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**Choice of Acquisition Form, Domestic  
Liquidity Costs for US Cross-listed Firms,  
and Convergence in Information  
Environment: An Investor Protection  
Perspective**

Nhut (Nick) Hoang Nguyen

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# Synopsis

This dissertation contains three empirical studies that examine the effect of investor protection on three different aspects of corporate governance: mergers and acquisitions, US cross-listings, and convergence of information environment around the world.<sup>1</sup>

The first study investigates the relation between investor protection and the choice of acquisition form (partial versus full acquisition). I argue that if private benefits are a motivation for mergers and acquisitions, an acquirer is more likely to bid for a controlling fraction (but not a hundred percent) of a target firm in countries with weak investor protection because in these countries private benefits of control are an important asset. The empirical results support this argument: compared to full mergers, partial acquisitions are the preferred form of acquisition when target countries do not effectively protect minority investors. Partial acquisitions are also more common among foreign acquirers from countries with poor legal systems. Finally, I show that firm-level corporate governance of the target firm is negatively related to the likelihood of partial acquisition.

The second study examines the effect of investor protection on domestic liquidity for cross-listed firms. If US cross-listing can improve a firm's information environment because of more stringent disclosure requirements in the US, I expect the information

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<sup>1</sup> The second and third empirical studies are co-authored work with my supervisor, Professor Henk Berkman. For consistency, I use the first person 'I' throughout the dissertation.

improvement to be reflected in a reduction in domestic liquidity costs. The empirical results are consistent with this prediction: local bid-ask spreads and price impact (a proxy for the cost of adverse information) significantly decrease while local trading volume significantly increases one year after US cross-listing. In addition, the liquidity improvement is larger for cross-listed firms that are from poor investor protection countries, and that are listed on the NYSE. The results in the second study are consistent with the “bonding” argument by Coffee (2002).

The third study tests Coffee’s (1999) prediction of a convergence in corporate governance around the world. Since information environment is a key factor of corporate governance, it is important to see if there is a convergence in information environment across countries over the past two decades. Using various common proxies for information environment, I show that the quality of information environment generally improves through time, but the improvement is larger for developed markets and countries with better institutional quality.

In the third study, I also reproduce the main results in Bailey, Karolyi and Salva (2006), and Fernandes and Ferreira (2008). These studies report similar divergence in information environment for cross-listed firms post-US-listing, but fail to control for the quality of information environment in the domestic market. After we control for this market effect, we do not find support for their results: there is no improvement in information environment for cross-listed firms, and no difference in the change between developed and emerging countries.

# **Chapter 1: Introduction**

## **1.1 Introduction**

Corporate governance and related agency issues have long been a central research area in economics and finance.<sup>2</sup> Early research on corporate governance focuses on internal and external governance mechanisms (such as board of directors, ownership structure, executive remuneration, large shareholders, large creditors and takeover market), and their effects on reducing agency costs and improving firm performance.<sup>3</sup> Although acknowledging that corporate governance mechanisms may vary across countries, early studies do not place much emphasis on the variation in corporate governance around the world (Denis and McConnell (2003)).

It is not until the work of La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998, hereafter LLSV) that research on corporate governance took a new direction: a study of structural differences in laws and regulations in international corporate governance. In their seminal paper, “Law and Finance”, LLSV argue that differences in several aspects of corporate governance (for example, ownership structure) around the world may be driven by cross-country differences in the degree of investor protection. They hypothesize that the extent to which a country’s laws protect investor rights determines

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<sup>2</sup> Adam Smith (1776), Berle and Means (1932), Coase (1937), Jensen and Meckling (1976), and Fama and Jensen (1983a,b) are among the first scholars to address the separation of ownership and control, and associated agency problems.

<sup>3</sup> See, for example, Jensen and Ruback (1983), Jensen (1986), Shleifer and Vishny (1986), Holderness and Sheehan (1988), Morck, Shleifer and Vishny (1988), Weisbach (1988), Jensen and Murphy (1990), McConnell and Servaes (1990), Kaplan (1994), Kaplan and Minton (1994), Franks and Mayer (1996), Gorton and Schmid (2000), Dahya, McConnell and Travlos (2002), and Holderness (2003).

the extent of agency conflict between insiders and outside investors, which, in turn, affects the evolution of corporate finance and corporate governance in the country.

Using various measures to proxy for the degree of investor protection in a country, LLSV find that legal protection of investor rights varies significantly across countries and is negatively related to the concentration of equity ownership. LLSV's findings have stimulated a growing body of research on the impact of investor protection on the development of capital markets, the access of firms to external finance, and the efficiency of corporate asset allocation (see, for example, La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997, 2002), Rajan and Zingales (1998), Wurgler (2000), Demirguc-Kunt and Maksimovic (2002), Claessens and Laeven (2003), Dittmar, Mahrt-Smith and Servaes (2003), and Rossi and Volpin (2004)).

This dissertation contributes to the international corporate governance literature, sometimes referred to as the “Law and Finance” literature, in three different ways. In the first essay, I examine the impact of investor protection on the probability of a takeover deal being a partial acquisition rather than a full merger. In the second essay, I analyze the impact of differences in investor protection on changes in domestic liquidity costs of cross-listed firms around the US listing date. In the third essay, I investigate changes in information environment through time for a wide cross-section of countries, and relate differences in these changes to differences in the degree of investor protection.

Before I discuss these research questions in more detail, I first review the literature on the relation between investor protection laws and the evolution of corporate finance and corporate governance.

## **1.2 Law and Finance**

My objective in this section is to provide an overview of studies that have made a significant contribution to the law and finance literature.

### ***1.2.1 The Seminal Study: LLSV (1998)***

“Corporate governance is, to a large extent, a set of mechanisms through which outside investors protect themselves against expropriation by the insiders” (La Porta, Lopez-de-Silanes, Shleifer and Vishny (2000, p.4). One of the key mechanisms is the legal rules on investor rights and the quality of their enforcement. Investor rights include the right to vote on important corporate matters, for examples, in elections of boards of directors; the right to sue directors and managers for suspected expropriation; the right to receive timely information about the firm and its performance; the right to receive dividends; and other similar rights. Without these rights and their effective enforcement, outside investors face the risk that the return on their investments will never be received due to expropriation by managers and controlling shareholders, i.e. “the insiders”.

In their pioneering work on law and finance, LLSV (1998) examine a set of laws pertaining to the protection of shareholders and creditors’ rights in 49 countries around the world. They find that these laws and their enforcement quality differ significantly

across countries. Assigning countries to four legal “families”, they find that countries with “common law” systems have the strongest protection of outside investors whereas countries with French “civil law” systems provide the least protection of outside investors. German civil law and Scandinavian countries fall in between the common law and civil law systems with regard to the degree of investor protection. LLSV also report that in countries where investor protection is poor, there appears to be an alternative corporate governance mechanism: the concentration of ownership of shares. They argue that the presence of large shareholders can be explained by their ability to monitor managers, to curb them from appropriating the firm’s assets, and to make sure that they (and other investors) receive a return on their investment. Consistent with this view, LLSV find that ownership concentration is negatively related to the effectiveness of investor protection.

Since LLSV’s seminal work, researchers have investigated the impact of legal protection of investor rights on many aspects of corporate finance and corporate governance. In the following sections, I review studies belonging to three different streams in the law and finance literature. The first group includes studies that examine the relation between investor protection and the development of financial markets. The second group of studies examines the impact of investor protection on ownership structure and agency costs. The third group are studies that provide evidence on the question whether there is a convergence in corporate governance across the world towards some standard.

### ***1.2.2 Financial Markets***

The importance of investor protection is evident in differences in the development of capital markets across countries. When investors are well protected from expropriation, they are more willing to provide finance to firms at lower required rates of return, which then encourages firms to obtain external finance for the growth of their business (Shleifer and Wolfenzon (2002)). Consistent with this view, La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997) find that countries with strong protection of shareholder and creditor rights have larger capital markets, in terms of both capitalization and the number of listed firms per capita, compared to countries where investors are not well protected. They also show that stronger investor protection is associated with a higher rate of initial public offerings. Giannetti (2003) reports evidence that the availability and use of debt are higher in countries where creditor rights are better protected.

Many studies show that financial development resulting from the availability of external finance has a significant effect on economic growth. Demircug-Kunt and Maksimovic (1998, 2002) compare the proportion of firms that require and actually use long-term external finance for their growth across forty countries. They find that this proportion is greater in countries with more developed financial markets and better investor protection. In addition, Rajan and Zingales (1998), Wurgler (2000), and Claessens and Laeven (2003) find that industrial sectors that need more external finance develop faster and allocate assets more efficiently and effectively in these countries.

Rossi and Volpin (2004) show that takeovers, a common mechanism of asset allocation, are more common in countries with superior investor protection.

Investor protection is also related to firm value and the ability of firms to respond to crises. La Porta, Lopez-de-Silanes, Shleifer and Vishny (2002) show that firms in countries with stronger protection of investor rights have higher Tobin's Q ratios than firms in countries with weaker protection. Fauver, Houston and Naranjo (2003) report a significant diversification premium for firms in countries with less developed capital markets and poor legal system. They interpret this finding as evidence that internal capital markets are more beneficial when external finance is limited. Johnson, Boone, Breach and Friedman (2000), and Lemmon and Lins (2003) find that during the Asian financial crisis of 1997-1998, stock prices respond less negatively for firms in countries with a higher degree of investor protection and a lower risk of expropriation.

Recent literature documents evidence on the link between investor protection and the quality and cost of information. Ball, Kothari and Robin (2000), Guenther and Young (2000), and Hung (2001) find that shareholder protection is positively correlated with the effectiveness, timeliness and value relevance of accounting information. In addition, Morck, Yeung and Yu (2000), and DeFond, Hung and Trezevant (2007) find that countries with stronger legal protection are characterized by better incorporation of firm-specific information. Better information quality also leads to lower opaqueness and fewer crashes for firms in these countries (Jin and Myers (2006)). Also supporting the notion that good shareholder protection has far-reaching implications, Eleswarapu and

Venkataraman (2006) show that when they cross-list in the US, firms from good shareholder protection countries experience lower transaction costs than firms from bad investor protection countries.

### ***1.2.3 Ownership versus Control***

Another branch of studies looks more directly at the relevance of investor protection for the pattern of ownership and control, and private benefits of control. LLSV, and La Porta, Lopez-de-Silanes and Shleifer (1999) show that countries with weak protection of investor rights generally exhibit relatively high ownership concentration compared to countries with strong investor protection. In many cases, the concentration of ownership and control fall in the hands of only a few families as reported in Claessens, Djankov and Lang (2000), who analyse a sample of 2,980 firms from nine East Asian countries.

Large shareholdings have long been viewed as an effective external corporate governance mechanism. Prior studies report evidence that large shareholders are associated with improved firm performance, lower discretionary spending, higher turnover of managers and directors, and an increased likelihood that a firm is taken over.<sup>4</sup> Lins (2003) investigates the relation between large shareholdings and firm value for a sample of 1,433 firms from 18 emerging economies. He finds that large non-management blockholders are positively related to firm value, and that this positive relation is stronger for firms in countries with poorer investor protection.

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<sup>4</sup> See, for example, Shivdasani (1993), Kaplan and Minton (1994), Kang and Shivdasani (1995), Gorton and Schmid (2000), and Franks and Mayer (2001).

Large shareholders, however, are not without costs. While the presence of large shareholders reduces the agency costs between managers and shareholders, it increases the conflict of interests between large shareholders and minority investors (Shleifer and Vishny (1997)). With control rights in excess of cash flow rights, large shareholders might try to extract private benefits of control at the expense of minority investors (Grossman and Hart (1988)).

Lins (2003) reports evidence that large shareholders with managerial control have a negative impact on firm value; and that impact is greater for firms in less protection countries. Using block premiums for control transactions as a proxy for private benefits of control, Dyck and Zingales (2004) find that private benefits of control vary greatly across countries, and are negatively correlated with the degree of investor protection.<sup>5</sup> Nenova (2003), and Doidge (2004) draw similar inferences when they define private benefits of control as the voting premium of stocks with superior voting rights relative to those with inferior voting rights.<sup>6</sup> Faccio, Lang and Young (2001) report that group-affiliated corporations in Europe pay higher dividends than group-affiliated corporations in Asia, suggesting expropriation is more severe in Asia than in Europe.<sup>7</sup>

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<sup>5</sup> Barclay and Holderness (1989) are the first to use block premiums to measure private control benefits.

<sup>6</sup> This measure of private control benefits is also used in earlier studies such as Lease, McConnell and Mikkelsen (1983, 1984), DeAngelo and DeAngelo (1985), and Zingales (1995).

<sup>7</sup> Other empirical studies that show the negative effect of large shareholders for individual countries include Bertrand, Mehta and Mullainathan (2002), Bae, Kang and Kim (2002), Claessens, Djankov, Fan and Lang (2002), and La Porta, Lopez-de-Silanes and Zamarripa (2003).

Some studies report evidence of a link between investor protection and managerial behaviour. La Porta, Lopez-de-Silanes, Shleifer and Vishny (2000a) find that firms in common law countries, which typically have better investor protection relative to civil law countries, make higher dividend payouts when reinvestment opportunities are dim than do firms in civil law countries. Dittmar, Mahrt-Smith and Servaes (2003) present evidence that firms with strong legal protection are less likely to maintain excess cash balances, which can be used at their discretion. Leuz, Nanda and Wysocki (2003) find that managers in countries with poor shareholder rights tend to have larger incentives to misrepresent firm performance through earnings management.

#### ***1.2.4 Convergence in Corporate Governance***

In the last decade, convergence of corporate governance around the world has attracted the interest of many researchers. It has also been an essential theme in defining policies by some major international organizations, such as the International Monetary Fund and the World Bank, since the Asian financial crisis of 1997-1998 (Gilson (2000), and Hill (2005)).

According to Coffee (1999) and Gilson (2000), there are two forms of convergence: legal convergence and functional convergence. Legal convergence refers to changes in rules and enforcement mechanisms toward some successful legal system. This form of convergence appears to be slow and hard to achieve due to barriers such as cultural traditions, nationalism, economic self-interest or path dependency (Coffee (1999), Bebchuk and Roe (1999)). The inflexibility of existing governance institutions

brings about functional convergence. Examples of functional convergence are cross-listings and acquisitions (Coffee (1999), Gilson (2000), and La Porta, Lopez-de-Silanes, Shleifer and Vishny (2000b)).

Evidence of functional convergence through cross-listings can be found in Foerster and Karolyi (1999), Pagano, Roell and Zechner (2002), and Reese and Weisbach (2002). These authors present evidence indicating that firms in weak corporate governance countries are more likely to cross-list their shares in strong corporate governance markets in order to enhance the protection of shareholder rights. Evidence of functional convergence through acquisitions is reported in Rossi and Volpin (2004), who show that firms in countries with poor legal protection of shareholder rights are often sold to buyers from countries with strong investor protection.

The benefits for firms to “bond” themselves to a better corporate governance system like the US include enhanced access to external finance, reduced private benefits of control, improved information environment, and higher valuation premium (see, for example, Baker, Nofsinger and Weaver (2002), Reese and Weisbach (2002), Lang, Lins and Miller (2003, 2004), Doidge (2004), and Doidge, Karolyi and Stulz (2004)). These studies also show that the positive effects of cross-listing are greater for firms from countries with weaker legal systems.

Overall, the law and finance literature has shown the impact of investor protection on a broad spectrum of important issues in corporate finance and corporate governance.

The effects of investor protection are also seen at both country and firm levels. Yet, there are still many interesting questions to be addressed in this research area.

### **1.3 Contribution of This Dissertation**

In this section, I discuss the three questions addressed in this dissertation and their contributions to the “Law and Finance” literature. The general contribution of this dissertation is to provide more evidence on the significance of legal protection of investor rights on various aspects of corporate finance and corporate governance around the world.

#### ***1.3.1 Investor Protection and the Transfer of Corporate Control: A Cross-country Analysis***

In my first empirical study, I look at the impact of investor protection and associated private benefits of control on the choice of acquisition form (partial acquisition versus full merger). This is an important issue because the market of mergers and acquisitions is an important mechanism in corporate governance and asset allocation. Any frictions (for example, private benefits) that interfere with this mechanism could ultimately cause a loss of investors’ wealth.<sup>8</sup>

Rossi and Volpin (2004) show that the takeover market is significantly more active in countries with stronger investor protection. They also show that firms in poor protection countries are more likely to be sold to firms from good protection countries.

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<sup>8</sup> Claessens, Djankov, Fan and Lang (2002) find that the wedge between control and ownership is negatively related to firm values.

Rossi and Volpin (2004) interpret this evidence as a form of functional convergence towards good corporate governance.

However, as shown in Bae, Kang and Kim (2002), and Bertrand, Mehta and Mullainathan (2002), the motivation for mergers and acquisitions could also be to acquire private control benefits. They argue that as long as an acquirer does not own the entire target firm he will not bear the entire cost of expropriation of minority shareholders and creditors. Dyck and Zingales (2004) show that in mergers and acquisitions, an acquirer is willing to pay a high premium for a controlling stake of a target firm when minority shareholders are not well protected by the legal system. They also show that the block premium is even higher when the acquirer comes from a country with weak investor protection. Their results suggest that the high premium paid is for the potential private benefits that the acquirer, the controlling shareholder after the deal, is able to extract. Their results also suggest that private benefits of control are an asset in countries with poor investor protection, and that asset is more valuable to foreign acquirers from weak legal systems.

To test these insights from Dyck and Zingales (2004), my first essay investigates if the prevalence of private benefits of control in countries with weak legal protection of investor rights is reflected in a higher frequency of partial acquisitions (versus full mergers) in which acquirers ultimately own a controlling stake (but less than a hundred percent).

Using a sample of 12,188 completed control transfers for listed firms in 49 countries from 1990 through 2003, I find that the proportion of partial acquisitions is negatively correlated with the degree of investor protection, and positively correlated with the size of private benefits of control in the target country. That is, acquirers are more likely to bid for a fraction (rather than a hundred percent) of the target's equity in countries where legal protection of investor rights is poor, the level of information asymmetry is high, and private benefits are valuable. In addition, I find that in cross-border deals, foreign acquirers are more likely to engage in partial acquisitions than in mergers of domestic targets if they come from countries with weak investor protection.

### ***1.3.2 Domestic Liquidity Costs and Cross-listing in the US***

In my second empirical study, I address the question whether the degree of investor protection in the home country affects the change in liquidity on the local market for domestic firms that cross-list in the US.

To my knowledge, this research is the first study to examine the change in liquidity costs in the local market for a wide cross-section of countries. The focus on local markets is important since, on average, trading of cross-listed securities in the home market makes up more than 70 percent of the combined trading volume on the home market and the US market (Eleswarapu and Venkataraman (2006)). Other studies either limit their cross-listing sample to a single country (see, for example, Domowitz, Glen and Madhavan (1998), and Foerster and Karolyi (1998)), or focus on liquidity costs in the

foreign market ignoring the effect of cross-listing on local liquidity costs (see, for example, Eleswarapu and Venkataraman (2006)).

Studying the effect of cross-listing around the US-listing date is also important because, as argued by Coffee (1999, 2002), and Stulz (1999), cross-listing is an important vehicle to obtain functional convergence in corporate governance. LLSV hypothesize that the development of financial markets depends on the extent to which a country's laws and their enforcement protect investor rights. Without an effective mechanism of investor protection, outside investors are less willing to finance firms due to high risk of insiders' expropriation and misrepresentation (La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997), Demirguc-Kunt and Maksimovic (2002), and Claessens and Laeven (2003)).

When firms decide to "bond" themselves to a market where investor protection is superior, like the US, firm managers are committing not to extract private benefits in exchange for having access to external capital and improving the firm's liquidity (Karolyi (2006)). The "bonding" mechanism suggests a reduction in the level of information asymmetry between insiders and outside investors. Therefore, I expect a general decrease in domestic costs of liquidity, especially the cost of information asymmetry, after US cross-listing. I also expect that the decrease is greater for cross-listed firms from countries where investors are poorly protected because in these countries the level of information asymmetry is relatively high.

Using intraday data from domestic markets for a sample of 295 cross-listed firms from 30 countries, I find evidence that cross-listing leads to significant reductions in domestic liquidity costs and significant increases in local trading volume. The average effective spread goes down by 14%, the average cost of adverse information decreases by 23%, and trading volume increases by 19% in the year after US cross-listing. Consistent with the “bonding” hypothesis, I find that these reductions in trading costs, and increases in trading volume, are significantly larger for firms from countries with weak investor protection, poor information quality, and less political stability. Also consistent with the “bonding” hypothesis, I find that liquidity cost reductions, and trading volume increases, are larger for stocks that are cross-listed on the NYSE versus stocks crossed-listed on NASDAQ or OTC markets.

### ***1.3.3 Is There a Convergence in Information Environment around the World?***

In my third empirical study, I test Coffee’s (1999) prediction of convergence in corporate governance around the world. In this study, I focus on one key aspect of corporate governance: the quality of information environment.

The quality of information environment and its improvement over time are important because they affect the level of information asymmetry, the cost of agency conflicts, and ultimately the development of financial markets and economic growth in a country (La Porta, Lopez-de-Silanes, Shleifer and Vishny (2002)).

Earlier studies mainly focus on either the evolution of information environment in the US stock markets (see, for example, Campbell, Lettau, Malkiel and Xu (2001), Francis, Schipper and Vincent (2002), and Landsman and Maydew (2002)), or cross-country differences in the quality of information environment at some point in time (see, for example, Morck, Yeung and Yu (2000), DeFond, Hung and Trezevant (2007), and Jin and Myers (2006)).

My third essay is an attempt to bridge a gap in the literature: the evolution of information environment around the world conditional on the degree of investor protection and the quality of institutional factors. My study provides direct evidence on whether the world is undergoing an informational convergence relative to indirect indications of such convergence (for example, the globalization of stock markets, the growing number of cross-listings, and the efforts to harmonize reporting standards by the International Accounting Standards Board and the Financial Accounting Standards Board (Pagano, Roell and Zechner (2002), and Schipper (2005))).

Using a sample of 151,571 firm-years across 43 countries during the period 1990 through 2006, I find that, on average, there is an improvement in stock price informativeness (measured by the market model  $R^2$ ) and earnings informativeness (measured by abnormal return variance and abnormal trading volume around earnings announcements). However, the information improvement exhibits a puzzling divergence over time between developed and emerging markets, and between strong and weak

investor protection countries; that is, the improvement is greater for developed markets and countries with better corporate governance.

Two studies related to my third essay are Bailey, Karolyi and Salva (2006, hereafter BKS), and Fernandes and Ferreira (2008, hereafter FF). Both studies report evidence of an improvement in information environment for cross-listed firms from developed countries five years after the US-listing date. Despite the long event window, these studies do not account for the evolution of information environment in the domestic market when analyzing the change in information environment for cross-listed firms. In my last essay, I reproduce their main results controlling for information environment of the local market. In contrast to BKS and FF, I find no evidence to support Coffee's "bonding" hypothesis for a sample of 257 cross-listed stocks from 36 countries: US cross-listing is not associated with a significant improvement in the general information environment and the information content of earnings announcements, and the effect is not different between developed and emerging markets.

#### **1.4 Outline of this Dissertation**

The remainder of this dissertation is organized as follows. Chapter 2 examines the relation between investor protection and the proportion of partial acquisitions. Chapter 3 investigates the impact of US cross-listing on domestic liquidity and liquidity costs around the listing date. Chapter 4 tests the predicted convergence in information environment around the world. Chapter 5 summarizes key findings from the three essays, and discusses some avenues for further research.

## **Chapter 2: Investor Protection and the Transfer of**

### **Corporate Control: A Cross-country Analysis**

#### **2.1 Introduction**

In their seminal paper, La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998, hereafter LLSV) find that corporate finance and corporate governance in a country depend on the extent to which the country's laws and their enforcement protect investor rights. Agency conflicts between insiders and outside investors are greater in countries with weaker protection of shareholder rights. Without an effective mechanism of investor protection, outside investors in these countries find themselves exposed to high risk of insiders' expropriation and misrepresentation. As a result, they are not willing to finance firms in both equity and debt markets (La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997)), which, in turn, negatively affects financial development and economic growth at the country, industry, and firm levels (Rajan and Zingales (1998), Demirguc-Kunt and Maksimovic (2002), Claessens and Laeven (2003)). Investor protection also affects the efficiency of corporate asset allocation, for example, through the level of corporate cash holdings, dividend payment, and the activity of mergers and acquisitions (La Porta, Lopez-de-Silanes, Shleifer and Vishny (2000a), Dittmar, Mahrt-Smith and Servaes (2003), and Rossi and Volpin (2004)).

This chapter contributes to the growing literature exploring cross-country variation in legal protection of investor rights in relation to the efficiency of asset allocation. Similar to Rossi and Volpin (2004), this study examines the impact of cross-

country differences in investor protection on the activity of mergers and acquisitions. However, this study looks at a particular aspect of the market for mergers and acquisitions and investigates how investor protection and information asymmetry affect the acquisition form: partial acquisition versus full merger. This issue is important because mergers and acquisitions are an essential vehicle through which corporate assets are allocated for their best possible use. Any frictions interfering with the efficiency of this asset allocation mechanism could negatively affect the distribution of wealth among investors.

Bae, Kang and Kim (2002), and Bertrand, Mehta and Mullainathan (2002) show that private benefits of control are sometimes a motive for mergers and acquisitions. They argue that as long as an acquirer does not own the entire target firm he will not bear the entire cost of expropriation of minority shareholders. Dyck and Zingales (2004) report that acquirers are willing to pay a higher premium for a controlling block of target firms in countries where investors are less well-protected. They also show that the block premium is even higher when acquirers come from countries with weaker legal protection of investor rights. Their results suggest that private benefits of control are an asset in countries with poor investor protection, and that asset is more important to foreign acquirers from weak investor protection countries. Their results also suggest that acquirers are more likely to prefer partial acquisitions to full mergers when investor protection is less effective since it is less costly and more beneficial for them to purchase only a controlling fraction of targets' equity and subsequently appropriate corporate resources.

Buying 100% equity of the target firm could become expensive for the acquirer due to loss of private control benefits and portfolio diversification. The acquisition cost could be even higher if the target eventually turns out to be a wealth-destroying investment (Akerlof (1970)). The ‘lemons’ problem is more likely to manifest itself in countries with poor investor protection because these countries are generally characterized by a higher level of information asymmetry. Loose accounting standards, less stringent disclosure requirements, and lower participation of sophisticated market participants (LLSV, Healy and Palepu (2001)) make it harder for acquirers to obtain sufficient and accurate information about targets in these countries. Asymmetric information increases valuation uncertainty and the risk of misrepresentation by the target managers (Williamson (1983)). Partial acquisition is a way to mitigate such risk without forgoing an opportunity to have a share in a potentially profitable target (Chen and Hennart (2004), and Lopez-Duarte and Garcia-Canal (2004)).<sup>9</sup>

Although an acquirer’s decision to bid for a fraction or 100% equity of a target depends on several other factors such as government regulations relating to taxes and foreign ownership, and business strategic reasons, the main focus of this study is on private benefits of control and information asymmetry. I use a sample of 12,188 mergers and acquisitions for listed targets from 1990 through 2003 to investigate the relation between the degree of investor protection and the acquisition form. I find that the

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<sup>9</sup> Chen and Hennart (2004), and Lopez-Duarte and Garcia-Canal (2004) use the argument of information asymmetry to explain why firms in Japan and Spain choose partial over full acquisitions for their international expansion. Kohers and Ang (2000), Datar, Frankel and Wolfson (2001), and Cain, Denis and Denis (2006) use the same argument to explain earnouts (i.e. future payments by acquirers contingent upon some unobservable performance variables) in mergers and acquisitions.

proportion of partial acquisitions is higher for countries with weaker investor protection. I also find evidence that firm-level corporate governance affects the probability of partial acquisition. Specifically, the result shows that given the degree of investor protection in a country, a deal is more likely to be a partial acquisition than a merger for a target with poor corporate governance. I find no evidence that acquirers' firm governance affects the acquisition form. Furthermore, I show that foreign bidders are more likely to engage in partial acquisitions if legal protection of investors is poor in a target country. The likelihood of cross-border partial acquisitions is even higher if foreign acquirers come from countries with weak investor protection.

The remainder of this chapter is structured as follows. The hypotheses are developed in section 2.2. Section 2.3 presents the data and research design. In section 2.4, I present descriptive statistics and the main results. Section 2.5 concludes.

## **2.2 Hypothesis Development**

A central concept in the literature on corporate governance is that there is a relation between the level of control and private benefits of control. According to Grossman and Hart (1980), when a large shareholder owns a controlling fraction of equity in a firm, he has an incentive to monitor and prevent management from destroying shareholders' wealth, which creates benefits for all shareholders. However, the controlling position also gives the large shareholder opportunities to extract private benefits at the expense of other minority shareholders.<sup>10</sup> For every dollar appropriated

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<sup>10</sup> Johnson, La Porta, Lopez-de-Silanes and Shleifer (2000) provide several examples of ways in which controlling shareholders appropriate firm resources.

from the firm the controlling shareholder bears only a fraction of its cost equivalent to his cash flow rights. The remaining cost is borne by minority shareholders. Barclay and Holderness (1989) find that in private negotiations, large blocks of stock trade at a premium to the exchange price, and argue that such premiums reflect the value of private benefits of control. Lease, McConnell and Mikkelsen (1983, 1984), DeAngelo and DeAngelo (1985), and Zingales (1995) measure the value of control benefits in a different manner: the voting premium of stocks with superior voting rights relative to stocks with inferior voting rights.<sup>11</sup>

LLSV suggest that the extent of controlling shareholders' expropriation depends on how well minority investors are protected by laws and their enforcement. Weaker legal protection of shareholder rights makes it easier for controlling shareholders to extract private benefits, and reduces the probability of being caught and prosecuted (Shleifer and Wolfenzon (2002)). Recent empirical evidence documented by Nenova (2003), Dyck and Zingales (2004), and Doidge (2004) shows that private benefits indeed vary greatly across countries, and are negatively correlated with the quality of legal environment, law enforcement, and investor protection. Dyck and Zingales (2004), for example, report that in countries where laws and regulations do not protect minority shareholders well, acquirers are willing to pay a higher premium for a controlling block of target firms. That high premium represents the expected private benefits that the acquirer can appropriate once they are in a controlling position. Loose disclosure requirements in countries with weak legal protection also make it easier for controlling shareholders to conceal their extraction of private benefits by, for example, managing the

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<sup>11</sup> See also Claessens, Djankov and Lang (2000), Faccio and Lang (2002).

firm's earnings (Leuz, Nanda and Wysocki (2003)). Therefore, given the ability to extract and conceal private control benefits, I expect that an acquirer is more likely to bid for a partial, but controlling, stake in a target firm in countries where investor protection is effectively weak.

While poor legal protection of minority shareholders and less stringent disclosure requirements are beneficial to an acquirer with a controlling position ex-post acquisition, they deter the acquirer from being able to find a good target (Rossi and Volpin (2004)).<sup>12</sup> In countries with weak governance rules, accounting information is typically of low quality and flows less freely and timely between inside managers and outside investors (LLSV, Ball, Kothari and Robin (2000), Guenther and Young (2000), and Hung (2001)). High information asymmetry about the target exposes the acquirer to misrepresentations by the target owners (Leuz, Nanda and Wysocki (2003)); that is, acquisition costs could eventually be much higher if the target turns out to be a wealth-destroying investment. In the presence of high uncertainty, the acquirer has an incentive to only partially buy the target to mitigate the risk of having acquired a 'lemons' without forgoing an opportunity to have a share in a potentially profitable target (Chen and Hennart (2004), and Lopez-Duarte and Garcia-Canal (2004)). Buying 100% equity of the target could incur extra costs due to loss of private benefits of control and loss of portfolio diversification. Therefore, a high level of information asymmetry makes it more likely that an acquirer

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<sup>12</sup> Rossi and Volpin (2004) show that in countries with good investor protection and high quality of accounting information there is a more active market for corporate control. Their results imply that there are more potential targets in these countries, which could translate into lower costs for acquirers to identify potential targets.

will engage in a partial acquisition of the target when the risk of misrepresentation is high.

In countries with strong investor protection, acquirers would not benefit from expropriation of minority shareholders since any private benefit of control is possibly offset by associated costs of legal prosecution and loss of reputation (Shleifer and Wolfenzon (2002)). In addition, in countries with good corporate governance, accounting information is typically of high quality, reduced information asymmetry between insiders and outside investors enables acquirers to identify potentially profitable targets at lower costs. Furthermore, strong governance rules are likely associated with high compliance costs of servicing minority shareholders (for example, registration and listing costs, audit fees, and costs of financial reports preparation).<sup>13</sup> Therefore, in strong investor protection countries, an acquirer is more likely to purchase 100% of a target's equity in order to save compliance costs and obtain all the potential future benefits generated by the target.

The above discussion leads to the following hypothesis:

*Hypothesis 1: A deal is more likely to be a partial acquisition than a merger if the degree of investor protection is low and the level of information asymmetry is high in the target country.*

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<sup>13</sup> Amoako-Adu and Smith (1993) find that the average abnormal return for target firms on the Toronto Stock Exchange in complete tender offers is almost twice as much as that in partial acquisitions. They attribute their findings to cost savings from servicing minority shareholders. Moreover, their results also show that the abnormal return is positively correlated with the fraction of acquired equity. Their result suggests that target shareholders evaluate acquirers' confidence in their ability to generate efficiency gains by observing the proportion of equity to be acquired.

In cases where acquirers come from foreign countries, their acquisition decision is not only affected by the laws and regulations of the target country but also the investor protection laws in their own country. Dyck and Zingales (2004) argue that a foreign acquirer coming from a country with poor legal protection of investors is better able to siphon out corporate resources of the target firm than an acquirer from a country with strong investor protection. Consistent with their argument, Dyck and Zingales (2004) find that foreign acquirers from weak corporate governance countries are willing to pay a higher premium for a controlling block than foreign acquirers from countries with good corporate governance. Their results suggest that private benefits of control are an important asset to foreign buyers from less protective countries, and that their ability to extract and conceal such benefits is less limited by their country's laws on investor protection and disclosure requirements. Therefore, my second hypothesis is:

*Hypothesis 2: Given the level of the target country's investor protection and disclosure requirements, foreign buyers from countries with weaker investor protection and less stringent disclosure requirements are more likely to acquire a partial stake of domestic targets.*

Apart from country-level investor protection, firm-level corporate governance may also have an impact on the acquisition form. A firm can improve its information environment and reduce its agency conflicts by voluntarily increasing disclosure, heightening independent monitoring, adopting more transparent business practices, or

even exposing itself to a more stringent governance rules (Coffee (1999)). Empirical evidence indicates that since firms with good quality of corporate governance are likely to extract less private benefits of control (Dyck and Zingales (2004)), investors value these firms higher (Klapper and Love (2004), and Durnev and Kim (2005)). Evidence from Klapper and Love (2004), and Durnev and Kim (2005) also show that firms in countries with less effective laws on investor protection are more likely to adopt better firm-level corporate governance because it is more beneficial for them to do so. Extending the arguments above to the research question in my study, I conjecture that it is less likely for firms, both targets and acquirers, with good corporate governance to engage in partial acquisitions because of smaller private benefits and lower level of information asymmetry. Hence, my third hypothesis is as follows:

*Hypothesis 3: The probability of partial acquisition is negatively correlated with firm-level corporate governance.*

## **2.3 Data and Research Design**

### **2.3.1 Data**

My initial sample is from Securities Data Corporation (SDC) Platinum and includes all completed mergers and acquisitions that are announced between January 1, 1990 and December 31, 2003. I only include deals for publicly traded companies in order to minimize possible bias due to differences in disclosure requirements for unlisted companies across countries (Rossi and Volpin (2004)). I restrict my sample to transactions that involve a true transfer of control and require that the acquirer's equity

interests in the target increase from no more than 20% before the deal to more than 50% after the transaction.<sup>14</sup> These transactions are then split into two types of control transfer: mergers and partial acquisitions. Mergers are transactions where the acquirer owns 100% of the target's equity after the transaction.<sup>15</sup> Partial acquisitions are transactions where the acquirer increases its equity holdings in the target to more than 50% (but less than 100%) after the deal is completed. I exclude deals classified as spin-offs, self-tender offers, and repurchases. I limit my sample to the 49 countries for which investor protection data are available in LLSV. After screening, the final sample includes 12,188 deals. The analysis in section 2.4.3 requires data on firm characteristics such as market value of equity, book value of debt, and book value of total assets. The required data are available from the SDC Platinum and Datastream for 5,165 targets (40% of the total sample) and 2,004 acquirers across 37 countries.

### **2.3.2 Research Design**

In this section I describe the research design to test the hypotheses in section 2.2. I perform the tests using both country-level and firm-level regression models.

#### *2.3.2.1 Country-level Analysis: Full Sample*

In the country-level analysis, I test the effect of investor protection and disclosure requirements in a target country on the proportion of partial acquisitions (hypothesis 1) using the following model:

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<sup>14</sup> Dyck and Zingales (2004) find that acquirers who bid for a controlling block of greater than 50% are willing to pay a higher premium because the block gives these acquirers absolute control over the target firm.

<sup>15</sup> The results reported in section 2.4 are robust if I use 95% of the target's equity as a threshold for the definition of mergers.

$$\begin{aligned} \text{Partial acquisitions}_c = & a + b (\text{Target IP})_c + c (\text{Same industry})_c \\ & + d (\text{Mandatory bid})_c + e_c \end{aligned} \quad (1)$$

The dependent variable is the number of partial acquisitions for target country  $c$  divided by the total number of mergers and acquisitions for that target country during the 14 year sample period (1990-2003). *Target IP* includes various indexes from LLSV to proxy for the degree of investor protection and the stringency of disclosure requirements for that target country.<sup>16</sup> Proxies for investor protection include *Common law* and *Shareholder protection*. *Common law* is a dummy variable with a value of 1 if the legal system of a target country belongs to the common law family, and zero otherwise. *Shareholder protection* is defined as the product of anti-director rights and rule of law indexes from LLSV divided by ten. The calculated index, used by Rossi and Volpin (2004), and Durnev and Kim (2005), captures both shareholders' de jure rights and the enforceability of these rights. I also replace investor protection variables with a proxy for private benefits of control at the target country level. *Private benefits* are the mean block premium per country reported in Dyck and Zingales (2004).<sup>17</sup> I use *Accounting standards* index from LLSV as a proxy for the stringency of disclosure requirements. The index measures the quality of the disclosure of accounting information based on the inclusion or omission of 90 items in the firm's 1990 annual reports.

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<sup>16</sup> See Table 2.A1 in the Appendix for the value of investor protection proxies in our sample countries. Also, Table 2.A2 in the Appendix presents the Pearson correlations between these variables.

<sup>17</sup> The block premium is defined as the difference between the price per share paid for the control block and exchange price two days after the announcement of the control transaction, divided by the exchange price two days after the announcement and multiplied by the proportion of cash flow rights represented in the controlling block (Dyck and Zingales (2004, p.547).

In all specifications, I include a variable, *Same industry*, to proxy for information asymmetry between the target and the acquirer based on whether or not they belong to the same industry. It is measured as the number of deals for target country  $c$ , where both acquirer and target are from the same industry (based on two-digit SIC code), divided by all deals in the target country. Since information asymmetry is likely to be less severe if both target and acquirer are operating in the same industry (Harris and Ravenscraft (1991)), the acquirer is less likely to purchase only a fraction of the target. Hence, I expect a negative correlation between the proportion of partial acquisitions and *Same industry* variable. I also include a dummy variable from Dyck and Zingales (2004) to control for the effect of mandatory bid rules on the fraction of equity acquired. *Mandatory bid* has a value of 1 if there is a legal requirement in target country  $c$  to purchase additional shares when shareholding after the acquisition exceeds a given ownership threshold, and zero otherwise. There are three options for an acquirer who wants to purchase a controlling stake that is higher than the legal ownership threshold. First, the acquirer has to make an equal offer to all remaining shareholders on the same terms as the block sale, and, therefore, ends up holding the entire target firm at higher costs. Second, the acquirer has to reduce the block to a level below the legal threshold, which may not give him the expected control level. Third, if neither above options is satisfactory the acquirer may just forgo the transaction. Therefore, I do not predict whether *Mandatory bid* has a negative, positive or no effect on the proportion of partial acquisitions.

