test of the complementary relations discussed in this paper is the subject of future research.

2.6. Conclusion

In this paper, a theory has been proposed that in an environment of poor investor protection, a firm's selection of ownership and capital structure should be part of a joint decision making process since they are complementary instruments. Adoption of any one instrument influences the adoption of the other. While concentrated ownership helps solve the problem of managerial moral hazard, it comes with the opportunity cost of exposing the large shareholder to greater idiosyncratic risk. Leverage offsets this risk by allowing the shareholder to share the downside risk of the firm with the creditors. Therefore, the paper predicts that firms

in environments of poor investor protection have concentrated ownership structures and high leverage ratios.

The theory is borne out by correlation tests done on a sample of firms from the Amadeus database. Using the residual based correlations approach described in Arora and Gambardella (1990), the paper finds that ownership concentration and leverage are pair-wise complementary in the Transition economies. The results contribute to existing empirical literature in law and finance by LLSV who document the effect of investor protection on ownership (LLSV 2000) and external financing (LLSV 1997) independently. This paper considers the interactions between these decisions to show that decisions of ownership and leverage are not merely correlated but the marginal benefits of using one increase with the use of the other.

In addition, the model generates several testable empirical predictions. The paper predicts that the complementary cluster of concentrated ownership and high leverage in poor investor protection environments is also associated with increased creditor monitoring and low dividend payouts. The result on increased monitoring is consistent with lending practices in these countries where provision of loan guarantees is often accompanied by seats on supervisory boards of the banks' corporate clients. The paper also predicts that firms adopting this complementary depend on business groups and relational network structures for contracting rather than on formal contracting mechanisms.

An important advantage of using lattice theory to obtain comparative static results is that it allows us to model several agency problems simultaneously and still obtain tractable results. Further, it allows us to extend the regulation parameter T to

be a vector that encompasses different aspects of investor protection. Representing T as a parameter vector would allow us to identify and isolate which aspects of shareholder rights or creditor rights protection are most important to tackle agency problems.

The results in the paper also have implications for corporate governance reform. The complementarity approach advocates that the focus of corporate governance should be *synergistic*: that is recognition that the interaction of two or more governance instruments to produce a combined effect is greater than the sum of their separate effects. Regulators therefore need to consider all dimensions of the corporate form before making changes to any one aspect.

The results also suggest that focusing on complementarities is important for financial system design. This is of particular significance in transition economies where the financial system is in its infancy and the focus is on designing stable financial system architecture. The idea that organizational forms survive because they are supported by complementary elements is not new in the economics literature. Williamson (1991) argues that viable organizational forms require a “syndrome of attributes that bear a supporting relation to one another” and contends that many forms of organization “never arise, or quickly die out, because they combine inconsistent features.” This paper reinforces the same idea but uses a different set of instruments- ownership, dividend policy, financing and contracting regime

These results in this paper suggest several important directions for additional research. One, the model doesn’t consider the role of markets in providing diversification benefits to the large stakeholders. A richer model which allows

explicitly for the role of financial markets would presumably yield interesting conclusions on cost of capital and market interest rates.

Second, the investor protection parameter in the model proxies for an aggregate measure of the various rights given to shareholders in different legal systems. A valuable extension to the model would involve modeling this parameter as a vector to study the effect of each of the individual rights in greater detail. The vector components could also be extended to include creditor rights and even intellectual property rights protection. Application of lattice theory and comparative statics would then help identify which aspects of the legal system behave as complements and which behave as substitutes. Such a model would help greatly in correctly identifying the relevant legal system variables to be used on the right hand side in regression analysis.

Third, though the model deals with managerial moral hazard, it does not use management compensation as a corporate governance instrument, which when included could provide valuable insights. Corporate finance literature on executive compensation has established the link between pecuniary incentives for management and use of leverage (John and John 1993). Extending the model in this paper would allow us to comment on how the joint adoption of concentrated ownership and high leverage affects management compensation. Finally, as discussed in Section 2.4, additional research would involve looking at stronger empirical tests of complementarity which accounts for unobservable heterogeneity.