### 2.3.2.2 Country-level Analysis: Cross-border Sample

As discussed in section 2.2, in addition to investor protection and information quality of the target country, I expect investor protection and information quality of the acquirer country to have an impact on the acquisition form. This hypothesis is tested for a sub-sample of 2,307 cross-border deals where targets and acquirers are from different countries. The following model is used:

$$\begin{aligned} \text{Cross-border } PA_{ta} = & a + b_1 (\text{Target IP})_t + b_2 (\text{Acquirer IP})_{ta} + c_1 (\text{Same industry})_{ta} \\ & + c_2 (\text{Same region})_{ta} + c_3 (\text{Mandatory bid})_t + e_i \end{aligned} \quad (2)$$

The dependent variable is the number of cross-border partial acquisitions (PA) between target country  $t$  and acquirer country  $a$  divided by the total number of cross-border deals between the two countries. *Target IP* and *Acquirer IP* represent proxies for investor protection and disclosure requirements of target country  $t$  and acquirer country  $a$ , respectively. *Same industry* is defined similarly as in model (1). It is the number of cross-border deals between target country  $t$  and acquirer country  $a$ , where the acquirer and the target are from the same industry (based on two-digit SIC code), divided by all cross-border deals between the two countries. I also include a *Same region* dummy to control for the fact that geographical closeness may reduce the level of information asymmetry between the acquirer and the target, which, in turn, negatively affects the proportion of partial acquisitions. *Same region* is equal 1 if target and acquirer countries are from the same continent, and zero otherwise. *Mandatory bid* is defined as in model (1).

### 2.3.2.3 Firm-level Analysis

I also investigate the effect of firm-level corporate governance on the probability of partial acquisition controlling for country-level investor protection and disclosure requirements. To my best knowledge, there are no data available on the quality of firm governance for a large number of firms across a wide range of countries. Therefore, I derive a proxy for the quality of my sample firms' corporate governance based on a model in Gompers, Ishii and Metrick (2003), in which a firm's Tobin's Q is defined as a function of a vector of corporate governance variables and a vector of firm characteristics.

$$Q_i = a + b (\text{Corporate governance})_i + c (\text{Firm characteristics})_i + e_i$$

Following Berkman, Cole and Fu (2005), I estimate the corporate governance component of  $Q_i$  as the residual from the following regression:

$$Q_i = b_0 + b_1 (\text{Size})_i + b_2 (\text{Leverage})_i + b_3 (\text{Growth opportunities})_i + b_k (\text{Industry})_i + b_m (\text{Country})_i + b_n (\text{Year})_i + e_i, \quad (3)$$

where  $Q_i$  is the sum of market value of equity and book value of debt divided by book value of total assets for firm  $i$ .<sup>18</sup> *Size*, *Leverage*, and *Growth opportunities* represent the vector of firm characteristics. *Size* is the logarithm of the firm's total assets. *Leverage* is measured as the ratio of total debt to total assets. *Growth opportunities* are defined as the

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<sup>18</sup> I obtain market value of equity 4 weeks prior to the announcement. Book value of debt and total assets are from the most recent financial statements before the deal.

actual growth in total assets 2 years before the deal occurrence. Model (3) also includes 3 sets of dummy variables to control for country, industry (at the two-digit SIC code level), and year effects. The residual,  $e_i$ , represents an estimate of firm-specific corporate governance that is based on the firm's concurrent market valuation. However, caution is warranted when the results for firm-level corporate governance are interpreted since the residuals from model (3) may include various omitted variables, which may well be unrelated to the quality of firm-level corporate governance.

After I obtain the residuals from model (3) for 5,165 target firms, for which data on firm characteristics are available in SDC Platinum, I divide target firms into strong and weak corporate governance. If a target firm's residual is higher (lower) than the median residual of all target firms, it is categorized as having high (low) quality of corporate governance.<sup>19</sup> The estimation and classification procedures are similar for the 2,004 acquirers for which firm data can be obtained from Datastream.<sup>20</sup> I then estimate the relation between the probability that a deal is a partial acquisition and the degree of investor protection at both country and firm levels using the following Probit model:

$$\begin{aligned}
 Prob(Partial\ deal)_i = & a + b_1 (Good\ target)_i + b_2 (Good\ acquirer)_i \\
 & + b_3 (Investor\ protection)_i + b_4 (Cross-border)_i \\
 & + b_5 (Cross-border) * \Delta(Investor\ protection)_i \\
 & + c_1 (Same\ industry)_i + c_2 (Same\ region)_i + c_3 (Mandatory\ bid)_i \\
 & + \sum c_4 (Country\ dummies) + \sum c_5 (Year\ dummies) + e_i, \quad (4)
 \end{aligned}$$

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<sup>19</sup> My results are robust when I classify firms into quintiles of firm-level corporate governance.

<sup>20</sup> Note that the required data on firm characteristics are not available for acquirers in SDC Platinum.

where *Partial deal* is a binary variable which has a value of 1 if a deal is a partial acquisition, and zero otherwise. *Good target (Good acquirer)* is a dummy that is equal to 1 if target (acquiring) firm  $i$  is categorized as having good firm-specific corporate governance, and zero otherwise. *Investor protection* includes proxies for country-level investor protection and disclosure requirements, as defined in model (1).  $\Delta(\textit{Investor protection})$  is the difference in investor protection between acquirer and target countries. *Cross-border* dummy is equal to 1 if a deal is cross-border, and zero otherwise. *Same industry* is a dummy that equals 1 if the target and the acquirer are from the same industry, and zero otherwise. *Same region* and *Mandatory bid* are defined as in models (2) and (1), respectively. Different sets of dummy variables are also included to control for target country and year effects.

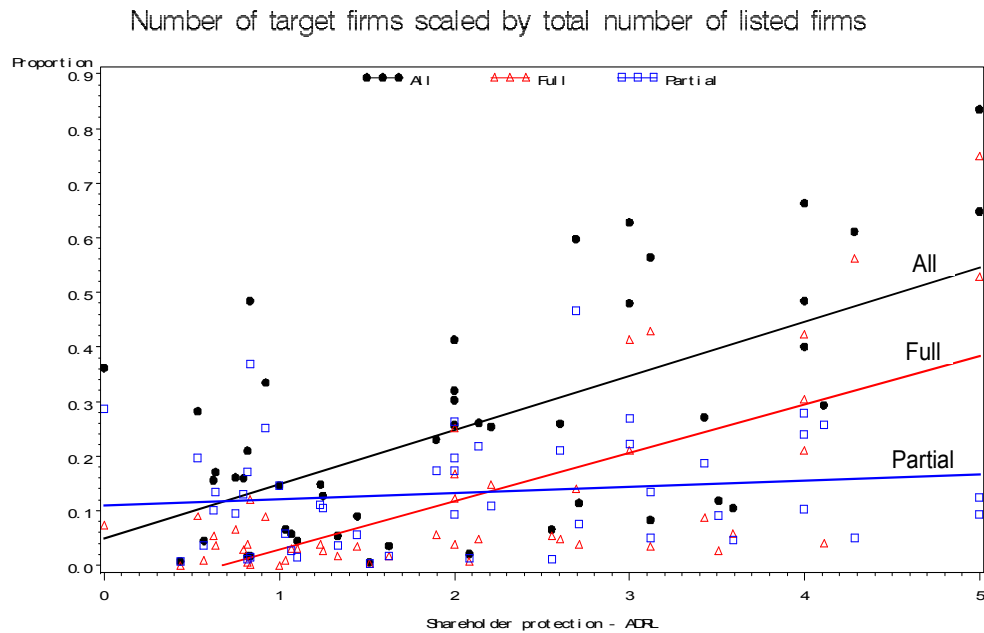
## 2.4 Empirical results

In this section, I first present descriptive statistics on the distribution of mergers and acquisitions across my sample countries. Then, I report empirical results on the relation between the probability of partial acquisition and the degree of investor protection at the country and firm levels.

### 2.4.1 Descriptive statistics

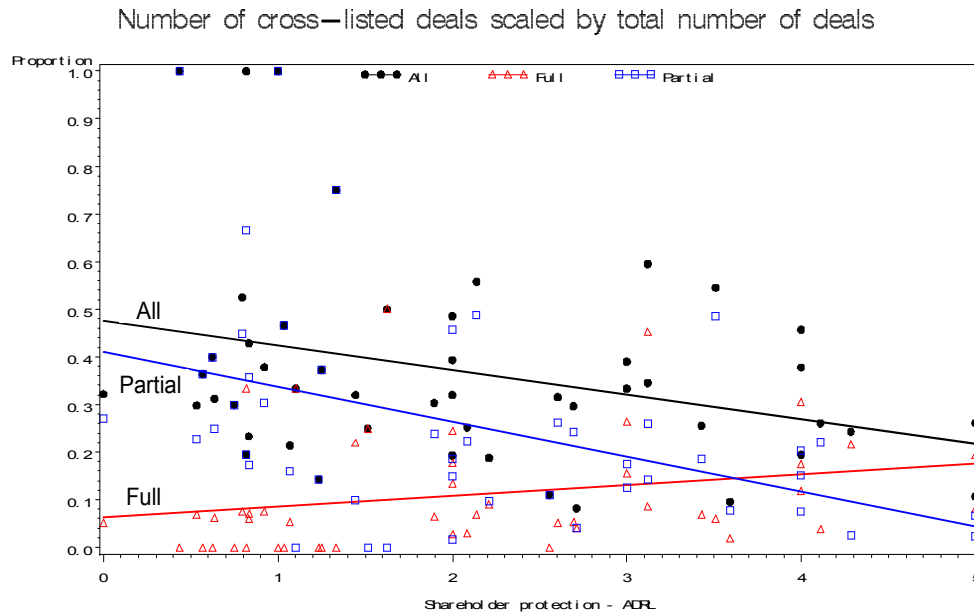
I graphically show the distribution of mergers and acquisitions in Figures 2.1 and 2.2. In Figure 2.1, *All* refers to the total number of firms targeted in takeover deals in a country, whether they are mergers or partial acquisitions, divided by the average number

of listed firms in that target country. *Full* and *Partial* are similarly calculated except that target firms are involved in full mergers and partial acquisitions, respectively. Each line represents a linear regression between shareholder protection (the horizontal axis) and the scaled number of target firms (the vertical axis) within each group. The result for *All* is consistent with Rossi and Volpin's (2004) finding that the volume of mergers and acquisitions is positively correlated with the degree of investor protection. However, as shown in Figure 2.1, the positive relation is mainly driven by the volume of full mergers. The regression line for *Full* is parallel to that for *All* whereas the regression line for *Partial* is almost horizontal. Thus, Figure 2.1 suggests that partial acquisitions are relatively more common in countries with weak investor protection and vice versa.



**Figure 2.1:** *All* refers to the number of firms targeted in M&A deals in a country, whether they are mergers or partial acquisitions, divided by the average number of listed firms in that target country. *Full* and *Partial* are similarly calculated except that target firms are involved in full mergers and partial acquisitions, respectively.

In Figure 2.2, *All* refers to the number of cross-border deals in a country divided by the total number of mergers and acquisitions in that target country. *Full* and *Partial* are the number of cross-border mergers and partial acquisitions as a proportion of all deals, respectively. The regression line for *All* confirms Rossi and Volpin's (2004) finding that the volume of cross-border deals is negatively correlated with the degree of investor protection in target countries. However, Figure 2.2 shows that the negative relation is driven by a decrease in the number of partial acquisitions as investor protection improves. Thus, Figure 2.2 suggests that in cross-border mergers and acquisitions, partial acquisitions are relatively more common in countries with less protective rules while full mergers are apparently a preferred form of acquisition in countries with more rigid rules.



**Figure 2.2:** *All* refers to the number of cross-border deals in a country divided by the total number of mergers and acquisitions in that target country. *Full* and *Partial* are the number of cross-border full mergers and partial acquisitions as a proportion of all deals, respectively.

Table 2.1 shows summary data on merger and acquisition activity, alphabetically sorted by target country.<sup>21</sup> Columns 2 and 3 show the number of deals and the proportion of partial acquisitions for the full sample. The last two columns present similar data for the sub-sample of 2,307 cross-border deals.

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<sup>21</sup> Rossi and Volpin (2004) also use data from the SDC platinum to examine the relation between investor protection and M&A activity during 1990s. The data in Table 2.1, though longer in time and restricted to listed target firms, exhibit similar patterns as in Rossi and Volpin (2004).

**Table 2.1: Frequency and proportion of mergers and partial acquisitions**

Data on completed mergers and acquisitions for listed firms from 01/01/1990 to 31/12/2003, ordered by target country. Columns 2 and 3 show the number of deals and the proportion of partial acquisitions (%PA) for the full sample. The last two columns present similar data for the sub-sample of cross-border deals. Superscript 'a' indicates statistical significance at the 1% level between the last two rows in the same column.

|                             | Full sample |                    | Cross-border sub-sample |                    |
|-----------------------------|-------------|--------------------|-------------------------|--------------------|
|                             | N           | %PA                | N                       | %PA                |
| <u>Civil law countries</u>  |             |                    |                         |                    |
| Argentina                   | 43          | 81.40              | 24                      | 87.50              |
| Austria                     | 35          | 88.57              | 17                      | 94.12              |
| Belgium                     | 59          | 79.66              | 19                      | 84.21              |
| Brazil                      | 122         | 73.77              | 37                      | 78.38              |
| Chile                       | 33          | 75.76              | 18                      | 88.89              |
| Colombia                    | 20          | 65.00              | 8                       | 100.00             |
| Denmark                     | 62          | 37.10              | 12                      | 8.33               |
| Ecuador                     | 4           | 75.00              | 3                       | 100.00             |
| Egypt                       | 14          | 92.86              | 6                       | 83.33              |
| Finland                     | 51          | 54.90              | 17                      | 52.94              |
| France                      | 428         | 77.34              | 127                     | 81.89              |
| Germany                     | 251         | 75.70              | 95                      | 80.00              |
| Greece                      | 35          | 74.29              | 5                       | 100.00             |
| Indonesia                   | 40          | 82.50              | 21                      | 85.71              |
| Italy                       | 133         | 77.44              | 31                      | 74.19              |
| Japan                       | 260         | 45.38              | 25                      | 80.00              |
| Jordan                      | 1           | 100.00             | 1                       | 100.00             |
| Mexico                      | 57          | 70.18              | 17                      | 76.47              |
| Netherlands                 | 94          | 41.49              | 37                      | 37.84              |
| Norway                      | 105         | 36.19              | 48                      | 33.33              |
| Peru                        | 40          | 60.00              | 12                      | 100.00             |
| Philippines                 | 46          | 82.61              | 9                       | 100.00             |
| Portugal                    | 38          | 81.58              | 12                      | 83.33              |
| South Korea                 | 56          | 44.64              | 12                      | 75.00              |
| Spain                       | 81          | 60.49              | 28                      | 75.00              |
| Sweden                      | 159         | 34.59              | 62                      | 32.26              |
| Switzerland                 | 75          | 62.67              | 24                      | 58.33              |
| Taiwan                      | 27          | 18.52              | 3                       | 100.00             |
| Turkey                      | 15          | 86.67              | 7                       | 100.00             |
| Uruguay                     | 3           | 100.00             | 3                       | 100.00             |
| Venezuela                   | 16          | 81.25              | 5                       | 80.00              |
| <u>Common law countries</u> |             |                    |                         |                    |
| Australia                   | 493         | 25.56              | 96                      | 38.54              |
| Canada                      | 1060        | 19.53              | 277                     | 25.63              |
| Hong Kong                   | 203         | 87.19              | 53                      | 84.91              |
| India                       | 103         | 66.02              | 26                      | 88.46              |
| Ireland                     | 42          | 23.81              | 25                      | 24.00              |
| Israel                      | 50          | 62.00              | 16                      | 31.25              |
| Kenya                       | 2           | 50.00              | 1                       | 0.00               |
| Malaysia                    | 73          | 67.12              | 6                       | 50.00              |
| New Zealand                 | 74          | 58.11              | 28                      | 53.57              |
| Nigeria                     | 3           | 66.67              | 3                       | 66.67              |
| Pakistan                    | 4           | 50.00              | 1                       | 0.00               |
| Singapore                   | 86          | 70.93              | 22                      | 72.73              |
| South Africa                | 165         | 42.42              | 31                      | 51.61              |
| Sri Lanka                   | 11          | 81.82              | 4                       | 100.00             |
| Thailand                    | 51          | 80.39              | 19                      | 100.00             |
| UK                          | 1202        | 8.32               | 292                     | 10.96              |
| US                          | 6160        | 11.28              | 661                     | 22.54              |
| Zimbabwe                    | 3           | 33.33              | 1                       | 0.00               |
| Civil law average           | 2403        | 68.31 <sup>a</sup> | 745                     | 78.42 <sup>a</sup> |
| Common law average          | 9785        | 50.25              | 1562                    | 45.60              |
| Total average               | 12188       | 61.67              | 2307                    | 66.37              |

The last 2 rows of Table 2.1 present the mean proportion of partial acquisitions for civil law and common law countries. The mean proportion of partial acquisitions for the full sample is higher for civil law countries (68.31%) than for common law countries (50.25%), and the difference is statistically significant at the 1% level. The difference (78.42% versus 45.60%) is also statistically significant for the sub-sample of cross-border deals.

Column 2 shows that 50% (6,160) of my sample deals are from the United States. The United Kingdom and Canada also have a high volume of mergers and acquisitions. However, partial acquisitions are not common in these countries. For instance, only 11% of the deals in the United States are partial acquisitions. The last 2 columns show that these three countries also account for more than half of all cross-border deals, and that less than 30% of cross-border deals in these countries involve partial acquisitions.

#### ***2.4.2 Acquisition Form in Relation to Investor Protection: Country-level Analysis***

As detailed in section 2.3, model (1) is used to examine the effect of a target country's investor protection and information quality on the acquisition form for the full sample regardless of the country origin of acquirers. Model (2) is then used to introduce similar effects for the acquirer country for a sub-sample of cross-border deals.

#### *2.4.2.1 Full Sample of Mergers and Acquisitions*

Table 2.2 reports the marginal effects of 8 Tobit regressions of model (1). Tobit regressions are used because the dependent variable is bounded between zero and one by construction.

As for the relation between investor protection and the proportion of partial acquisitions, I present the results for investor protection and disclosure requirement proxies, and private benefits individually in columns 1-4. The results for different combinations of these variables are reported in the last 4 columns.

**Table 2.2: Proportion of partial acquisitions in relation to investor protection in target countries**

This table shows the marginal effects of 8 Tobit regressions, in which the dependent variable is the number of partial acquisitions for target country  $c$  divided by the total number of completed deals for that target country. Independent variables from LLSV are common law, a dummy variable that equals one if target country  $c$  belongs to the English common law system, and zero otherwise; shareholder protection, an index of the effective rights of minority shareholders for target country  $c$ ; accounting standards, a measure of the accounting quality for target country  $c$ ; and private benefits of control proxied by the mean block premium for target country  $c$  reported in Dyck and Zingales (2004). Mandatory bid is equal 1 if there is a legal requirement in target country  $c$  to purchase additional shares when shareholding after the acquisition exceeds a given ownership threshold, and zero otherwise (Dyck and Zingales (2004)). Same industry is defined as the number of deals for target country  $c$  where both target and acquirer are from the same industry (based on two-digit SIC code), divided by all deals in that target country. T-statistics are in parentheses. \*\*\*, \*\*, \* indicate significance at the 1%, 5%, and 10% levels, respectively.

|                        | (1)                  | (2)                  | (3)                  | (4)                 | (5)                  | (6)                  | (7)                  | (8)                  |
|------------------------|----------------------|----------------------|----------------------|---------------------|----------------------|----------------------|----------------------|----------------------|
| Constant               | 1.30<br>(7.51) ***   | 1.10<br>(7.53) ***   | 1.83<br>(9.31) ***   | 0.95<br>(5.22) ***  | 1.32<br>(8.63) ***   | 1.72<br>(9.27) ***   | 1.25<br>(7.15) ***   | 1.67<br>(7.80) ***   |
| Common law             | -0.24<br>(-4.42) *** |                      |                      |                     | -0.17<br>(-2.99) *** |                      |                      |                      |
| Shareholder protection |                      | -0.09<br>(-4.92) *** |                      |                     | -0.07<br>(-3.73) *** | -0.05<br>(-2.66) *** | -0.08<br>(-3.72) *** | -0.05<br>(-2.14) **  |
| Accounting standards   |                      |                      | -0.01<br>(-5.84) *** |                     |                      | -0.01<br>(-3.95) *** |                      | -0.01<br>(-2.96) *** |
| Private benefits       |                      |                      |                      | 0.76<br>(3.68) ***  |                      |                      | 0.35<br>(1.75) *     | 0.27<br>(1.35)       |
| Mandatory bid          |                      |                      |                      |                     |                      |                      |                      | 0.03<br>(0.52)       |
| Same industry          | -0.01<br>(-3.68) *** | 0.00<br>(-1.97) **   | -0.01<br>(-3.55) *** | -0.01<br>(-2.48) ** | -0.01<br>(-3.34) *** | -0.01<br>(-3.57) *** | -0.01<br>(-3.31) *** | -0.01<br>(-4.04) *** |
| Pseudo R <sup>2</sup>  | 0.04                 | 0.04                 | 0.08                 | 0.05                | 0.05                 | 0.09                 | 0.08                 | 0.11                 |
| N obs.                 | 49                   | 49                   | 41                   | 37                  | 49                   | 41                   | 37                   | 35                   |

Generally, the results are consistent with hypothesis 1: partial acquisitions are preferred to mergers in countries with weak legal protection of shareholder rights and loose disclosure requirements. The coefficient of investor protection is always negative and significant at the 1% level. The result in column 1 shows that compared to mergers, partial acquisitions occur relatively more often in civil law countries than in common law countries. The proportion of partial acquisitions is approximately 24% higher in civil law countries than in common law countries. The degree of shareholder protection in column 2 also has a negative impact on the proportion of partial deals across countries. A one-point increase in shareholder protection (for instance, the adoption of cumulative voting in a country like the Netherlands) is associated with a reduction of 9% in the proportion of partial acquisitions. Column 3 suggests that countries with high level of information asymmetry are likely to have relatively more partial acquisitions than full mergers. The accounting standards coefficient of -0.01 indicates that an 18-point increase in the quality of accounting standards (the average difference in accounting standards measure between civil law and common law countries) is associated with an 18% decrease in the proportion of partial acquisitions. In column 4, I test the relation between private benefits of control and the proportion of partial acquisitions using the mean block premium reported in Dyck and Zingales (2004). The result shows that private benefits of control are positively correlated with the proportion of partial deals. A 1% increase in the size of private benefits is associated with a significant 0.76% increase in the probability that a deal is a partial acquisition.

The results for different combinations of independent variables are presented in the last 4 columns. Column 5 shows that when I control for the origin of the target country's legal system, shareholder protection is still highly significant. This finding indicates that within the same legal family, countries with weaker shareholder protection have more partial acquisitions relative to mergers.<sup>22</sup> Column 6 shows that shareholder protection and accounting standards are both important in explaining the proportion of partial acquisitions. In column 7, the coefficient of private benefits is still significant at the 10% level after controlling for the effect of shareholder protection. The effect of private benefits, however, becomes insignificant in the presence of both shareholder protection and accounting standards.

The results for control variables show that the coefficient of same industry is negative and significant across all specifications. The result indicates that an acquirer is less likely to purchase only a fraction of a target's equity if they both are operating in the same industry. This finding is consistent with the view that it is more likely for acquirers to choose partial acquisition over full merger if they are less knowledgeable about the target industry, and hence more vulnerable to the target's misrepresentations (Harris and Ravenscraft (1991)). The result in column 8 does not show a significant effect of mandatory bid rules on the proportion of partial deals.

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<sup>22</sup> I also find that for countries for which legal systems have the same origin, those with lower accounting quality and higher private benefits of control would be a preferred home of partial acquisitions (not reported).

#### *2.4.2.2 Sub-sample of Cross-border Mergers and Acquisitions*

Table 2.3 reports the marginal effects of 6 Tobit regressions of model (2). Letters  $a$  and  $t$  at the end of the independent variables in Table 2.3 stand for acquirer and target, respectively. Recall that the dependent variable in model (2) is the number of cross-border partial acquisitions between a target country and an acquirer country, for which investor protection data are available in LLSV, divided by the total number of cross-border deals between those two countries.

As for the relation between investor protection and the proportion of cross-border partial acquisitions, the first 2 columns present the results for proxies for investor protection and information asymmetry for target countries only. The last 4 columns show the results for these proxies for both target and acquirer countries. Generally, there is evidence that of all deals that involve foreign acquirers, a higher frequency of partial acquisitions is reported in countries with less effective investor protection, higher level of information asymmetry, and larger private benefits of control.

**Table 2.3: Proportion of cross-border partial acquisitions in relation to investor protection in target and acquirer countries**

This table shows the marginal effects of 6 Tobit regressions, in which the dependent variable is the number of cross-border partial acquisitions between a target country and an acquirer country divided by the total number of cross-border deals between those two countries. Independent variables from LLSV are common law, a dummy variable that equals one if country  $c$  belongs to the English common law system, and zero otherwise; shareholder protection, an index of the effective rights of minority shareholders for country  $c$ ; accounting standards, a measure of the accounting quality for country  $c$  private benefits proxied by the mean block premium for country  $c$  reported in Dyck and Zingales (2004). Letters  $a$  and  $t$  represents acquirer and target, respectively. Mandatory bid is equal 1 if there is a legal requirement in target country  $c$  to purchase additional shares when shareholding after the acquisition exceeds a given ownership threshold, and zero otherwise (Dyck and Zingales (2004)).

Same industry is defined as number of cross-border deals between a target country and an acquirer country, where both acquirer and target are from the same industry (based on two-digit SIC code), divided by all cross-border deals between the two countries. Same region dummy equals 1 if target and acquirer countries are situated in the same continent, and zero otherwise. T-statistics are in parentheses. \*\*\*, \*\*, \* indicate significance at the 1%, 5%, and 10% levels, respectively.

|                            | (1)                  | (2)                  | (3)                  | (4)                  | (5)                  | (6)                |
|----------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--------------------|
| Constant                   | 1.55<br>(8.30) ***   | 4.48<br>(7.58) ***   | 1.58<br>(7.97) ***   | 2.47<br>(9.41) ***   | 4.27<br>(6.87) ***   | 0.75<br>(4.95) *** |
| Common law (t)             | -0.26<br>(-5.63) *** |                      | -0.26<br>(-5.60) *** |                      |                      |                    |
| Shareholder protection (t) |                      | -0.08<br>(-4.20) *** |                      | -0.12<br>(-8.46) *** |                      |                    |
| Accounting standards (t)   |                      | -0.01<br>(-4.87) *** |                      |                      | -0.02<br>(-8.08) *** |                    |
| Private benefits (t)       |                      | -0.27<br>(-1.52)     |                      |                      |                      | 0.76<br>(4.75) *** |
| Common law (a)             |                      |                      | -0.02<br>(-0.47)     |                      |                      |                    |
| Shareholder protection (a) |                      |                      |                      | -0.03<br>(-2.48) **  |                      |                    |
| Accounting standards (a)   |                      |                      |                      |                      | 0.00<br>(0.38)       |                    |
| Private benefits (a)       |                      |                      |                      |                      |                      | -0.20<br>(-1.04)   |
| Mandatory bid              | 0.00<br>(0.07)       | 0.00<br>(0.08)       |                      |                      |                      |                    |
| Same industry              | -0.10<br>(-1.58)     | -0.13<br>(-2.23) **  | -0.10<br>(-1.80) *   | -0.08<br>(-1.49)     | -0.12<br>(-2.15) **  | -0.06<br>(-0.99)   |
| Same region                | -0.11<br>(-2.51) **  | -0.08<br>(-2.01) **  | -0.11<br>(-2.55) **  | -0.11<br>(-2.77) *** | -0.04<br>(-1.05)     | -0.03<br>(-0.61)   |
| Pseudo R <sup>2</sup>      | 0.05                 | 0.14                 | 0.04                 | 0.11                 | 0.12                 | 0.04               |
| N obs.                     | 359                  | 349                  | 398                  | 398                  | 368                  | 336                |
| N target countries         | 37                   | 35                   | 46                   | 46                   | 41                   | 37                 |
| N acquirer countries       | 42                   | 42                   | 42                   | 42                   | 39                   | 35                 |

Column 1 shows that the proportion of cross-border partial deals is approximately 26% higher in civil law countries than in common law countries. Also, a one-point increase in shareholder protection index for the target country is associated with 8% fewer cross-border partial acquisitions. Similarly, a 10-point increase in the quality of accounting standards for the target country is associated with a 10% decrease the proportion of cross-border partial deals. The effect of private benefits is subsumed by the effects of both shareholder protection and accounting standards.

The last 4 columns in Table 2.3 report the effects of investor protection in both target and acquirer countries on the proportion of cross-border partial deals. The results show weak evidence that investor protection of acquirer countries affects the acquisition form. While the coefficients for investor protection for target countries are still significant at the 1% level, only the coefficient of shareholder protection for acquirer countries is negative and significant at the 5% level. The result in column 4 indicates that if two bidders, identical in all aspects except for the degree of shareholder protection provided by their respective countries' laws and regulations, want to expand their business through mergers and acquisitions to country X, the bidder with weaker country-level shareholder protection is likely to prefer a partial acquisition to a full merger. In contrast, the bidder with stronger legal protection of shareholder rights tends to choose a merger over a partial acquisition. If shareholder protection score is one point lower for the bidder from the weak protective country, he is approximately 3% more likely to choose partial acquisition over merger as a way of business expansion to country X.

As for control variables, the results show weak evidence that cross-border partial acquisitions are less likely when a foreign acquirer operates in the same industry as a target. The coefficient of same industry is negative and significant in 3 out of 6 specifications. There is also evidence that cross-border deals between countries in the same region are less likely to be partial deals. The coefficient of same region is negative and significant in 4 out of 6 regressions. As in table 2.2, the mandatory bid dummy is not statistically significant when used as a control variable.

#### ***2.4.3 Acquisition Form in Relation to Investor Protection: Firm-level Analysis***

So far, the country-level analysis shows that the proportion of partial acquisitions is correlated with the degree of investor protection and the stringency of disclosure requirements in both target and acquirer countries. In this section, I extend the analysis to include the quality of corporate governance at the firm level.

Model (3) in section 2.3 is used to estimate and classify firm-level corporate governance. The OLS regression results of model (3) are shown separately for targets and acquirers in Table 2.A3 in the Appendix, and are consistent with previous studies regarding the relation between Tobin's Q and firm characteristics such as size (-), leverage (-), and growth opportunities (+). The residuals from model (3) are used to classify firms into two groups of good and bad corporate governance.

Table 2.4 shows the marginal effects of 10 Probit regressions of model (4).<sup>23</sup> For brevity, I do not report the coefficients of country and year dummies. Specifications 1 and 2 are a test of hypothesis 3 that firm-level corporate governance is negatively correlated with the likelihood of partial acquisition. Specifications 3-10 show the effects of firm-level corporate governance of target firms and acquiring firms controlling for country-level investor protection. Note that lack of financial data on acquirers reduces the sample size by more than half.

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<sup>23</sup> To make sure that US observations, which account for around 70% of my sample, do not drive the results, I re-run model (4) without deals from the US. The results, reported in Table 2.A4 in the Appendix, are qualitatively similar to Table 2.4.

**Table 2.4: Probability of partial acquisitions and corporate governance in the firm-level analysis**

This table reports the marginal effects of 10 Probit regressions, in which the dependent is a binary variable that equals 1 if a deal is a partial acquisition, and zero otherwise. Independent variables are good target (acquirer), a dummy that has a value of 1 if a target (acquirer) is categorized as having good firm governance, and zero otherwise; common law, a dummy variable that equals one if country  $c$  belongs to the English common law system, and zero otherwise; shareholder protection, an index of the effective rights of minority shareholders for country  $c$  accounting standards, a measure of the accounting quality for country  $c$ ; and private benefits of control proxied by the mean block premium for country  $c$ . Letters  $a$  and  $t$  represents acquirer and target, respectively. Cross-border is equal 1 if a deal is cross-border, and zero otherwise. Mandatory bid equals 1 if there is a legal requirement in target country  $c$  to purchase additional shares when shareholding after the acquisition exceeds a given ownership threshold, and zero otherwise. Same industry is 1 if both acquirer and target are in the same industry (based on two-digit SIC code), and zero otherwise.

Same region dummy is equal 1 if target and acquirer countries are situated in the same continent, and zero otherwise. Two sets of dummies are also included to control for the effects of year and target country. Robust t-statistics are in parentheses. \*\*\*, \*\*, \* indicate significance at the 1%, 5%, and 10% levels, respectively.

|                                                              | (1)                  | (2)                  | (3)                  | (4)                  | (5)                  | (6)                  | (7)                 | (8)                  | (9)                  | (10)                |
|--------------------------------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------|----------------------|----------------------|---------------------|
| Constant                                                     | -0.82<br>(-7.34) *** | -1.31<br>(-6.48) *** | -0.02<br>(-0.06)     | 1.23<br>(2.24) **    | 8.94<br>(3.07) ***   | -1.39<br>(-7.85) *** | -0.04<br>(-0.07)    | 1.30<br>(1.43)       | 11.95<br>(3.02) ***  | -6.26<br>(-1.61)    |
| Good target                                                  | -0.04<br>(-5.05) *** | -0.03<br>(-2.43) **  | -0.04<br>(-5.08) *** | -0.04<br>(-5.18) *** | -0.04<br>(-5.12) *** | -0.04<br>(-4.91) *** | -0.03<br>(-2.47) ** | -0.03<br>(-2.41) **  | -0.03<br>(-2.34) **  | -0.02<br>(-2.11) ** |
| Good acquirer                                                |                      | 0.01<br>(0.68)       |                      |                      |                      |                      | 0.00<br>(0.44)      | 0.00<br>(0.36)       | 0.00<br>(0.22)       | 0.00<br>(0.11)      |
| Common law                                                   |                      |                      | -0.17<br>(-3.58) *** |                      |                      |                      |                     |                      |                      |                     |
| Shareholder protection                                       |                      |                      |                      | -0.07<br>(-4.55) *** |                      |                      |                     | -0.06<br>(-3.34) *** |                      |                     |
| Accounting standards                                         |                      |                      |                      |                      | -0.02<br>(-3.47) *** |                      |                     |                      | -0.02<br>(-3.41) *** |                     |
| Private benefits                                             |                      |                      |                      |                      |                      | 1.95<br>(3.72) ***   |                     |                      |                      | 0.24<br>(1.27)      |
| Cross-border                                                 |                      |                      | 0.02<br>(1.36)       | 0.02<br>(0.89)       | 0.02<br>(1.29)       | 0.02<br>(0.90)       | 0.01<br>(0.61)      | 0.01<br>(0.37)       | 0.01<br>(0.38)       | 0.00<br>(0.04)      |
| Cross-border * $\Delta(\text{Common law})_{a,t}$             |                      |                      | -0.03<br>(-1.96) **  |                      |                      |                      | -0.04<br>(-2.50) ** |                      |                      |                     |
| Cross-border * $\Delta(\text{Shareholder protection})_{a,t}$ |                      |                      |                      | -0.01<br>(-3.10) *** |                      |                      |                     | -0.01<br>(-2.49) **  |                      |                     |
| Cross-border * $\Delta(\text{Accounting standards})_{a,t}$   |                      |                      |                      |                      | 0.00<br>(-2.45) **   |                      |                     |                      | 0.00<br>(-1.27)      |                     |
| Cross-border * $\Delta(\text{Private benefits})_{a,t}$       |                      |                      |                      |                      |                      | 0.32<br>(3.30) ***   |                     |                      |                      | 0.15<br>(1.25)      |
| Mandatory bid                                                |                      |                      | 0.27<br>(2.62) ***   | 0.22<br>(2.23) **    | 0.02<br>(0.14)       | -0.07<br>(-0.43)     | -0.03<br>(-0.47)    | -0.04<br>(-0.54)     | -0.24<br>(-1.14)     | -3.69<br>(-0.17)    |
| Same industry                                                | -0.06<br>(-7.20) *** | -0.02<br>(-1.40)     | -0.05<br>(-6.66) *** | -0.05<br>(-6.62) *** | -0.05<br>(-6.68) *** | -0.05<br>(-6.80) *** | -0.01<br>(-1.37)    | -0.01<br>(-1.35)     | -0.02<br>(-1.56)     | -0.02<br>(-1.67) *  |
| Same region                                                  | -0.04<br>(-3.63) *** | -0.02<br>(-1.21)     | 0.00<br>(0.09)       | 0.00<br>(0.06)       | 0.00<br>(-0.03)      | 0.00<br>(-0.18)      | 0.00<br>(-0.08)     | -0.01<br>(-0.25)     | -0.01<br>(-0.55)     | -0.02<br>(-0.77)    |
| Year effects                                                 | y                    | y                    | y                    | y                    | y                    | y                    | y                   | y                    | y                    | y                   |
| Target country effects                                       | y                    | y                    | y                    | y                    | y                    | y                    | y                   | y                    | y                    | y                   |
| Pseudo R <sup>2</sup>                                        | 0.30                 | 0.30                 | 0.30                 | 0.30                 | 0.30                 | 0.31                 | 0.32                | 0.32                 | 0.33                 | 0.33                |
| N obs.                                                       | 5165                 | 2004                 | 5074                 | 5074                 | 5058                 | 5014                 | 1991                | 1991                 | 1981                 | 1979                |
| N target countries                                           | 38                   | 33                   | 34                   | 34                   | 33                   | 34                   | 33                  | 33                   | 32                   | 29                  |
| N acquirer countries                                         | 58                   | 35                   | 39                   | 39                   | 37                   | 35                   | 35                  | 35                   | 33                   | 31                  |

Consistent with hypothesis 3, column 1 shows that target firms' corporate governance exhibits a significantly negative correlation with the probability of partial acquisition. Target firms with good governance practices are about 4% less likely to be partially acquired, compared to target firms with poor governance quality. The coefficient of good target across all specifications retains its significance after controlling for firm-level corporate governance of acquirers and country-level investor protection and accounting information quality. The good acquirer dummy in column 2 and 7-10 does not exhibit a significant impact on the probability of partial deals.

The results in Table 2.4 also confirm the significantly negative correlation between country-level investor protection and the probability of partial deals. All proxies for investor protection and disclosure of information, except private benefits in column 10, are statistically significant at the 1% level. Note that this applies to cases where targets and acquirers are from the same country.

The results for the cross-border dummy show no evidence that foreign acquirers, on average, are more likely to engage in partial acquisitions than are domestic acquirers, which is inconsistent with the possibly increased information asymmetry for foreign acquirers. However, among foreign acquirers, those from countries with poor legal protection of investors and low disclosure quality are more likely to choose partial acquisitions over mergers. The interaction terms between cross-border and the difference in investor protection proxies between acquirer and target countries are significant at the

5% level or more, except accounting standards and private benefits in the last 2 columns. These results are consistent with Table 2.3.

The results for same industry are consistent with the results in Tables 2.2 and 2.3, and suggest that firms operating in the same industry have low level of information asymmetry, which, in turn, lowers the probability of partial acquisition. The same region dummy is significant in the first column only. Table 2.4 indicates weak evidence of a positive effect of mandatory bid rules on the probability of partial deals.