Table 2.1
Comparison of Theoretical Models of Effects of Investor Protection*

	Shleifer and Wolfenzon (2001)	Himmelberg, Hubbard and Love (2001)	John and Kedia (2001)	Burkart and Panunzi (2001)	Ayyagari (2003)
Identity of owner and manager	Owner-manager (risk neutral)	Owner-manager (risk aversion implicitly assumed)	Entrepreneur hires a manager (risk neutral)	Entrepreneur hires a manager (risk neutral)	Entrepreneur hires risk-averse manager. (Entrepreneur is less risk averse than manager)
Equity ownership of manager	Manager is Large SH	Manager is Large SH	Manager owns equity	Manager owns no equity.	Manager owns no equity
Leverage	No Leverage	No Leverage	Bank (monitored) debt	No leverage	Debt
Agency Problem	Owner-manager diverts fraction of revenue.	Owner-manager steals; Agency problem is between insiders and outsiders.	Manager derives private benefits from diversion.	Manager steals; Agency problem is between manager and large SH	Several agency conflicts; Agency problems between managers, shareholders and creditors.
Role of investor protection	Investor protection influences probability of large SH getting caught and the fine he pays	Stealing is associated with a punishment technology that imposes a cost which is dependent on legal protection	The legal system and the level of market development affect the level of private benefits, the ease of takeovers and the efficiency of bank monitoring.	Legal rules affect entrepreneur's incentives to monitor and the resource allocation decision chosen by manager	Legal investor protection affects monitoring and the level of diversion by the manager.
Difference from other models	No consideration of interactions between the different mechanisms.	<i>No consideration of dividends, leverage, monitoring, contracting</i>	No consideration of dividends, contracting	No consideration of leverage, dividends, contracting	No consideration of cost of capital, takeovers

* The table compares models which are closest in motivation and intent to this paper. Any omission of other models of investor protection and corporate governance is regretted.

Table 2.2
Variable Definitions

Variable	Definition	Source
<i>Firm-level Variables</i>		
o15	Percentage holding of five largest shareholders	Amadeus
HI	Herfindahl Index of ownership concentration. Calculated as the sum of squared ownership stakes of all the shareholders	Amadeus
SIZE	Log of total firm sales	Amadeus
AGE	Numbers of years since the date of incorporation	Amadeus
GROWTH	Growth in firm sales	Amadeus
ROA	Return on assets	Amadeus
<i>Country-level Variables</i>		
Property Rights	The degree to which property rights are protected in an economy	Heritage Foundation
KK	Average of following six institutional variables: voice accountability, political stability, government effectiveness, and regulatory quality, rule of law and control of corruption	Kaufman, Kraay Mastruzzi (2003)
SHrights	Anti-director rights index formed by aggregating shareholder rights. The index is formed by adding 1 when (1) the country allows shareholders to mail their proxy vote; (2) shareholders are not required to deposit their shares prior to the General Shareholders' Meeting; (3) cumulative voting in board of directors is allowed; (4) an oppressed minorities mechanism is in place; (5) the minimum percentage of share capital that entitles a shareholder to call for an Extraordinary Shareholders' Meeting is less than or equal to 10 percent; or (6) shareholders have preemptive rights that can only be waived by a shareholders' vote. Index ranges from 0 to 6.	La Porta et.al (1998) Pistor et.al (2000)
CRrights	An index aggregating different creditor rights. The index is formed by adding 1 when (1) the country imposes restrictions to file for reorganization; (2) there is no automatic stay (3) secured creditors are ranked first in the distribution of proceeds that results from disposition of assets of a bankrupt firm; and (4) the debtor does not retain administration of its property pending the resolution of the reorganization. The index ranges from 0 to 4.	La Porta et.al (1998) Pistor et. al (2000)
<i>Industry Dummies</i>		
sic20-sic39	Manufacturing Industries	