## **2.5 Conclusion**

In this chapter, I examine the impact of country-level investor protection, the stringency of disclosure requirements, and the quality of firm-level corporate governance on the choice of partial acquisition versus full merger. I find that partial acquisitions are more common than mergers in countries with weak legal protection of investor rights. This result is consistent with the idea that private benefits are an important asset for controlling shareholders in countries with weak investor protection (Dyck and Zingales (2004), Nenova (2003)). The relative popularity of partial acquisitions in these countries is also likely due to more severe information asymmetry, which increases the uncertainty of target valuation and the risk of misrepresentation by target owners.

I also provide weak evidence that the corporate governance quality of the target firm itself has an independent impact on whether the firm is acquired fully or partially.

There is, however, no evidence of a significant effect of acquirers' firm governance on the preference of partial deals.

My results show no evidence of a difference in the probability of partial acquisition between cross-border and domestic deals. However, I find that within the group of foreign acquirers, those from weak investor protection countries and low-quality accounting information prefer partial acquisitions to mergers, which might suggest that those foreign acquirers are better able to extract private benefits. This result is consistent with Dyck and Zingales's (2004) evidence that foreign acquirers from countries with weaker investor protection are willing to pay more for control.

The analyses in this study are likely to suffer from some limitations. First, many factors that might have an impact on the choice of mergers and acquisitions are not included in my empirical models. They include government regulations relating to taxes, investment, and foreign ownership. There might also be business strategic motives (for example, growth, market share, and product development) for partial or full acquisitions that are not reflected in my empirical models. The presence or absence of other large shareholders in the target firm, their reasons to relinquish private benefits of control, and the relative bargaining power of management are also factors likely to affect the choice of an acquisition form.

## 2.6 Appendix

**Table 2.A1: Proxies for investor protection and information quality**

Data are alphabetically sorted by country. Columns (1) - (4) are from LLSV. Columns (5) and (6) are from Dyck and Zingales (2004). Legal system indicates if a country's legal system belongs to the common law family or the civil law family. Anti-director rights is a composit index for right to vote by mail, right not to deposit shares with the company or a financial intermediary several days before a shareholder meeting, right to voting cumulatively for directors, right to litigate against oppression by directors, pre-emptive right to buy new issues of stock, and minimum percentage of share capital needed to call an extraordinary shareholders' meeting. Rule of law, an assessment of law and order tradition in the country provided by the country risk rating agency International Country Risk, is the average of the months of April and October of the monthly index between 1982 and 1995. Accounting standards is an index measuring the quality of the disclosure of accounting information in each target country. The index value is obtained by rating its companies' 1990 annual reports on their inclusion or omission of 90 items.

Private benefits are the mean block premium, computed by taking the difference between the price per share paid for the control block and exchange price two days after the announcement of the control transaction, dividing it by the exchange price two days after the announcement and multiplying the ratio by the proportion of cash flow rights represented in the controlling block. Mandatory bid rules indicate if there is a legal requirement in a country to purchase additional shares when shareholding after the acquisition exceeds a given ownership threshold.

| Country      | Legal system | Anti-director<br>rights | Rule of law | Accounting<br>standards | Private<br>benefits | Mandatory bid<br>rules |
|--------------|--------------|-------------------------|-------------|-------------------------|---------------------|------------------------|
|              | (1)          | (2)                     | (3)         | (4)                     | (5)                 | (6)                    |
| Argentina    | civil law    | 4                       | 05.35       | 45                      | 0.27                | no                     |
| Australia    | common law   | 4                       | 10.00       | 75                      | 0.02                | yes                    |
| Austria      | civil law    | 2                       | 10.00       | 54                      | 0.38                | yes                    |
| Belgium      | civil law    | 0                       | 10.00       | 61                      |                     |                        |
| Brazil       | civil law    | 3                       | 06.32       | 54                      | 0.65                | yes                    |
| Canada       | common law   | 5                       | 10.00       | 74                      | 0.01                | yes                    |
| Chile        | civil law    | 5                       | 07.02       | 52                      | 0.15                | no                     |
| Colombia     | civil law    | 3                       | 02.08       | 50                      | 0.27                | no                     |
| Denmark      | civil law    | 2                       | 10.00       | 62                      | 0.08                | yes                    |
| Ecuador      | civil law    | 2                       | 06.67       |                         |                     |                        |
| Egypt        | civil law    | 2                       | 04.17       | 24                      | 0.04                |                        |
| Finland      | civil law    | 3                       | 10.00       | 77                      | 0.02                | yes                    |
| France       | civil law    | 3                       | 08.98       | 69                      | 0.02                | yes                    |
| Germany      | civil law    | 1                       | 09.23       | 62                      | 0.1                 | no                     |
| Greece       | civil law    | 2                       | 06.18       | 55                      |                     |                        |
| Hong Kong    | common law   | 5                       | 08.22       | 69                      | 0.01                | no                     |
| India        | common law   | 5                       | 04.17       | 57                      |                     |                        |
| Indonesia    | civil law    | 2                       | 03.98       |                         | 0.07                | yes                    |
| Ireland      | common law   | 4                       | 07.80       |                         |                     |                        |
| Israel       | common law   | 3                       | 04.82       | 64                      | 0.27                | no                     |
| Italy        | civil law    | 1                       | 08.33       | 62                      | 0.37                | yes                    |
| Japan        | civil law    | 4                       | 08.98       | 65                      | -0.04               | no                     |
| Jordan       | civil law    | 1                       | 04.35       |                         |                     |                        |
| Kenya        | common law   | 3                       | 05.42       |                         |                     | no                     |
| Malaysia     | common law   | 4                       | 06.78       | 76                      | 0.07                | yes                    |
| Mexico       | civil law    | 1                       | 05.35       | 60                      | 0.34                | no                     |
| Netherlands  | civil law    | 2                       | 10.00       | 64                      | 0.02                | no                     |
| New Zealand  | common law   | 4                       | 10.00       | 70                      | 0.03                | no                     |
| Nigeria      | common law   | 3                       | 02.73       | 59                      |                     |                        |
| Norway       | civil law    | 4                       | 10.00       | 74                      | 0.01                | yes                    |
| Pakistan     | common law   | 5                       | 03.03       |                         |                     |                        |
| Peru         | civil law    | 3                       | 02.50       | 38                      | 0.14                | no                     |
| Philippines  | civil law    | 3                       | 02.73       | 65                      | 0.13                | yes                    |
| Portugal     | civil law    | 3                       | 08.68       | 36                      | 0.2                 | yes                    |
| Singapore    | common law   | 4                       | 08.57       | 78                      | 0.03                | no                     |
| South Africa | common law   | 5                       | 04.42       | 70                      | 0.02                | yes                    |
| South Korea  | civil law    | 2                       | 05.35       | 62                      | 0.16                | yes                    |
| Spain        | civil law    | 4                       | 07.80       | 64                      | 0.04                | yes                    |
| Sri Lanka    | common law   | 3                       | 01.90       |                         |                     |                        |
| Sweden       | civil law    | 3                       | 10.00       | 83                      | 0.06                | no                     |
| Switzerland  | civil law    | 2                       | 10.00       | 68                      | 0.06                | yes                    |
| Taiwan       | civil law    | 3                       | 08.52       | 65                      | 0                   | no                     |
| Thailand     | common law   | 2                       | 06.25       | 64                      | 0.12                | yes                    |
| Turkey       | civil law    | 2                       | 05.18       | 51                      | 0.3                 | yes                    |
| UK           | common law   | 5                       | 08.57       | 78                      | 0.02                | no                     |
| Uruguay      | civil law    | 2                       | 05.00       | 31                      |                     |                        |
| US           | common law   | 5                       | 10.00       | 71                      | 0.02                | no                     |
| Venezuela    | civil law    | 1                       | 06.37       | 40                      | 0.27                | no                     |
| Zimbabwe     | common law   | 3                       | 03.68       |                         |                     |                        |

**Table 2.A2: Pearson correlations and some descriptive statistics of investor protection proxies across 49 sample countries**

|                        | Legal system | Shareholder protection | Accounting standards | Private benefits |
|------------------------|--------------|------------------------|----------------------|------------------|
| Shareholder protection | 0.37         |                        |                      |                  |
| Accounting standards   | 0.45         | 0.56                   |                      |                  |
| Private benefits       | -0.32        | -0.51                  | -0.46                |                  |
| Mean                   | 0.37         | 2.05                   | 60.93                | 12.78            |
| Std. Dev.              | 0.49         | 1.33                   | 13.40                | 14.70            |
| No. countries          | 49           | 49                     | 41                   | 37               |

**Table 2.A3: Firm-level corporate governance estimation**

This table presents the results of OLS regressions for model (3). The dependent variable is the firm's Tobin's Q, defined as the sum of market value of equity and book value of debt divided by book value of total assets for firm  $i$ . Independent variables include firm size, the logarithm of total assets of firm  $i$ ; leverage, measured as the ratio of total debt to total assets; and growth opportunities, defined as the actual growth in total assets 2 years before the deal occurrence. Three sets of dummy variables are also included to control for industry (at the two-digit SIC code level), country, and year effects. The residual from the regression is used for the classification of firm-level corporate governance. The regression is done for target firms and acquiring firms separately. The results are White-corrected. T-stats are shown in parentheses. \*\* and \*\*\* indicate significance at the 5% and 1% levels, respectively.

|                         | Targets              | Acquirers            |
|-------------------------|----------------------|----------------------|
| Intercept               | 1.23<br>(2.54) **    | 0.03<br>(0.03)       |
| Ln(total assets)        | -0.07 ***<br>(-6.07) | 0.02<br>(1.19)       |
| Leverage                | -0.43 ***<br>(-4.28) | -1.30 ***<br>(-6.73) |
| Growth opportunities    | 0.11 ***<br>(4.17)   | 0.77 ***<br>(8.84)   |
| Country effects         | y                    | y                    |
| Industry effects        | y                    | y                    |
| Year effects            | y                    | y                    |
| Adjusted R <sup>2</sup> | 0.13                 | 0.34                 |
| N obs.                  | 5165                 | 2004                 |

**Table 2.A4: Probability of partial acquisitions and corporate governance in the firm-level analysis - Excluding US**

This table reports the marginal effects of 10 Probit regressions, in which the dependent is a binary variable that equals 1 if a deal is a partial acquisition, and zero otherwise. Independent variables are good target (acquirer), a dummy that has a value of 1 if a target (acquirer) is categorized as having good firm governance, and zero otherwise; common law, a dummy variable that equals one if country  $c$  belongs to the English common law system, and zero otherwise; shareholder protection, an index of the effective rights of minority shareholders for country  $c$ ; accounting standards, a measure of the accounting quality for country  $c$ ; and private benefits of control proxied by the mean block premium for country  $c$ . Letters  $a$  and  $t$  represents acquirer and target, respectively. Cross-border is equal 1 if a deal is cross-border, and zero otherwise. Mandatory bid equals 1 if there is a legal requirement in target country  $c$  to purchase additional shares when shareholding after the acquisition exceeds a given ownership threshold, and zero otherwise. Same industry is 1 if both acquirer and target are in the same industry (based on two-digit SIC code), and zero otherwise.

Same region dummy is equal 1 if target and acquirer countries are situated in the same continent, and zero otherwise. Two set of dummies are also included to control for the effects of year and target country. Robust t-statistics are in parentheses. \*\*\*, \*\*, \* indicate significance at the 1%, 5%, and 10% levels, respectively.

|                                                                              | (1)                  | (2)                  | (3)                  | (4)                  | (5)                  | (6)                  | (7)                 | (8)                 | (9)                  | (10)                  |
|------------------------------------------------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------|---------------------|----------------------|-----------------------|
| Constant                                                                     | -1.25<br>(-5.98) *** | -1.85<br>(-4.76) *** | -0.26<br>(-0.67)     | 1.57<br>(2.34) **    | 5.17<br>(3.31) ***   | -1.66<br>(-7.00) *** | -0.67<br>(-1.09)    | 0.47<br>(0.39)      | 5.95<br>(2.53) **    | -4.95<br>(-11.99) *** |
| Good target                                                                  | -0.04<br>(-2.59) *** | -0.06<br>(-1.78) *   | -0.05<br>(-2.45) **  | -0.05<br>(-2.55) **  | -0.05<br>(-2.48) **  | -0.05<br>(-2.43) **  | -0.05<br>(-1.64)    | -0.05<br>(-1.62)    | -0.05<br>(-1.57)     | -0.04<br>(-1.22)      |
| Good acquirer                                                                |                      | 0.04<br>(1.12)       |                      |                      |                      |                      | 0.03<br>(0.95)      | 0.03<br>(1.00)      | 0.03<br>(0.96)       | 0.02<br>(0.67)        |
| Common law                                                                   |                      |                      | -0.26<br>(-3.47) *** |                      |                      |                      | -0.27<br>(-2.49) ** |                     |                      |                       |
| Shareholder protection                                                       |                      |                      |                      | -0.15<br>(-4.55) *** |                      |                      |                     | -0.12<br>(-2.07) ** |                      |                       |
| Accounting standards                                                         |                      |                      |                      |                      | -0.02<br>(-4.25) *** |                      |                     |                     | -0.02<br>(-3.35) *** |                       |
| Private benefits                                                             |                      |                      |                      |                      |                      | 3.02<br>(3.80) ***   |                     |                     |                      | 34.08<br>(3.96) ***   |
| Cross-border                                                                 |                      |                      | 0.04<br>(1.21)       | 0.02<br>(0.71)       | 0.04<br>(1.19)       | 0.02<br>(0.62)       | 0.04<br>(0.76)      | 0.04<br>(0.76)      | 0.03<br>(0.51)       | -0.02<br>(-0.36)      |
| Cross-border * $\Delta$ (Common law) <sub><math>a,t</math></sub>             |                      |                      | -0.01<br>(-0.31)     |                      |                      |                      | 0.01<br>(0.18)      |                     |                      |                       |
| Cross-border * $\Delta$ (Shareholder protection) <sub><math>a,t</math></sub> |                      |                      |                      | -0.02<br>(-1.87) *   |                      |                      |                     | 0.00<br>(0.20)      |                      |                       |
| Cross-border * $\Delta$ (Accounting standards) <sub><math>a,t</math></sub>   |                      |                      |                      |                      | 0.00<br>(-0.62)      |                      |                     |                     | 0.00<br>(0.27)       |                       |
| Cross-border * $\Delta$ (Private benefits) <sub><math>a,t</math></sub>       |                      |                      |                      |                      |                      | 0.52<br>(2.71) ***   |                     |                     |                      | 0.38<br>(1.38)        |
| Mandatory bid                                                                |                      |                      | 0.42<br>(2.77) ***   | 0.34<br>(2.32) **    | 0.17<br>(0.98)       | -0.10<br>(-0.43)     | -0.05<br>(-0.29)    | -0.03<br>(-0.21)    | -0.28<br>(-1.23)     | -4.55<br>(-9.33) ***  |
| Same industry                                                                | -0.06<br>(-3.04) *** | -0.03<br>(-0.81)     | -0.05<br>(-2.75) *** | -0.05<br>(-2.74) *** | -0.05<br>(-2.81) *** | -0.05<br>(-2.82) *** | -0.03<br>(-0.89)    | -0.03<br>(-0.88)    | -0.04<br>(-1.07)     | -0.05<br>(-1.37)      |
| Same region                                                                  | 0.01<br>(0.38)       | 0.10<br>(1.72) *     | 0.03<br>(0.71)       | 0.00<br>(-0.02)      | 0.03<br>(0.77)       | 0.01<br>(0.35)       | 0.08<br>(1.26)      | 0.09<br>(1.24)      | 0.06<br>(0.96)       | 0.03<br>(0.44)        |
| Year effects                                                                 | y                    | y                    | y                    | y                    | y                    | y                    | y                   | y                   | y                    | y                     |
| Target country effects                                                       | y                    | y                    | y                    | y                    | y                    | y                    | y                   | y                   | y                    | y                     |
| Pseudo R <sup>2</sup>                                                        | 0.34                 | 0.29                 | 0.34                 | 0.35                 | 0.35                 | 0.36                 | 0.30                | 0.30                | 0.32                 | 0.33                  |
| N obs.                                                                       | 1543                 | 513                  | 1520                 | 1520                 | 1509                 | 1497                 | 513                 | 513                 | 507                  | 506                   |
| N target countries                                                           | 37                   | 32                   | 33                   | 33                   | 32                   | 33                   | 32                  | 32                  | 31                   | 28                    |
| N acquirer countries                                                         | 57                   | 34                   | 38                   | 38                   | 36                   | 34                   | 34                  | 34                  | 32                   | 30                    |

## **Chapter 3: Domestic Liquidity Costs and Cross-listing in**

### **the US**

#### **3.1 Introduction**

Surveys of corporate managers indicate that increased liquidity is a primary motivation for cross-listing (Mittoo (1992), and Fanto and Karmel (1997)). Given that, on average, more than 70% of the trading volume for cross-listed stocks comes from the domestic market, it is surprising that only a few empirical studies examine the effect of cross-listing on domestic liquidity costs. Domowitz, Glen and Madhavan (1998), and Foerster and Karolyi (1998) report a decrease in domestic bid-ask spreads for US cross-listed firms from Mexico and Canada, respectively, whereas Noronha, Sann and Saudagaran (1996) find no evidence of reductions in domestic liquidity costs for US firms cross-listed on the London and Tokyo stock exchanges.

This study examines the impact of cross-listing in the US on domestic liquidity for a sample of 295 firms from 30 countries in the period of 1996-2005. I examine the change in domestic trading costs and domestic trading volume after cross-listing in the US, and analyze whether these changes are related to the strength of investor protection and financial information quality in the domestic market.

Several theoretical papers suggest that cross-listing affects the costs of liquidity in the local market.<sup>24</sup> Hamilton (1979), and Domowitz, Glen and Madhavan (1998) argue that increased competition for order flow between markets might lead to lower liquidity costs. Chowdhry and Nanda (1991), on the other hand, argue that when trading is available in multiple markets, there are enhanced opportunities for informed investors to camouflage their information by timing their trading in the most liquid market. Higher probability of trading with investors with superior information causes market makers to increase bid-ask spreads.

Another strand in the literature relates the impact of cross-listing on liquidity in the home market to changes in information environment. Coffee (2002) argues that cross-listed firms improve their information environment by “bonding” themselves to an increased level of disclosure and scrutiny in the US. Consistent with this prediction, Baker, Nofsinger and Weaver (2002) show that NYSE cross-listings are associated with increased analyst and media coverage for foreign firms. Lang, Lins and Miller (2003) find that cross-listing results in increased analyst coverage, and that analyst forecasts become more accurate after US cross-listing. These papers, however, do not examine whether higher information quality affects information asymmetry among investors, and, relatedly, whether improved information quality affects domestic liquidity costs.

There is empirical support for the notion that lower quality institutions in the domestic market result in higher costs of trading for cross-listed stocks in the foreign

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<sup>24</sup> In addition to improving liquidity, several other motivations for overseas cross-listing have been suggested in the literature. They include an increase in shareholder base, enhanced visibility, improvement of product exposure, possibility of lowering cost of capital, and access to foreign capital markets (see Karolyi (2006)).

market. Bacidore and Sofianos (2002) document that US bid-ask spreads for non-US stocks are larger than their US-matched stocks. They attribute this result to higher information asymmetry for non-US stocks. Brockman and Chung (2003) find similar results for a sample of Hong Kong-listed Chinese stocks and their Hong Kong counterparts. Finally, Eleswarapu and Venkataraman (2006) examine bid-ask spreads for 412 NYSE-listed ADRs from 44 countries, and find that US spreads are significantly lower for stocks from countries with better corporate governance.

The main contribution of this study is that I focus on the effect of US cross-listing on the cost of trading in the local market rather than in the US market. As noted before, this focus on local markets is important since most trading of cross-listed securities still happens in the home market.<sup>25</sup> In addition, I examine whether the benefit of US cross-listing is different across countries based on the home country's institutional quality. Of particular interest is the price impact measure, a proxy for information asymmetry among investors, which allows me to test directly whether the general improvement in information environment (see, for example, Baker, Nofsinger and Weaver (2002), and Lang, Lins and Miller (2003)) filters through to a reduction in the costs of liquidity, especially the asymmetric information component (as hypothesized by Coffee (2002)).

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<sup>25</sup> Table 1 of Eleswarapu and Venkataraman (2006) reports the local trading volume as a percentage of total trading volume in both domestic and US markets for their ADR sample from 44 countries. On average, 72% of trading volume is executed in the local market. Halling, Pagano, Randl and Zechner (2008) examine the distribution of trading volume for cross-listed stocks and find that the ratio of US volume to domestic volume stays at around 35% or lower four years after cross-listing (although there is an initial surge of US trading volume two months post-listing).

I find that cross-listing leads to significant reductions in domestic liquidity costs and significant increases in local trading volume. For example, the average effective spread goes down by 14%, the cost of information asymmetry (proxied by price impact) decreases by 23%, and trading volume increases by 19% in the year after US cross-listing. Consistent with the bonding hypothesis, I find that these reductions in trading costs, and increases in trading volume are significantly larger for firms from countries with weaker investor protection, poorer information quality, and less political stability. Also consistent with the bonding hypothesis, I find that liquidity cost reductions, and trading volume increases, are larger for stocks that are cross-listed on the NYSE than stocks crossed-listed on NASDAQ or OTC markets.

The rest of this chapter is structured as follows. Section 3.2 presents data and methodology. Section 3.3 provides the empirical results. Section 3.4 concludes.

## **3.2 Data and Methodology**

### **3.2.1 Data**

I obtain the list of non-US firms cross-listed on US markets as of 31 December 2005 from the Bank of New York website, <http://adrbny.com>. The list includes 2,120 American Depositary Receipts (ADRs). Based on their country of origin, name, stock type, and price, I hand-match these firms with firms in the Reuters database provided by the Securities Industry Research Center of Asia-Pacific (SIRCA). This step leaves me with 1,352 cross-listed stocks. Since Reuters transaction data are only available from 1996 onwards (and later for some markets), I lose another 943 stocks that are cross-listed

in the US before that year.<sup>26</sup> Another complication is that depositary banks update the effective date of cross-listing when a cross-listed firm changes its listing type, listing exchange or depositary bank; as a result, the effective date may not reflect the original cross-listing date. I use Datastream's start date, and Factiva to manually check if the effective date on the Bank of New York website is the original cross-listing date. I exclude 114 stocks with incorrect effective dates. My final sample of 295 stocks consists of 49 NYSE-listed, 20 NASDAQ-listed, and 226 OTC stocks. From the Reuters database, I obtain intraday data on traded price, bid price, ask price, and trading volume. I also obtain daily market values in US dollar from Datastream.

### 3.2.2 Methodology

To analyze the change in trading volume and transaction costs I use event study methodology. My event windows are the 240-day period starting 260 days before the cross-listing date  $(-260, -20)$  and the 240-day period starting 20 days after the cross-listing date  $(+20, +260)$ .<sup>27</sup>

Trading volume is defined as traded shares divided by the total number of shares outstanding. I use different measures of transaction costs: the percentage quoted bid-ask spread, the percentage effective bid-ask spread and the percentage price impact (see Foerster and Karolyi (1998), and Eleswarapu and Venkataraman (2006)).

The quoted bid-ask spread,  $QSP$ , is defined as:

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<sup>26</sup> If a stock trades in more than one local market, I obtain data for its principal market only.

<sup>27</sup> I also use a shorter event window, the  $(-140, -20)$  days before and  $(+20, +140)$  days after the event date. The results are similar and are reported in Tables 3.A4 in the Appendix.

$$QSP_{it} = 100 * (Ask_{it} - Bid_{it}) / Midpoint_{it}, \quad (1)$$

where

$QSP_{it}$  : the percentage quoted spread for security  $i$  at time  $t$ ;

$Ask_{it}$  : the quoted ask price for security  $i$  at time  $t$ ;

$Bid_{it}$  : the quoted bid price for security  $i$  at time  $t$ ;

$Midpoint_{it}$  : the midpoint of the ask and bid prices for security  $i$  at time  $t$ , i.e.

$$(Ask_{it} + Bid_{it}) / 2.$$

The effective spread,  $ESP$ , measures how close trades are executed to the midpoint, and is defined as:

$$ESP_{it} = 100 * |Price_{it} - Midpoint_{it}| / Midpoint_{it}, \quad (2)$$

where

$ESP_{it}$  : the percentage effective spread for security  $i$  at time  $t$ ;

$Price_{it}$  : the traded price for security  $i$  at time  $t$ ;

Finally, the price impact is defined as:

$$PRIM_{it} = D_{it} * (Midpoint_{i, t+30} - Midpoint_{it}) / Midpoint_{it}, \quad (3)$$

where

$D_{it}$  : a binary variable that equals 1 for orders at the ask and -1 for orders at the bid.<sup>28</sup>

$Midpoint_{i,t+30}$  : the midpoint of the first reported ask and bid prices at least 30 minutes after a trade.<sup>29</sup> It is a measure of the ‘true’ value of the stock after the trade.

While the quoted and effective spreads measure the total cost of transacting, the price impact represents the cost of information asymmetry among investors as it measures the permanent price impact of a trade (Huang and Stoll (1996)). If cross-listing in the US improves the information environment, as documented in previous studies (see Baker, Nofsinger and Weaver (2002), and Lang, Lins and Miller (2003)), I expect a reduction in information asymmetry among investors. Hence, I expect a significant decrease in the price impact after US cross-listing, especially for firms from countries with lower quality of information environment.<sup>30</sup>

For each liquidity measure (trading volume, quoted spread, effective spread, and price impact), the change in liquidity for stock  $i$  around cross-listing,  $\Delta LIQ_i$ , is defined as the natural logarithm of the ratio of the mean value for  $LIQ_i$ , averaged over the period from day  $t+20$  through day  $t+260$  after the effective cross-listing date, over the mean

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<sup>28</sup> A trade is at the ask side if its price is closer to the ask than to the bid. It is at the bid if its price is closer to the bid than to the ask. Trades at the quote midpoint are classified as at the ask or at the bid based on the ‘tick test’ documented by Lee and Ready (1991).

<sup>29</sup> I also use a 5-minute interval. The results for the price impact, reported in Table 3.A2 in the Appendix, are robust.

<sup>30</sup> In their cross-sectional analysis, Eleswarapu and Venkataraman (2006) find that the US price impact for cross-listed firms is larger for firms from countries with lower quality of accounting standards and less political stability than for firms from countries with better ratings on these measures.

value for  $LIQ_i$  averaged over the period from day  $t-260$  through day  $t-20$  before the cross-listing date. For the three transaction cost measures, I obtain daily observations by calculating the simple average across all observations for the day.

To analyze whether the impact of cross-listing on the change in local liquidity is related to institutional factors, I estimate the following model:

$$\begin{aligned} \Delta LIQ_i = & a + b_1 IP_i + b_2 NYSE_i + b_3 Ln(\Delta PRC)_i \\ & + b_4 Ln(\Delta RVOL)_i + b_5 TICK_i + e_i \end{aligned} \quad (4)$$

The vector  $IP$  represents various institutional factors and proxies for the degree of investor protection and information quality in the local market. I briefly describe these factors and refer to Table 3.A1 in the Appendix for a more detailed description and source. *Common law* is equal to 1 if a country belongs to the common law system, and zero otherwise. *Shareholder protection* for a country is the product of its anti-director rights index and the rule-of-law index divided by 10. The calculated index, used by Rossi and Volpin (2004), and Durnev and Kim (2005), captures both shareholders' de jure rights and the enforceability of these rights. *Accounting standards* measures the general quality of accounting information in a country. *Political stability* measures the stability of a country's political system.<sup>31</sup> *Insider trading* is a dummy equal to 1 if a home country

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<sup>31</sup> Eleswarapu and Venkataraman (2006) argue that political stability is a key factor to the liquidity of capital markets because it affects the level of trust between market participants and the country's political regime.

has had at least one prosecution under insider trading laws at the time of the effective listing date, and zero otherwise (Bhattacharya and Daouk (2002)).

In model (4), I include a NYSE dummy to distinguish stocks cross-listed on the New York Stock Exchange (NYSE) from stocks cross-listed on NASDAQ and OTC markets. Given more stringent listing and disclosure requirements, NYSE-listed stocks are expected to have relatively larger reductions in domestic liquidity costs. I also control for the percentage logarithmic change in the average stock price (in local currency) from the period before the cross-listing to the period after the cross-listing,  $Ln(\Delta PRC)_i$ , and for the logarithmic change in return volatility from the pre-cross-listing period to the post-cross-listing period,  $Ln(\Delta RVOL)_i$ . Return volatility is defined as the standard deviation of stock returns based on the midpoints in the 240-day period before or after the cross-listing date.

Several studies show that the tick size,  $TICK$ , can significantly affect the dynamics of bid-ask spreads (Seppi (1997), Bacidore (1997), and Chakravarty, Harris and Wood (2001)). Therefore, I also include the average relative tick size for each country, reported in Jain (2003), as a control variable.

### **3.3 Empirical Results**

#### **3.3.1 Descriptive Statistics**

For each country in the sample, Table 3.1 documents the number of cross-listed stocks, the average level for each of the four liquidity measures in the period before and

after the cross-listing, and the percentage change in each of these measures. The subscript  $b(a)$  indicates the period from  $(-260, -20)$  days before  $(+20, +260)$  days after) the effective cross-listing date. The top half of Table 3.1 contains the civil law countries and the bottom half of Table 3.1 contains the common law countries. The last three rows show the average of each measure for civil law countries, common law countries, and for the sample as a whole. Note that the averages in the last three rows are computed across all cross-listed stocks from each country group and for the whole sample.

**Table 3.1: Liquidity measures before and after US cross-listing**

This table presents bid-ask spreads, price impact, and volume and their respective changes averaged across US-listed stocks for each home country. QSP and ESP represent the percentage quoted and effective spreads, respectively. PRIM stands for price impact, the percentage change in the midpoint of the ask and bid prices 30 minutes after the trade. VOLM is trading volume as a percentage of total shares outstanding. Subscripts b and a indicate (-260,-20) days before and (+20,+260) days after the cross-listing date, respectively.  $\Delta QSP = \ln(QSP_a / QSP_b)$ ,  $\Delta ESP = \ln(ESP_a / ESP_b)$ ,  $\Delta PRIM = \ln(PRIM_a / PRIM_b)$ , and  $\Delta VOLM = \ln(VOLM_a / VOLM_b)$ . \*\*\*, \*\*, and \* indicate significant at the 1%, 5%, and 10% levels, respectively.

| Country                     | N   | QSP <sub>b</sub> | QSP <sub>a</sub> | $\Delta QSP$ | ESP <sub>b</sub> | ESP <sub>a</sub> | $\Delta ESP$ | PRIM <sub>b</sub> | PRIM <sub>a</sub> | $\Delta PRIM$ | VOLM <sub>b</sub> | VOLM <sub>a</sub> | $\Delta VOLM$ |
|-----------------------------|-----|------------------|------------------|--------------|------------------|------------------|--------------|-------------------|-------------------|---------------|-------------------|-------------------|---------------|
| <b>Civil law countries</b>  |     |                  |                  |              |                  |                  |              |                   |                   |               |                   |                   |               |
| Argentina                   | 1   | 2.15             | 6.53             | 0.84         | 1.16             | 2.06             | 0.57         | 0.00              | 0.10              |               | 0.02              | 0.01              | -0.45         |
| Austria                     | 6   | 1.63             | 1.40             | -0.16 ***    | 0.67             | 0.53             | -0.23 ***    | 0.86              | 0.50              | -2.13         | 0.13              | 0.18              | 0.44 **       |
| Brazil                      | 17  | 11.44            | 5.59             | -0.50 ***    | 3.66             | 1.77             | -0.44 **     | 0.54              | 0.33              | -0.33         | 0.03              | 0.08              | 0.45 *        |
| China                       | 6   | 0.34             | 0.33             | -0.01        | 0.15             | 0.14             | -0.01        | 0.00              | 0.00              | -0.06         | 0.16              | 0.31              | 0.25          |
| Denmark                     | 4   | 3.00             | 2.53             | -0.08        | 0.88             | 0.70             | -0.17        | 0.15              | 0.19              | -0.10         | 0.26              | 0.21              | 0.23          |
| France                      | 2   | 0.99             | 1.78             | 0.16         | 0.39             | 0.72             | 0.16         | 0.11              | 0.29              | 0.22          | 0.10              | 0.26              | 0.17          |
| Germany                     | 14  | 1.15             | 0.91             | -0.12 *      | 0.44             | 0.34             | -0.14 **     | 0.19              | 0.11              | -0.45 **      | 0.83              | 1.03              | 0.42 **       |
| Greece                      | 2   | 1.13             | 1.65             | 0.10         | 0.66             | 0.85             | 0.25 **      | 0.01              | 0.05              | 0.85          | 0.13              | 0.11              | -0.39         |
| Indonesia                   | 4   | 3.38             | 2.93             | -0.17 *      | 0.88             | 0.88             | -0.06        | 0.23              | 0.17              | -0.54 *       | 0.12              | 0.15              | 0.70 **       |
| Italy                       | 4   | 0.77             | 0.80             | -0.10        | 0.47             | 0.40             | -0.24        | 0.02              | 0.03              | -0.18         | 0.21              | 0.30              | -0.38         |
| Korea                       | 3   | 1.63             | 1.07             | -0.19        | 0.69             | 0.44             | -0.16        | 0.03              | 0.01              | -1.31         | 1.69              | 3.29              | 1.04          |
| Luxembourg                  | 1   | 1.10             | 1.08             | -0.02        | 0.64             | 0.66             | 0.03         | 0.09              | 0.08              | -0.15         | 0.67              | 1.19              | 0.57          |
| Mexico                      | 9   | 14.75            | 11.42            | -0.27        | 4.13             | 2.74             | -0.37 *      | 0.47              | 1.19              | -0.15         | 0.35              | 0.20              | -0.02         |
| Netherlands                 | 4   | 0.83             | 0.53             | -0.41 ***    | 0.27             | 0.19             | -0.37 ***    | 0.04              | 0.02              | -1.03 **      | 1.94              | 0.69              | -0.30         |
| Norway                      | 1   | 1.50             | 1.55             | 0.03         | 0.38             | 0.34             | -0.10        | 0.03              | 0.03              | -0.12         | 0.54              | 0.57              | 0.02          |
| Philippines                 | 2   | 7.97             | 8.22             | -0.04        | 2.42             | 2.24             | -0.18        | 0.43              | 0.27              | -0.48         | 3.62              | 16.64             | 1.59 **       |
| Spain                       | 3   | 0.42             | 0.42             | -0.04        | 0.17             | 0.16             | -0.10        | 0.00              | 0.00              | -0.31         | 0.53              | 0.58              | 0.18          |
| Sweden                      | 3   | 0.90             | 1.10             | 0.07         | 0.29             | 0.37             | 0.12         | 0.01              | 0.01              | -0.41         | 0.43              | 0.40              | 0.17          |
| Switzerland                 | 1   | 2.77             | 1.73             | -0.47        | 1.31             | 0.70             | -0.62        | 0.08              | 0.14              | 0.58          | 0.39              | 0.22              | -0.54         |
| Taiwan                      | 44  | 0.61             | 0.59             | -0.07        | 0.26             | 0.24             | -0.07        | 0.00              | 0.00              | -0.24 ***     | 0.00              | 0.00              | 0.44 ***      |
| Turkey                      | 8   | 1.80             | 1.78             | -0.02        | 0.70             | 0.71             | 0.00         | 0.02              | 0.01              | -0.24         | 9.19              | 10.23             | 0.30          |
| <b>Common law countries</b> |     |                  |                  |              |                  |                  |              |                   |                   |               |                   |                   |               |
| Australia                   | 48  | 3.00             | 3.47             | 0.03         | 1.07             | 1.17             | 0.02         | 0.24              | 0.33              | 0.07          | 0.74              | 1.04              | -0.26 ***     |
| Canada                      | 8   | 3.23             | 0.87             | -0.13 *      | 1.06             | 0.25             | -0.14 *      | 0.03              | 0.03              | -0.26         | 0.25              | 0.26              | 0.53 *        |
| India                       | 36  | 0.45             | 0.35             | -0.25 **     | 0.20             | 0.15             | -0.22 ***    | 0.01              | 0.00              | -0.69 ***     | 1.73              | 1.29              | 0.29 *        |
| Ireland                     | 3   | 2.74             | 2.62             | -0.04        | 0.91             | 0.79             | -0.19 *      | 0.14              | 0.09              | -0.28         | 0.16              | 0.20              | 0.12          |
| Malaysia                    | 5   | 1.55             | 1.24             | -0.11        | 0.46             | 0.40             | -0.10        | 0.07              | 0.04              | -0.10         | 0.11              | 0.14              | 0.12          |
| New Zealand                 | 2   | 7.70             | 6.20             | -0.13        | 1.20             | 1.08             | -0.07        | 1.43              | 1.58              | -0.10         | 0.05              | 0.04              | 0.12          |
| Singapore                   | 8   | 1.54             | 1.65             | 0.10         | 0.42             | 0.43             | 0.05         | 0.06              | 0.09              | 0.31          | 0.49              | 0.36              | -0.43 **      |
| Thailand                    | 4   | 6.62             | 6.55             | 0.16         | 2.14             | 1.92             | 0.14         | 0.33              | 0.19              | -0.46         | 0.00              | 0.00              | 0.97          |
| UK                          | 42  | 4.37             | 3.71             | -0.15 **     | 1.33             | 0.88             | -0.26 ***    | 0.07              | 0.08              | 0.01          | 0.77              | 0.59              | 0.12          |
| Civil law average           | 139 | 3.35             | 2.38             | -0.14 ***    | 1.09             | 0.74             | -0.15 ***    | 0.18              | 0.18              | -0.33 ***     | 0.91              | 1.13              | 0.34 ***      |
| Common law average          | 156 | 2.82             | 2.61             | -0.10 ***    | 0.91             | 0.76             | -0.13 ***    | 0.13              | 0.16              | -0.15 *       | 0.88              | 0.82              | 0.05          |
| Total average               | 295 | 3.07             | 2.50             | -0.12 ***    | 0.99             | 0.75             | -0.14 ***    | 0.15              | 0.17              | -0.23 ***     | 0.90              | 0.96              | 0.19 ***      |

There are 139 cross-listed stocks from civil law countries and 156 stocks from common law countries in my sample. Out of the 21 civil law countries that have stocks cross-listed in the US, Taiwan, Brazil, and Germany have the highest number of cross-listed stocks, accounting for approximately 54% of the stocks in this group. Within the group of 9 countries in the common law system, the United Kingdom, Australia, and India have most cross-listed stocks, collectively accounting for 80% of the stocks in this group.

The last row of Table 3.1 show that cross-listed firms, on average, experience significantly lower bid-ask spreads, smaller price impact, and larger domestic trading volume. The decreases in the costs of liquidity are significant for both civil and common law countries. The increase in the local trading volume, however, is only significant for cross-listed firms from civil law countries.

The average domestic quoted and effective spreads show substantial variation across countries.<sup>32</sup> Before cross-listing, firms from Mexico exhibit the highest quoted spread (14.75%) and the highest effective spread (4.13%). Firms from Brazil and the Philippines are also costly to trade. On the other hand, firms from China have the lowest average liquidity costs before cross-listing in the US. The average quoted and effective spreads prior to cross-listing are 0.34% and 0.15%, respectively. Cross-listed firms from Spain, India, and Taiwan also have relatively low transaction costs before US listing.

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<sup>32</sup> I find that my country-average quoted and effective spreads are strongly correlated with the country-average spreads reported in Table 2 of Jain (2003) for similar countries. The Spearman correlation coefficients are 0.73 (0.65) if pre- (post-) US-cross-listing spreads are used; both are significant at the 1% level. Note that the country-average spreads reported in Jain (2003) are computed from January 2000 to April 2000.

Seventy percent of the sample countries show a reduction in the local spreads as measured by  $\Delta QSP$  and  $\Delta ESP$ . Among countries with relatively more observations, Brazil, for example, shows significant decreases of 50% and 44% for the quoted and effective spreads, respectively. Firms from India and the United Kingdom also have significant reductions in the liquidity costs after US cross-listing. The quoted spread decreases by 25% for Indian firms and 15% for UK firms while the decrease in the effective spread is 22% and 26% for the two countries, respectively. Cross-listed firms from Taiwan do not show significant decreases in both measures of the local spread. In contrast, the average local spreads of the 48 cross-listed firms from Australia have a slight increase of 3%. However, this increase is statistically insignificant.

Foerster and Karolyi (1998) report an 11% decrease in the quoted spread and a 7% decrease in the effective spread for cross-listed firms from Canada. Consistent with Foerster and Karolyi's (1998) findings, Table 3.1 shows that the average quoted and effective spreads for Canadian cross-listed firms decrease by 13% and 14%, respectively. Both decreases are significant at the 10% level. Table 3.1 also shows reductions in the local bid-ask spreads for Mexican firms after US cross-listing. Although the 27% decrease in the quoted spread is not significant, the 37% reduction in the effective spread is significant at the 10% level. The results for Mexican firms are consistent with Domowitz, Glen and Madhavan (1998), who measure the implicit spread using Roll's (1984) model, and find that the implicit spread decreases for 17 out of 22 cross-listed stocks.

Similar to the local spreads, the price impact in Table 3.1 exhibits substantial variation across countries. Cross-listed firms from New Zealand, Austria, Brazil, and Mexico have relatively high costs of information asymmetry before US cross-listing. For example, the price impact prior to US listing is 0.86% for the 6 Austrian firms, and 0.54% for the 17 Brazilian firms. On the other hand, cross-listed firms from Taiwan and India have relatively small price impact pre-listing.

The results for the change in the price impact show that for countries with relatively more observations, Germany, Taiwan, and India exhibit significant decreases in the price impact. For example, the price impact for German firms after their US cross-listing is 45% lower compared to the pre-cross-listing level. The decrease in the price impact for Indian firms is even greater, at 69% (significant at the 1% level).

As for the local trading volume, Table 3.1 shows that out of the 30 countries in my sample, eight countries exhibit a significant increase and two countries show a significant decrease. Although the percentage volume change in Table 3.1 should be interpreted with caution due to the low number of observations in some countries, it is interesting to compare this number with previous studies. For example, I find a significant 53% increase in the local trading volume for cross-listed firms from Canada. The result is consistent with the 26% increase in Foerster and Karolyi (1993), and the 20% increase reported in Mittoo (1997).<sup>33</sup> Hargis (1997) reports an overall increase in the

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<sup>33</sup> Note that my 240-day event window is longer than Foerster and Karolyi's (1993) 6-month window, but shorter than Mittoo's (1997) 2-year event window surrounding the cross-listing date. Using an event

domestic trading volume for a majority of his 65 cross-listed stocks from Argentina, Brazil, Chile, and Mexico. In Table 3.1, the local trading volume increases by 44% (significant at the 5% level) for the 17 cross-listed firms from Brazil. The 9 Mexican firms in my sample do not exhibit a significant change in their trading volume.

Table 3.2 presents an overview of the institutional factors and other independent variables used in this study. Cross-listed firms in my sample are from 21 countries with civil law system and 9 countries with common law system. Shareholder protection index, *ADRL*, varies substantially across countries with the full sample mean of 2.3. Canada, the United Kingdom, Australia, New Zealand, and Norway have the highest scores. Mexico, Indonesia, Italy, and the Philippines have the lowest scores of shareholder protection. The mean score for accounting standards, *ACCTG*, for the full sample is 65. Sweden has the most stringent requirements for the disclosure of accounting information with a score of 83, whereas Argentina has the worst rating in accounting standards with a score of only 45. The full sample's average score for political stability, *POLI*, is 78. Countries with the most stable political regimes include Ireland, Sweden, Switzerland, and Australia with scores of higher than 88. Countries with the least stable regimes include Thailand, the Philippines, and India with political stability ratings of lower than 65. Twenty three out of 30 countries in my sample have, at some stage in the past, enforced their insider trading laws, *INSTR*.

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window of 30 days around the effective cross-listing date, Foerster and Karolyi (1998) find a marginal 5% decrease in the local trading volume for Canadian stocks.

**Table 3.2: Institutional factors and some country-level descriptive statistics**

This table presents some country-level descriptive statistics for the sample firms. COMLW is equal 1 if a country belongs to the common law system, and zero otherwise. Shareholder protection, ADRL, is the product of anti-director rights index and rule-of-law index divided by 10. Accounting standards, ACCTG, measure the general quality of accounting information in a country. Political stability, POLI, measures the stability of a country's political system. Insider trading enforcement, INSTR, equals to 1 if there is at least one prosecution under insider trading laws, and zero otherwise. Relative tick size, TICK, is defined as the absolute tick size applicable to price range divided by closing stock price. Market values, MV, are obtained on the effective cross-listing date, and expressed in USD million. PRC and RVOL stand for stock price in local currency and the standard deviation of daily stock returns, respectively. Subscripts b and a indicate (-260,-20) days before and (+20,+260) days after the cross-listing date, respectively.  $\Delta PRC = \ln(PRC_a / PRC_b)$ ,  $\Delta RVOL = \ln(RVOL_a / RVOL_b)$ .

| Country                     | COMLW | ADRL | ACCTG | POLI | INSTR | TICK | MV    | PRC <sub>b</sub> | PRC <sub>a</sub> | $\Delta PRC$ | RVOL <sub>b</sub> | RVOL <sub>a</sub> | $\Delta RVOL$ |
|-----------------------------|-------|------|-------|------|-------|------|-------|------------------|------------------|--------------|-------------------|-------------------|---------------|
| <b>Civil law countries</b>  |       |      |       |      |       |      |       |                  |                  |              |                   |                   |               |
| Argentina                   | 0     | 2.1  | 45    | 71.0 | 1     | 0.38 | 371   | 6.6              | 3.8              | -0.56        | 0.03              | 0.03              | 0.16          |
| Austria                     | 0     | 2.0  | 54    | 85.5 | 0     | 0.03 | 1081  | 881.5            | 761.4            | 0.01         | 0.05              | 0.08              | 0.04          |
| Brazil                      | 0     | 1.9  | 54    | 65.5 | 1     | 1.16 | 1538  | 33.4             | 18.5             | 0.29         | 0.09              | 0.05              | -0.44 ***     |
| China                       | 0     |      |       |      | 0     | 0.09 | 151   | 8.9              | 12.2             | 0.20         | 0.02              | 0.02              | 0.03          |
| Denmark                     | 0     | 2.0  | 62    | 84.5 | 1     | 0.32 | 1964  | 117.2            | 96.1             | -0.26        | 0.03              | 0.03              | -0.05         |
| France                      | 0     | 2.7  | 69    | 76.5 | 1     | 0.07 | 28476 | 28.6             | 21.8             | -0.33        | 0.02              | 0.03              | 0.20          |
| Germany                     | 0     | 0.9  | 62    | 86.0 | 1     | 0.02 | 6678  | 74.5             | 59.8             | -0.20        | 0.04              | 0.03              | -0.09         |
| Greece                      | 0     | 1.2  | 55    | 76.5 | 1     | 1.21 | 11501 | 6005.2           | 6434.0           | 0.10         | 0.03              | 0.05              | 0.22          |
| Indonesia                   | 0     | 0.8  |       | 59.0 | 1     | 1.70 | 687   | 2489.5           | 2299.2           | -0.16        | 0.05              | 0.03              | -0.61 **      |
| Italy                       | 0     | 0.8  | 62    | 77.5 | 1     | 0.15 | 5785  | 11.9             | 13.5             | 0.00         | 0.04              | 0.04              | -0.26         |
| Korea                       | 0     | 1.1  | 62    | 76.0 | 1     | 0.18 | 2865  | 51323.9          | 37541.1          | 0.14         | 0.03              | 0.05              | 0.44          |
| Luxembourg                  | 0     |      |       |      | 0     | 0.31 | 9292  | 12.6             | 14.4             | 0.13         | 0.03              | 0.02              | -0.18         |
| Mexico                      | 0     | 0.5  | 60    | 72.5 | 0     | 0.16 | 783   | 16.6             | 19.7             | 0.05         | 0.12              | 0.05              | -0.49 **      |
| Netherlands                 | 0     | 2.0  | 64    | 84.0 | 1     | 0.05 | 558   | 33.2             | 26.2             | -0.24        | 0.04              | 0.02              | -0.41         |
| Norway                      | 0     | 4.0  | 74    | 88.0 | 1     | 0.42 | 659   | 141.2            | 85.1             | -0.51        | 0.04              | 0.03              | -0.14         |
| Philippines                 | 0     | 0.8  | 65    | 62.0 | 0     | 0.88 | 56    | 7.2              | 18.1             | 0.48         | 0.03              | 0.04              | 0.22          |
| Spain                       | 0     | 3.1  | 64    | 79.5 | 1     | 0.06 | 7431  | 2204.3           | 1266.0           | -1.85        | 0.16              | 0.04              | -0.55         |
| Sweden                      | 0     | 3.0  | 83    | 89.5 | 1     | 0.31 | 3125  | 161.9            | 124.7            | -0.43        | 0.03              | 0.04              | 0.22          |
| Switzerland                 | 0     | 2.0  | 68    | 89.0 | 1     | 0.10 | 20    | 23.1             | 22.8             | -0.01        | 0.04              | 0.02              | -0.93         |
| Taiwan                      | 0     | 2.6  | 65    | 79.0 | 1     | 0.44 | 3728  | 76.5             | 76.0             | -0.02        | 0.03              | 0.03              | -0.01         |
| Turkey                      | 0     | 1.0  | 51    | 68.0 | 1     |      | 3802  | 25266.5          | 22667.9          | -1.03        | 0.11              | 0.07              | -0.34         |
| <b>Common law countries</b> |       |      |       |      |       |      |       |                  |                  |              |                   |                   |               |
| Australia                   | 1     | 4.0  | 75    | 88.5 | 1     | 0.16 | 576   | 3.1              | 3.7              | -0.13 **     | 0.04              | 0.04              | -0.04         |
| Canada                      | 1     | 5.0  | 74    | 85.5 | 1     | 0.16 | 4308  | 29.5             | 36.3             | 0.48         | 0.03              | 0.02              | -0.29         |
| India                       | 1     | 2.1  | 57    | 64.5 | 1     | 0.07 | 952   | 348.0            | 307.5            | 0.03         | 0.04              | 0.04              | -0.02         |
| Ireland                     | 1     | 3.1  |       | 90.5 | 0     | 0.32 | 1994  | 6.9              | 8.1              | 0.22         | 0.02              | 0.01              | -0.15         |
| Malaysia                    | 1     | 2.7  | 76    | 76.0 | 1     | 0.61 | 3032  | 7.8              | 8.5              | 0.04         | 0.02              | 0.02              | -0.12         |
| New Zealand                 | 1     | 4.0  | 70    | 86.5 | 0     | 0.47 | 25    | 1.5              | 1.4              | -0.08        | 0.03              | 0.02              | -0.36         |
| Singapore                   | 1     | 3.4  | 78    | 84.0 | 1     | 0.54 | 743   | 1.8              | 2.3              | 0.06         | 0.06              | 0.03              | -0.04         |
| Thailand                    | 1     | 1.3  | 64    | 60.5 | 1     | 0.88 | 263   | 129.7            | 56.6             | -0.78 ***    | 0.05              | 0.07              | 0.20          |
| UK                          | 1     | 4.3  | 78    | 82.0 | 1     | 0.03 | 2705  | 406.5            | 399.4            | 0.01         | 0.09              | 0.11              | 0.03          |
| Civil law average           | -     | 1.8  | 62    | 77.3 | -     | 0.40 | 3628  | -                | -                | -0.11        | 0.05              | 0.04              | -0.15 ***     |
| Common law average          | -     | 3.3  | 72    | 79.8 | -     | 0.36 | 1501  | -                | -                | -0.02        | 0.05              | 0.06              | -0.03         |
| Total average               | -     | 2.3  | 65    | 78.1 | -     | 0.39 | 2536  | -                | -                | -0.06        | 0.05              | 0.05              | -0.09 ***     |

Most countries have a relative tick size of less than 1% with the exception of Brazil, Greece, and Indonesia. Among countries with relatively small tick sizes are Germany, the United Kingdom, and Austria.

Market value,  $MV$ , is measured on the cross-listing date, and is expressed in millions of US dollars.  $PRC$  stands for stock price in local currency.  $RVOL$  represents the standard deviation of daily stock returns based on the midpoints of the quoted bid and ask prices. The subscripts,  $b$  and  $a$ , indicate the 240 days in the pre- and post-listing periods, respectively. Note that the averages for  $MV$ ,  $PRC$ , and  $RVOL$  in the last three rows are computed across all cross-listed stocks from each country group and for the whole sample.

The mean (median) market value of all cross-listed firms in my sample is USD2,536 million (USD510 million). For cross-listed firms from civil law countries, the mean (median) market value is USD1,501 (USD292) million. For cross-listed firms from common law countries, the mean (median) market value is USD3,628 (USD894) million.<sup>34</sup> The difference between the two means (medians) is statistically significant at the 5% (1%) level. Among countries with relatively many cross-listed firms, Taiwan has the largest average firm size of USD3,728 million.

Across sample countries, there is a wide range of stock prices expressed in local currency. The  $\Delta PRC$  column shows that cross-listed firms, on average, do not experience

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<sup>34</sup> Further analyses (not reported) show that firms cross-listed on the NYSE exchange are significantly larger than firms cross-listed on NASDAQ or OTC markets (USD9,517 million for NYSE firms, USD562 million for NASDAQ firms, and USD1,390 million for OTC firms).

a significant change in their stock price after US cross-listing. The mean price change for the full sample is about -6%, with -11% for firms from civil law countries and -2% for firms from common law countries. However, these changes are not statistically significant, and neither is the difference between civil law and common law countries. Half of the countries in my sample have positive stock returns, and the other half exhibit negative returns around the cross-listing date. All country-average changes are insignificant, except for cross-listed stocks from Australia and Thailand.

Table 3.2 shows that cross-listed firms in the full sample, on average, have their return volatility, *RVOL*, reduced by 9% after cross-listing (significant at the 1% level). The volatility reduction is 15% for firms from civil law countries (significant at the 1% level) and 3% for common law countries (not statistically significant). The difference in the volatility change between civil law and common law countries is significant at the 5% level. Out of the two thirds of the sample countries with volatility reductions, only Brazil, Indonesia, and Mexico experience a statistically significant volatility decrease. No significant increase in return volatility is found in column *ARVOL*.

Panel A of Table 3.3 presents the correlation matrix of the institutional variables used in this study. Almost all institutional variables and investor protection proxies are significantly correlated. The exception is the correlation between insider trading enforcement and political stability. All variables, except insider trading enforcement, are also significantly negatively correlated to relative tick size.

**Table 3.3: Spearman correlations between variables**

| Panel A:                    | Common law       | Shareholder protection | Accounting standards | Political stability | Insider trading enforcement |                   |
|-----------------------------|------------------|------------------------|----------------------|---------------------|-----------------------------|-------------------|
| Shareholder protection      | 0.67<br>(0.00)   |                        |                      |                     |                             |                   |
| Accounting standards        | 0.52<br>(0.00)   | 0.85<br>(0.00)         |                      |                     |                             |                   |
| Political stability         | 0.24<br>(0.00)   | 0.55<br>(0.00)         | 0.62<br>(0.00)       |                     |                             |                   |
| Insider trading enforcement | 0.24<br>(0.00)   | 0.27<br>(0.00)         | 0.22<br>(0.00)       | -0.02<br>(0.76)     |                             |                   |
| Relative tick size          | -0.33<br>(0.00)  | -0.24<br>(0.00)        | -0.17<br>(0.00)      | -0.24<br>(0.00)     | 0.02<br>(0.74)              |                   |
| Panel B:                    | Ln(market value) | Ln(price)              | Ln(volume)           | Return volatility   | Quoted spreads              | Effective spreads |
| Ln(price)                   | 0.51<br>(0.00)   |                        |                      |                     |                             |                   |
| Ln(volume)                  | 0.12<br>(0.06)   | 0.11<br>(0.05)         |                      |                     |                             |                   |
| Return volatility           | -0.33<br>(0.00)  | -0.16<br>(0.01)        | -0.11<br>(0.06)      |                     |                             |                   |
| Quoted spreads              | -0.56<br>(0.00)  | -0.43<br>(0.00)        | -0.22<br>(0.00)      | 0.38<br>(0.00)      |                             |                   |
| Effective spreads           | -0.55<br>(0.00)  | -0.44<br>(0.00)        | -0.21<br>(0.00)      | 0.41<br>(0.00)      | 0.95<br>(0.00)              |                   |
| Price impact                | -0.60<br>(0.00)  | -0.50<br>(0.00)        | -0.27<br>(0.00)      | 0.26<br>(0.00)      | 0.90<br>(0.00)              | 0.86<br>(0.00)    |

Panel B of Table 3.3 presents the correlation matrix of the liquidity measures, and stock price and volatility over the entire event window from day  $t-260$  to day  $t+260$  around the cross-listing date.<sup>35</sup> Panel B shows that larger firms have higher stock price, larger trading volume, lower volatility, and smaller spreads. In addition, stock price and trading volume are negatively correlated with volatility and the measures of liquidity costs. As expected, volatility is positively correlated with the local bid-ask spreads. Finally, the three measures of liquidity costs are strongly correlated to each other. All correlations in Panel B are statistically significant at conventional levels.

### **3.3.2 *Univariate Analysis***

In Table 3.4, I present the results of univariate analysis of the relation between the change in domestic liquidity (trading volume and the measures of transaction costs) and proxies for investor protection and institutional quality. Note that in Table 3.4 the liquidity measures for the pre- and post-cross-listing periods are averaged across all observations in each of the classification groups. Also, in Table 3.4 the change in each of the liquidity measures represents the mean logarithmic change across all observations in each classification group.<sup>36</sup>

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<sup>35</sup> The correlations are slightly lower for the pre-listing period than for the post-listing period.

<sup>36</sup> See Table 3.A5 in the Appendix for the median and the median logarithmic change across all observations in each classification group. The test for statistical significance in Table 3.A5 is based on the Wilcoxon non-parametric test.

**Table 3.4: Liquidity for groups formed by different institutional variables**

This table presents the average bid-ask spreads, the price impact, and volume and their respective changes for different groups. QSP and ESP represent the percentage quoted and effective spreads, respectively. PRIM stands for price impact, the percentage change in the midpoint of the ask and bid prices 30 minutes after the trade. VOLUME is trading volume as a percentage of total shares outstanding. Subscripts b and a indicate (-260,-20) days before and (+20,+260) days after the cross-listing date, respectively. The liquidity measures for the pre- and post-cross-listing periods are averaged across all observations in each of the classification groups.  $\Delta QSP = \ln(QSP_a / QSP_b)$ ,  $\Delta ESP = \ln(ESP_a / ESP_b)$ ,  $\Delta PRIM = \ln(PRIM_a / PRIM_b)$ , and  $\Delta VOLUME = \ln(VOLUME_a / VOLUME_b)$ . The change in each of the liquidity measures represents the mean logarithmic change across all observations in each classification group. Common law is equal 1 if a country belongs to the common law system, and zero otherwise. Shareholder protection is the product of anti-director rights index and rule-of-law index divided by 10. Accounting standards measure the general quality of accounting information in a country. Political stability measures the stability of a country's political system. Insider trading enforcement equals to 1 if there is at least one prosecution under insider trading laws, and zero otherwise. Host markets are where a cross-listed stock is listed on. \*\*\*, \*\*, and \* indicate significant at the 1%, 5%, and 10% levels, respectively.

|                                  | N   | QSP <sub>b</sub> | QSP <sub>a</sub> | $\Delta QSP$ | ESP <sub>b</sub> | ESP <sub>a</sub> | $\Delta ESP$ | PRIM <sub>b</sub> | PRIM <sub>a</sub> | $\Delta PRIM$ | VOLUME <sub>b</sub> | VOLUME <sub>a</sub> | $\Delta VOLUME$ |
|----------------------------------|-----|------------------|------------------|--------------|------------------|------------------|--------------|-------------------|-------------------|---------------|---------------------|---------------------|-----------------|
| Panel A: Origin of legal systems |     |                  |                  |              |                  |                  |              |                   |                   |               |                     |                     |                 |
| Civil law                        | 139 | 3.35             | 2.38             | -0.14 ***    | 1.09             | 0.74             | -0.15 ***    | 0.18              | 0.18              | -0.33 ***     | 0.91                | 1.13                | 0.33 ***        |
| Common law                       | 156 | 2.82             | 2.61             | -0.10 ***    | 0.91             | 0.76             | -0.13 ***    | 0.13              | 0.16              | -0.15 *       | 0.88                | 0.82                | 0.05            |
| Difference (civil vs. common)    |     | 0.52             | -0.24            | -0.04        | 0.18             | -0.02            | -0.02        | 0.05              | 0.02              | -0.19 *       | 0.03                | 0.31                | 0.28 **         |
| Panel B: Shareholder protection  |     |                  |                  |              |                  |                  |              |                   |                   |               |                     |                     |                 |
| Lowest quality tercile           | 44  | 4.56             | 3.73             | -0.14 ***    | 1.39             | 1.05             | -0.17 ***    | 0.20              | 0.31              | -0.36 ***     | 2.33                | 3.25                | 0.35 **         |
| Tercile 2                        | 119 | 2.49             | 1.61             | -0.18 ***    | 0.85             | 0.55             | -0.18 ***    | 0.14              | 0.09              | -0.46 ***     | 0.65                | 0.43                | 0.35 ***        |
| Highest quality tercile          | 125 | 3.24             | 3.03             | -0.06        | 1.03             | 0.87             | -0.11 ***    | 0.15              | 0.20              | 0.01          | 0.62                | 0.69                | 0.04            |
| Difference (lowest vs. highest)  |     | 1.32             | 0.71             | -0.08        | 0.36             | 0.18             | -0.06        | 0.05              | 0.12              | -0.37 ***     | 1.70 **             | 2.56 *              | 0.31 *          |
| Panel C: Accounting standards    |     |                  |                  |              |                  |                  |              |                   |                   |               |                     |                     |                 |
| Lowest quality tercile           | 70  | 3.42             | 2.00             | -0.25 ***    | 1.16             | 0.69             | -0.23 ***    | 0.21              | 0.13              | -0.58 ***     | 2.34                | 1.89                | 0.31 **         |
| Tercile 2                        | 91  | 2.67             | 2.24             | -0.10 ***    | 0.85             | 0.65             | -0.13 ***    | 0.11              | 0.16              | -0.33 ***     | 0.41                | 0.72                | 0.37 ***        |
| Highest quality tercile          | 120 | 3.32             | 3.09             | -0.06 *      | 1.06             | 0.89             | -0.11 **     | 0.16              | 0.20              | 0.03          | 0.64                | 0.70                | 0.03            |
| Difference (lowest vs. highest)  |     | 0.10             | -1.09 **         | -0.19 **     | 0.11             | -0.20            | -0.12        | 0.06              | -0.07             | -0.61 ***     | 1.70 **             | 1.19                | 0.28 **         |
| Panel D: Political stability     |     |                  |                  |              |                  |                  |              |                   |                   |               |                     |                     |                 |
| Lowest stability tercile         | 63  | 4.23             | 2.57             | -0.28 ***    | 1.37             | 0.81             | -0.25 ***    | 0.20              | 0.12              | -0.56 ***     | 1.33                | 1.30                | 0.44 ***        |
| Tercile 2                        | 123 | 3.10             | 2.65             | -0.10 ***    | 0.97             | 0.72             | -0.15 ***    | 0.07              | 0.13              | -0.12         | 0.96                | 1.00                | 0.23 ***        |
| Highest stability tercile        | 102 | 2.49             | 2.42             | -0.05 *      | 0.84             | 0.78             | -0.08 **     | 0.24              | 0.25              | -0.17 *       | 0.65                | 0.75                | 0.06            |
| Difference (lowest vs. highest)  |     | 1.75 *           | 0.15             | -0.22 ***    | 0.53             | 0.03             | -0.17 **     | -0.04             | -0.13 **          | -0.38 **      | 0.69                | 0.54                | 0.38 **         |
| Panel E: Insider trading         |     |                  |                  |              |                  |                  |              |                   |                   |               |                     |                     |                 |
| Without enforcement              | 29  | 6.39             | 5.20             | -0.13 *      | 1.82             | 1.32             | -0.20 ***    | 0.47              | 0.61              | -0.48 *       | 0.46                | 1.37                | 0.28            |
| With enforcement                 | 266 | 2.71             | 2.21             | -0.12 ***    | 0.90             | 0.69             | -0.14 ***    | 0.12              | 0.12              | -0.21 ***     | 0.95                | 0.92                | 0.21 ***        |
| Difference (without vs. with)    |     | 3.68 *           | 3.00 *           | -0.02        | 0.91             | 0.63 *           | -0.07        | 0.35 **           | 0.49 **           | -0.28         | -0.48               | 0.46                | 0.07            |
| Panel F: Host markets            |     |                  |                  |              |                  |                  |              |                   |                   |               |                     |                     |                 |
| NYSE                             | 49  | 3.47             | 1.38             | -0.28 ***    | 1.21             | 0.50             | -0.29 ***    | 0.11              | 0.06              | -0.45 ***     | 1.00                | 0.58                | 0.27 **         |
| NASD                             | 20  | 2.77             | 2.50             | -0.06        | 0.99             | 0.81             | -0.08        | 0.08              | 0.10              | 0.10          | 0.53                | 0.56                | 0.05            |
| OTC                              | 226 | 3.01             | 2.75             | -0.09 ***    | 0.95             | 0.80             | -0.12 ***    | 0.17              | 0.20              | -0.22 ***     | 0.91                | 1.08                | 0.18 ***        |
| Difference (NYSE vs. OTC)        |     | 0.46             | -1.37 ***        | -0.19 **     | 0.27             | -0.29 **         | -0.17 **     | -0.06             | -0.14 ***         | -0.23         | 0.22                | 0.11                | 0.10            |
| Difference (NYSE vs. NASD)       |     | 0.70             | -1.12 **         | -0.22 *      | 0.22             | -0.31            | -0.21        | 0.02              | -0.05             | -0.54 **      | 0.47                | 0.02                | 0.23            |
| Difference (NASD vs. OTC)        |     | -0.24            | -0.25            | 0.03         | 0.04             | 0.01             | 0.03         | -0.08 **          | -0.09 *           | 0.31          | -0.38               | -0.52               | -0.13           |

Panel A of Table 3.4 shows that the local bid-ask spreads, on average, are not significantly different between firms from civil law and common law countries, both before and after the cross-listing date. Both groups of countries experience significant decreases in the quoted and effective spreads. The decrease in the quoted spread is 14% for firms from civil law countries and 10% for firms from common law countries. The decrease in the effective spread is 15% and 13% for firms from the two groups of countries, respectively. There is no significant difference in the spread reduction between the two groups. The decrease in the price impact is 33% for civil law countries (significant at the 1% level) and 15% for common law countries (significant at the 10% level). The 19% difference in the price impact reduction between the two groups of countries is statistically significant at the 10% level. The local trading volume increases by 33% for civil law countries (significant at the 1% level) and 5% for common law countries (not statistically significant) after US cross-listing. The 28% difference in the volume increase between the two groups is significant at the 5% level.

In Panels B to D of Table 3.4, I sort cross-listed firms into three groups basing on their home countries' shareholder protection, accounting standards, and political stability. I then compare the means of trading volume and the cost of liquidity between the first and third terciles.

Panel B shows that the average quoted (effective) spread exhibits a significant 14% (17%) decrease for firms from the lowest shareholder protection tercile after US cross-listing. Similar decreases are also seen for firms in the second tercile. Cross-listed

firms from countries with the most effective shareholder protection laws also experience narrower local spreads, but the reductions are only significant for the effective spread. The differences in the spread changes between the lowest and highest quality terciles are not statistically significant. As for the cost of information asymmetry, Panel B shows that US cross-listing significantly reduces the price impact for firms from countries where investors are least protected. These firms experience a 36% decrease in the price impact, which is significantly higher than the 1% price impact change for firms from countries with the strongest shareholder protection. Local trading activity is generally higher for firms from countries with the weakest shareholder protection compared to those from the strongest protection group, both before and after US cross-listing. In addition, firms in the former group exhibit a significant 35% increase in the local trading volume post-listing, which is significantly higher than the increase of 4% for firms in the latter group.

The results for accounting standards are presented in Panel C. The results show similar patterns as in Panel B. The local spreads and the price impact decrease the most for firms from countries with the lowest quality of accounting information. The local spreads are also significantly lower for firms from countries with the most stringent accounting standards after US cross-listing. However, there is no significant change in the price impact post-listing for these countries. The differences in the liquidity changes between the lowest and highest accounting quality groups are significant for the quoted spread and the price impact, but insignificant for the effective spread. Trading volume increases by 31% for countries with the least stringent accounting standards, which is

significantly higher than the 3% volume change for countries with the highest accounting quality.

Panel D shows the results for political stability. Generally, the results indicate that political stability of a country from which a firm cross-lists its shares on the US markets significantly affects the liquidity costs of the firm after the cross-listing. Firms in the lowest and highest stability groups experience significant reductions in the local bid-ask spreads and the price impact. However, the reductions are significantly larger for the former group than for the latter. For instance, the decrease in the effective spread is 17% larger for the lowest stability tercile than for the highest stability tercile (-25% versus -8%). As for trading volume, the results show similar patterns as in Panels B and C. Trading volume increases significantly for countries with the least stable political regimes, and this increase is significantly larger than for countries with the most stable political regimes.

Following Eleswarapu and Venkataraman (2006), I use insider trading enforcement as another proxy for the degree of investor protection. Panel E indicates that whether or not insider trading laws in the home country have ever been enforced does not affect the change in the local spreads, the price impact, and the local trading volume. Firms from both groups of countries exhibit significant decreases in the measures of liquidity costs. However, the decreases for countries without enforcement are not different from the decreases for countries with enforcement of insider trading laws. There

is a significant increase in trading volume for the latter group, but that increase does not statistically differ from the increase for the former group of countries.

In the last panel, I examine whether the host market where a cross-listed stock is traded affects the change in liquidity on the local market. Firms cross-listed on the NYSE and OTC market have significant reductions in the costs of liquidity, as well as significant increases in trading volume. NASDAQ-listed stocks appear to have no significant changes in any of the liquidity measures. Compared to OTC-listed stocks, NYSE-listed stocks exhibit significantly larger decreases in the local spreads. The difference in the change of the price impact is not statistically significant. Compared to NASDAQ-listed stocks, NYSE-listed stocks have significantly larger reductions in the quoted spread and the price impact. The difference in the change of the effective spread is insignificant. There is no difference between NASDAQ-listed and OTC-listed stocks in the change of the liquidity costs. Pair-wise comparisons for the changes in trading volume do not show significant differences among the host markets.

### ***3.3.3 Multivariate Analysis***

The univariate results in the previous section indicate positive relations between the change in the domestic liquidity measures and the degree of investor protection and institutional quality. In this section, I further examine these relations with a multivariate analysis using model (4) in section 3.2. Since previous studies show that firm-level characteristics and the relative tick size of the local market affect liquidity costs and

trading volume, I need to control for these factors. The results for model (4) are presented in Panels A and B of Table 3.5.

**Table 3.5: Regressions of the change in liquidity on proxies for investor protection and institutional quality**

This table presents the OLS regression results for different liquidity measures. Dependent variables are the change in the quoted spread, the effective spread, the price impact, and the domestic trading volume between (-260,-20) days before and (+20,+260) days after the US cross-listing date. All changes are in logarithm. Independent variables include common law, which is equal 1 if a country belongs to the common law system, and zero otherwise; shareholder protection, the product of anti-director rights index and rule-of-law index divided by 10; accounting standards, measuring the general quality of accounting information in a country; political stability, measuring the stability of a country's political system; and insider trading, which equals to 1 if there is at least one prosecution under insider trading laws, and zero otherwise. Control variables are NYSE-listed stocks, tick size, log change in the local share price, and log change in the stock return volatility after US cross-listing. T-statistics in parentheses are corrected for heteroskedasticity. \*\*\*, \*\*, and \* indicate significant at the 1%, 5%, and 10% levels, respectively.

| Panel A:               | Change in the quoted spread |                      |                      |                      |                      | Change in the effective spread |                      |                      |                      |                      |
|------------------------|-----------------------------|----------------------|----------------------|----------------------|----------------------|--------------------------------|----------------------|----------------------|----------------------|----------------------|
|                        | (1)                         | (2)                  | (3)                  | (4)                  | (5)                  | (1)                            | (2)                  | (3)                  | (4)                  | (5)                  |
| Intercept              | -0.11<br>(-2.43) **         | -0.21<br>(-2.73) *** | -0.57<br>(-2.30) **  | -0.73<br>(-2.32) **  | -0.07<br>(-0.95)     | -0.16<br>(-3.54) ***           | -0.23<br>(-3.13) *** | -0.47<br>(-2.05) **  | -0.68<br>(-2.38) **  | -0.15<br>(-2.20) **  |
| Common law             | 0.03<br>(0.69)              |                      |                      |                      |                      | 0.03<br>(0.71)                 |                      |                      |                      |                      |
| Shareholder protection |                             | 0.04<br>(1.87) *     |                      |                      |                      |                                | 0.03<br>(1.35)       |                      |                      |                      |
| Accounting standards   |                             |                      | 0.01<br>(2.02) **    |                      |                      |                                |                      | 0.00<br>(1.47)       |                      |                      |
| Political stability    |                             |                      |                      | 0.01<br>(2.14) **    |                      |                                |                      |                      | 0.01<br>(1.98) **    |                      |
| Insider trading        |                             |                      |                      |                      | -0.03<br>(-0.39)     |                                |                      |                      |                      | 0.01<br>(0.17)       |
| NYSE-listed            | -0.17<br>(-2.69) ***        | -0.17<br>(-2.73) *** | -0.15<br>(-2.53) **  | -0.16<br>(-2.55) **  | -0.17<br>(-2.70) *** | -0.15<br>(-2.57) **            | -0.15<br>(-2.55) **  | -0.14<br>(-2.40) **  | -0.14<br>(-2.38) **  | -0.15<br>(-2.61) *** |
| Ln(Aprice)             | -0.28<br>(-4.10) ***        | -0.27<br>(-4.04) *** | -0.27<br>(-4.10) *** | -0.27<br>(-4.07) *** | -0.28<br>(-4.05) *** | -0.26<br>(-4.19) ***           | -0.26<br>(-4.12) *** | -0.25<br>(-4.14) *** | -0.25<br>(-4.15) *** | -0.26<br>(-4.11) *** |
| Ln(Avolatility)        | 0.14<br>(1.85) *            | 0.15<br>(1.96) **    | 0.15<br>(1.94) *     | 0.15<br>(2.09) **    | 0.15<br>(1.89) *     | 0.19<br>(2.51) **              | 0.19<br>(2.57) **    | 0.20<br>(2.56) **    | 0.20<br>(2.69) ***   | 0.19<br>(2.53) **    |
| Tick size              | 0.01<br>(0.14)              | 0.04<br>(0.57)       | 0.06<br>(0.68)       | 0.08<br>(1.04)       | -0.01<br>(-0.09)     | 0.10<br>(1.37)                 | 0.12<br>(1.68) *     | 0.12<br>(1.41)       | 0.16<br>(2.02) **    | 0.08<br>(1.18)       |
| _ADJRSQ_               | 0.20                        | 0.21                 | 0.22                 | 0.22                 | 0.20                 | 0.19                           | 0.19                 | 0.20                 | 0.20                 | 0.19                 |
| N obs                  | 287                         | 280                  | 273                  | 280                  | 287                  | 287                            | 280                  | 273                  | 280                  | 287                  |

**Table 3.5 (continued)**

| Panel B:                 | Change in the price impact |                      |                      |                      |                     | Change in the local trading volume |                    |                     |                     |                    |
|--------------------------|----------------------------|----------------------|----------------------|----------------------|---------------------|------------------------------------|--------------------|---------------------|---------------------|--------------------|
|                          | (1)                        | (2)                  | (3)                  | (4)                  | (5)                 | (1)                                | (2)                | (3)                 | (4)                 | (5)                |
| Intercept                | -0.41<br>(-3.13) ***       | -0.86<br>(-4.28) *** | -2.63<br>(-3.89) *** | -2.10<br>(-2.67) *** | -0.44<br>(-1.80) *  | 0.27<br>(2.59) ***                 | 0.40<br>(2.37) **  | 1.11<br>(2.62) ***  | 1.24<br>(2.24) **   | 0.25<br>(1.54)     |
| Common law               | 0.24<br>(1.86) *           |                      |                      |                      |                     | -0.19<br>(-1.89) *                 |                    |                     |                     |                    |
| Shareholder protection   |                            | 0.19<br>(3.80) ***   |                      |                      |                     |                                    | -0.09<br>(-1.92) * |                     |                     |                    |
| Accounting standards     |                            |                      | 0.03<br>(3.68) ***   |                      |                     |                                    |                    | -0.01<br>(-2.40) ** |                     |                    |
| Political stability      |                            |                      |                      | 0.02<br>(2.47) **    |                     |                                    |                    |                     | -0.01<br>(-2.08) ** |                    |
| Insider trading          |                            |                      |                      |                      | 0.24<br>(0.99)      |                                    |                    |                     |                     | -0.14<br>(-0.84)   |
| NYSE-listed              | -0.24<br>(-1.67) *         | -0.26<br>(-1.86) *   | -0.22<br>(-1.59)     | -0.24<br>(-1.72) *   | -0.28<br>(-1.90) *  | 0.11<br>(0.83)                     | 0.13<br>(1.00)     | 0.10<br>(0.82)      | 0.10<br>(0.80)      | 0.13<br>(1.01)     |
| Ln(Aprice)               | -0.27<br>(-2.33) **        | -0.26<br>(-2.27) **  | -0.24<br>(-2.24) **  | -0.24<br>(-2.14) **  | -0.25<br>(-2.12) ** | 0.11<br>(0.99)                     | 0.10<br>(0.89)     | 0.10<br>(0.87)      | 0.09<br>(0.80)      | 0.10<br>(0.87)     |
| Ln( $\Delta$ volatility) | -0.03<br>(-0.20)           | -0.02<br>(-0.10)     | -0.05<br>(-0.35)     | 0.00<br>(0.03)       | -0.02<br>(-0.15)    | 0.41<br>(3.02) ***                 | 0.39<br>(2.88) *** | 0.40<br>(2.99) ***  | 0.38<br>(2.91) ***  | 0.41<br>(3.03) *** |
| Tick size                | 0.23<br>(1.15)             | 0.34<br>(1.89) *     | 0.52<br>(2.28) **    | 0.36<br>(1.78) *     | 0.08<br>(0.46)      | 0.24<br>(1.59)                     | 0.25<br>(1.69) *   | 0.18<br>(0.99)      | 0.20<br>(1.28)      | 0.36<br>(2.62) *** |
| _ADJRSQ_                 | 0.03                       | 0.07                 | 0.10                 | 0.05                 | 0.03                | 0.08                               | 0.08               | 0.08                | 0.08                | 0.07               |
| N obs                    | 275                        | 268                  | 261                  | 268                  | 275                 | 285                                | 278                | 271                 | 278                 | 285                |

In Panel A of Table 3.5, the dependent variables are the change in the quoted and effective spreads. The results for the quoted spread show that the decrease is significantly larger for firms from countries with weaker legal protection of shareholder rights and lower quality of accounting information. The result for shareholder protection indicates that if country A's shareholder protection score is one point lower than country B's protection score, firms from country A, on average, will experience a 4% larger decrease in the local quoted spread after they cross-list in the US, compared to cross-listed firms from country B. Similarly, if accounting standards score is ten points lower for country A than for country B, cross-listed firms from the former country, on average, will have a 10% larger decrease in the local quoted spread post-US-listing, compared to cross-listed firms from the latter country.