Table 2.3
Unconditional Correlations

Panel A presents Pearson's correlations between ownership concentration and leverage ratios. Panel B presents the Spearman correlation coefficients between ownership concentration and leverage ratios. The null hypothesis of the Spearman correlation coefficient is that the two variables are independent. Two measures of ownership concentration are used: *o15* is the percentage stake of the five largest shareholders and *Herfindahl Index* is the Herfindahl Index of ownership concentration calculated as the sum of the squared ownership stakes of all the shareholders of the firm. *Leverage Ratio* is measured as the ratio of total debt to total assets. Values are 1990-1999 averages. Detailed variable definitions and sources are in the appendix.

Panel A: Pearson's Correlation

	O15	Herfindahl Index	Leverage Ratio
O15	1		
Herfindahl Index	0.6333***	1	
Leverage Ratio	0.0589**	0.0067*	1

*, ** and *** represent significance at the 1, 5 and 10% level respectively

Panel B: Spearman Correlation

	O15	Herfindahl Index	Leverage Ratio
O15	1		
Herfindahl Index	0.5840***	1	
Leverage Ratio	0.1550***	0.0159***	1

*, ** and *** represent significance at the 1, 5 and 10% level respectively

Table 2.4
Complementarity of Ownership and Leverage Ratios

Panel A presents the OLS regressions. The regression equation estimated in specification (1) is : $\text{Ownership} = \alpha + \beta_1 \text{Size} + \beta_2 \text{Age} + \beta_3 \text{Growth} + \beta_4 \text{ROA} + \beta_5 \text{Property} + \beta_6 \text{KK} + \beta_7 \text{SHrights} + \beta_8 \text{Industry Dummies}$. The dependent variable, Ownership is the percentage holding of the five largest shareholders in the company. Size is the log of total sales of the firm. Age is the number of years since the date of incorporation. Growth is the growth in firm sales. ROA is return on assets. Property is a property rights index from the Heritage Foundation. KK is an aggregate indicator of institutional quality from Kaufman, Kraay and Mastruzzi (2003). SHrights is a measure of shareholder rights protection from Pistor et. al (2000). Industry dummies are 19 industry dummies controlling for 2-digit sic codes 20-39. The regression equation estimated in specification (2) is similar to (1) : $\text{Leverage Ratio} = \alpha + \beta_1 \text{Size} + \beta_2 \text{Age} + \beta_3 \text{Growth} + \beta_4 \text{ROA} + \beta_5 \text{Property} + \beta_6 \text{KK} + \beta_7 \text{CRrights} + \beta_8 \text{Industry Dummies}$. The dependent variable Leverage Ratio is the ratio of total debt to total assets of the firm. The regressor variables are the same as in specification (1) except for CRrights which is the creditor rights index from Pistor et al. (2000). Values are 1990-1999 averages. Detailed variable definitions and sources are in the appendix.

Panel B presents the correlations between the residuals from regressions (1) and (2). The first number in each cell is the Pearson's correlation coefficient and the second number is the Spearman correlation coefficient. The null hypothesis of the Spearman correlation coefficient is that the two variables are independent. Detailed variable definitions and sources are in the appendix.

Panel A: OLS Regressions

	Ownership	Leverage Ratio
Constant	150.390*** (0.742)	2.249 (2.586)
Size	-0.599*** (0.011)	-0.088*** (0.014)
Age	-0.008*** (0.001)	0.000 (0.002)
Growth	0.000* 0.000	0.000 0.000
ROA	0.000 0.000	-0.003*** 0.000
SHrights	-2.967*** (0.446)	
CRrights		0.028 -0.340
Property Rights	-16.960*** (0.559)	0.193 (0.630)
KK	25.803*** (1.281)	-0.290 (1.235)
N	120848	120848
R-square	0.18	0.17