In addition to investor protection and information quality, political stability of the home country also has a significant impact on the liquidity costs for cross-listed firms. Cross-listed firms from countries with less stable political regimes exhibit a significantly larger decrease in the quoted spread after US listing. The coefficients for common law and insider trading are not statistically significant, consistent with the results in Table 3.4.

Investor protection and institutional factors have similar effects on the change in the effective spread. However, the effects are only statistically significant for political stability.

Panel A also shows that stocks cross-listed on the New York Stock Exchange (NYSE) exhibit significantly larger decreases in the local spreads than stocks cross-listed on NASDAQ and OTC markets. The average spread decrease for NYSE-listed firms is about 15% larger than the average decrease for non-NYSE-listed firms.<sup>37</sup> The results for the NYSE dummy are consistent with the “bonding” argument by Coffee (2002). The commitment to bond themselves to the market with the most stringent disclosure requirements and corporate governance results in significantly lower liquidity costs for firms that cross-list on the NYSE.

The results for the control variables show that the local bid-ask spreads, as expected, are negatively correlated with stock returns and positively correlated with stock return volatility around the listing date.<sup>38</sup> There is weak evidence that the tick size affects the change in the local spreads after US cross-listing.

Panel B of Table 3.5 presents the results for the change in the price impact and the change in the local trading volume. All investor protection and institutional factors, except insider trading, have a significant impact on the change in the price impact after US cross-listing. The positive coefficients of these variables suggest that cross-listed firms from countries with the civil law system, weaker shareholder protection, looser accounting standards, and less political stability experience a significantly larger

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<sup>37</sup> As a robustness test, I use another dummy that is equal 1 if a stock is cross-listed on NYSE or NASDAQ, and zero otherwise. The unreported results are similar.

<sup>38</sup> I do not include the change in trading volume as a control variable because it is also a dependent variable in my study. Table 3.A3 in the Appendix shows that when trading volume is included as a control variable, the coefficients of investor protection and institutional factors become insignificant for the quoted and effective spreads. However, the effects of accounting standards and shareholder protection are still statistically significant at the 5% level for the price impact. Table 3.A3 shows robust results for the effect of NYSE-listing.

improvement in information environment post-US-listing, which, in turn, reduces the cost of information asymmetry among investors. The result for accounting standards, for instance, indicates that if the score for the quality of accounting information is ten points lower for country A than for country B, the reduction in the cost of information asymmetry after US-listing is, on average, 30% larger for cross-listed firms from country A than for cross-listed firms from country B. Similarly, a 10-point difference in the score for political stability between the two countries, on average, will result in a 20% greater reduction in the price impact post-US-listing for firms from the country with a less stable regime. As expected, the coefficient for NYSE-listed stocks is negative and statistically significant at the 10% level for 4 out of 5 specifications.

The results for the change in the domestic trading volume show that the change in volume depends on the quality of investor protection and institutional factors of the home country. The result in specification (1) shows that there is a significant 19% larger increase in the local trading volume for cross-listed firms from civil law countries compared to firms from common law countries (significant at the 10% level). In addition, a one-point difference in shareholder protection index is associated with a 9% larger increase in the local trading volume after US listing for cross-listed firms from countries with less protection. The NYSE-listed coefficient does not indicate any significant difference in the volume change between NYSE-listed stocks and non-NYSE-listed stocks, consistent with the results in Table 3.4.

Overall, the results in Table 3.5 confirm the univariate results in Table 3.4 and show that investor protection, information quality, and political stability of the home country have a significant impact on liquidity for firms that cross-list on the US markets after the listing. Also, firms that choose to cross-list on the NYSE experience larger reductions in their local spreads and price impact post-listing.

### **3.4. Conclusion**

This chapter contributes to the existing literature on the relation between macro-level institutions and micro-level liquidity costs for cross-listed firms, a research area that has long been hampered by lack of transaction data in the home markets.

Using transaction data from Reuters for a sample of 295 stocks cross-listed in the US from 30 different countries, I find evidence of significant reductions in domestic liquidity costs. In addition, I find that the degree of investor protection and institutional quality in the home market affect the extent of US cross-listing benefits. For cross-listed firms from countries with weaker shareholder protection, poorer accounting information, and less political stability, there are larger decreases in the local spreads and the price impact post-US-listing. Moreover, I find that domestic trading volume increases more for firms from these countries. Finally, I find that compared to non-NYSE-listed stocks, NYSE-listed stocks, on average, have a 15% larger decrease in the local spreads and a 26% larger decrease in the price impact after US listing.

The results, especially for the price impact and NYSE-listed stocks, in this chapter are consistent with the idea that by cross-listing in the US firms can improve their information environment due to more stringent disclosure requirements in the US (Coffee (2002)). The results also support empirical evidence in previous studies that the information environment for cross-listed firms improves after US listing.

### 3.5 Appendix

**Table 3.A1: Descriptions and sources of institutional and investor protection variables**

| Variable                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Source                           |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Accounting standards        | Index measuring the quality of the disclosure of accounting information in each target country. The index value is obtained by rating its companies' 1990 annual reports on their inclusion or omission of 90 items.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | LLSV                             |
| Anti-director rights        | Index of six anti-director rights: right to vote by mail, right not to deposit shares with the company or a financial intermediary several days before a shareholder meeting, right to voting cumulatively for directors, right to litigate against oppression by directors, pre-emptive right to buy new issues of stock, and minimum percentage of share capital needed to call an extraordinary shareholders' meeting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | LLSV                             |
| Common law                  | Equals one if the home country belongs to the English common law system, and zero otherwise.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | LLSV                             |
| Insider trading enforcement | Equals one if insider trading laws has been enforced, and zero otherwise. It is derived from a survey of national regulators and officials of stock exchanges in March 1999.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Bhattacharya and Daouk (2002)    |
| Political stability         | “Assessment of the ‘political stability of the countries on a comparable basis,’ by assigning risk points to a pre-set group of risk components as of January 2005. The minimum number of points assigned to each component is zero, while the maximum number of points is a function of the components’ weight in the overall political stability assessment. The risk components (and maximum points) are: government stability (e.g., popular support) (12), socioeconomic conditions (e.g., poverty) (12), investment profile (e.g., expropriation) (12), internal conflict (e.g., terrorism or civil war) (12), external conflict (e.g., war) (12), corruption (6), military in politics (6), religion in politics (6), law and order (6), ethnic tensions (6), democratic accountability (6) and bureaucracy quality (4). Scale from zero to 100; low scores indicate low political stability.” | International Country Risk Guide |
| Relative tick size          | Equals absolute tick size applicable to price range divided by closing stock price, then averaged across time and 25 largest stocks for each country from January to April 2000.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Jain (2003)                      |
| Rule of law                 | Assessment of law and order tradition in the country provided by the country risk rating agency International Country Risk. Average of the months of April and October of the monthly index between 1982 and 1995. Scale from zero to 10, with lower scores for less tradition for law and order.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | LLSV                             |
| Shareholder protection      | Product of rule of law and anti-director rights divided by ten.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | LLSV                             |

**Table 3.A2: Dependent variable is the change in the price impact for the 5-minute interval**

Dependent variables are the logarithmic change in the price impact between (-260,-20) days before and (+20,+260) days after the US cross-listing date. Independent variables include common law, which is equal 1 if a country belongs to the common law system, and zero otherwise; shareholder protection, the product of anti-director rights index and rule-of-law index divided by 10; accounting standards, measuring the general quality of accounting information in a country; political stability, measuring the stability of a country's political system; and insider trading, which equals to 1 if there is at least one prosecution under insider trading laws, and zero otherwise. Control variables are NYSE-listed stocks, tick size, log change in the local share price, and log change in the stock return volatility after US cross-listing. T-statistics in parentheses are corrected for heteroskedasticity. \*\*\*, \*\*, and \* indicate significant at the 1%, 5%, and 10% levels, respectively.

|                          | (1)                  | (2)                  | (3)                  | (4)                  | (5)                 |
|--------------------------|----------------------|----------------------|----------------------|----------------------|---------------------|
| Intercept                | -0.25<br>(-2.76) *** | -0.60<br>(-4.25) *** | -1.70<br>(-3.71) *** | -1.53<br>(-2.97) *** | -0.17<br>(-1.13)    |
| Common law               | 0.18<br>(2.07) **    |                      |                      |                      |                     |
| Shareholder protection   |                      | 0.15<br>(4.13) ***   |                      |                      |                     |
| Accounting standards     |                      |                      | 0.02<br>(3.57) ***   |                      |                     |
| Political stability      |                      |                      |                      | 0.02<br>(2.88) ***   |                     |
| Insider trading          |                      |                      |                      |                      | 0.07<br>(0.44)      |
| NYSE-listed              | -0.23<br>(-2.38) **  | -0.25<br>(-2.57) **  | -0.21<br>(-2.14) **  | -0.22<br>(-2.22) **  | -0.25<br>(-2.51) ** |
| Ln( $\Delta$ price)      | -0.26<br>(-2.59) *** | -0.25<br>(-2.54) **  | -0.24<br>(-2.54) **  | -0.23<br>(-2.42) **  | -0.25<br>(-2.42) ** |
| Ln( $\Delta$ volatility) | 0.12<br>(0.95)       | 0.14<br>(1.14)       | 0.11<br>(0.98)       | 0.15<br>(1.33)       | 0.12<br>(1.01)      |
| Tick size                | 0.10<br>(0.79)       | 0.18<br>(1.54)       | 0.27<br>(1.80) *     | 0.20<br>(1.45)       | -0.01<br>(-0.06)    |
| _ADJRSQ_                 | 0.07                 | 0.12                 | 0.13                 | 0.10                 | 0.06                |
| N_obs                    | 284                  | 277                  | 270                  | 277                  | 284                 |

**Table 3.A3: Regression results for the change in liquidity costs with the change in the local trading volume as a control variable**

This table presents the OLS regression results for different liquidity measures. Dependent variables are the change in the quoted spread, the effective spread, and the price impact between (-260,-20) days before and (+20,+260) days after the US cross-listing date. All changes are in logarithm. Independent variables include common law, which is equal 1 if a country belongs to the common law system, and zero otherwise; shareholder protection, the product of anti-director rights index and rule-of-law index divided by 10; accounting standards, measuring the general quality of accounting information in a country; political stability, measuring the stability of a country's political system; and insider trading, which equals to 1 if there is at least one prosecution under insider trading laws, and zero otherwise. Control variables are NYSE-listed stocks, tick size, log change in the local share price, log change in the stock return volatility, and log change in local trading volume after US cross-listing. T-statistics in parentheses are corrected for heteroskedasticity. \*\*\*, \*\*, and \* indicate significant at the 1%, 5%, and 10% levels, respectively.

|                          | Change in the quoted spread |                      |                      |                      |                      | Change in the effective spread |                      |                      |                      |                      | Change in the price impact |                      |                      |                      |                      |
|--------------------------|-----------------------------|----------------------|----------------------|----------------------|----------------------|--------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------------|----------------------|----------------------|----------------------|----------------------|
|                          | (1)                         | (2)                  | (3)                  | (4)                  | (5)                  | (1)                            | (2)                  | (3)                  | (4)                  | (5)                  | (1)                        | (2)                  | (3)                  | (4)                  | (5)                  |
| Intercept                | -0.04<br>(-1.02)            | -0.09<br>(-1.60)     | -0.23<br>(-1.22)     | -0.35<br>(-1.47)     | -0.00<br>(-0.01)     | -0.10<br>(-2.41) **            | -0.13<br>(-2.17) **  | -0.18<br>(-0.97)     | -0.35<br>(-1.64)     | -0.09<br>(-1.67) *   | -0.21<br>(-1.91) *         | -0.52<br>(-3.25) *** | -1.58<br>(-2.60) *** | -0.83<br>(-1.33)     | -0.30<br>(-1.39)     |
| Common law               | -0.04<br>(-0.83)            |                      |                      |                      |                      | -0.02<br>(-0.55)               |                      |                      |                      |                      | 0.05<br>(0.40)             |                      |                      |                      |                      |
| Shareholder protection   |                             | 0.01<br>(0.41)       |                      |                      |                      |                                | 0.00<br>(0.10)       |                      |                      |                      |                            | 0.10<br>(2.39) **    |                      |                      |                      |
| Accounting standards     |                             |                      | 0.00<br>(0.86)       |                      |                      |                                |                      | 0.00<br>(0.31)       |                      |                      |                            |                      | 0.02<br>(2.34) **    |                      |                      |
| Political stability      |                             |                      |                      | 0.00<br>(1.21)       |                      |                                |                      |                      | 0.00<br>(1.10)       |                      |                            |                      |                      | 0.01<br>(1.05)       |                      |
| Insider trading          |                             |                      |                      |                      | -0.08<br>(-1.31)     |                                |                      |                      |                      | -0.03<br>(-0.57)     |                            |                      |                      |                      | 0.13<br>(0.62)       |
| NYSE-listed              | -0.15<br>(-2.79) ***        | -0.14<br>(-2.69) *** | -0.13<br>(-2.60) *** | -0.14<br>(-2.63) *** | -0.14<br>(-2.65) *** | -0.12<br>(-2.25) **            | -0.11<br>(-2.10) **  | -0.11<br>(-2.07) **  | -0.11<br>(-2.06) **  | -0.11<br>(-2.17) **  | -0.23<br>(-1.66) *         | -0.23<br>(-1.71) *   | -0.21<br>(-1.55)     | -0.22<br>(-1.62)     | -0.24<br>(-1.77) *   |
| Ln( $\Delta$ volume)     | -0.26<br>(-7.99) ***        | -0.25<br>(-7.61) *** | -0.25<br>(-7.66) *** | -0.24<br>(-7.70) *** | -0.26<br>(-8.12) *** | -0.23<br>(-7.11) ***           | -0.23<br>(-6.87) *** | -0.23<br>(-6.96) *** | -0.22<br>(-6.90) *** | -0.23<br>(-7.24) *** | -0.68<br>(-8.73) ***       | -0.65<br>(-8.56) *** | -0.63<br>(-8.23) *** | -0.66<br>(-9.02) *** | -0.68<br>(-9.23) *** |
| Ln( $\Delta$ price)      | -0.25<br>(-4.69) ***        | -0.25<br>(-4.76) *** | -0.25<br>(-4.79) *** | -0.25<br>(-4.78) *** | -0.25<br>(-4.81) *** | -0.23<br>(-4.84) ***           | -0.23<br>(-4.89) *** | -0.23<br>(-4.88) *** | -0.23<br>(-4.89) *** | -0.23<br>(-4.89) *** | -0.25<br>(-2.56) **        | -0.25<br>(-2.59) *** | -0.24<br>(-2.51) **  | -0.24<br>(-2.48) **  | -0.24<br>(-2.46) **  |
| Ln( $\Delta$ volatility) | 0.25<br>(4.38) ***          | 0.25<br>(4.27) ***   | 0.25<br>(4.18) ***   | 0.25<br>(4.29) ***   | 0.26<br>(4.36) ***   | 0.29<br>(4.90) ***             | 0.29<br>(4.82) ***   | 0.30<br>(4.75) ***   | 0.29<br>(4.80) ***   | 0.29<br>(4.89) ***   | 0.36<br>(3.27) ***         | 0.34<br>(3.10) ***   | 0.30<br>(2.79) ***   | 0.36<br>(3.33) ***   | 0.36<br>(3.28) ***   |
| Tick size                | 0.07<br>(1.24)              | 0.10<br>(1.72) *     | 0.11<br>(1.44)       | 0.13<br>(1.99) **    | 0.10<br>(1.72) *     | 0.16<br>(2.49) **              | 0.18<br>(2.82) ***   | 0.17<br>(2.20) **    | 0.20<br>(3.02) ***   | 0.17<br>(2.79) ***   | 0.43<br>(2.97) ***         | 0.52<br>(3.71) ***   | 0.66<br>(3.69) ***   | 0.50<br>(3.13) ***   | 0.40<br>(3.01) ***   |
| _ADIRSQ_                 | 0.40<br>288                 | 0.39<br>281          | 0.39<br>274          | 0.39<br>281          | 0.40<br>288          | 0.34<br>288                    | 0.34<br>281          | 0.34<br>274          | 0.34<br>281          | 0.34<br>288          | 0.30<br>276                | 0.31<br>269          | 0.32<br>262          | 0.30<br>269          | 0.31<br>276          |
| N obs                    |                             |                      |                      |                      |                      |                                |                      |                      |                      |                      |                            |                      |                      |                      |                      |

**Table 3.A4: Regressions of the change in liquidity on various institutional proxies for the [-140,-20), (+20,+140)] event window**

This table presents the OLS regression results for different liquidity measures. Dependent variables are the change in the quoted spread, the effective spread, the price impact, and the domestic trading volume between (-140,-20) days before and (+20,+140) days after the US cross-listing date. All changes are in logarithm. Independent variables include common law, which is equal 1 if a country belongs to the common law system, and zero otherwise; shareholder protection, the product of anti-director rights index and rule-of-law index divided by 10; accounting standards, measuring the general quality of accounting information in a country; political stability, measuring the stability of a country's political system; and insider trading, which equals to 1 if there is at least one prosecution under insider trading laws, and zero otherwise. Control variables are NYSE-listed stocks, tick size, log change in the local share price, and log change in the stock return volatility after US cross-listing. T-statistics in parentheses are corrected for heteroskedasticity. \*\*\*, \*\*, and \* indicate significant at the 1%, 5%, and 10% levels, respectively.

| Panel A:                 | Change in the quoted spread |                      |                      |                      |                      | Change in the effective spread |                      |                      |                      |                      |
|--------------------------|-----------------------------|----------------------|----------------------|----------------------|----------------------|--------------------------------|----------------------|----------------------|----------------------|----------------------|
|                          | (1)                         | (2)                  | (3)                  | (4)                  | (5)                  | (1)                            | (2)                  | (3)                  | (4)                  | (5)                  |
| Intercept                | -0.06<br>(-1.33)            | -0.10<br>(-1.55)     | -0.40<br>(-2.10) **  | -0.43<br>(-1.92) *   | -0.02<br>(-0.35)     | -0.10<br>(-2.30) **            | -0.12<br>(-1.96) **  | -0.33<br>(-1.89) *   | -0.43<br>(-2.13) **  | -0.08<br>(-1.36)     |
| Common law               | 0.06<br>(1.38)              |                      |                      |                      |                      | 0.05<br>(1.19)                 |                      |                      |                      |                      |
| Shareholder protection   |                             | 0.03<br>(1.57)       |                      |                      |                      |                                | 0.02<br>(1.05)       |                      |                      |                      |
| Accounting standards     |                             |                      | 0.01<br>(2.13) **    |                      |                      |                                |                      | 0.00<br>(1.63)       |                      |                      |
| Political stability      |                             |                      |                      | 0.00<br>(1.92) *     |                      |                                |                      |                      | 0.00<br>(1.88) *     |                      |
| Insider trading          |                             |                      |                      |                      | 0.01<br>(0.13)       |                                |                      |                      |                      | 0.02<br>(0.31)       |
| NYSE-listed              | -0.10<br>(-2.08) **         | -0.11<br>(-2.17) **  | -0.09<br>(-1.93) *   | -0.10<br>(-2.14) **  | -0.11<br>(-2.16) **  | -0.09<br>(-1.90) *             | -0.10<br>(-1.96) *   | -0.09<br>(-1.82) *   | -0.09<br>(-1.95) *   | -0.10<br>(-1.99) **  |
| Ln( $\Delta$ price)      | -0.00<br>(-4.93) ***        | -0.00<br>(-4.75) *** | -0.00<br>(-4.79) *** | -0.00<br>(-4.79) *** | -0.00<br>(-4.84) *** | -0.00<br>(-5.06) ***           | -0.00<br>(-4.84) *** | -0.00<br>(-4.79) *** | -0.00<br>(-4.90) *** | -0.00<br>(-4.95) *** |
| Ln( $\Delta$ volatility) | 0.10<br>(1.76) *            | 0.10<br>(1.78) *     | 0.10<br>(1.79) *     | 0.10<br>(1.80) *     | 0.10<br>(1.81) *     | 0.12<br>(2.56) **              | 0.12<br>(2.54) **    | 0.13<br>(2.61) ***   | 0.12<br>(2.57) **    | 0.12<br>(2.59) ***   |
| Tick size                | -0.12<br>(-1.76) *          | -0.12<br>(-1.76) *   | -0.16<br>(-2.17) **  | -0.09<br>(-1.36)     | -0.15<br>(-2.41) **  | -0.03<br>(-0.49)               | -0.04<br>(-0.60)     | -0.08<br>(-1.02)     | -0.01<br>(-0.13)     | -0.06<br>(-0.94)     |
| _ADJRSQ_                 | 0.19                        | 0.20                 | 0.22                 | 0.20                 | 0.19                 | 0.14                           | 0.14                 | 0.15                 | 0.15                 | 0.14                 |
| N obs                    | 284                         | 277                  | 270                  | 277                  | 284                  | 284                            | 277                  | 270                  | 277                  | 284                  |

**Table 3.A4 (continued)**

| Panel B:                 | Change in the price impact |                      |                      |                      |                      | Change in the local trading volume |                     |                      |                     |                    |
|--------------------------|----------------------------|----------------------|----------------------|----------------------|----------------------|------------------------------------|---------------------|----------------------|---------------------|--------------------|
|                          | (1)                        | (2)                  | (3)                  | (4)                  | (5)                  | (1)                                | (2)                 | (3)                  | (4)                 | (5)                |
| Intercept                | -0.33<br>(-3.09) ***       | -0.38<br>(-2.37) **  | -1.07<br>(-2.30) **  | -0.86<br>(-1.61)     | -0.31<br>(-1.51)     | 0.18<br>(2.10) **                  | 0.23<br>(2.06) **   | 0.84<br>(2.58) ***   | 0.80<br>(2.04) **   | 0.22<br>(1.55)     |
| Common law               | 0.22<br>(2.27) **          |                      |                      |                      |                      | -0.22<br>(-2.62) ***               |                     |                      |                     |                    |
| Shareholder protection   |                            | 0.07<br>(1.76) *     |                      |                      |                      |                                    | -0.07<br>(-2.31) ** |                      |                     |                    |
| Accounting standards     |                            |                      | 0.01<br>(2.00) **    |                      |                      |                                    |                     | -0.01<br>(-2.63) *** |                     |                    |
| Political stability      |                            |                      |                      | 0.01<br>(1.34)       |                      |                                    |                     |                      | -0.01<br>(-2.05) ** |                    |
| Insider trading          |                            |                      |                      |                      | 0.16<br>(0.82)       |                                    |                     |                      |                     | -0.23<br>(-1.59)   |
| NYSE-listed              | -0.19<br>(-1.75) *         | -0.22<br>(-2.01) **  | -0.21<br>(-1.94) *   | -0.21<br>(-1.99) **  | -0.22<br>(-2.03) **  | -0.00<br>(-0.05)                   | 0.03<br>(0.38)      | 0.02<br>(0.20)       | 0.02<br>(0.30)      | 0.03<br>(0.36)     |
| Ln( $\Delta$ price)      | -0.00<br>(-3.10) ***       | -0.00<br>(-2.94) *** | -0.00<br>(-2.96) *** | -0.00<br>(-2.91) *** | -0.00<br>(-2.95) *** | 0.00<br>(1.10)                     | 0.00<br>(0.94)      | 0.00<br>(0.89)       | 0.00<br>(0.93)      | 0.00<br>(0.88)     |
| Ln( $\Delta$ volatility) | 0.10<br>(0.95)             | 0.11<br>(1.07)       | 0.10<br>(1.03)       | 0.11<br>(1.15)       | 0.11<br>(1.07)       | 0.37<br>(4.24) ***                 | 0.35<br>(4.08) ***  | 0.35<br>(4.07) ***   | 0.35<br>(4.17) ***  | 0.37<br>(4.13) *** |
| Tick size                | 0.23<br>(1.52)             | 0.19<br>(1.25)       | 0.24<br>(1.43)       | 0.20<br>(1.29)       | 0.09<br>(0.69)       | 0.29<br>(2.43) **                  | 0.33<br>(2.88) ***  | 0.33<br>(2.44) **    | 0.31<br>(2.51) **   | 0.43<br>(3.89) *** |
| _ADJRSQ_                 | 0.05                       | 0.04                 | 0.05                 | 0.04                 | 0.03                 | 0.14                               | 0.13                | 0.13                 | 0.13                | 0.13               |
| N_obs                    | 266                        | 259                  | 252                  | 259                  | 266                  | 284                                | 277                 | 270                  | 277                 | 284                |

**Table 3.A5: Liquidity for groups formed by different institutional variables - Median and median change**

This table presents the median bid-ask spreads, the price impact, and volume and their respective median changes for different groups. QSP and ESP represent the percentage quoted and effective spreads, respectively. PRIM stands for price impact, the percentage change in the midpoint of the ask and bid prices 30 minutes after the trade. VOLM is trading volume as a percentage of total shares outstanding. Subscripts a and b indicate (-260, -20) days before and (+20, +260) days after the cross-listing date, respectively. The liquidity measures for the pre- and post-cross-listing periods are the median values across all observations in each of the classification groups.  $\Delta QSP = \text{Ln}(QSP_a / QSP_b)$ ,  $\Delta ESP = \text{Ln}(ESP_a / ESP_b)$ ,  $\Delta PRIM = \text{Ln}(PRIM_a / PRIM_b)$ , and  $\Delta VOLM = \text{Ln}(VOLM_a / VOLM_b)$ . The change in each of the liquidity measures represents the median logarithmic change across all observations in each classification group. Common law is equal 1 if a country belongs to the common law system, and zero otherwise. Shareholder protection is the product of anti-director rights index and rule-of-law index divided by 10. Accounting standards measure the general quality of accounting information in a country. Political stability measures the stability of a country's political system. Insider trading enforcement equals to 1 if there is at least one prosecution under insider trading laws, and zero otherwise. Host markets are where a cross-listed stock is listed on. \*\*\*, \*\*, and \* indicate significant at the 1%, 5%, and 10% levels based on the Wilcoxon sign-ranked test, respectively.

|                                         | N   | QSP <sub>b</sub> | QSP <sub>a</sub> | $\Delta QSP$ | ESP <sub>b</sub> | ESP <sub>a</sub> | $\Delta ESP$ | PRIM <sub>b</sub> | PRIM <sub>a</sub> | $\Delta PRIM$ | VOLM <sub>b</sub> | VOLM <sub>a</sub> | $\Delta VOLM$ |
|-----------------------------------------|-----|------------------|------------------|--------------|------------------|------------------|--------------|-------------------|-------------------|---------------|-------------------|-------------------|---------------|
| <b>Panel A: Origin of legal systems</b> |     |                  |                  |              |                  |                  |              |                   |                   |               |                   |                   |               |
| Civil law                               | 139 | 0.812            | 0.784            | -0.125 ***   | 0.331            | 0.299            | -0.109 ***   | 0.007             | 0.007             | -0.239 ***    | 0.001             | 0.001             | 0.271 ***     |
| Common law                              | 156 | 1.319            | 1.270            | -0.083 ***   | 0.460            | 0.429            | -0.110 ***   | 0.027             | 0.025             | -0.035        | 0.003             | 0.003             | 0.042         |
| Difference (civil vs. common)           |     | -0.507           | -0.486           | -0.041       | -0.129           | -0.129           | 0.001        | -0.020 **         | -0.018 *          | -0.203 **     | -0.002 ***        | -0.003 ***        | 0.229 ***     |
| <b>Panel B: Shareholder protection</b>  |     |                  |                  |              |                  |                  |              |                   |                   |               |                   |                   |               |
| Lowest quality tercile                  | 44  | 1.566            | 1.567            | -0.122 ***   | 0.605            | 0.569            | -0.101 ***   | 0.020             | 0.020             | -0.377 ***    | 0.003             | 0.003             | 0.398 ***     |
| Tercile 2                               | 119 | 0.675            | 0.598            | -0.151 ***   | 0.277            | 0.251            | -0.161 ***   | 0.004             | 0.003             | -0.239 ***    | 0.000             | 0.001             | 0.258 ***     |
| Highest quality tercile                 | 125 | 1.766            | 1.670            | -0.067       | 0.612            | 0.514            | -0.077 **    | 0.040             | 0.043             | 0.045         | 0.003             | 0.003             | 0.024         |
| Difference (lowest vs. highest)         |     | -0.201           | -0.103           | -0.055       | -0.007           | 0.054            | -0.025       | -0.021            | -0.023            | -0.422 ***    | 0.000             | 0.000             | 0.374 ***     |
| <b>Panel C: Accounting standards</b>    |     |                  |                  |              |                  |                  |              |                   |                   |               |                   |                   |               |
| Lowest quality tercile                  | 70  | 0.925            | 0.704            | -0.154 ***   | 0.362            | 0.319            | -0.167 ***   | 0.011             | 0.009             | -0.419 ***    | 0.003             | 0.003             | 0.289 **      |
| Tercile 2                               | 91  | 0.675            | 0.627            | -0.145 ***   | 0.273            | 0.253            | -0.094 ***   | 0.005             | 0.004             | -0.233 ***    | 0.000             | 0.000             | 0.258 ***     |
| Highest quality tercile                 | 120 | 1.826            | 1.729            | -0.070       | 0.626            | 0.546            | -0.072 *     | 0.042             | 0.047             | 0.076         | 0.003             | 0.003             | 0.018         |
| Difference (lowest vs. highest)         |     | -0.901 ***       | -1.025 ***       | -0.083 ***   | -0.264 ***       | -0.227 ***       | -0.094 **    | -0.031 ***        | -0.038 ***        | -0.495 ***    | 0.000             | 0.000             | 0.271 ***     |
| <b>Panel D: Political stability</b>     |     |                  |                  |              |                  |                  |              |                   |                   |               |                   |                   |               |
| Lowest stability tercile                | 63  | 0.843            | 0.690            | -0.239 ***   | 0.348            | 0.298            | -0.258 ***   | 0.017             | 0.012             | -0.400 ***    | 0.002             | 0.002             | 0.377 ***     |
| Tercile 2                               | 123 | 0.871            | 0.817            | -0.091 ***   | 0.338            | 0.334            | -0.074 ***   | 0.008             | 0.007             | -0.088 *      | 0.001             | 0.001             | 0.173 ***     |
| Highest stability tercile               | 102 | 1.498            | 1.505            | -0.085 *     | 0.577            | 0.503            | -0.099 **    | 0.076             | 0.065             | -0.151 *      | 0.002             | 0.003             | 0.018         |
| Difference (lowest vs. highest)         |     | -0.656           | -0.815 **        | -0.154 ***   | -0.228 *         | -0.205 **        | -0.159 ***   | -0.059 **         | -0.053 ***        | -0.249 **     | 0.000             | 0.000             | 0.359 ***     |
| <b>Panel E: Insider trading</b>         |     |                  |                  |              |                  |                  |              |                   |                   |               |                   |                   |               |
| Without enforcement                     | 29  | 1.345            | 1.201            | -0.107 **    | 0.651            | 0.543            | -0.172 ***   | 0.061             | 0.076             | -0.444 **     | 0.001             | 0.001             | 0.296 **      |
| With enforcement                        | 266 | 0.993            | 0.899            | -0.107 ***   | 0.365            | 0.342            | -0.090 ***   | 0.015             | 0.011             | -0.130 ***    | 0.002             | 0.002             | 0.147 ***     |
| Difference (without vs. with)           |     | 0.352            | 0.303            | 0.000        | 0.286            | 0.201            | -0.082       | 0.046 *           | 0.064 ***         | -0.314        | -0.001            | -0.001            | 0.148         |
| <b>Panel F: Host markets</b>            |     |                  |                  |              |                  |                  |              |                   |                   |               |                   |                   |               |
| NYSE                                    | 49  | 0.664            | 0.550            | -0.190 ***   | 0.267            | 0.221            | -0.236 ***   | 0.007             | 0.003             | -0.463 ***    | 0.002             | 0.003             | 0.266 ***     |
| NASD                                    | 20  | 2.229            | 1.617            | -0.079       | 0.740            | 0.730            | -0.064       | 0.023             | 0.045             | 0.229         | 0.004             | 0.003             | -0.012        |
| OTC                                     | 226 | 1.052            | 0.943            | -0.091 ***   | 0.390            | 0.355            | -0.081 ***   | 0.019             | 0.016             | -0.126 ***    | 0.002             | 0.002             | 0.158 ***     |
| Difference (NYSE vs. OTC)               |     | -0.387 ***       | -0.393 ***       | -0.099 **    | -0.123 ***       | -0.134 ***       | -0.155 **    | -0.013 ***        | -0.013 ***        | -0.337 **     | 0.000             | 0.001             | 0.109         |
| Difference (NYSE vs. NASD)              |     | -1.565 ***       | -1.067 ***       | -0.111       | -0.473 ***       | -0.508 ***       | -0.172       | -0.016 *          | -0.042 ***        | -0.692 **     | -0.002            | 0.000             | 0.278         |
| Difference (NASDAQ vs. OTC)             |     | 1.177            | 0.674 *          | 0.012        | 0.350            | 0.375 *          | 0.017        | 0.003             | 0.029             | 0.356         | 0.002             | 0.001             | -0.170        |

## **Chapter 4: Is There a Convergence in Information**

### **Environment around the World?**

#### **4.1 Introduction**

Coffee (1999) predicts convergence in corporate governance across the world towards the US structure. Coffee's convergence prediction appears to be supported by the globalization of securities markets and firms, in particular the increased number of foreign firms cross-listed in the US and the UK, and the efforts by the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB) to make financial reporting standards more compatible and comparable across countries.<sup>39</sup> In this chapter, I analyze whether the last two decades have displayed a convergence in information environment, using common measures in the accounting and finance literature.

Several studies analyze the evolution through time of the quality of information environment and the usefulness of earnings announcements for US stock markets. For example, Landsman and Maydew (2002), and Francis, Schipper and Vincent (2002) report evidence of a significant increase in the information content of earnings announcements in US markets over the last few decades. Campbell, Lettau, Malkiel and Xu (2001) document a decrease in synchronous stock price movements in the US over

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<sup>39</sup> However, Barth, Landsman and Lang (2008) report that only 327 firms across 22 countries adopted International Accounting Standards (IAS) from 1994 to 2003.

the period from 1962 to 1997, which they interpret as evidence of increasing stock price informativeness.

Cross-country studies, on the other hand, have focused on whether informativeness of earnings announcements and stock price synchronicity are different across countries, and have not analyzed the evolution of information environment through time. These studies typically find that earnings announcements are relatively more informative in countries with better accounting standards and stronger investor protection (DeFond, Hung and Trezevant (2007)). With regard to stock return synchronicity, Morck, Yeung and Yu (2000), and Jin and Myers (2006) find that  $R^2$  is lower in countries with more developed capital markets and better corporate governance. In these studies, a lower market model  $R^2$  is interpreted as evidence of a better information environment as it indicates the incorporation of more firm-specific information into stock prices.

I contribute to the literature by analyzing the development of earnings informativeness and the quality of information environment for a broad cross-section of countries for a 17-year period from 1990 through 2006.

My sample includes data for 151,571 firm-years across 43 countries. I use abnormal return variance and abnormal volume in the days around earnings announcements as proxies for earnings informativeness, and  $R^2$  from the market model as a proxy for the quality of information environment. I find that the improvement in the

quality of information environment in the last 17 years is a worldwide phenomenon. However, in contrast to the convergence hypothesis, I find that information environment has improved more slowly for emerging markets than for developed markets.

I also address a related question whether there has been increased convergence for firms cross-listed in the US, as Coffee (1999, 2002) suggests cross-listing is an effective mechanism towards convergence. Two recent studies in this area provide partial support for this hypothesis. Bailey, Karolyi and Salva (2006, hereafter BKS), and Fernandes and Ferreira (2008, hereafter FF) find a significant increase in information measures 5 years after the cross-listing. However, they also report that the improvement in information environment is larger for cross-listed firms from developed countries than for firms from emerging markets. These latter results are surprising and inconsistent with Coffee's convergence prediction. I replicate both studies, accounting for differences in the evolution of information environment in the local market - a factor not accounted for in BKS and FF. My results show that once market-wide changes in information environment of the local markets are accounted for, there is no support for the bonding hypothesis in Coffee (2002): there is no evidence of a significant improvement in earnings informativeness and information environment after US cross-listing, and no difference between developed and emerging markets.

Baker, Nofsinger and Weaver (2002), and Lang, Lins and Miller (2003) also analyze the impact of US cross-listing on a firm's information environment. They show that non-US firms cross-listed in the US experience increased analyst following,

improved forecast accuracy, and more media coverage. However, as reported by Piotroski and Roulstone (2004), and Chan and Hameed (2006), an increase in the number of analysts that follow a firm does not necessarily have a positive impact on the production of firm-specific information. These papers show that greater analyst coverage is positively associated with market and industry information, and negatively associated with firm-specific stock return variation.

My study is also related to Land and Lang (2002) who provide evidence on the convergence of financial information. Using earnings multiples for seven developed countries between 1987 and 1999, they find that the earnings multiples move towards the sample mean, an indication of convergence in earnings quality across their sample countries. In contrast, my results suggest that information environment in general, and earnings informativeness in particular, appears to improve more slowly for countries with weaker corporate governance and less developed markets.

The rest of the chapter is structured as follows. In section 4.2, I discuss the research design. Section 4.3 describes sample selection and provides descriptive statistics. In section 4.4, I present the main empirical results and robustness tests. In section 4.5, I replicate BKS's and FF's main results with and without controlling for changes in the quality of information environment of the home country. Section 4.6 concludes.

## 4.2 Research Design

I measure the quality of information environment separately for the period around the annual earnings announcement date, and the remainder of the year. Following previous literature, I employ  $R^2$  from the market model to proxy for stock price informativeness during the period from day  $t-240$  through day  $t-5$  before the earnings announcement date.<sup>40</sup> For each year from 1990 through to 2006, I estimate  $R^2$  for all stocks using the following market model:

$$R_{c,i,t} = \alpha_{c,i} + \sum \beta_{c,i,t} R_{c,m,t} + \varepsilon_{c,i,t}, \quad (1)$$

where  $R_{c,i,t}$  is the return of stock  $i$  in country  $c$  on day  $t$ .  $R_{c,m,t}$  is the return of the local market index on day  $t$ .<sup>41</sup> To reduce the effect of infrequent trading in less liquid markets, I include 3 lags and 3 leads of the local market return. I exclude firm-years that do not have at least 100 days of return data during the estimation period. I also exclude firm-years if more than 50% of the returns in the 235-day period are zero returns.

Following Morck, Yeung and Yu (2000), I measure a country's stock price synchronicity as an equally-weighted  $R^2$  across all firms in that country for each year that the country appears in the sample. The trend in stock price synchronicity for different groups of countries is estimated with the following model:

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<sup>40</sup> I also follow Morck, Yeung and Yu (2000), and Jin and Myers (2006) to re-estimate model (1) using weekly returns (Wednesday to Wednesday). The results (not reported) are qualitatively similar to the results reported in this chapter.