*, ** and *** represent significance at the 1, 5 and 10% level respectively

Panel B: Conditional Correlations

	Pearsons	Spearman
Ownership-Leverage Ratio	0.0265***	0.3905***

*, ** and *** represent significance at the 1, 5 and 10% level respectively

Figure 1: Timeline of cash flows

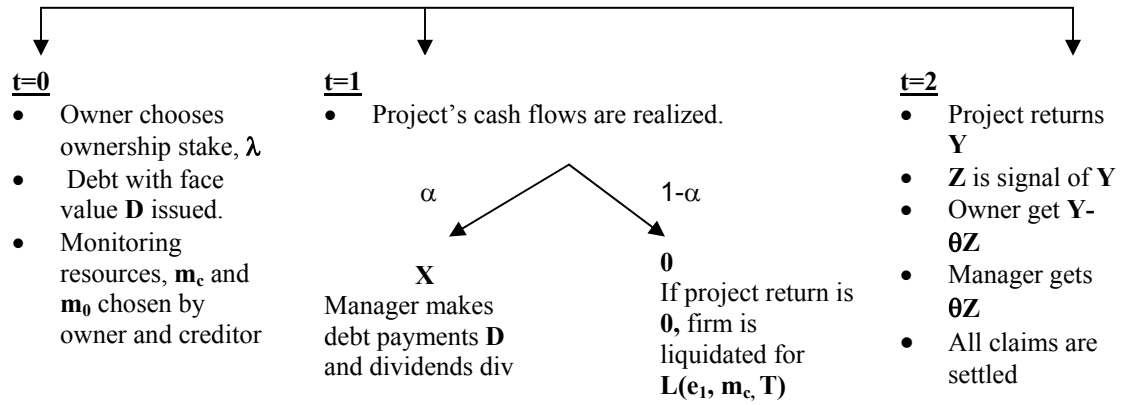
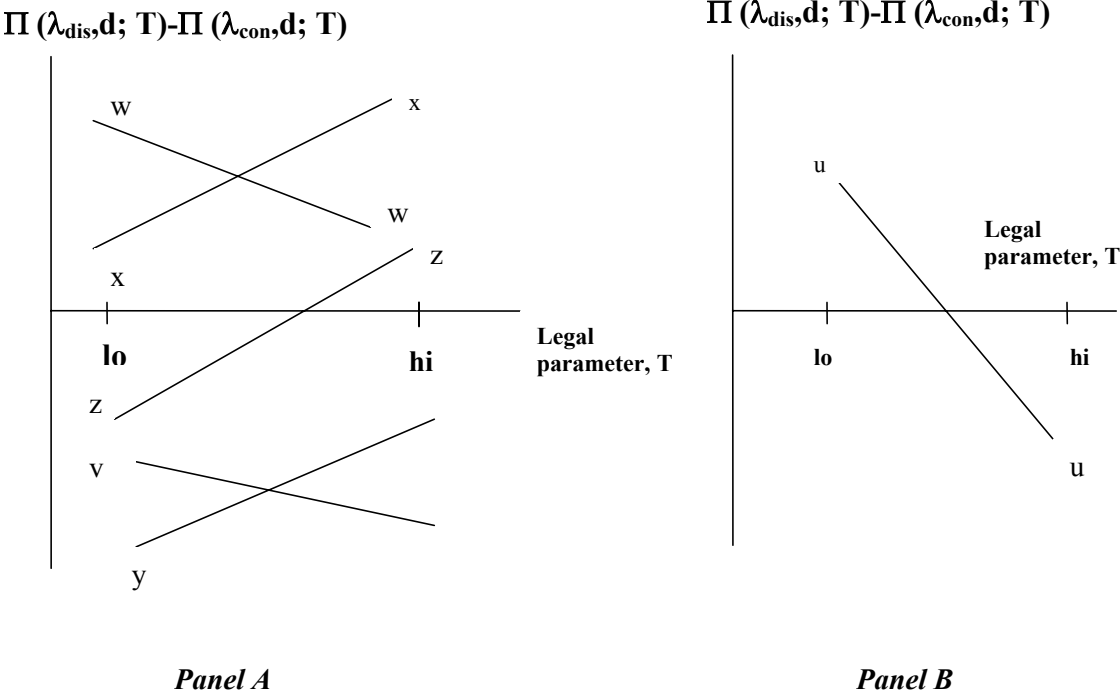


Figure 2: Graphical Representation of Supermodularity

Panel A illustrates cases that are consistent with single crossing property
 Panel B illustrates a relation that is ruled out.



Appendix 2.A. The Complementarity Results

Proofs of Theorem 1 and 2: The Total expected certainty equivalent is given by:

$$\Pi_{CEQ} = \alpha[X + y(e_1, e_2) - e_2] + (1 - \alpha)L(e_1, m_d) - c_o m_o - c_d m_d - R - I_o - I_d \quad (A1)$$

Theorem 1 states the supermodularity of ownership concentration and leverage with a weak investor protection environment and Theorem 2 expands the complementary cluster to include the share of monitoring borne by the creditor. To prove that Π_{CEQ} is a supermodular function in $(-T, \lambda, m_d$ and $d)$, we follow Milgrom and Roberts(1992) and Holmstrom and Milgrom(1990)

Effect of poor investor protection and creditor monitoring:

$$\frac{\partial^2 \Pi_{CEQ}}{\partial(-T)\partial m_d} = \frac{\partial}{\partial T} \left[c_o \frac{\partial m_o}{\partial m_d} + c_d + \frac{\partial R}{\partial m_d} \right] \quad (A2)$$

Sign of this second order derivative depends crucially on the sign of the last term because the first two terms can be shown to be positive easily. Since creditor and owner monitoring are substitutes, $\frac{\partial m_o}{\partial m_d} < 0$ and we also have $\frac{\partial c_o}{\partial T} < 0$. Proving $\frac{\partial^2 R}{\partial T \partial m_d} > 0$ involves a careful application of the *Chain Rule* for partial derivatives. The risk premium R is a non-linear increasing function of the coefficient of risk aversion, r , the share of the manager in the stochastic third period output $1 - \theta$, the variance of his payoff σ_{y^2} , and the manager's share in the liquidation value, d . The monitoring resources spent m_o and m_d are substitutes in decreasing the variance, so we have

$\sigma_y^2(m_o, m_d)$. But $m_d(m_o)$, the extent of creditor monitoring is dependent on the amount of owner monitoring undertaken and m_o itself is a function of the parameter vector T . Therefore, we have

$$\frac{\partial R}{\partial m_d} = \frac{\partial R}{\partial \sigma_y^2} \frac{\partial \sigma_y^2}{\partial m_d} \quad (\text{A3})$$

$$\frac{\partial^2 R}{\partial(-T)\partial m_d} = \frac{\partial R}{\partial \sigma_y^2} \frac{\partial}{\partial T} \left[\frac{\partial \sigma_y^2}{\partial m_d} \right] + \frac{\partial \sigma_y^2}{\partial m_d} \frac{\partial}{\partial T} \left[\frac{\partial R}{\partial \sigma_y^2} \right] \quad (\text{A4})$$

$$= \frac{\partial R}{\partial \sigma_y^2} \left[\frac{\partial^2 \sigma_y^2}{\partial m_d^2} \frac{\partial m_d}{\partial m_o} \frac{\partial m_o}{\partial T} + \frac{\partial^2 \sigma_y^2}{\partial m_o \partial m_d} \frac{\partial m_o}{\partial T} \right] + \frac{\partial \sigma_y^2}{\partial m_d} \left[\frac{\partial^2 R}{\partial \sigma_y^2} \frac{\partial \sigma_y^2}{\partial m_d} \frac{\partial m_d}{\partial m_o} \frac{\partial m_o}{\partial T} \right] \quad (\text{A5})$$