<sup>41</sup> The results reported in this chapter are based on arithmetic returns. When I use logarithmic returns, the results (not reported) are similar.

$$\begin{aligned}
SYNCH_{c,y} = & \alpha + \beta_1 IV_c + \beta_2 TREND_y + \beta_3 (IV * TREND)_{c,y} + \\
& \gamma_1 Ln(NSTKS)_{c,y} + \gamma_2 MVGDP_{c,y} + \gamma_3 VOLGDP_{c,y} + \varepsilon, \quad (2)
\end{aligned}$$

where  $SYNCH_{c,y}$  is the logistic transformation of the average  $R^2$  for country  $c$  in year  $y$ ,  $SYNCH = \log(R^2/(1-R^2))$ .<sup>42</sup>  $IV_{c,y}$  represents different institutional and structural factors for country  $c$  in year  $y$  (see Table 4.A1 in the Appendix for their descriptions and sources). These factors include several dummy variables to proxy for developed markets, good government, good accounting standards, and strong shareholder protection.<sup>43</sup>

*Developed markets* is equal 1 if a country is classified as a developed economy, and zero otherwise. As in Morck, Yeung and Yu (2000), *government quality* is calculated as the mean of three indexes measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. The dummy for *good government* is then defined as equal to 1 for a country that has an aggregate score above the median, and zero otherwise. *Accounting standards* measures the general quality of accounting information in a country. The dummy for *good accounting standards* is equal to 1 if a country's accounting standards index is above the median of all countries in the sample. *Shareholder protection* is the product of anti-director rights and rule of law indexes divided by ten. This index, used by Rossi and Volpin (2004), and Durnev and Kim (2005), captures both shareholders' de jure rights

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<sup>42</sup> I also use the SST-weighted  $R^2$ , where SST is a stock's sum of squared total variation. The results for model (2) using the SST-weighted  $R^2$  are reported in Table 4.A2 in the Appendix.

<sup>43</sup> I also estimate models (2), (5) and (6) using continuous institutional variables. The results are reported in Tables 4.A3, 4.A4 and 4.A5 in the Appendix. Note that I use the logarithm of GDP per capita as a proxy for the development of a country's financial market as in Morck, Yeung and Yu (2000).

and the enforceability of these rights. The dummy for *strong shareholder protection* is then defined as equal to 1 if a country's shareholder protection index is above the median of all sample countries. All corporate governance indexes are from La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998).

$TREND_y$  is a time variable; its value ranges from 0 (year 1990) to 17 (year 2006). I include a number of control variables that have been used in other studies in this area: the logarithm of number of stocks,  $Ln(NSTKS)$ , the total capitalization of a country's stock market as a percentage of its total GDP,  $MVGDP$ , and the total value of stock trading as a percentage of GDP,  $VOLGDP$ . Since these variables represent the development of stock markets, they are likely to have an impact on the quality of information environment, and, therefore, need to be controlled for (Morck, Yeung and Yu (2000), and DeFond, Hung and Trezevant (2007)).

To estimate the information content of earnings announcements, I use abnormal return variance and abnormal volume around the earnings announcement date (Beaver (1968), and Landsman and Maydew (2002)).

Abnormal return variance is defined as:

$$ARVAR_i = \sum u_{i,t}^2 / \sigma_i^2, \quad (3)$$

where  $u_{it}$  is the market model adjusted abnormal return for firm  $i$  on day  $t$  relative to the earnings announcement day (day 0).  $\sigma_i^2$  is the variance of the return residuals from the market model (1) for stock  $i$ .  $ARVAR_i$  is the simple sum of the squared abnormal returns over the 3-day announcement window  $(-1, +1)$ , scaled by the variance of the market model residuals.

Abnormal volume is defined as:

$$AVOL_i = \sum(VOL_{it} - MVOL_i) / \sigma_i, \quad (4)$$

where  $VOL_{it}$  is trading volume, measured as the number of shares traded divided by the total number of shares outstanding, of firm  $i$  on day  $t$ .  $MVOL_i$  and  $\sigma_i$  are the mean and standard deviation of the daily trading volume during the estimation period of 235 days ending on day  $t-5$  relative to earnings announcement  $i$ .  $ARVOL_i$  is abnormal volume during the 3-day announcement period  $(-1, +1)$ , scaled by the standard deviation of daily volume.

I exclude observations if there is missing daily volume or return data during the announcement period, i.e. day  $t-1$  through day  $t+1$ .

I examine the usefulness of earnings announcements for different groups of countries during the sample period, using the following models:

$$AARVAR_{c,y} = \alpha + \beta_1 IV_c + \beta_2 TREND_y + \beta_3 (IV * TREND)_{c,y} + \gamma_1 Ln(NSTKS)_{c,y} + \gamma_2 MVGDP_{c,y} + \gamma_3 VOLGDP_{c,y} + \varepsilon \quad (5)$$

$$AAVOL_{c,y} = \alpha + \beta_1 IV_c + \beta_2 TREND_y + \beta_3 (IV * TREND)_{c,y} + \gamma_1 Ln(NSTKS)_{c,y} + \gamma_2 MVGDP_{c,y} + \gamma_3 VOLGDP_{c,y} + \varepsilon, \quad (6)$$

where  $AARVAR_{c,y}$  and  $AAVOL_{c,y}$  are abnormal return variance and abnormal volume averaged across all earnings announcements for country  $c$  in year  $y$ . All other variables have been defined before.

### 4.3 Data and Descriptive Statistics

I draw my sample firms from the I/B/E/S database from 1990 to 2006. Earnings announcement dates are also from I/B/E/S. Similar to Bailey, Karolyi and Salva (2006), and DeFond, Hung and Trezevant (2007), I only use annual earnings announcements for my analysis because the frequency of earnings information reports varies across firms and countries. Stock returns are from Datastream. Local market indexes are obtained from Globalfinancialdata.com. I obtain the total capitalization of stock markets as a percentage of GDP, and the total value of stock trading as a percentage of GDP from the World Development Indicators published by the World Bank. I limit my sample to countries for which data on corporate governance are available from La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998).

Table 4.1 shows the distribution of my sample firms by country and year. The last row of Table 4.1 shows the total number of observations per year while the last column presents the total number of firm-year observations per sample country. My sample includes a total of 151,571 firm-years from 43 countries, of which 23,976 observations are from emerging markets, and 127,595 observations are from developed countries. For both groups of countries, there are more observations in more recent years than in earlier years. The United States contribute more than one third of the total number of observations. Japan also has relatively many firm-year observations (15% of the total sample). Venezuela is the sample country with the fewest number of firm-years (a total of 54). It is also one of the countries that do not have observations in all sample years.

**Table 4.1: Distribution of firm-year observations by country and year**

| Country                    | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997  | 1998  | 1999  | 2000  | 2001  | 2002  | 2003  | 2004  | 2005  | 2006  | Total  |
|----------------------------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| <u>Emerging countries</u>  |      |      |      |      |      |      |      |       |       |       |       |       |       |       |       |       |       |        |
| Argentina                  |      |      |      | 11   | 28   | 30   | 33   | 33    | 28    | 31    | 20    | 16    | 17    | 27    | 29    | 12    | 14    | 329    |
| Brazil                     |      |      |      | 3    | 41   | 47   | 47   | 56    | 55    | 81    | 95    | 89    | 79    | 86    | 82    | 84    | 89    | 934    |
| Chile                      |      |      |      | 43   | 49   | 62   | 55   | 46    | 33    | 41    | 37    | 38    | 36    | 33    | 33    | 30    | 29    | 565    |
| Colombia                   |      |      |      |      | 5    | 4    | 3    | 8     | 6     | 7     | 2     | 4     | 5     | 5     | 2     | 2     |       | 53     |
| Egypt                      |      |      |      |      |      |      |      |       |       | 1     | 11    | 15    | 11    | 15    | 3     | 12    | 20    | 88     |
| India                      |      |      |      |      |      | 156  | 156  | 198   | 144   | 139   | 182   | 180   | 140   | 159   | 178   | 191   | 256   | 2079   |
| Indonesia                  |      | 23   | 15   | 23   | 37   | 45   | 55   | 74    | 50    | 46    | 74    | 58    | 46    | 45    | 55    | 58    | 63    | 767    |
| Israel                     |      |      |      |      |      |      | 9    | 15    | 24    | 37    | 37    | 25    | 28    | 26    | 23    | 32    | 29    | 285    |
| Malaysia                   | 87   | 105  | 138  | 164  | 165  | 198  | 149  | 270   | 222   | 217   | 241   | 200   | 192   | 202   | 248   | 249   | 277   | 3324   |
| Mexico                     |      |      |      | 31   | 36   | 43   | 44   | 60    | 62    | 50    | 47    | 41    | 31    | 47    | 40    | 42    | 42    | 616    |
| Pakistan                   |      |      |      | 23   | 16   | 36   | 29   | 41    | 29    | 24    | 33    | 13    | 8     | 21    | 28    | 20    | 11    | 332    |
| Peru                       |      |      |      |      |      | 24   | 22   | 13    | 15    | 11    | 9     | 4     | 2     | 4     | 5     | 4     | 5     | 118    |
| Philippines                | 6    | 11   | 13   | 18   | 31   | 52   | 59   | 76    | 70    | 60    | 41    | 29    | 33    | 27    | 32    | 31    | 36    | 625    |
| South Africa               | 19   | 25   | 42   | 24   | 26   | 43   | 109  | 161   | 159   | 168   | 153   | 150   | 115   | 134   | 109   | 122   | 106   | 1665   |
| South Korea                | 51   | 47   | 62   | 216  | 305  | 323  | 254  | 379   | 297   | 281   | 286   | 325   | 481   | 498   | 348   | 109   | 203   | 4465   |
| Sri Lanka                  |      |      |      | 32   | 38   | 18   | 10   | 18    | 20    | 18    | 6     |       | 2     | 6     | 7     | 1     | 1     | 177    |
| Taiwan                     |      | 70   | 140  | 204  | 237  | 267  | 155  | 223   | 344   | 487   | 491   | 428   | 318   | 329   | 319   | 282   | 261   | 4555   |
| Thailand                   | 33   | 68   | 103  | 127  | 155  | 165  | 168  | 141   | 78    | 76    | 75    | 95    | 106   | 152   | 189   | 217   | 220   | 2168   |
| Turkey                     |      |      |      |      |      |      |      | 3     | 82    | 98    | 89    | 99    | 96    | 93    | 75    | 66    | 76    | 777    |
| Venezuela                  |      |      |      |      |      | 8    | 6    | 10    | 7     | 5     | 6     | 3     | 2     | 3     | 2     | 1     | 1     | 54     |
| <u>Developed countries</u> |      |      |      |      |      |      |      |       |       |       |       |       |       |       |       |       |       |        |
| Australia                  | 84   | 96   | 126  | 129  | 141  | 201  | 226  | 239   | 278   | 291   | 322   | 353   | 353   | 371   | 352   | 405   | 407   | 4374   |
| Austria                    | 23   | 53   | 49   | 56   | 50   | 62   | 44   | 58    | 41    | 39    | 35    | 35    | 36    | 26    | 33    | 30    | 32    | 702    |
| Belgium                    | 22   | 31   | 27   | 26   | 30   | 44   | 44   | 57    | 63    | 65    | 79    | 86    | 70    | 79    | 77    | 88    | 83    | 971    |
| Canada                     | 97   | 209  | 234  | 275  | 285  | 329  | 406  | 501   | 548   | 583   | 528   | 461   | 420   | 460   | 530   | 646   | 672   | 7184   |
| Denmark                    | 9    | 11   | 41   | 56   | 52   | 60   | 59   | 61    | 48    | 94    | 70    | 76    | 62    | 66    | 68    | 79    | 72    | 984    |
| Finland                    | 3    | 6    | 7    | 12   | 16   | 22   | 28   | 31    | 30    | 44    | 75    | 88    | 89    | 96    | 88    | 93    | 98    | 826    |
| France                     | 9    | 64   | 200  | 190  | 189  | 246  | 248  | 352   | 379   | 408   | 401   | 406   | 387   | 376   | 324   | 358   | 334   | 4871   |
| Germany                    | 11   | 15   | 16   | 20   | 16   | 21   | 11   | 13    | 13    | 267   | 361   | 448   | 442   | 394   | 360   | 326   | 318   | 3052   |
| Greece                     |      |      |      | 59   | 86   | 108  | 120  | 118   | 138   | 140   | 112   | 148   | 132   | 115   | 101   | 104   | 106   | 1587   |
| Hong Kong                  | 108  | 107  | 126  | 150  | 148  | 163  | 178  | 196   | 193   | 196   | 213   | 191   | 200   | 223   | 261   | 285   | 260   | 3198   |
| Ireland                    |      |      |      |      |      |      |      |       |       |       | 12    | 34    | 30    | 29    | 30    | 32    | 28    | 195    |
| Italy                      | 14   | 16   | 17   | 23   | 93   | 107  | 103  | 115   | 131   | 139   | 149   | 166   | 165   | 177   | 166   | 174   | 182   | 1937   |
| Japan                      | 3    | 413  | 407  | 411  | 421  | 924  | 1058 | 1557  | 1525  | 1728  | 1887  | 2030  | 1424  | 1495  | 1483  | 1521  | 1455  | 19742  |
| Netherlands                | 108  | 97   | 94   | 98   | 95   | 100  | 116  | 128   | 134   | 128   | 143   | 133   | 110   | 117   | 109   | 101   | 96    | 1907   |
| New Zealand                | 8    | 6    | 32   | 38   | 38   | 42   | 39   | 44    | 49    | 51    | 48    | 41    | 47    | 60    | 61    | 55    | 34    | 693    |
| Norway                     | 15   | 19   | 21   | 26   | 29   | 39   | 63   | 64    | 71    | 72    | 79    | 80    | 81    | 79    | 87    | 106   | 118   | 1049   |
| Portugal                   |      |      | 1    | 3    | 17   | 25   | 29   | 35    | 41    | 37    | 32    | 29    | 28    | 24    | 26    | 25    | 28    | 380    |
| Singapore                  | 80   | 88   | 102  | 123  | 130  | 143  | 123  | 166   | 157   | 173   | 141   | 151   | 151   | 141   | 167   | 183   | 167   | 2386   |
| Spain                      | 54   | 73   | 70   | 75   | 70   | 82   | 78   | 86    | 95    | 100   | 106   | 107   | 95    | 97    | 95    | 97    | 96    | 1476   |
| Sweden                     | 26   | 26   | 32   | 62   | 79   | 99   | 114  | 133   | 146   | 181   | 194   | 186   | 185   | 168   | 151   | 150   | 150   | 2082   |
| Switzerland                | 46   | 59   | 46   | 66   | 62   | 62   | 81   | 101   | 106   | 106   | 113   | 127   | 115   | 119   | 117   | 124   | 127   | 1577   |
| United Kingdom             | 123  | 294  | 296  | 342  | 327  | 294  | 348  | 432   | 491   | 543   | 540   | 557   | 489   | 485   | 498   | 622   | 611   | 7292   |
| United States              | 2093 | 2221 | 2394 | 2689 | 3070 | 3552 | 3856 | 4305  | 4473  | 4467  | 4228  | 3928  | 3683  | 3574  | 3452  | 3676  | 3469  | 59130  |
| Emerging total             | 196  | 349  | 513  | 919  | 1169 | 1521 | 1363 | 1825  | 1725  | 1878  | 1935  | 1812  | 1748  | 1912  | 1807  | 1565  | 1739  | 23976  |
| Developed total            | 2936 | 3904 | 4338 | 4929 | 5444 | 6725 | 7372 | 8792  | 9150  | 9852  | 9868  | 9861  | 8794  | 8771  | 8636  | 9280  | 8943  | 127595 |
| Sample total               | 3132 | 4253 | 4851 | 5848 | 6613 | 8246 | 8735 | 10617 | 10875 | 11730 | 11803 | 11673 | 10542 | 10683 | 10443 | 10845 | 10682 | 151571 |

Table 4.2 presents the value of institutional factors and corporate governance measures used in this study. The last three rows show the average across emerging markets, developed markets and total sample, respectively. Developed markets, on average, have higher-quality governments, better accounting standards, and stronger shareholder protection. The average of the government quality index is 9.1 for developed countries and 6.2 for emerging countries. The average score for accounting standards is more than 11 points higher for developed economies than for emerging economies (66.9 vs. 55.1). The shareholder protection index is twice as high for developed countries as for emerging countries (2.9 vs. 1.4).

Stock markets, on average, are much bigger and more liquid for developed countries than for emerging economies. The average of the total market capitalization is 93.5% of GDP for developed markets compared to 53.7% of GDP for emerging countries. The average of the total trading value is 64.3% and 27.1% of GDP for developed countries and emerging economies, respectively. For Hong Kong, Switzerland, the United States and Finland, the total market capitalization and total annual trading volume exceed the value of annual GDP. Venezuela, Sri Lanka and Colombia have the smallest and least liquid stock markets, with the total market capitalization at less than 20 percent of GDP, and the total trading volume at less than 5 percent of GDP.

**Table 4.2: Country-level insitutional variables**

Developed is equal 1 if a country is classified as a developed country, and zero otherwise. Government quality is defined as the mean of three indexes from La Porta et al. (1998) measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. Accounting standards is an index measuring the quality of the disclosure of accounting information. Shareholder protection is defined as the product of anti-director rights and rule of law from La Porta et al. (1998) divided by ten. Total market capitalization is the averaged market capitalization as a percentage of GDP. Total trading value is the averaged market trading volume as a percentage of GDP.

| Country                    | Developed | Government quality | Accounting standards | Shareholder protection | Total market cap. (%GDP) | Total trading value (%GDP) |
|----------------------------|-----------|--------------------|----------------------|------------------------|--------------------------|----------------------------|
| <u>Emerging countries</u>  |           |                    |                      |                        |                          |                            |
| Argentina                  | 0         | 5.6                | 45.0                 | 2.1                    | 31.1                     | 4.7                        |
| Brazil                     | 0         | 6.7                | 54.0                 | 1.9                    | 40.5                     | 15.4                       |
| Chile                      | 0         | 6.5                | 52.0                 | 3.5                    | 101.6                    | 9.8                        |
| Colombia                   | 0         | 6.3                | 50.0                 | 0.6                    | 17.0                     | 1.2                        |
| Egypt                      | 0         | 5.4                | 24.0                 | 0.8                    | 51.0                     | 5.4                        |
| India                      | 0         | 6.1                | 57.0                 | 2.1                    | 44.9                     | 42.7                       |
| Indonesia                  | 0         | 5.1                |                      | 0.8                    | 25.4                     | 25.3                       |
| Israel                     | 0         | 8.0                | 64.0                 | 1.4                    | 60.5                     | 26.0                       |
| Malaysia                   | 0         | 7.6                | 76.0                 | 2.7                    | 170.5                    | 82.2                       |
| Mexico                     | 0         | 6.2                | 60.0                 | 0.5                    | 29.3                     | 9.6                        |
| Pakistan                   | 0         | 4.5                |                      | 1.5                    | 18.5                     | 28.2                       |
| Peru                       | 0         | 5.0                | 38.0                 | 0.8                    | 25.8                     | 5.4                        |
| Philippines                | 0         | 4.3                | 65.0                 | 0.8                    | 57.1                     | 16.7                       |
| South Africa               | 0         | 7.7                | 70.0                 | 2.2                    | 169.1                    | 47.8                       |
| South Korea                | 0         | 7.4                | 62.0                 | 1.1                    | 46.9                     | 96.5                       |
| Sri Lanka                  | 0         | 5.4                |                      | 0.6                    | 17.5                     | 3.1                        |
| Taiwan                     | 0         | 8.4                | 65.0                 | 2.6                    | 62.3                     |                            |
| Thailand                   | 0         | 6.1                | 64.0                 | 1.3                    | 61.2                     | 43.0                       |
| Turkey                     | 0         | 6.0                | 51.0                 | 1.0                    | 34.3                     | 50.0                       |
| Venezuela                  | 0         | 6.0                | 40.0                 | 0.6                    | 8.8                      | 1.5                        |
| <u>Developed countries</u> |           |                    |                      |                        |                          |                            |
| Australia                  | 1         | 8.8                | 75.0                 | 4.0                    | 90.9                     | 51.1                       |
| Austria                    | 1         | 9.3                | 54.0                 | 2.0                    | 15.9                     | 6.2                        |
| Belgium                    | 1         | 9.3                | 61.0                 | 0.0                    | 76.0                     | 14.0                       |
| Canada                     | 1         | 9.5                | 74.0                 | 5.0                    | 94.4                     | 50.6                       |
| Denmark                    | 1         | 9.7                | 62.0                 | 2.0                    | 51.4                     | 30.6                       |
| Finland                    | 1         | 9.6                | 77.0                 | 3.0                    | 125.2                    | 102.9                      |
| France                     | 1         | 9.3                | 69.0                 | 2.7                    | 69.6                     | 48.1                       |
| Germany                    | 1         | 9.5                | 62.0                 | 0.9                    | 49.4                     | 55.3                       |
| Greece                     | 1         | 7.0                | 55.0                 | 1.2                    | 61.3                     | 38.3                       |
| Hong Kong                  | 1         | 8.5                | 69.0                 | 4.1                    | 330.3                    | 154.0                      |
| Italy                      | 1         | 8.2                | 62.0                 | 0.8                    | 41.7                     | 37.4                       |
| Japan                      | 1         | 9.3                | 65.0                 | 3.6                    | 71.4                     | 40.7                       |
| Netherlands                | 1         | 9.8                | 64.0                 | 2.0                    | 104.5                    | 94.5                       |
| New Zealand                | 1         | 9.7                | 70.0                 | 4.0                    | 44.1                     | 15.2                       |
| Norway                     | 1         | 9.9                | 74.0                 | 4.0                    | 40.9                     | 29.1                       |
| Portugal                   | 1         | 8.3                | 36.0                 | 2.6                    | 40.1                     | 24.0                       |
| Ireland                    | 1         | 9.1                |                      | 3.1                    | 61.7                     | 24.5                       |
| Singapore                  | 1         | 8.8                | 78.0                 | 3.4                    | 156.7                    | 79.6                       |
| Spain                      | 1         | 8.4                | 64.0                 | 3.1                    | 59.6                     | 84.2                       |
| Sweden                     | 1         | 9.7                | 83.0                 | 3.0                    | 101.4                    | 90.0                       |
| Switzerland                | 1         | 10.0               | 68.0                 | 2.0                    | 202.0                    | 165.0                      |
| United Kingdom             | 1         | 9.5                | 78.0                 | 4.3                    | 141.4                    | 94.6                       |
| United States              | 1         | 9.2                | 71.0                 | 5.0                    | 121.2                    | 148.4                      |
| Emerging average           | -         | 6.2                | 55.1                 | 1.4                    | 53.7                     | 27.1                       |
| Developed average          | -         | 9.1                | 66.9                 | 2.9                    | 93.5                     | 64.3                       |
| Total average              | -         | 7.8                | 61.7                 | 2.2                    | 75.0                     | 47.5                       |

## 4.4 Main Results

### 4.4.1 Univariate Analysis

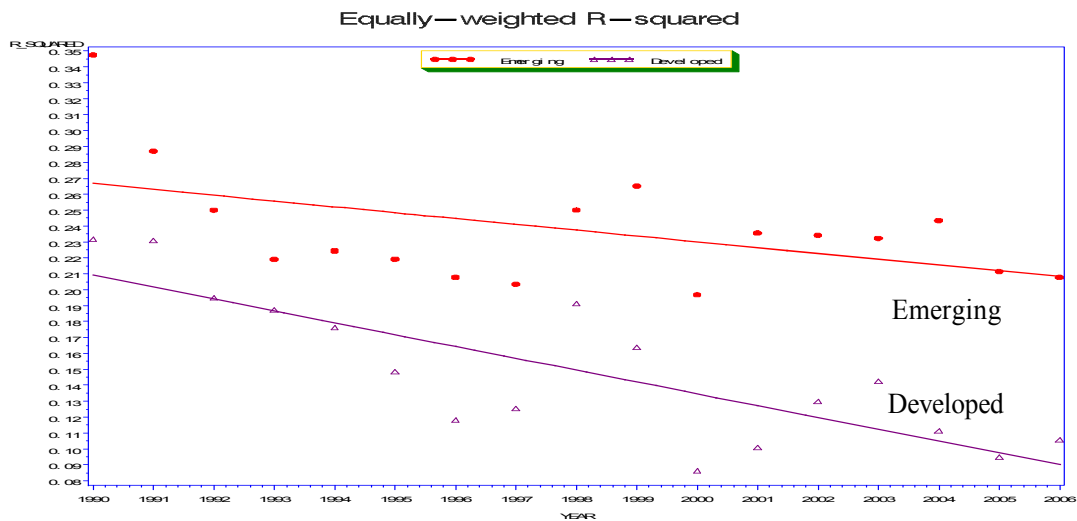
For each year in my sample, Figures 4.1, 4.2 and 4.3 show the market model  $R^2$ , abnormal return variance, and abnormal volume for the 3-day period around the earnings announcement date averaged across developed and emerging countries, respectively. A trend line is also included for each group of countries.

Figure 4.1 shows that there is a decline in stock price synchronicity for both groups of countries.<sup>44</sup> However, the decline is stronger for developed markets than for emerging countries. The coefficient for the trend is -0.002 ( $t$ -statistic = -2.29) for emerging markets and -0.005 ( $t$ -statistic = -10.08) for developed countries.

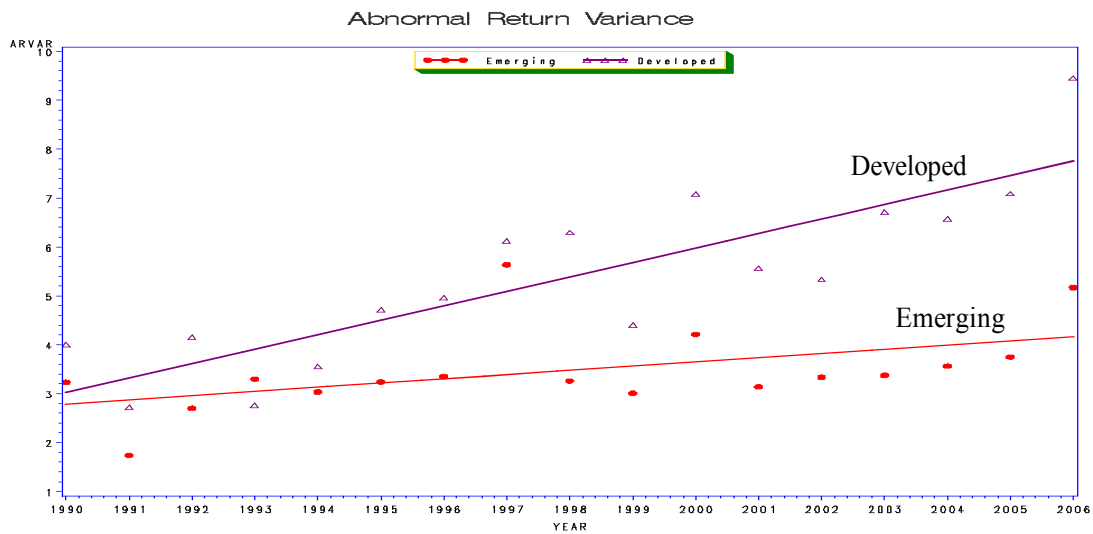
Both Figures 4.2 and 4.3 suggest an increase in the information content of earnings announcements. Also, the increase is larger for countries with developed markets. The trend coefficient for abnormal return variance is 0.07 ( $t$ -statistic = 2.59) for emerging markets and 0.30 ( $t$ -statistic = 9.88) for developed countries. The trend coefficient for abnormal volume is 0.03 ( $t$ -statistic = 1.72) for emerging markets and 0.13 ( $t$ -statistic = 12.07) for developed countries.

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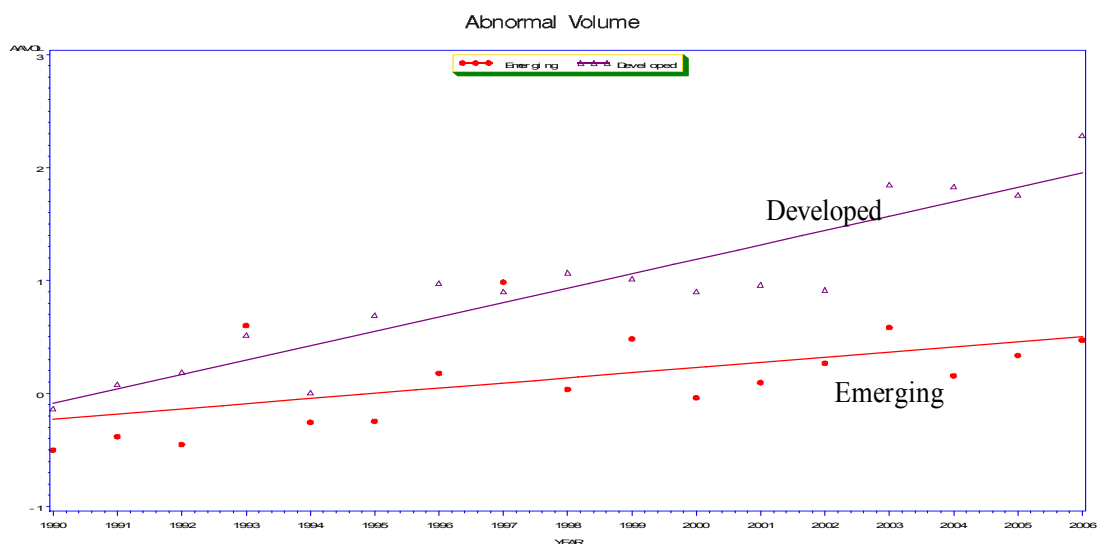
<sup>44</sup> Figure 1 in Jin and Myers (2006) also shows a decreasing trend of the equally-weighted  $R^2$  for 30 countries in their sample for the period of 1990-2002. However, they stop short of comparing  $R^2$  across countries. Moreover, convergence in information environment is not the focus of their paper.



**Figure 4.1:** The triangle and round solid points represent the equally weighted  $R^2$ 's for developed and emerging countries, respectively. A trend line for the mean  $R^2$  is also included for each group of countries.



**Figure 4.2:** The triangle and round solid points represent the mean abnormal return variance for developed and emerging countries, respectively. A trend line for the mean variance is also included for each group of countries.



**Figure 4.3:** The triangle and round solid points represent the mean abnormal volume for developed and emerging countries, respectively. A trend line for the mean volume is also included for each group of countries.

The trends shown in all three figures are inconsistent with the prediction of informational convergence across countries over time. The figures also suggest that information environment both before and around annual earnings announcements has improved over the past 17 years, and that the improvement, on average, is larger for developed markets than for emerging markets.

The average trend for each of the three measures of the quality of information environment for each country in my sample is shown in Figures 4.4, 4.5 and 4.6. The trend coefficient is obtained by running a simple regression of the annual average of the proxies for the quality of information environment on the trend variable.

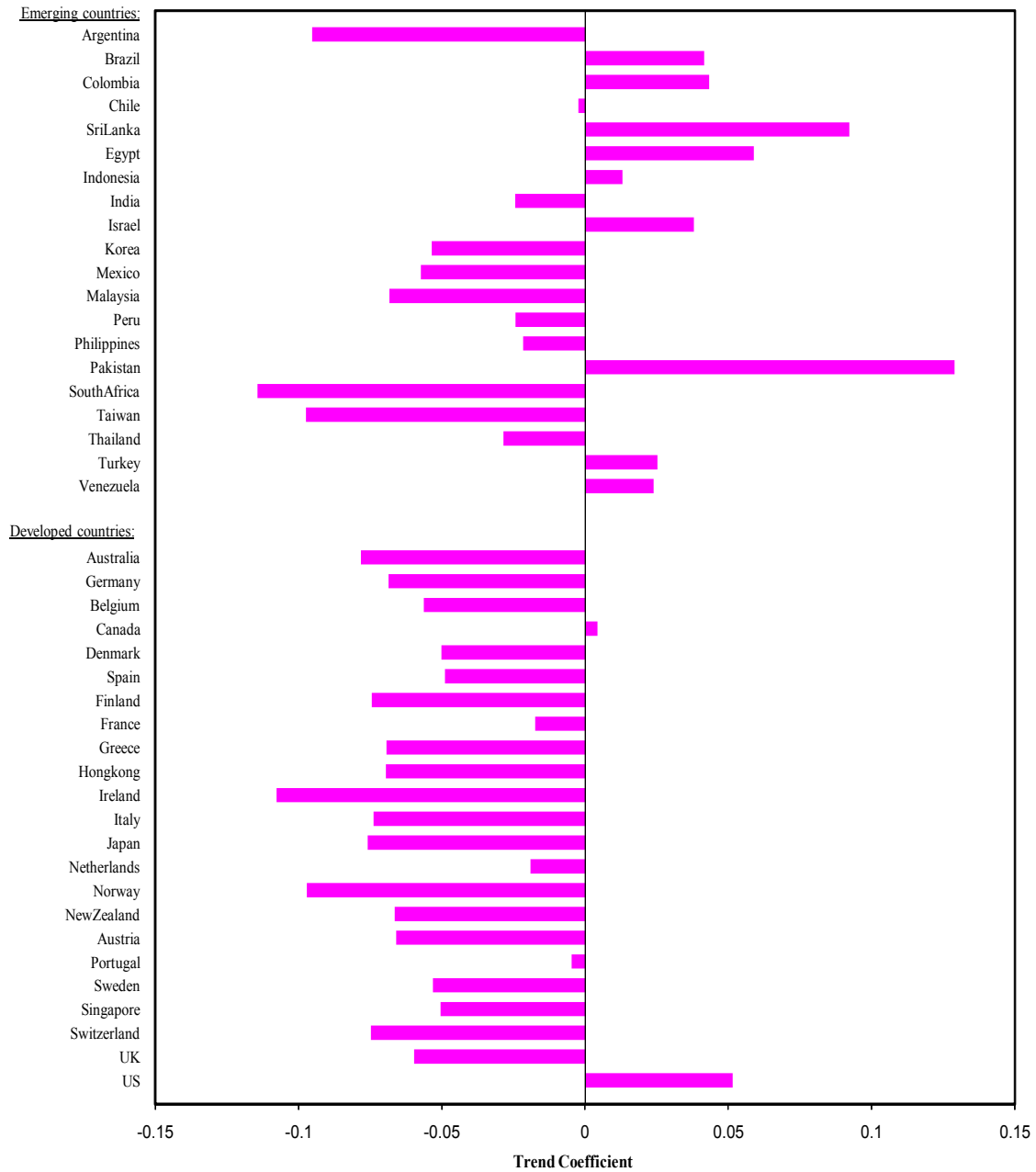
Figure 4.4 shows that 32 out of 43 sample countries experienced a decrease in stock price synchronicity over the past 17 years. South Africa, Ireland, Argentina, Taiwan, and Norway are countries with the greatest reductions. Among countries that exhibit an increase in the information content of stock markets, Pakistan has the largest annual increase. Interestingly, the US is the only developed market that shows a significant increase (trend coefficient = 0.07,  $t$ -statistic = 2.74) in stock price synchronicity.<sup>45</sup>

Figures 4.5 and 4.6 show earnings announcements have become more informative to investors over the years. The trend coefficient for abnormal return variance and abnormal volume is positive for more than two-thirds of the sample countries. The countries with negative trends all are from the emerging market group, except the trend of abnormal return variance for Italy.

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<sup>45</sup> Campbell, Lettau, Malkiel and Xu (2001) show an increase in idiosyncratic volatility for all US stocks from 1962 to 1997, which suggests an increase in the information content of US stock markets. However, Brandt, Brav, Graham and Kumar (2008) find that idiosyncratic volatility drops significantly during more recent years, especially after the year 2000.

### Trend of Stock Price Synchronicity (SYNCH) by Country



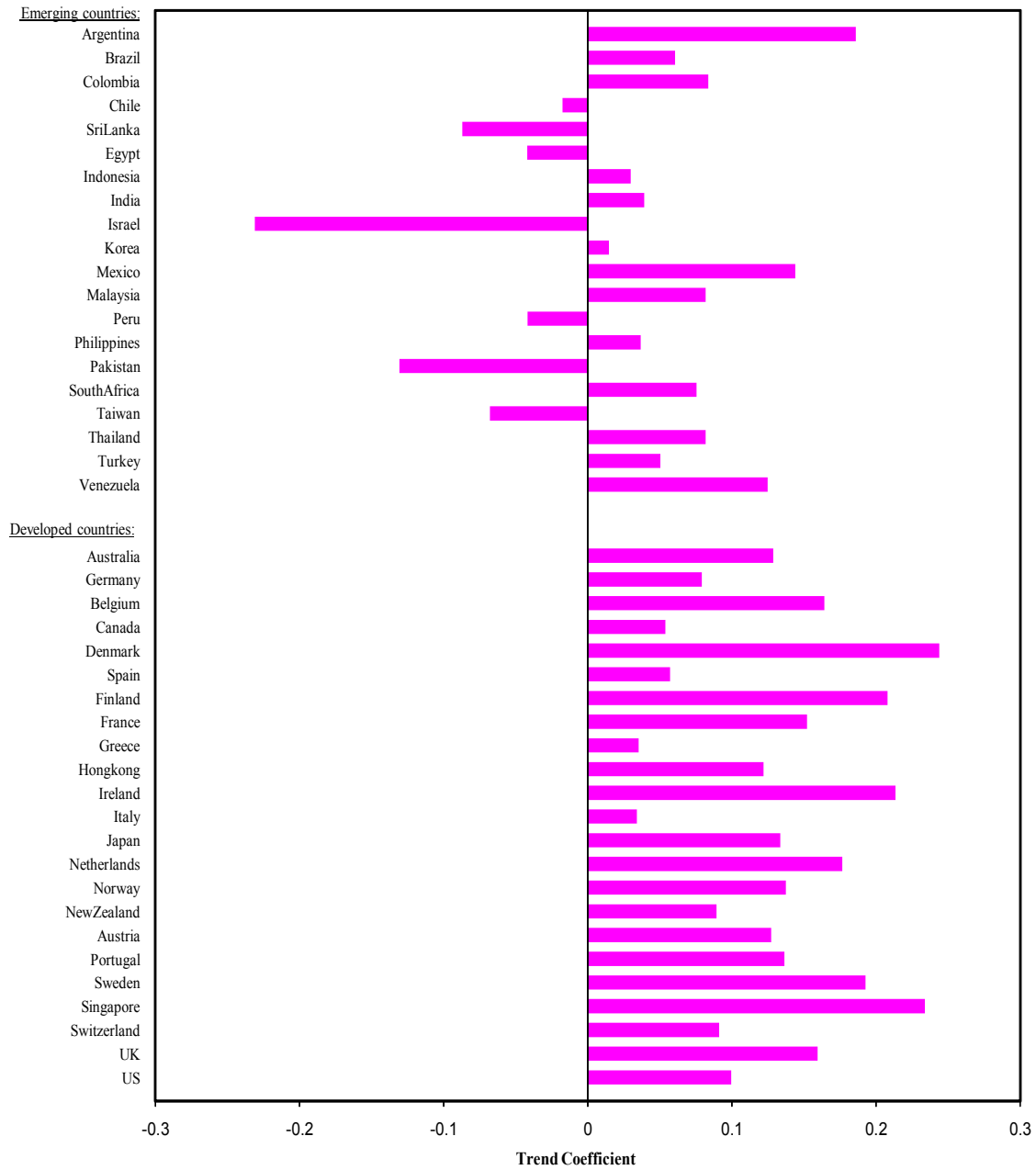
**Figure 4.4:** The trend coefficient for each country is obtained from the following model:  $SYNCH_t = a + b \cdot TREND_t + u$ , where SYNCH is the yearly average of stock price synchronicity.

### Trend of Abnormal Return Variance (AAVAR) by Country



**Figure 4.5:** The trend coefficient for each country is obtained from the following model:  $AARVAR_t = a + b \cdot TREND_t + u$ , where AARVAR is the yearly average of cumulative abnormal return variance 3 days around the earnings announcement date.