$$= \frac{\partial m_o}{\partial T} \left[\frac{\partial R}{\partial \sigma_y^2} \left[\frac{\partial^2 \sigma_y^2}{\partial m_d^2} \frac{\partial m_d}{\partial m_o} + \frac{\partial^2 \sigma_y^2}{\partial m_o \partial m_d} \right] + \frac{\partial^2 R}{\partial m_d^2} \frac{\partial m_d}{\partial m_o} \right] \quad (\text{A6})$$

$$\geq 0 \quad (\text{A7})$$

Analyzing each term in the above equation, the risk premium increases with variance of the third period return, so $\frac{\partial R}{\partial \sigma_y^2} > 0$. The first term in the inner brackets, $\frac{\partial^2 \sigma_y^2}{\partial m_d^2} \frac{\partial m_d}{\partial m_o}$ is negative since owner and creditor monitoring are substitutes while the second term is positive since we are looking at their cross partial in determining third period variance. The same reasoning applies for $\frac{\partial^2 R}{\partial m_d^2} \frac{\partial m_d}{\partial m_o}$ being less than zero. Hence the combination of terms within the outer brackets is taken to be positive assuming the second order cross partial effect dominates the first order effect of $\frac{\partial m_d}{\partial m_o}$ being less than zero.

Therefore, the sign of $\frac{\partial^2 R}{\partial T \partial m_d}$ depends on $\frac{\partial m_o}{\partial T}$ or the impact of the stock market regulation parameter on the monitoring resources spent by the owner. For better legal protection to have an increasing effect on the extent of monitoring undertaken by the owner, we are looking at a dispersed ownership structure. If the ownership structure was concentrated, then the legal system might actually constrain any active role that the large blockholder might want to have. Hence, increased creditor monitoring and a poor legal system would be complementary at concentrated ownership structures.

Effect of poor investor protection and concentrated ownership:

$$\frac{\partial^2 \Pi}{\partial(\lambda)\partial(-T)} \geq 0 \quad (\text{A8})$$

This has already been discussed in Proposition 2 which shows that a poor investor protection environment and a concentrated ownership structure go together much like in the Civil Law Countries. Conversely, a dispersed ownership structure and a good legal system are complementary as in the countries that have adopted English Common Law.

Effect of poor investor protection and leverage:

$$\frac{\partial^2 \Pi}{\partial d \partial (-T)} = \frac{\partial c_o}{\partial T} \frac{\partial m_o}{\partial d} + \frac{\partial c_d}{\partial T} \frac{\partial m_d}{\partial d} \geq 0 \quad (\text{A9})$$

Therefore countries with poor legal shareholder protection have high debt ratios.

Effect of creditor monitoring and leverage:

$$\frac{\partial^2 \Pi}{\partial m_d \partial d} \geq 0 \quad (\text{A10})$$

The intuition for this result comes from the fact that creditor monitoring and leverage are both complementary in generating a high liquidation value for the creditor which would make the whole cross partial of Π_{CEQ} with respect to m_d and d greater than zero.

Effect of creditor monitoring and ownership:

$$\frac{\partial R}{\partial m_d} = \frac{\partial R}{\partial \sigma_y^2} \frac{\partial \sigma_y^2}{\partial m_d} \quad (\text{A11})$$

$$\frac{\partial^2 R}{\partial(\lambda)\partial m_d} = -\frac{\partial R}{\partial \sigma_y^2} \frac{\partial}{\partial \lambda} \left[\frac{\partial \sigma_y^2}{\partial m_d} \right] - \frac{\partial \sigma_y^2}{\partial m_d} \frac{\partial}{\partial \lambda} \left[\frac{\partial R}{\partial \sigma_y^2} \right] \quad (\text{A12})$$

$$= -\frac{\partial R}{\partial \sigma_y^2} \left[\frac{\partial^2 \sigma_y^2}{\partial m_d^2} \frac{\partial m_d}{\partial m_o} \frac{\partial m_o}{\partial \lambda} + \frac{\partial^2 \sigma_y^2}{\partial m_o \partial m_d} \frac{\partial m_o}{\partial \lambda} \right] - \frac{\partial \sigma_y^2}{\partial m_d} \left[\frac{\partial^2 R}{\partial \sigma_y^2} \frac{\partial \sigma_y^2}{\partial m_d} \frac{\partial m_d}{\partial m_o} \frac{\partial m_o}{\partial \lambda} \right] \quad (\text{A13})$$

$$= -\frac{\partial m_o}{\partial \lambda} \left[\frac{\partial R}{\partial \sigma_y^2} \left[\frac{\partial^2 \sigma_y^2}{\partial m_d^2} \frac{\partial m_d}{\partial m_o} + \frac{\partial^2 \sigma_y^2}{\partial m_o \partial m_d} \right] + \frac{\partial^2 R}{\partial m_d^2} \frac{\partial m_d}{\partial m_o} \right] \quad (\text{A14})$$

$$\geq 0 \quad (\text{A15})$$

We have already shown the term in the inner brackets to be 0 when we discussed the effect of creditor monitoring on the risk premium. So the sign of the entire derivative depends crucially on the impact of concentrated ownership on monitoring resources spent by the owner. There is an increasing relation between concentrated ownership and monitoring resources only when the legal environment is weak and not protective of shareholder rights and not imposing any controls on the activity of the large shareholder. Conversely, $\frac{\partial m_o}{\partial \lambda} < 0$ when the stock market regulations are good and the minority shareholders are protected by imposing

restrictions on active monitoring role by the blockholder. Thus, creditor monitoring and concentrated ownership are complementary in environments of poor investor protection.

Application of the above 5 results prove Theorem 1 and 2: The total certainty equivalent payoff, Π_{CEQ} is pair-wise complementary in $(-T, \lambda, m_d$ and $d)$

Appendix 2.B. Basics of Lattice Theory and Supermodular Functions

This section includes concepts and results on supermodularity and complementarity that are relevant for the model of the firm discussed in this paper. For a collection of optimization problems where the objective function and the constraint set depend on a parameter (in our model, the parameter T), monotone comparative statics (which is the primary issue considered herein) examines scenarios where optimal decisions or equilibria vary monotonically with the parameter. To develop a general theory of monotone comparative statics, what we need is lattice theory. We first introduce our notation and some definitions.

A *binary relation* \circ on a set X specifies for all x' and x'' in X either that $x' \circ x''$ is true or that $x' \leq x''$ is false. A *partially ordered set* is a set X on which there is a binary relation \circ that is reflexive, antisymmetric, and transitive. For x' and x'' elements of the partially ordered set X , let $x \vee x''$, denote the least upper bound, or *join*, of x' and x'' and let $x \wedge x''$ denote the greatest lower bound, or *meet* of x' and x'' in X .

Definition 1. The set X is a **lattice** if for every pair of elements of x' and x'' in X , the join $x \vee x''$ and the meet $x \wedge x''$ do exist as elements of X . Similarly a subset S of X is a **sublattice** of X if S is closed under the operations meet and join. Therefore, a sublattice is a partially ordered set which is closed under the maximum and minimum operations on its elements.

The definition of a sublattice represents the idea that if it is possible to engage in high levels of each of several activities separately, then it is possible to engage in

equally high levels of all of the activities simultaneously. It also allows for the possibility that some activities are at a high level only if other activities are at a high level as well. Next, the notion of increasing differences is a well known condition for a utility function to be that of a system of complementary products.

Definition 2. A collection of products (or activities or other decision variables or parameters) are complements and each pair is said to be complementary if the products have a real valued utility function with increasing differences. Therefore, a set of activities are complements if the additional utility resulting from the availability of any additional activity is increasing with the set of other activities available.