### Trend of Abnormal Volume (AAVOL) by Country



**Figure 4.6:** The trend coefficient for each country is obtained from the following model:  $AAVOL_t = a + b \cdot TREND_t + u$ , where AAVOL is the yearly average of cumulative abnormal volume 3 days around the earnings announcement date.

#### **4.4.2 Multivariate Analysis**

##### *4.4.2.1 Stock Price Synchronicity*

To examine the trend of stock price synchronicity across countries over the past 17 years, I estimate model (2). Table 4.3 reports the results for model (2) with the dependent variable being the annual country-average stock price synchronicity,  $SYNCH_{c,y}$ .  $IV$  represents four different institutional variables for each of the specifications in Table 4.3. My main focus is on the coefficients for  $TREND$ , and its interaction with the institutional variables ( $IV*TREND$ ).

The results for the trend coefficient indicate a decrease over the last 17 years in the average stock price synchronicity for emerging markets and countries with weak corporate governance. With the exception of emerging markets, the trend coefficient across all specifications is negative and statistically significant. Bad government countries, for instance, experience an annual decrease of 1.7% ( $t$ -statistic = -2.38) in stock price synchronicity. The same result is found for countries with loose accounting standards and poor shareholder protection.

**Table 4.3: Stock return synchronicity for the 235-day pre-announcement period**

This table presents the OLS regression results for model (2). The dependent variable is the logistic transformation of the country-average  $R^2$ . IV represents independent variables in columns 1-4. Developed markets is equal 1 if a country is classified as a developed economy, and zero otherwise. Government quality is calculated as the mean of three indexes measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. Accounting standards measures the general quality of accounting information in a country. Shareholder protection is the product of anti-director rights and rule of law divided by ten. Good government, good accounting standards, and strong shareholder protection in this table are dummy variables with the value of 1 if a country's score for an index is above the median score for all sample countries, and zero otherwise. Trend is a time variable ranging from 0 (year 1990) to 17 (year 2006).

Control variables include the logarithm of number of stocks,  $\text{Ln}(\text{NSTKS})$ , the total capitalization of a country's stock market as a percentage of its total GDP,  $\text{MVGDP}$ , and the total value of stock trading as a percentage of GDP,  $\text{VOLGDP}$ . Heteroscedasticity-corrected t-statistics are in parentheses. \*\*\*, \*\*, and \* represent significant at the 1%, 5%, and 10% levels, respectively.

|                           | Developed<br>markets<br>(1) | Good government<br>(2) | Good accounting<br>standards<br>(3) | Strong shareholder<br>protection<br>(4) |
|---------------------------|-----------------------------|------------------------|-------------------------------------|-----------------------------------------|
| INTERCEPT                 | -0.494<br>(-4.85) ***       | -0.519<br>(-5.15) ***  | -0.490<br>(-4.49) ***               | -0.510<br>(-5.27) ***                   |
| IV                        | -0.252<br>(-2.75) ***       | -0.278<br>(-3.22) ***  | -0.148<br>(-1.60)                   | -0.014<br>(-0.16)                       |
| TREND                     | -0.012<br>(-1.63)           | -0.017<br>(-2.38) **   | -0.023<br>(-3.30) ***               | -0.014<br>(-1.98) **                    |
| IV*TREND                  | -0.032<br>(-3.51) ***       | -0.030<br>(-3.38) ***  | -0.018<br>(-1.84) *                 | -0.025<br>(-2.71) ***                   |
| $\text{Ln}(\text{NSTKS})$ | -0.123<br>(-6.70) ***       | -0.124<br>(-6.79) ***  | -0.148<br>(-7.36) ***               | -0.161<br>(-8.69) ***                   |
| $\text{MVGDP}$            | -0.032<br>(-0.79)           | 0.022<br>(0.55)        | 0.082<br>(2.06) **                  | 0.024<br>(0.58)                         |
| $\text{VOLGDP}$           | 0.041<br>(0.70)             | -0.002<br>(-0.04)      | -0.110<br>(-1.81) *                 | -0.070<br>(-1.11)                       |
| $\_ADJRSQ\_$              | 0.39                        | 0.39                   | 0.29                                | 0.28                                    |
| N obs                     | 641                         | 641                    | 591                                 | 641                                     |

The results for  $IV*TREND$  show that the information environment of stock markets has improved more for developed markets and countries with higher-quality government, better accounting standards, and stronger shareholder protection compared to countries with lower ratings on these institutional factors. The interaction coefficient

for all variables is relatively similar at around 3% and statistically significant at conventional levels. The results in Table 4.3 not only confirm the results reported by Morck, Yeung and Yu (2000), and Jin and Myers (2006) that, on average, there is a gap in synchronous stock price movement between poor and rich countries, but also show that the gap has increased over time.

As for control variables, Table 4.3 shows that the relation between the number of stocks and stock price synchronicity is negative and significant at the 1% level across all specifications, consistent with Morck, Yeung and Yu (2000). The impact of market size and market liquidity on the synchronous movement of stock prices, however, is unclear.

#### *4.4.2.2 Information Content of Earnings Announcements*

In this section, I report the regression results for models (5) and (6) to examine the trend of the information content of annual earnings announcements. Table 4.4 reports the results for abnormal return variance around the 3-day earnings announcement period. The results for the trend coefficient and its interaction with institutional variables indicate that earnings announcements have generally become more useful to investors, and that the increase in the usefulness of earnings announcements is greater for countries with developed economies, good government, good accounting standards, and strong shareholder protection.

**Table 4.4: Cumulative abnormal return variance for the (-1,+1) event window**

This table presents the OLS regression results for model (5). The dependent variable is the country-average of abnormal return variance for 3 days around the earnings announcement date. IV represents independent variables in columns 1-4. Developed markets is equal 1 if a country is classified as a developed economy, and zero otherwise. Government quality is calculated as the mean of three indexes measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. Accounting standards measures the general quality of accounting information in a country. Shareholder protection is the product of anti-director rights and rule of law divided by ten. Good government, good accounting standards, and strong shareholder protection in this table are dummy variables with the value of 1 if a country's score for an index is above the median score for all sample countries, and zero otherwise. Trend is a time variable ranging from 0 (year 1990) to 17 (year 2006).

Control variables include the logarithm of number of stocks, Ln(NSTKS), the total capitalization of a country's stock market as a percentage of its total GDP, MVGDP, and the total value of stock trading as a percentage of GDP, VOLGDP. Heteroscedasticity-corrected t-statistics are in parentheses. \*\*\*, \*\*, and \* represent significant at the 1%, 5%, and 10% levels, respectively.

|           | Developed<br>markets<br>(1) | Good government<br>(2) | Good accounting<br>standards<br>(3) | Strong shareholder<br>protection<br>(4) |
|-----------|-----------------------------|------------------------|-------------------------------------|-----------------------------------------|
| INTERCEPT | 1.834<br>(4.93) ***         | 1.952<br>(5.25) ***    | 1.495<br>(4.08) ***                 | 1.752<br>(4.81) ***                     |
| IV        | 0.064<br>(0.18)             | -0.150<br>(-0.43)      | 0.078<br>(0.21)                     | -0.414<br>(-1.15)                       |
| TREND     | 0.073<br>(2.38) **          | 0.061<br>(2.10) **     | 0.101<br>(3.13) ***                 | 0.089<br>(2.83) ***                     |
| IV*TREND  | 0.167<br>(4.02) ***         | 0.211<br>(5.12) ***    | 0.080<br>(1.83) *                   | 0.124<br>(2.89) ***                     |
| Ln(NSTKS) | 0.198<br>(2.29) **          | 0.213<br>(2.49) **     | 0.328<br>(3.92) ***                 | 0.292<br>(3.37) ***                     |
| MVGDP     | 0.457<br>(2.88) ***         | 0.410<br>(2.62) ***    | 0.235<br>(1.22)                     | 0.305<br>(1.60)                         |
| VOLGDP    | 0.352<br>(1.25)             | 0.239<br>(0.85)        | 0.650<br>(2.07) **                  | 0.758<br>(2.54) **                      |
| _ADJRSQ_  | 0.29                        | 0.31                   | 0.25                                | 0.24                                    |
| N_obs     | 641                         | 641                    | 591                                 | 641                                     |

The trend coefficient and the interaction are statistically significant across all 4 specifications. Specification 1, for instance, shows that the 3-day abnormal return variance, on average, increased by 7.3% ( $t$ -statistic = 2.38) per year for emerging markets. The combined coefficients of *TREND* and *IV\*TREND* indicate that the average

increase in abnormal return variance has been 24% per year for developed markets, a significant 16.7% ( $t$ -statistics = 4.02) larger than for emerging markets. Although the *TREND* coefficient is relatively similar for all institutional variables, the coefficient of *IV\*TREND* is substantially larger for developed markets and countries with good government compared to countries with good accounting standards and strong shareholder protection.

Table 4.4 shows that the number of stocks is positively correlated with the country-average stock return volatility around the annual earnings announcement. The coefficient for  $\ln(NSTKS)$  is statistically significant at conventional levels for all four specifications. Table 4.4 also presents weak evidence that stock returns are more volatile for countries with larger capital markets relative to their GDP. The *MVGDP* coefficient is positive and significant for 2 out of 4 specifications.<sup>46</sup> Evidence of a relation between stock return volatility and the total value of stock trading as a percentage of GDP is also weak. The *VOLGDP* coefficient is positive and significant at the 10% level for good accounting standards and strong shareholder protection.

The results for abnormal trading volume are presented in Table 4.5. The *TREND* coefficient and its interaction with other institutional factors both show a statistically significant increase in trading volume around the 3-day announcement period for the countries in my sample. Only the interaction between *TREND* and good accounting standards is not significant.

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<sup>46</sup> DeFond, Hung and Trezevant (2006) also control for the total market capitalization as a percentage of the 1994 GDP in their analysis. They do not find a significant correlation between this variable and abnormal return variance around the earnings announcement date.

**Table 4.5: Cumulative abnormal volume for the (-1,+1) event window**

This table presents the OLS regression results for model (6). The dependent variable is the country-average of abnormal trading volume for 3 days around the earnings announcement date. IV represents independent variables in columns 1-4. Developed markets is equal 1 if a country is classified as a developed economy, and zero otherwise. Government quality is calculated as the mean of three indexes measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. Accounting standards measures the general quality of accounting information in a country. Shareholder protection is the product of anti-director rights and rule of law divided by ten. Good government, good accounting standards, and strong shareholder protection in this table are dummy variables with the value of 1 if a country's score for an index is above the median score for all sample countries, and zero otherwise. Trend is a time variable ranging from 0 (year 1990) to 17 (year 2006).

Control variables include the logarithm of number of stocks, Ln(NSTKS), the total capitalization of a country's stock market as a percentage of its total GDP, MVGDP, and the total value of stock trading as a percentage of GDP, VOLGDP. Heteroscedasticity-corrected t-statistics are in parentheses. \*\*\*, \*\*, and \* represent significant at the 1%, 5%, and 10% levels, respectively.

|           | Developed<br>markets<br>(1) | Good government<br>(2) | Good accounting<br>standards<br>(3) | Strong shareholder<br>protection<br>(4) |
|-----------|-----------------------------|------------------------|-------------------------------------|-----------------------------------------|
| INTERCEPT | -0.464<br>(-2.51) **        | -0.418<br>(-2.36) **   | -0.661<br>(-3.76) ***               | -0.533<br>(-3.13) ***                   |
| IV        | 0.015<br>(0.09)             | -0.109<br>(-0.73)      | 0.150<br>(0.90)                     | -0.200<br>(-1.35)                       |
| TREND     | 0.037<br>(2.49) **          | 0.033<br>(2.36) **     | 0.066<br>(3.92) ***                 | 0.047<br>(3.34) ***                     |
| IV*TREND  | 0.075<br>(4.07) ***         | 0.091<br>(5.11) ***    | 0.030<br>(1.50)                     | 0.050<br>(2.75) ***                     |
| Ln(NSTKS) | 0.067<br>(1.99) **          | 0.080<br>(2.36) **     | 0.097<br>(2.53) **                  | 0.116<br>(3.29) ***                     |
| MVGDP     | 0.183<br>(2.37) **          | 0.164<br>(2.14) **     | 0.057<br>(0.61)                     | 0.131<br>(1.41)                         |
| VOLGDP    | 0.008<br>(0.08)             | -0.030<br>(-0.30)      | 0.175<br>(1.56)                     | 0.179<br>(1.62)                         |
| _ADJRSQ_  | 0.27                        | 0.28                   | 0.23                                | 0.21                                    |
| N_obs     | 641                         | 641                    | 591                                 | 641                                     |

The results show that emerging countries exhibit an average annual increase of 3.7% ( $t$ -statistic = 2.49) in abnormal trading volume around the earnings announcement date. Compared to emerging countries, the abnormal volume increase for developed countries is a significant 7.5% ( $t$ -statistic = 4.07) per annum larger. Similarly, the

magnitude of the annual increase in abnormal trading volume is approximately 9.1% ( $t$ -statistic = 5.11) higher for countries with good government relative to countries with bad government; and the magnitude of the annual increase in abnormal trading volume is approximately 5% ( $t$ -statistic = 2.75) higher for countries with strong investor protection than for countries with weak investor protection.

As in Table 4.4, Table 4.5 also shows a significantly positive correlation between the number of stocks and abnormal trading volume. The *MVGDP* coefficient is positive and significant at the 5% level for developed markets and good government. The *VOLGDP* coefficient is not significant for any of the four specifications.

To summarize, the multivariate analysis confirms the results in Figures 4.1 – 4.3, that stock price informativeness and earnings informativeness have improved over the last two decades, and that this improvement is significantly larger for countries with better scores on institutional measures.

#### **4.4.3 Robustness Tests**

DeFond, Hung and Trezevant (2007) find that I/B/E/S earnings announcement dates for some countries are measured with substantial noise. Using a random sample of five company-year earnings announcement dates from 26 countries, they find that only 44% of I/B/E/S earnings dates are within 1 day of Lexis/Nexis announcement dates. In this section, I present two sets of tests that are designed to deal with the problem of

inaccurate earnings announcement dates. The first test is to exclude incorrect earnings dates, and the second test is to widen the event window.

#### *4.4.3.1 Excluding Incorrect Earnings Announcement Dates*

DeFond, Hung and Trezevant (2007) find that the proportion of I/B/E/S earnings announcement dates falling within 1 day of Lexis/Nexis announcement dates is positively correlated with the difference between the earnings announcement date and the fiscal year-end date. If they restrict their sample to observations with a reporting lag of less than 99 (62) days, this proportion increases to 57% (73%).

Based on the findings reported in DeFond, Hung and Trezevant (2007), I perform two robustness tests in this section. I exclude observations for which the reporting lag is larger than 99 and 62 calendar days, respectively. The 99-day exclusion results in a 14% reduction of the total number of observations in my sample.<sup>47</sup> The reduction is 29% for emerging countries and 11% for developed markets.<sup>48</sup> The 62-day exclusion results in a 32% reduction in sample size. The reduction is 51% for emerging countries and 28% for developed markets. I re-examine models (2), (5) and (6) in section 4.2 and report the results in Tables 4.6, 4.7 and 4.8 for the 99-day exclusion and in Tables 4.9, 4.10 and 4.11 for the 62-day exclusion.

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<sup>47</sup> A similar exclusion results in an 18% reduction of the total number of observations in DeFond, Hung, and Trezevant's (2006) sample.

<sup>48</sup> DeFond, Hung, and Trezevant (2006) do not find a significant correlation between the likely incorrectness of I/B/E/S earnings announcement dates (as compared to Lexis/Nexis earnings announcement dates) and investor protection. However, I find that the correlation between the reporting lag and institutional factors is approximately -0.25 (significant at the 1% level), which suggests that I/B/E/S earnings announcement dates are more likely to be incorrect for countries with poor quality of institutional factors.

The results for *TREND* and *IV\*TREND* in Tables 4.6, 4.7 and 4.8, and Tables 4.9, 4.10 and 4.11 are generally consistent with those reported in Tables 4.3, 4.4 and 4.5, respectively. The results, albeit less significant, again indicate that information environment before and around earnings announcements has improved over the past 17 years across countries, and that the improvement is greater for countries with better institutional factors.

**Table 4.6: Stock return synchronicity for the 235-day pre-announcement period, excluding observations with a reporting lag of more than 99 calendar days**

This table presents the OLS regression results for model (2). The dependent variable is the logistic transformation of the country-average  $R^2$ . IV represents independent variables in columns 1-4. Developed markets is equal 1 if a country is classified as a developed economy, and zero otherwise. Government quality is calculated as the mean of three indexes measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. Accounting standards measures the general quality of accounting information in a country. Shareholder protection is the product of anti-director rights and rule of law divided by ten. Good government, good accounting standards, and strong shareholder protection in this table are dummy variables with the value of 1 if a country's score for an index is above the median score for all sample countries, and zero otherwise. Trend is a time variable ranging from 0 (year 1990) to 17 (year 2006). Control variables include the logarithm of number of stocks, Ln(NSTKS), the total capitalization of a country's stock market as a percentage of its total GDP, MVGDP, and the total value of stock trading as a percentage of GDP, VOLGDP. Heteroscedasticity-corrected t-statistics are in parentheses. \*\*\*, \*\*, and \* represent significant at the 1%, 5%, and 10% levels, respectively.

|           | Developed<br>markets<br>(1) | Good government<br>(2) | Good accounting<br>standards<br>(3) | Strong shareholder<br>protection<br>(4) |
|-----------|-----------------------------|------------------------|-------------------------------------|-----------------------------------------|
| INTERCEPT | -0.648<br>(-6.54) ***       | -0.715<br>(-7.64) ***  | -0.728<br>(-7.14) ***               | -0.772<br>(-8.44) ***                   |
| IV        | -0.316<br>(-3.29) ***       | -0.319<br>(-3.54) ***  | -0.146<br>(-1.50)                   | -0.010<br>(-0.11)                       |
| TREND     | -0.011<br>(-1.40)           | -0.014<br>(-1.89) *    | -0.016<br>(-2.20) **                | -0.007<br>(-1.01)                       |
| IV*TREND  | -0.026<br>(-2.68) ***       | -0.026<br>(-2.85) ***  | -0.021<br>(-2.09) **                | -0.024<br>(-2.49) **                    |
| Ln(NSTKS) | -0.098<br>(-5.72) ***       | -0.092<br>(-5.30) ***  | -0.117<br>(-6.25) ***               | -0.125<br>(-7.00) ***                   |
| MVGDP     | -0.022<br>(-0.53)           | 0.032<br>(0.80)        | 0.095<br>(2.40) **                  | 0.031<br>(0.71)                         |
| VOLGDP    | 0.041<br>(0.71)             | -0.010<br>(-0.18)      | -0.104<br>(-1.80) *                 | -0.082<br>(-1.33)                       |
| _ADJRSQ_  | 0.34                        | 0.33                   | 0.25                                | 0.22                                    |
| N_obs     | 632                         | 632                    | 582                                 | 632                                     |

**Table 4.7: Cumulative abnormal return variance for the (-1,+1) event window, excluding observations with a reporting lag of more than 99 calendar days**

This table presents the OLS regression results for model (5). The dependent variable is the country-average of abnormal return variance for 3 days around the earnings announcement date. IV represents independent variables in columns 1-4. Developed markets is equal 1 if a country is classified as a developed economy, and zero otherwise. Government quality is calculated as the mean of three indexes measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. Accounting standards measures the general quality of accounting information in a country. Shareholder protection is the product of anti-director rights and rule of law divided by ten. Good government, good accounting standards, and strong shareholder protection in this table are dummy variables with the value of 1 if a country's score for an index is above the median score for all sample countries, and zero otherwise. Trend is a time variable ranging from 0 (year 1990) to 17 (year 2006).

Control variables include the logarithm of number of stocks, Ln(NSTKS), the total capitalization of a country's stock market as a percentage of its total GDP, MVGDP, and the total value of stock trading as a percentage of GDP, VOLGDP. Heteroscedasticity-corrected t-statistics are in parentheses. \*\*\*, \*\*, and \* represent significant at the 1%, 5%, and 10% levels, respectively.

|           | Developed<br>markets<br>(1) | Good government<br>(2) | Good accounting<br>standards<br>(3) | Strong shareholder<br>protection<br>(4) |
|-----------|-----------------------------|------------------------|-------------------------------------|-----------------------------------------|
| INTERCEPT | 1.864<br>(4.88) ***         | 2.027<br>(5.66) ***    | 1.976<br>(5.37) ***                 | 2.154<br>(5.90) ***                     |
| IV        | 0.567<br>(1.32)             | 0.404<br>(0.94)        | 0.410<br>(0.84)                     | -0.122<br>(-0.24)                       |
| TREND     | 0.079<br>(2.30) **          | 0.071<br>(2.18) **     | 0.099<br>(2.73) ***                 | 0.085<br>(2.27) **                      |
| IV*TREND  | 0.146<br>(3.09) ***         | 0.184<br>(3.92) ***    | 0.062<br>(1.22)                     | 0.101<br>(1.99) **                      |
| Ln(NSTKS) | 0.187<br>(2.14) **          | 0.187<br>(2.11) **     | 0.260<br>(2.68) ***                 | 0.244<br>(2.48) **                      |
| MVGDP     | 0.438<br>(2.39) **          | 0.385<br>(2.11) **     | 0.168<br>(0.76)                     | 0.261<br>(1.14)                         |
| VOLGDP    | 0.471<br>(1.47)             | 0.385<br>(1.21)        | 0.886<br>(2.49) **                  | 1.020<br>(2.93) ***                     |
| _ADJRSQ_  | 0.26                        | 0.27                   | 0.21                                | 0.20                                    |
| N_obs     | 632                         | 632                    | 582                                 | 632                                     |

**Table 4.8: Cumulative abnormal volume for the (-1,+1) event window, excluding observations with a reporting lag of more than 99 calendar days**

This table presents the OLS regression results for model (6). The dependent variable is the country-average of abnormal trading volume for 3 days around the earnings announcement date. IV represents independent variables in columns 1-4. Developed markets is equal 1 if a country is classified as a developed economy, and zero otherwise. Government quality is calculated as the mean of three indexes measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. Accounting standards measures the general quality of accounting information in a country. Shareholder protection is the product of anti-director rights and rule of law divided by ten. Good government, good accounting standards, and strong shareholder protection in this table are dummy variables with the value of 1 if a country's score for an index is above the median score for all sample countries, and zero otherwise. Trend is a time variable ranging from 0 (year 1990) to 17 (year 2006).

Control variables include the logarithm of number of stocks, Ln(NSTKS), the total capitalization of a country's stock market as a percentage of its total GDP, MVGDP, and the total value of stock trading as a percentage of GDP, VOLGDP. Heteroscedasticity-corrected t-statistics are in parentheses. \*\*\*, \*\*, and \* represent significant at the 1%, 5%, and 10% levels, respectively.

|           | Developed<br>markets<br>(1) | Good government<br>(2) | Good accounting<br>standards<br>(3) | Strong shareholder<br>protection<br>(4) |
|-----------|-----------------------------|------------------------|-------------------------------------|-----------------------------------------|
| INTERCEPT | -0.438<br>(-2.48) **        | -0.323<br>(-1.80) *    | -0.554<br>(-2.84) ***               | -0.384<br>(-2.24) **                    |
| IV        | 0.142<br>(0.77)             | -0.045<br>(-0.24)      | 0.204<br>(0.93)                     | -0.126<br>(-0.65)                       |
| TREND     | 0.034<br>(2.13) **          | 0.027<br>(1.72) *      | 0.064<br>(3.14) ***                 | 0.043<br>(2.61) ***                     |
| IV*TREND  | 0.075<br>(3.77) ***         | 0.094<br>(4.71) ***    | 0.020<br>(0.86)                     | 0.043<br>(2.08) **                      |
| Ln(NSTKS) | 0.074<br>(2.27) **          | 0.080<br>(2.46) **     | 0.102<br>(3.00) ***                 | 0.110<br>(3.13) ***                     |
| MVGDP     | 0.147<br>(1.88) *           | 0.128<br>(1.63)        | 0.018<br>(0.18)                     | 0.093<br>(0.97)                         |
| VOLGDP    | 0.051<br>(0.50)             | 0.030<br>(0.28)        | 0.273<br>(2.29) **                  | 0.280<br>(2.35) **                      |
| _ADJRSQ_  | 0.26                        | 0.27                   | 0.20                                | 0.19                                    |
| N_obs     | 632                         | 632                    | 582                                 | 632                                     |

**Table 4.9: Stock return synchronicity for the 235-day pre-announcement period, excluding observations with a reporting lag of more than 62 calendar days**

This table presents the OLS regression results for model (2). The dependent variable is the logistic transformation of the country-average  $R^2$ . IV represents independent variables in columns 1-4. Developed markets is equal 1 if a country is classified as a developed economy, and zero otherwise. Government quality is calculated as the mean of three indexes measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. Accounting standards measures the general quality of accounting information in a country. Shareholder protection is the product of anti-director rights and rule of law divided by ten. Good government, good accounting standards, and strong shareholder protection in this table are dummy variables with the value of 1 if a country's score for an index is above the median score for all sample countries, and zero otherwise. Trend is a time variable ranging from 0 (year 1990) to 17 (year 2006).

Control variables include the logarithm of number of stocks, Ln(NSTKS), the total capitalization of a country's stock market as a percentage of its total GDP, MVGDP, and the total value of stock trading as a percentage of GDP, VOLGDP. Heteroscedasticity-corrected t-statistics are in parentheses. \*\*\*, \*\*, and \* represent significant at the 1%, 5%, and 10% levels, respectively.

|           | Developed<br>markets<br>(1) | Good government<br>(2) | Good accounting<br>standards<br>(3) | Strong shareholder<br>protection<br>(4) |
|-----------|-----------------------------|------------------------|-------------------------------------|-----------------------------------------|
| INTERCEPT | -0.795<br>(-8.02) ***       | -0.896<br>(-9.34) ***  | -1.000<br>(-9.02) ***               | -0.967<br>(-9.63) ***                   |
| IV        | -0.463<br>(-4.40) ***       | -0.423<br>(-4.15) ***  | -0.146<br>(-1.30)                   | -0.059<br>(-0.55)                       |
| TREND     | -0.013<br>(-1.61)           | -0.014<br>(-1.79) *    | -0.012<br>(-1.43)                   | -0.007<br>(-0.85)                       |
| IV*TREND  | -0.017<br>(-1.69) *         | -0.019<br>(-1.90) *    | -0.016<br>(-1.44)                   | -0.013<br>(-1.27)                       |
| Ln(NSTKS) | -0.067<br>(-3.93) ***       | -0.064<br>(-3.62) ***  | -0.086<br>(-4.55) ***               | -0.105<br>(-5.83) ***                   |
| MVGDP     | -0.083<br>(-1.94) *         | -0.025<br>(-0.61)      | 0.015<br>(0.37)                     | -0.048<br>(-1.07)                       |
| VOLGDP    | 0.095<br>(1.47)             | 0.036<br>(0.60)        | -0.056<br>(-0.90)                   | -0.030<br>(-0.46)                       |
| _ADJRSQ_  | 0.29                        | 0.27                   | 0.15                                | 0.14                                    |
| N_obs     | 619                         | 619                    | 570                                 | 619                                     |

**Table 4.10: Cumulative abnormal return variance for the (-1,+1) event window, excluding observations with a reporting lag of more than 62 calendar days**

This table presents the OLS regression results for model (5). The dependent variable is the country-average of abnormal return variance for 3 days around the earnings announcement date. IV represents independent variables in columns 1-4. Developed markets is equal 1 if a country is classified as a developed economy, and zero otherwise. Government quality is calculated as the mean of three indexes measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. Accounting standards measures the general quality of accounting information in a country. Shareholder protection is the product of anti-director rights and rule of law divided by ten. Good government, good accounting standards, and strong shareholder protection in this table are dummy variables with the value of 1 if a country's score for an index is above the median score for all sample countries, and zero otherwise. Trend is a time variable ranging from 0 (year 1990) to 17 (year 2006).

Control variables include the logarithm of number of stocks, Ln(NSTKS), the total capitalization of a country's stock market as a percentage of its total GDP, MVGDP, and the total value of stock trading as a percentage of GDP, VOLGDP. Heteroscedasticity-corrected t-statistics are in parentheses. \*\*\*, \*\*, and \* represent significant at the 1%, 5%, and 10% levels, respectively.

|           | Developed<br>markets<br>(1) | Good government<br>(2) | Good accounting<br>standards<br>(3) | Strong shareholder<br>protection<br>(4) |
|-----------|-----------------------------|------------------------|-------------------------------------|-----------------------------------------|
| INTERCEPT | 2.368<br>(4.42) ***         | 2.464<br>(5.02) ***    | 2.335<br>(4.96) ***                 | 2.462<br>(5.46) ***                     |
| IV        | 0.182<br>(0.30)             | 0.119<br>(0.20)        | 0.430<br>(0.63)                     | 0.059<br>(0.09)                         |
| TREND     | 0.057<br>(1.30)             | 0.053<br>(1.33)        | 0.093<br>(2.11) **                  | 0.086<br>(2.12) **                      |
| IV*TREND  | 0.191<br>(3.11) ***         | 0.225<br>(3.74) ***    | 0.081<br>(1.30)                     | 0.121<br>(1.96) *                       |
| Ln(NSTKS) | 0.126<br>(1.25)             | 0.124<br>(1.23)        | 0.179<br>(1.56)                     | 0.140<br>(1.27)                         |
| MVGDP     | 0.511<br>(2.16) **          | 0.455<br>(1.93) *      | 0.186<br>(0.62)                     | 0.248<br>(0.85)                         |
| VOLGDP    | 0.630<br>(1.43)             | 0.526<br>(1.20)        | 1.105<br>(2.27) **                  | 1.274<br>(2.73) ***                     |
| _ADJRSQ_  | 0.20                        | 0.22                   | 0.17                                | 0.17                                    |
| N_obs     | 619                         | 619                    | 570                                 | 619                                     |

**Table 4.11: Cumulative abnormal volume for the (-1,+1) event window, excluding observations with a reporting lag of more than 62 calendar days**

This table presents the OLS regression results for model (6). The dependent variable is the country-average of abnormal trading volume for 3 days around the earnings announcement date. IV represents independent variables in columns 1-4. Developed markets is equal 1 if a country is classified as a developed economy, and zero otherwise. Government quality is calculated as the mean of three indexes measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. Accounting standards measures the general quality of accounting information in a country. Shareholder protection is the product of anti-director rights and rule of law divided by ten. Good government, good accounting standards, and strong shareholder protection in this table are dummy variables with the value of 1 if a country's score for an index is above the median score for all sample countries, and zero otherwise. Trend is a time variable ranging from 0 (year 1990) to 17 (year 2006).

Control variables include the logarithm of number of stocks, Ln(NSTKS), the total capitalization of a country's stock market as a percentage of its total GDP, MVGDP, and the total value of stock trading as a percentage of GDP, VOLGDP. Heteroscedasticity-corrected t-statistics are in parentheses. \*\*\*, \*\*, and \* represent significant at the 1%, 5%, and 10% levels, respectively.

|           | Developed<br>markets<br>(1) | Good government<br>(2) | Good accounting<br>standards<br>(3) | Strong shareholder<br>protection<br>(4) |
|-----------|-----------------------------|------------------------|-------------------------------------|-----------------------------------------|
| INTERCEPT | -0.368<br>(-1.86) *         | -0.269<br>(-1.39)      | -0.542<br>(-2.56) **                | -0.358<br>(-1.96) **                    |
| IV        | 0.175<br>(0.79)             | 0.031<br>(0.14)        | 0.342<br>(1.35)                     | 0.066<br>(0.29)                         |
| TREND     | 0.038<br>(2.05) **          | 0.033<br>(1.84) *      | 0.074<br>(3.17) ***                 | 0.055<br>(3.01) ***                     |
| IV*TREND  | 0.076<br>(3.28) ***         | 0.092<br>(4.05) ***    | 0.012<br>(0.44)                     | 0.027<br>(1.16)                         |
| Ln(NSTKS) | 0.067<br>(1.82) *           | 0.072<br>(1.96) **     | 0.094<br>(2.44) **                  | 0.097<br>(2.39) **                      |
| MVGDP     | 0.175<br>(2.05) **          | 0.154<br>(1.79) *      | 0.041<br>(0.40)                     | 0.108<br>(1.04)                         |
| VOLGDP    | 0.010<br>(0.08)             | -0.016<br>(-0.13)      | 0.236<br>(1.66) *                   | 0.264<br>(1.88) *                       |
| _ADJRSQ_  | 0.21                        | 0.22                   | 0.17                                | 0.15                                    |
| N_obs     | 619                         | 619                    | 570                                 | 619                                     |

#### *4.4.3.2 Expanding the Event Window*

As in DeFond, Hung and Trezevant (2007), an alternative way to deal with possibly incorrect earnings announcement dates is to expand the event window from a 3-day window  $(-1, +1)$  to a 5-day window  $(-2, +2)$  or an 11-day window  $(-5, +5)$ . The results for the  $(-2, +2)$  event window are reported in Table 4.12 for abnormal return variance, and Table 4.13 for abnormal volume. Tables 4.14 and 4.15 report the results for the  $(-5, +5)$  event window. Although widening the event window reduces the power of the tests because of the increased number of non-announcement days, there is still evidence of a divergent trend in the information content of earnings announcements between countries with weak and strong institutional quality over the sample period.

**Table 4.12: Cumulative abnormal return variance for the (-2,+2) event window**

This table presents the OLS regression results for model (5). The dependent variable is the country-average of abnormal return variance for 5 days around the earnings announcement date. IV represents independent variables in columns 1-4. Developed markets is equal 1 if a country is classified as a developed economy, and zero otherwise. Government quality is calculated as the mean of three indexes measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. Accounting standards measures the general quality of accounting information in a country. Shareholder protection is the product of anti-director rights and rule of law divided by ten. Good government, good accounting standards, and strong shareholder protection in this table are dummy variables with the value of 1 if a country's score for an index is above the median score for all sample countries, and zero otherwise. Trend is a time variable ranging from 0 (year 1990) to 17 (year 2006).

Control variables include the logarithm of number of stocks, Ln(NSTKS), the total capitalization of a country's stock market as a percentage of its total GDP, MVGDP, and the total value of stock trading as a percentage of GDP, VOLGDP. Heteroscedasticity-corrected t-statistics are in parentheses. \*\*\*, \*\*, and \* represent significant at the 1%, 5%, and 10% levels, respectively.

|           | Developed<br>markets<br>(1) | Good government<br>(2) | Good accounting<br>standards<br>(3) | Strong shareholder<br>protection<br>(4) |
|-----------|-----------------------------|------------------------|-------------------------------------|-----------------------------------------|
| INTERCEPT | 4.413<br>(7.22) ***         | 4.434<br>(7.58) ***    | 3.230<br>(6.35) ***                 | 3.896<br>(7.17) ***                     |
| IV        | -0.552<br>(-1.03)           | -0.677<br>(-1.34)      | 0.109<br>(0.23)                     | -0.520<br>(-1.05)                       |
| TREND     | 0.034<br>(0.75)             | 0.031<br>(0.74)        | 0.116<br>(2.91) ***                 | 0.091<br>(2.15) **                      |
| IV*TREND  | 0.244<br>(4.29) ***         | 0.279<br>(5.09) ***    | 0.072<br>(1.34)                     | 0.133<br>(2.43) **                      |
| Ln(NSTKS) | 0.226<br>(2.00) **          | 0.245<br>(2.18) **     | 0.425<br>(4.10) ***                 | 0.338<br>(2.98) ***                     |
| MVGDP     | 0.509<br>(2.58) ***         | 0.463<br>(2.37) **     | 0.319<br>(1.37)                     | 0.370<br>(1.60)                         |
| VOLGDP    | 0.397<br>(1.12)             | 0.278<br>(0.78)        | 0.751<br>(1.93) *                   | 0.851<br>(2.29) **                      |
| _ADJRSQ_  | 0.23                        | 0.24                   | 0.21                                | 0.18                                    |
| N_obs     | 641                         | 641                    | 591                                 | 641                                     |

**Table 4.13: Cumulative abnormal volume for the (-2,+2) event window**

This table presents the OLS regression results for model (6). The dependent variable is the country-average of abnormal trading volume for 5 days around the earnings announcement date. IV represents independent variables in columns 1-4. Developed markets is equal 1 if a country is classified as a developed economy, and zero otherwise. Government quality is calculated as the mean of three indexes measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. Accounting standards measures the general quality of accounting information in a country. Shareholder protection is the product of anti-director rights and rule of law divided by ten. Good government, good accounting standards, and strong shareholder protection in this table are dummy variables with the value of 1 if a country's score for an index is above the median score for all sample countries, and zero otherwise. Trend is a time variable ranging from 0 (year 1990) to 17 (year 2006).

Control variables include the logarithm of number of stocks, Ln(NSTKS), the total capitalization of a country's stock market as a percentage of its total GDP, MVGDP, and the total value of stock trading as a percentage of GDP, VOLGDP. Heteroscedasticity-corrected t-statistics are in parentheses. \*\*\*, \*\*, and \* represent significant at the 1%, 5%, and 10% levels, respectively.

|           | Developed<br>markets<br>(1) | Good government<br>(2) | Good accounting<br>standards<br>(3) | Strong shareholder<br>protection<br>(4) |
|-----------|-----------------------------|------------------------|-------------------------------------|-----------------------------------------|
| INTERCEPT | -0.687<br>(-2.47) **        | -0.620<br>(-2.29) **   | -0.972<br>(-3.67) ***               | -0.771<br>(-2.99) ***                   |
| IV        | 0.018<br>(0.08)             | -0.161<br>(-0.73)      | 0.242<br>(0.98)                     | -0.265<br>(-1.23)                       |
| TREND     | 0.054<br>(2.44) **          | 0.047<br>(2.28) **     | 0.096<br>(3.87) ***                 | 0.066<br>(3.26) ***                     |
| IV*TREND  | 0.104<br>(3.89) ***         | 0.126<br>(4.87) ***    | 0.038<br>(1.32)                     | 0.072<br>(2.78) ***                     |
| Ln(NSTKS) | 0.113<br>(1.98) **          | 0.130<br>(2.30) **     | 0.152<br>(2.38) **                  | 0.176<br>(2.98) ***                     |
| MVGDP     | 0.261<br>(2.44) **          | 0.235<br>(2.21) **     | 0.084<br>(0.65)                     | 0.181<br>(1.43)                         |
| VOLGDP    | -0.124<br>(-0.86)           | -0.174<br>(-1.20)      | 0.098<br>(0.61)                     | 0.118<br>(0.77)                         |
| _ADJRSQ_  | 0.23                        | 0.24                   | 0.20                                | 0.18                                    |
| N_obs     | 641                         | 641                    | 591                                 | 641                                     |

**Table 4.14: Cumulative abnormal return variance for the (-5,+5) event window**

This table presents the OLS regression results for model (5). The dependent variable is the country-average of abnormal return variance for 11 days around the earnings announcement date. IV represents independent variables in columns 1-4. Developed markets is equal 1 if a country is classified as a developed economy, and zero otherwise. Government quality is calculated as the mean of three indexes measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. Accounting standards measures the general quality of accounting information in a country. Shareholder protection is the product of anti-director rights and rule of law divided by ten. Good government, good accounting standards, and strong shareholder protection in this table are dummy variables with the value of 1 if a country's score for an index is above the median score for all sample countries, and zero otherwise. Trend is a time variable ranging from 0 (year 1990) to 17 (year 2006).