Milgrom and Roberts (1990) shows that complementarities among variables in a problem with a lattice structure are sufficient for strong comparative static results. Milgrom and Shannon (1994) show that for a firm's optimal policy characteristics to depend monotonically on firm characteristics (i.e. for complementarities), a necessary and sufficient condition is one of supermodularity. So supermodular functions on a lattice provide a mathematical context for studying complementarity and monotone comparative statics.

Definition 3. A function that exhibits complementarities among its arguments is a supermodular function. Suppose that $f(x)$ is a real valued function on a lattice X . Then $f(x)$ is supermodular if $f(x') + f(x'') \leq f(\min(x', x'')) + f(\max(x', x''))$

This is clearly equivalent to

$$\begin{aligned} & [f(x') - f(\min(x', x''))] + [f(x'') - f(\min(x', x''))] \leq \\ & f(\max(x', x'')) - f(\min(x', x'')) \end{aligned} \tag{B1}$$

This implies that sum of changes in the function when several arguments are increasing separately is less than changes resulting from increasing all arguments together. Or increasing one/more variables increases the return to other variables. Although the concept of supermodularity may seem abstract and difficult to check, the following theorems of Topkis (1978) allow easy characterization of supermodularity for smooth functions.

Theorem B1: *Let $f: R^n \times R^m \rightarrow R$ be twice continuously differentiable on the interval (a,b) . Then f has increasing differences in (x,t) if and only if $\partial^2 f / \partial x_i \partial t_j \geq 0$ for $i=1, \dots, n, j=1, \dots, m$; and f is supermodular in x if and only if $\partial^2 f / \partial x_i \partial x_j \geq 0$ for $i \neq j$*

The above theorem basically says that supermodularity implies increasing differences for a function on a sublattice of the direct product of lattices. The converse is also true that is, on the direct product of finitely many lattices, increasing differences together with supermodularity in each component implies supermodularity. In general, supermodularity, like all concepts in this theory, uses only the order structure of the lattice. It entails no assumptions of convexity or concavity or connectedness of the domain. However, in view of the above theorem, it is particularly easy to check whether smooth functions on Euclidean intervals are supermodular. Furthermore, as the next theorem illustrates, supermodularity is preserved under a number of operations

Theorem B2: *Suppose that X is a lattice.*

(a) If $f(x)$ is supermodular on X and $\alpha \succ 0$, then $\alpha f(x)$ is supermodular on X .

(b) If $f(x)$ and $g(x)$ are supermodular on X , then $f(x)+g(x)$ is supermodular on X

(c) If $f_k(x)$ is supermodular on X for $k=1,2,\dots$ and $\lim_{k \rightarrow \infty} f_k(x) = f(x)$ for each x in X , then $f(x)$ is supermodular on X

So in establishing our supermodularity results, following Theorems B1 and B2, all we need to ensure is that the cross-partials are positive. This is done in Appendix A. For the constrained optimization of our certainty equivalent function, the following two theorems from Milgrom and Roberts (1990) are the most relevant.

Theorem B3: Suppose $f : R^{n+k} \rightarrow R$ is supermodular and suppose $T(y)$ and $T(y')$ are sublattices of R^n . Let $S(y) \equiv \operatorname{argmax}\{f(z, y) \mid z \in T(y)\}$, and define $S(y')$ analogously. Then $y \geq y'$ and $T(y) \geq T(y')$ imply that $S(y) \geq S(y')$

Theorem B4: Suppose $f : R^{n+k} \rightarrow R$ is supermodular and suppose T is a sublattice of R^n . Then the set of maximizers of f over T is also a sublattice.

Theorem B3 basically says that the set of optimizers “rises” as the parameter values increases. In other words, the theorem implies that supermodularity is preserved under the maximization operation. An implication of this is that if one optimizes a system of complementary products with respect to any subset of the products then the remaining products would still be complementary. Theorem B4 shows that the set of points at which a supermodular function attains its maximum on a lattice is a sublattice. These theorems are directly employed in proving that ownership concentration, leverage, creditor monitoring, dividend payouts and contracting mechanism all form a complementary cluster.

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