Control variables include the logarithm of number of stocks, Ln(NSTKS), the total capitalization of a country's stock market as a percentage of its total GDP, MVGDP, and the total value of stock trading as a percentage of GDP, VOLGDP. Heteroscedasticity-corrected t-statistics are in parentheses. \*\*\*, \*\*, and \* represent significant at the 1%, 5%, and 10% levels, respectively.

|           | Developed<br>markets<br>(1) | Good government<br>(2) | Good accounting<br>standards<br>(3) | Strong shareholder<br>protection<br>(4) |
|-----------|-----------------------------|------------------------|-------------------------------------|-----------------------------------------|
| INTERCEPT | 12.767<br>(10.73) ***       | 12.960<br>(11.34) ***  | 11.244<br>(9.55) ***                | 11.986<br>(11.55) ***                   |
| IV        | -0.967<br>(-0.89)           | -1.508<br>(-1.45)      | -0.284<br>(-0.26)                   | -0.370<br>(-0.36)                       |
| TREND     | -0.035<br>(-0.38)           | -0.055<br>(-0.64)      | 0.080<br>(0.87)                     | 0.053<br>(0.68)                         |
| IV*TREND  | 0.333<br>(3.11) ***         | 0.402<br>(3.90) ***    | 0.078<br>(0.74)                     | 0.177<br>(1.80) *                       |
| Ln(NSTKS) | 0.033<br>(0.15)             | 0.072<br>(0.33)        | 0.308<br>(1.39)                     | 0.130<br>(0.58)                         |
| MVGDP     | 0.490<br>(1.46)             | 0.440<br>(1.31)        | 0.313<br>(0.85)                     | 0.214<br>(0.56)                         |
| VOLGDP    | 0.660<br>(1.08)             | 0.519<br>(0.84)        | 1.222<br>(1.91) *                   | 1.311<br>(2.10) **                      |
| _ADJRSQ_  | 0.09                        | 0.09                   | 0.06                                | 0.06                                    |
| N_obs     | 641                         | 641                    | 591                                 | 641                                     |

**Table 4.15: Cumulative abnormal volume for the (-5,+5) event window**

This table presents the OLS regression results for model (6). The dependent variable is the country-average of abnormal trading volume for 11 days around the earnings announcement date. IV represents independent variables in columns 1-4. Developed markets is equal 1 if a country is classified as a developed economy, and zero otherwise. Government quality is calculated as the mean of three indexes measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. Accounting standards measures the general quality of accounting information in a country. Shareholder protection is the product of anti-director rights and rule of law divided by ten. Good government, good accounting standards, and strong shareholder protection in this table are dummy variables with the value of 1 if a country's score for an index is above the median score for all sample countries, and zero otherwise. Trend is a time variable ranging from 0 (year 1990) to 17 (year 2006).

Control variables include the logarithm of number of stocks, Ln(NSTKS), the total capitalization of a country's stock market as a percentage of its total GDP, MVGDP, and the total value of stock trading as a percentage of GDP, VOLGDP. Heteroscedasticity-corrected t-statistics are in parentheses. \*\*\*, \*\*, and \* represent significant at the 1%, 5%, and 10% levels, respectively.

|           | Developed<br>markets<br>(1) | Good government<br>(2) | Good accounting<br>standards<br>(3) | Strong shareholder<br>protection<br>(4) |
|-----------|-----------------------------|------------------------|-------------------------------------|-----------------------------------------|
| INTERCEPT | -0.752<br>(-1.49)           | -0.622<br>(-1.25)      | -1.327<br>(-2.80) ***               | -0.889<br>(-1.91) *                     |
| IV        | -0.021<br>(-0.05)           | -0.407<br>(-0.96)      | 0.425<br>(0.94)                     | -0.424<br>(-1.05)                       |
| TREND     | 0.064<br>(1.65) *           | 0.052<br>(1.38)        | 0.139<br>(3.32) ***                 | 0.084<br>(2.37) **                      |
| IV*TREND  | 0.157<br>(3.40) ***         | 0.191<br>(4.21) ***    | 0.045<br>(0.93)                     | 0.109<br>(2.50) **                      |
| Ln(NSTKS) | 0.130<br>(1.33)             | 0.166<br>(1.71) *      | 0.197<br>(1.96) *                   | 0.223<br>(2.21) **                      |
| MVGDP     | 0.436<br>(2.20) **          | 0.403<br>(2.04) **     | 0.163<br>(0.75)                     | 0.320<br>(1.47)                         |
| VOLGDP    | -0.215<br>(-0.82)           | -0.271<br>(-1.01)      | 0.139<br>(0.49)                     | 0.139<br>(0.52)                         |
| _ADJRSQ_  | 0.17                        | 0.18                   | 0.15                                | 0.13                                    |
| N_obs     | 641                         | 641                    | 591                                 | 641                                     |

## **4.5 Information Environment for Cross-listed Firms**

The empirical analysis so far shows a consistent and surprising divergence in the quality of information environment between countries with high scores on institutional quality and countries with low scores on institutional quality. Using similar measures as in this chapter, Bailey, Karolyi and Salva (2006), BKS, find that non-US stocks from developed countries experience a significant increase in return volatility and trading volume after cross-listing in the US, whereas no such increase is found for cross-listed stocks from emerging economies. Fernandes and Ferreira (2008), FF, report that stock price synchronicity increases significantly for cross-listed firms from developed countries and decreases significantly for firms from emerging markets after US cross-listing. BKS and FF do not adjust their measures of the quality of information environment for the change in the quality of information environment in the home country. Therefore, given the result in the previous section that firm-specific information during the year and around earnings announcements generally has become more useful over time, especially for developed countries, the results in BKS and FF could be a reflection of general trends in the domestic countries rather than the result of cross-listing.

In this section, I use a sample of cross-listed stocks to analyze the change in information environment after US cross-listing. I compare the results with and without adjusting for changes in the quality of information environment averaged across all firms in the domestic market (excluding cross-listed stocks). In addition to comparing the results between developed and emerging markets as in BKS and FF, I also compare the

results between countries with strong investor protection and countries with poor investor protection.

I obtain an ADR list from the Bank of New York website as at 09 December, 2005. Since the list of ADRs is frequently updated, my sample differs from the sample in BKS. I select stocks that cross-list in the US sometime between 1 January 1989 and 31 December 2001 as in BKS. I then match my sample to the I/B/E/S database to obtain local earnings announcement dates. Similar to BKS, I require my sample of ADRs to have at least one earnings announcement before and one earnings announcement after the cross-listing date. Moreover, the maximum number of earnings announcements required for each ADR is 5 announcements before and 5 announcements after US cross-listing. Abnormal return variance, abnormal volume, and stock price synchronicity are estimated using the same method as discussed in section 4.2. Following BKS, I also require that cross-listed stocks have at least 3 analyst earnings forecasts per announcement.<sup>49</sup> Compared to 387 stocks across 42 countries in BKS, my final cross-listed sample includes 257 stocks across 36 countries. Of these 257 stocks, 71 are NYSE-listed, 12 are NASDAQ-listed, 131 are OTC-listed, and 43 are Rule 144a stocks.

The country distribution of my cross-listing sample is presented in Table 4.16. As in BKS, only a few ADR firms have full data for the 10-year window surrounding the cross-listing date. The number of pre-listing and post-listing events is not always equal either. The spearman correlation between the number of ADR firms across countries in BKS's sample and my sample is 82%. Similar correlations are also found between BKS's

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<sup>49</sup> When I drop this requirement in the sample selection, the results (not reported) are similar.

sample and my sample when I compare the number of observations in each country before, and the number of observations in each country after the cross-listing date. The correlation between the number of non-ADR firms across countries in BKS's sample and my sample is 92%.

The last two rows in Table 4.16 show that the number of cross-listed firms from developed countries is twice the number of cross-listed firms from emerging markets (171 versus 86). The second column shows the average number of non-cross-listed firms in the home country that are used to estimate the general information environment of the domestic market in a year.

**Table 4.16: Distribution of ADRs and their earnings events across countries**

This table presents the number of US-cross-listed firms ordered by the home country. Non-ADR firms are the average number of non-cross-listed firms in the home market that are used to compute the market-wide information environment in a year. Pre- (post-) listing events are the number of earnings announcement events available for the ADR firms before and after the cross-listing.

| Country           | ADR firms | Non-ADR firms | Pre-listing events | Post-listing events |
|-------------------|-----------|---------------|--------------------|---------------------|
| Argentina         | 1         | 20            | 1                  | 5                   |
| Australia         | 10        | 204           | 23                 | 50                  |
| Austria           | 7         | 38            | 25                 | 35                  |
| Belgium           | 2         | 57            | 9                  | 10                  |
| Brazil            | 8         | 56            | 17                 | 38                  |
| Canada            | 4         | 434           | 20                 | 20                  |
| Chile             | 5         | 42            | 11                 | 25                  |
| Denmark           | 1         | 53            | 2                  | 5                   |
| Egypt             | 1         | 12            | 2                  | 5                   |
| Finland           | 3         | 46            | 9                  | 15                  |
| France            | 17        | 299           | 69                 | 84                  |
| Germany           | 6         | 312           | 14                 | 30                  |
| Greece            | 3         | 117           | 13                 | 15                  |
| Hongkong          | 38        | 130           | 135                | 188                 |
| India             | 8         | 159           | 25                 | 40                  |
| Indonesia         | 1         | 56            | 1                  | 3                   |
| Israel            | 2         | 21            | 4                  | 10                  |
| Italy             | 6         | 123           | 21                 | 30                  |
| Japan             | 24        | 1300          | 83                 | 117                 |
| Malaysia          | 2         | 178           | 10                 | 6                   |
| Mexico            | 12        | 33            | 26                 | 51                  |
| Netherlands       | 4         | 108           | 16                 | 20                  |
| Norway            | 3         | 53            | 8                  | 15                  |
| Peru              | 1         | 12            | 2                  | 3                   |
| Philippines       | 4         | 44            | 9                  | 20                  |
| Portugal          | 1         | 30            | 5                  | 5                   |
| Singapore         | 7         | 141           | 20                 | 35                  |
| SouthAfrica       | 15        | 110           | 55                 | 71                  |
| Spain             | 6         | 84            | 25                 | 30                  |
| SriLanka          | 1         | 18            | 1                  | 5                   |
| Sweden            | 2         | 160           | 3                  | 8                   |
| Taiwan            | 19        | 303           | 67                 | 94                  |
| Thailand          | 1         | 110           | 4                  | 5                   |
| Turkey            | 2         | 90            | 3                  | 10                  |
| UK                | 27        | 407           | 113                | 131                 |
| Venezuela         | 3         | 2             | 9                  | 10                  |
| Emerging markets  | 86        | 1266          | 247                | 401                 |
| Developed markets | 171       | 4094          | 613                | 843                 |

Table 4.17 reports univariate results for unadjusted and adjusted abnormal return variance and abnormal volume cumulated over a window of three days (-1 through +1) around the earnings announcement date. The adjusted abnormal return variance for cross-listed firm  $i$  in year  $t$  is calculated by subtracting the median abnormal return variance for all non-cross-listed firms in the home market in that year from the unadjusted abnormal return variance for that firm in that year. The adjusted abnormal volume is similarly calculated. As in BKS, all significance levels are based on Wilcoxon non-parametric tests.

The results for unadjusted measures in Panel A show that stocks from developed markets experience significant increases in both abnormal return variance and abnormal volume after US cross-listing, whereas there are no significant changes for cross-listed stocks from emerging markets. The mean of abnormal return variance for 3 days around the earnings announcement date increases from 4.86 before cross-listing to 5.56 after cross-listing for developed countries.<sup>50</sup> The increase of 0.7 is statistically significant at the 5% level. The increase of 23% in abnormal volume post-listing is also significant at the 5% level for countries with developed markets. The results are consistent with BKS.<sup>51</sup>

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<sup>50</sup> Note that BKS use absolute abnormal returns rather than abnormal return variance (scaled by the variance of the market model residuals) around earnings announcement dates as in this study. The 21.8% increase (2.66% pre-listing to 3.24% post-listing) in absolute abnormal returns in BKS is similar to the 14.4% increase (4.86 pre-listing to 5.56 post-listing) in abnormal return variance in my study for cross-listed firms from developed countries.

<sup>51</sup> Fernandes and Ferreira (2007) also reports similar results as BKS.

**Table 4.17: Abnormal return variance and abnormal volume with and without adjusting for the market-wide effect**

The market-wide effect is defined as the median of abnormal return variance and abnormal volume for all non-cross-listed stocks in the home market in a year. Developed markets is equal 1 if a country is classified as a developed economy, and zero otherwise. Government quality is calculated as the mean of three indexes measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. Accounting standards measures the general quality of accounting information in a country. Shareholder protection is the product of anti-director rights and rule of law divided by ten. Good government, good accounting standards, and strong shareholder protection in this table are dummy variables with the value of 1 if a country's score for an index is above the median score for all sample countries, and zero otherwise. All tests are Wilcoxon nonparametric tests. \*\*\*, \*\*, and \* represent significant at the 1%, 5%, and 10% levels, respectively.

**Panel A: Unadjusted abnormal return variance and abnormal volume**

|                               | Obs    |       | Unadjusted abnormal return variance |       |                | Unadjusted abnormal volume |       |                |
|-------------------------------|--------|-------|-------------------------------------|-------|----------------|----------------------------|-------|----------------|
|                               | Before | After | Before                              | After | After - Before | Before                     | After | After - Before |
| Emerging markets              | 247    | 403   | 3.20                                | 3.58  | 0.38           | 0.04                       | -0.05 | -0.10          |
| Developed markets             | 613    | 843   | 4.86                                | 5.56  | 0.70 **        | 0.90                       | 1.14  | 0.23 **        |
| Bad government                | 214    | 352   | 3.43                                | 3.80  | 0.37           | 0.17                       | 0.13  | -0.05          |
| Good government               | 646    | 892   | 4.74                                | 5.38  | 0.64 **        | 0.84                       | 1.01  | 0.18 *         |
| Bad accounting standards      | 185    | 317   | 4.09                                | 4.37  | 0.27           | 0.24                       | 0.34  | 0.11 *         |
| Good accounting standards     | 673    | 919   | 4.56                                | 5.19  | 0.63 **        | 0.82                       | 0.95  | 0.13 *         |
| Weak shareholder protection   | 178    | 305   | 4.12                                | 4.88  | 0.76 **        | 0.54                       | 0.46  | -0.08          |
| Strong shareholder protection | 682    | 939   | 4.56                                | 4.99  | 0.43           | 0.74                       | 0.90  | 0.16 **        |

**Panel B: Market-adjusted abnormal return variance and abnormal volume**

|                               | Obs    |       | Adjusted abnormal return variance |          |                | Adjusted abnormal volume |          |                |
|-------------------------------|--------|-------|-----------------------------------|----------|----------------|--------------------------|----------|----------------|
|                               | Before | After | Before                            | After    | After - Before | Before                   | After    | After - Before |
| Emerging markets              | 247    | 403   | 1.49 ***                          | 1.70 *** | 0.21           | 0.55                     | 0.45     | -0.10          |
| Developed markets             | 613    | 843   | 2.71 ***                          | 3.06 *** | 0.35           | 1.08 ***                 | 1.10 *** | 0.03           |
| Bad government                | 214    | 352   | 1.73 ***                          | 1.97 *** | 0.23           | 0.65                     | 0.52 *   | -0.13          |
| Good government               | 646    | 892   | 2.60 ***                          | 2.90 *** | 0.29           | 1.03 ***                 | 1.05 *** | 0.02           |
| Bad accounting standards      | 185    | 317   | 2.36 ***                          | 2.43 *** | 0.07           | 0.71                     | 0.69 *** | -0.02          |
| Good accounting standards     | 673    | 919   | 2.43 ***                          | 2.74 *** | 0.31           | 1.01 ***                 | 1.00 *** | -0.01          |
| Weak shareholder protection   | 178    | 305   | 2.30 ***                          | 2.92 *** | 0.62 *         | 0.93 ***                 | 0.72 *** | -0.21          |
| Strong shareholder protection | 682    | 939   | 2.45 ***                          | 2.55 *** | 0.10           | 0.95 ***                 | 0.98 *** | 0.03           |

Panel A of Table 4.17 also shows significant increases in both measures of earnings informativeness after US cross-listing for the group of stocks from countries with good government. In addition, the difference in unadjusted abnormal return variance between pre- and post-listing is only statistically significant for firms from countries with good accounting standards. However, unadjusted abnormal volume exhibits significant increases for cross-listed stocks from both good and bad accounting standards countries. Using shareholder protection as the classification variable, I find a significant increase in abnormal volatility for cross-listed stocks from weak shareholder protection countries. However, the increase in abnormal volume is only significant for cross-listed stocks from strong investor protection countries.

Panel B of Table 4.17 reports the results for abnormal return variance and abnormal volume after adjusting for the median abnormal return variance and median abnormal volume for all non-cross-listed firms from the same country in the same year. The results generally show that the information content of earnings announcements for cross-listed stocks is higher than the median earnings informativeness of the market both before and after US cross-listing. The results are statistically significant at the 1% level for adjusted return variance regardless of what institutional factor I use. For adjusted abnormal volume, the results are highly significant for cross-listed stocks from countries with better institutional quality, whereas they are only significant in half of the tests for cross-listed stocks from countries with lower institutional quality. The results are consistent with BKS in that, on average, information environment is better for cross-listed firms than for non-cross-listed firms, especially for firms from developed countries.

As for the difference in market-adjusted information environment between pre- and post-listing, the results in Panel B of Table 4.17 show no significant differences between the pre- and post-period, except for the adjusted abnormal return variance for weak shareholder protection stocks. Therefore, these results suggest that the divergence in the information content of earnings announcements for cross-listed stocks is driven by the market-wide changes described in the previous section. In relation to BKS, the results in Panel B of Table 4.17 suggest that the puzzling increase in information environment for cross-listed firms from developed markets following US listing is just a reflection of a similar increase in the quality of information environment of the domestic market.

Table 4.18 presents the results for unadjusted and market-adjusted stock price synchronicity 5 years before and 5 years after the US cross-listing year.<sup>52</sup> The unadjusted results show that stock price synchronicity decreases significantly after US listing for countries with developed financial markets, good government, high-quality accounting standards, and strong protection of shareholder rights.<sup>53</sup> There is also a decrease in stock price synchronicity for countries with lower ratings of institutional measures. However, this decrease is not statistically significant for any of the classification variables.

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<sup>52</sup> Note that my sample of 83 stocks cross-listed on NYSE and NASDAQ is much smaller than the 879 exchange-listed stocks in FF. The analysis in Table 4.18 uses all cross-listed stocks regardless of their listing venues, and caution is therefore warranted when comparing the results with FF.

<sup>53</sup> The change in stock price synchronicity is, however, not significant for both unadjusted and adjusted measures if I use 1-year, 2-year, and 3-year event windows as in FF (not reported). I also restrict my sample to exchange-listed ADRs, the results (not reported) do not indicate any significant change in the co-movement of stock prices for both adjusted and unadjusted measures.

**Table 4.18: Stock return synchronicity with and without adjusting for the market-wide effect**

The market-wide effect is defined as the median of stock return synchronicity for all non-cross-listed stocks in the home market in a year. Developed markets is equal 1 if a country is classified as a developed economy, and zero otherwise. Government quality is calculated as the mean of three indexes measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. Accounting standards measures the general quality of accounting information in a country. Shareholder protection is the product of anti-director rights and rule of law divided by ten. Good government, good accounting standards, and strong shareholder protection in this table are dummy variables with the value of 1 if a country's score for an index is above the median score for all sample countries, and zero otherwise. All tests are Wilcoxon nonparametric tests. \*\*\*, \*\*, and \* represent significant at the 1%, 5%, and 10% levels, respectively.

|                               | Unadjusted return synchronicity |       |                | Market-adjusted return synchronicity |          |                |
|-------------------------------|---------------------------------|-------|----------------|--------------------------------------|----------|----------------|
|                               | Before                          | After | After - Before | Before                               | After    | After - Before |
| Emerging markets              | -0.75                           | -0.80 | -0.05          | 0.24 ***                             | 0.35 *** | 0.12           |
| Developed markets             | -0.98                           | -1.10 | -0.12 **       | 0.56 ***                             | 0.62 *** | 0.06           |
| Bad government                | -0.87                           | -0.92 | -0.06          | 0.26 ***                             | 0.33 *** | 0.07           |
| Good government               | -0.94                           | -1.04 | -0.10 *        | 0.54 ***                             | 0.62 *** | 0.07           |
| Bad accounting standards      | -0.75                           | -0.77 | -0.03          | 0.63 ***                             | 0.61 *** | -0.02          |
| Good accounting standards     | -0.97                           | -1.10 | -0.12 **       | 0.45 ***                             | 0.52 *** | 0.07           |
| Weak shareholder protection   | -0.79                           | -0.81 | -0.02          | 0.61 ***                             | 0.55 *** | -0.07          |
| Strong shareholder protection | -0.97                           | -1.09 | -0.12 *        | 0.45 ***                             | 0.50 *** | 0.05           |

The market-adjusted results show that stock price synchronicity is significantly higher for cross-listed stocks regardless of where they come from than for the median non-cross-listed firm in the home country both before and after US listing. There is no evidence that firm-specific information for cross-listed stocks increases post-listing. The differences in the market-adjusted stock return synchronicity for all classification variables are small and not statistically significant.

## 4.6 Conclusion

In this chapter, I investigate changes through time in the quality of information environment for a large sample of stocks from different countries. I also re-examine the main evidence reported in Bailey, Karolyi and Salva (2006), and Fernandes and Ferreira

(2008), which suggests that cross-listed stocks experience an improvement in information environment.

I find that for most countries stock price synchronicity has decreased over the 17-year sample period. However, the decrease is significantly larger for stocks from countries with developed markets, good government, good accounting standards, and strong shareholder protection. My results also show a significant improvement in the informativeness of earnings announcements. Again, I find that this improvement is larger for stocks from countries with better institutional factors.

My results are inconsistent with the convergence in information environment predicted by Coffee (1999), and provide no support for the bonding hypothesis, which predicts that stocks will experience an improvement in information environment after cross-listing in the US.

## 4.7 Appendix

**Table 4.A1: Descriptions and sources of institutional and investor protection variables**

| Variable                               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Source     |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Accounting standards                   | Index measuring the quality of the disclosure of accounting information in each target country. The index value is obtained by rating its companies' 1990 annual reports on their inclusion or omission of 90 items.                                                                                                                                                                                                                                                                                                                   | LLSV       |
| Anti-director rights                   | Index of six anti-director rights: right to vote by mail, right not to deposit shares with the company or a financial intermediary several days before a shareholder meeting, right to voting cumulatively for directors, right to litigate against oppression by directors, pre-emptive right to buy new issues of stock, and minimum percentage of share capital needed to call an extraordinary shareholders' meeting.                                                                                                              | LLSV       |
| Corruption                             | ICR's assessment of the corruption in government. Lower scores indicate that "high government officials are likely to demand special payments" and "illegal payments are generally expected throughout lower levels of government" in the form of "bribes connected with import and export licenses, exchange controls, tax assessment, policy protection, or loans." Average of the months of April and October of the monthly index between 1982 and 1995. Scale from zero to 10, with lower scores for higher levels of corruption. | LLSV       |
| Developed countries                    | A country is classified as a developed or emerging market by Standard & Poor's.                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Datastream |
| Government quality                     | Mean of corruption, risk of expropriation, and risk of repudiation                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | LLSV       |
| Repudiation of contracts by government | ICR's assessment of the "risk of a modification in a contract taking the form of a repudiation, postponement, or scaling down" due to "budget cutbacks, indigenization pressure, a change in government, or a change in government economic and social priorities." . Average of the months of April and October of the monthly index between 1982 and 1995. Scale from zero to 10, with lower scores for higher risks.                                                                                                                | LLSV       |
| Risk of expropriation                  | ICR's assessment of the risk of "outright confiscation" or "forced nationalization" . Average of the months of April and October of the monthly index between 1982 and 1995. Scale from zero to 10, with lower scores for higher risks.                                                                                                                                                                                                                                                                                                | LLSV       |
| Rule of law                            | Assessment of law and order tradition in the country provided by the country risk rating agency International Country Risk. Average of the months of April and October of the monthly index between 1982 and 1995. Scale from zero to 10, with lower scores for less tradition for law and order.                                                                                                                                                                                                                                      | LLSV       |
| Shareholder protection                 | Product of rule of law and anti-director rights divided by ten.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | LLSV       |

**Table 4.A2: Stock return synchronicity for the 235-day pre-announcement period using SST-weighted  $R^2$** 

This table presents the OLS regression results for model (2). The dependent variable is the logistic transformation of the country-average  $R^2$ . IV represents independent variables in columns 1-4. Developed markets is equal 1 if a country is classified as a developed economy, and zero otherwise. Government quality is calculated as the mean of three indexes measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. Accounting standards measures the general quality of accounting information in a country. Shareholder protection is the product of anti-director rights and rule of law divided by ten. Good government, good accounting standards, and strong shareholder protection in this table are dummy variables with the value of 1 if a country's score for an index is above the median score for all sample countries, and zero otherwise. Trend is a time variable ranging from 0 (year 1990) to 17 (year 2006).

Control variables include the logarithm of number of stocks, Ln(NSTKS), the total capitalization of a country's stock market as a percentage of its total GDP, MVGDP, and the total value of stock trading as a percentage of GDP, VOLGDP. Heteroscedasticity-corrected t-statistics are in parentheses. \*\*\*, \*\*, and \* represent significant at the 1%, 5%, and 10% levels, respectively.

|           | Developed<br>markets<br>(1) | Good government<br>(2) | Good accounting<br>standards<br>(3) | Strong shareholder<br>protection<br>(4) |
|-----------|-----------------------------|------------------------|-------------------------------------|-----------------------------------------|
| INTERCEPT | -0.656<br>(-4.60) ***       | -0.687<br>(-5.15) ***  | -0.532<br>(-3.99) ***               | -0.631<br>(-4.98) ***                   |
| IV        | -0.134<br>(-1.00)           | -0.159<br>(-1.32)      | -0.077<br>(-0.66)                   | 0.046<br>(0.39)                         |
| TREND     | 0.001<br>(0.09)             | -0.003<br>(-0.32)      | -0.017<br>(-1.87) *                 | -0.005<br>(-0.51)                       |
| IV*TREND  | -0.044<br>(-3.44) ***       | -0.045<br>(-3.84) ***  | -0.025<br>(-2.06) **                | -0.031<br>(-2.62) ***                   |
| Ln(NSTKS) | -0.174<br>(-7.94) ***       | -0.171<br>(-7.82) ***  | -0.206<br>(-8.73) ***               | -0.210<br>(-9.51) ***                   |
| MVGDP     | -0.023<br>(-0.50)           | 0.033<br>(0.74)        | 0.079<br>(1.65) *                   | 0.030<br>(0.61)                         |
| VOLGDP    | 0.103<br>(1.51)             | 0.064<br>(1.03)        | -0.036<br>(-0.53)                   | -0.010<br>(-0.14)                       |
| _ADJRSQ_  | 0.30                        | 0.31                   | 0.26                                | 0.23                                    |
| N_obs     | 641                         | 641                    | 591                                 | 641                                     |

**Table 4.A3: Stock return synchronicity for the 235-day pre-announcement period for continuous institutional variables**

This table presents the OLS regression results for model (2). The dependent variable is the logistic transformation of the country-average R2. IV represents independent variables in columns 1-4. Market development is the logarithm of GDP per capita. Government quality is calculated as the mean of three indexes measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. Accounting standards measures the general quality of accounting information in a country. Shareholder protection is the product of anti-director rights and rule of law divided by ten. Trend is a time variable ranging from 0 (year 1990) to 17 (year 2006).

Control variables include the logarithm of number of stocks, Ln(NSTKS), the total capitalization of a country's stock market as a percentage of its total GDP, MVGDP, and the total value of stock trading as a percentage of GDP, VOLGDP. Heteroscedasticity-corrected t-statistics are in parentheses. \*\*\*, \*\*, and \* represent significant at the 1%, 5%, and 10% levels, respectively.

|           | Market<br>development<br>(1) | Government<br>quality<br>(2) | Accounting<br>standards<br>(3) | Shareholder<br>protection<br>(4) |
|-----------|------------------------------|------------------------------|--------------------------------|----------------------------------|
| INTERCEPT | -0.494<br>(-4.85) ***        | -0.519<br>(-5.15) ***        | -0.490<br>(-4.49) ***          | -0.510<br>(-5.27) ***            |
| IV        | -0.252<br>(-2.75) ***        | -0.278<br>(-3.22) ***        | -0.148<br>(-1.60)              | -0.014<br>(-0.16)                |
| TREND     | -0.012<br>(-1.63)            | -0.017<br>(-2.38) **         | -0.023<br>(-3.30) ***          | -0.014<br>(-1.98) **             |
| IV*TREND  | -0.032<br>(-3.51) ***        | -0.030<br>(-3.38) ***        | -0.018<br>(-1.84) *            | -0.025<br>(-2.71) ***            |
| Ln(NSTKS) | -0.123<br>(-6.70) ***        | -0.124<br>(-6.79) ***        | -0.148<br>(-7.36) ***          | -0.161<br>(-8.69) ***            |
| MVGDP     | -0.032<br>(-0.79)            | 0.022<br>(0.55)              | 0.082<br>(2.06) **             | 0.024<br>(0.58)                  |
| VOLGDP    | 0.041<br>(0.70)              | -0.002<br>(-0.04)            | -0.110<br>(-1.81) *            | -0.070<br>(-1.11)                |
| _ADJRSQ_  | 0.39                         | 0.39                         | 0.29                           | 0.28                             |
| N_obs     | 641                          | 641                          | 591                            | 641                              |

**Table 4.A4: Cumulative abnormal return variance for the (-1,+1) event window for continuous institutional variables**

This table presents the OLS regression results for model (5). The dependent variable is the country-average of abnormal return variance for 3 days around the earnings announcement date. IV represents independent variables in columns 1-4. Market development is the logarithm of GDP per capita. Government quality is calculated as the mean of three indexes measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. Accounting standards measures the general quality of accounting information in a country. Shareholder protection is the product of anti-director rights and rule of law divided by ten. Trend is a time variable ranging from 0 (year 1990) to 17 (year 2006).

Control variables include the logarithm of number of stocks, Ln(NSTKS), the total capitalization of a country's stock market as a percentage of its total GDP, MVGDP, and the total value of stock trading as a percentage of GDP, VOLGDP. Heteroscedasticity-corrected t-statistics are in parentheses. \*\*\*, \*\*, and \* represent significant at the 1%, 5%, and 10% levels, respectively.

|           | Market<br>development<br>(1) | Government quality<br>(2) | Accounting<br>standards<br>(3) | Shareholder<br>protection<br>(4) |
|-----------|------------------------------|---------------------------|--------------------------------|----------------------------------|
| INTERCEPT | 1.845<br>(4.32) ***          | 1.805<br>(3.74) ***       | 2.052<br>(4.30) ***            | 1.887<br>(4.32) ***              |
| IV        | 0.756<br>(0.93)              | 0.050<br>(0.08)           | -0.189<br>(-0.25)              | 0.024<br>(0.04)                  |
| TREND     | 0.031<br>(0.71)              | 0.021<br>(0.47)           | 0.024<br>(0.50)                | 0.049<br>(1.00)                  |
| IV*TREND  | 0.202<br>(2.46) **           | 0.282<br>(3.61) ***       | 0.275<br>(3.11) ***            | 0.217<br>(2.74) ***              |
| Ln(NSTKS) | 0.174<br>(1.94) *            | 0.213<br>(2.44) **        | 0.228<br>(2.69) ***            | 0.210<br>(2.31) **               |
| MVGDP     | 0.410<br>(2.50) **           | 0.417<br>(2.49) **        | 0.190<br>(1.00)                | 0.243<br>(1.31)                  |
| VOLGDP    | 0.392<br>(1.36)              | 0.341<br>(1.20)           | 0.602<br>(1.95) *              | 0.637<br>(2.13) **               |
| _ADJRSQ_  | 0.28                         | 0.28                      | 0.27                           | 0.25                             |
| N_obs     | 641                          | 641                       | 591                            | 641                              |

**Table 4.A5: Cumulative abnormal volume for the (-1,+1) event window for continuous institutional variables**

This table presents the OLS regression results for model (6). The dependent variable is the country-average of abnormal volume for 3 days around the earnings announcement date. IV represents independent variables in columns 1-4. Market development is the logarithm of GDP per capita. Government quality is calculated as the mean of three indexes measuring government corruption, the risk of expropriation of private property by the government, and the risk of government repudiating contracts. Accounting standards measures the general quality of accounting information in a country. Shareholder protection is the product of anti-director rights and rule of law divided by ten. Trend is a time variable ranging from 0 (year 1990) to 17 (year 2006).

Control variables include the logarithm of number of stocks, Ln(NSTKS), the total capitalization of a country's stock market as a percentage of its total GDP, MVGDP, and the total value of stock trading as a percentage of GDP, VOLGDP. Heteroscedasticity-corrected t-statistics are in parentheses. \*\*\*, \*\*, and \* represent significant at the 1%, 5%, and 10% levels, respectively.

|           | Market<br>development<br>(1) | Government quality<br>(2) | Accounting<br>standards<br>(3) | Shareholder<br>protection<br>(4) |
|-----------|------------------------------|---------------------------|--------------------------------|----------------------------------|
| INTERCEPT | -0.334<br>(-1.69) *          | -0.391<br>(-1.75) *       | -0.542<br>(-2.44) **           | -0.496<br>(-2.40) **             |
| IV        | 0.069<br>(0.22)              | -0.076<br>(-0.30)         | 0.358<br>(1.03)                | -0.090<br>(-0.34)                |
| TREND     | 0.005<br>(0.28)              | 0.003<br>(0.14)           | 0.042<br>(1.77) *              | 0.034<br>(1.61)                  |
| IV*TREND  | 0.119<br>(3.77) ***          | 0.149<br>(4.64) ***       | 0.097<br>(2.47) **             | 0.078<br>(2.38) **               |
| Ln(NSTKS) | 0.055<br>(1.58)              | 0.065<br>(1.90) *         | 0.044<br>(1.13)                | 0.095<br>(2.55) **               |
| MVGDP     | 0.160<br>(2.04) **           | 0.163<br>(2.08) **        | 0.023<br>(0.25)                | 0.120<br>(1.31)                  |
| VOLGDP    | 0.017<br>(0.17)              | -0.017<br>(-0.17)         | 0.163<br>(1.49)                | 0.136<br>(1.24)                  |
| _ADJRSQ_  | 0.27                         | 0.28                      | 0.26                           | 0.21                             |
| N_obs     | 641                          | 641                       | 591                            | 641                              |

## **Chapter 5: Conclusion**

### **5.1 Summary of Findings in the Dissertation**

Since the seminal work of La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998), laws and regulations on investor protection have become a fruitful research area for scholars around the world. Researchers have found plentiful evidence of the impact of investor protection on various aspects of corporate finance and corporate governance at both country and firm levels. The key reason why legal protection of investor rights is so important in corporate governance is because investor protection affects the extent of agency conflicts between insiders and outside investors.

Since the degree of investor protection differs across countries around the world, agency conflicts vary accordingly. The review of the “Law and Finance” literature in Chapter 1 shows that legal protection of shareholder rights is positively related to the development of financial markets and economic growth. It also positively affects the availability of external finance, the number of listed firms, and the rate of initial public offerings. In addition, strong investor protection is associated with high efficiency of asset allocation, and low risk of expropriation. Last but not least, better investor protection leads to higher firm value.

The purpose of this dissertation is to provide more evidence on the relation between law and finance. This dissertation includes three empirical studies that show the effect of investor protection on three different areas of corporate governance: mergers and acquisitions, US cross-listings, and convergence of information

environment around the world. I summarize each study in the next three sub-sections before discussing avenues for future research in the final section.

### ***5.1.1 Investor Protection and the Transfer of Corporate Control: A Cross-country Analysis***

In my first study, I look at the choice of acquisition form in relation to the quality of investor protection. My main hypothesis is that a deal is more likely to be a partial acquisition if minority investors are not well protected. My hypothesis is based on the findings of prior studies. First, the market for takeovers is an important channel through which corporate assets are allocated for the best possible use. Frictions, however, can prevent the efficiency of this asset allocation channel. One of the frictions is private benefits. Second, prior studies show that the extraction of private benefits could be a motivation for acquiring control because, unless he owns the entire firm, the acquirer may prefer to maximize private benefits of control rather than wealth for all shareholders. Third, when investor protection is weak, private control benefits are large and hard to be verified due to low quality of accounting information. Therefore, if private benefits are a reason for takeovers, acquirers are more likely to bid for a controlling block (rather than a hundred percent) of target firms' equity.

Using a large sample of completed deals from SDC Platinum, I find evidence consistent with my hypothesis. At the country-level, I find that the choice of partial acquisitions (versus full mergers) is relatively more common in countries with weak protection of shareholder rights, large private control benefits, and high information asymmetry. I also find that partial acquisition is the preferred acquisition form for

foreign acquirers from bad corporate governance countries. At the firm-level, I find that the quality of the target firm's corporate governance is negatively associated with the probability of partial acquisition. I do not find a significant impact of the acquirer's governance quality on the choice of acquisition form. My results are generally consistent with the idea that private benefits are a valuable asset for controlling shareholders in poor investor protection countries.

### ***5.1.2 Domestic Liquidity Costs and Cross-listing in the US***

In my second study, I examine the change in domestic liquidity and local liquidity costs around the US-cross-listing date conditional on the degree of shareholder protection in the home country. There are two motivations for this study. First, the focus on domestic liquidity costs is important because, on average, more than two thirds of cross-listed firms' trading occur on the local market. Second, although researchers have argued that cross-listing is an important way toward functional convergence in corporate governance, there is still only limited empirical evidence. By "bonding" themselves to the US markets with more stringent disclosure requirements, foreign firms that cross-list in the US are able to reduce the level of information asymmetry among investors. Therefore, cross-listed firms should be able to lower their transaction costs, especially the information asymmetry cost, after cross-listing. My study is the first to use a large sample from a wide cross-section of countries to investigate this issue.

Using transaction data for cross-listed firms from 30 countries, I show that foreign firms that cross-list in the US exhibit an improvement in local liquidity and domestic liquidity costs following the listing. Of particular interest is the cost of

information asymmetry which exhibits an average reduction of 23 percent. I also find that the improvement in local liquidity costs is larger for cross-listed firms from countries with weaker corporate governance. In addition, I find that listing on the NYSE provides significantly greater benefits in terms of changes in liquidity than listing on NASDAQ or OTC markets. The results in the second study are generally consistent with the “bonding” hypothesis.

### ***5.1.3 Is There a Convergence in Information Environment around the World?***

In the last empirical study, I investigate whether the world is experiencing a convergence in information environment as suggested by Coffee (1999). This investigation is important since the quality of information is a key determinant of the level of agency costs in a country (Leuz, Nanda and Wysocki (2003)). The convergence theory suggests that the information environment will improve over time and that this improvement will be greater for countries with low quality of institutional factors.

Using common measures from the accounting and finance literature to proxy for the quality of information environment, I find a significant improvement in stock price informativeness and the information content of earnings announcements through time. However, inconsistent with the predicted convergence, I find that the improvement in the information quality over the period of 1990-2006 is greater for countries with better institutional quality.

Two recent studies, Bailey, Karolyi and Salva (2006), and Fernandes and Ferreira (2008), report a similarly puzzling divergence for cross-listed firms. They

find that information environment improves significantly for cross-listed firms from developed countries, whereas there is no such improvement for cross-listed firms from emerging countries. Since their event windows cover many years around the cross-listing year, I test whether their results are driven by the general evolution of information environment in the local market. I reproduce their main results controlling for this market effect, and find no support for their results: there is no significant improvement in information quality for cross-listed firms, and the change is not different between developed and emerging markets.

## **5.2 Directions for Future Research**

In this section, I discuss some directions for future research based on the findings in this dissertation.

First, the second empirical study shows the effect of US-cross-listing on domestic liquidity costs one year after the listing date. The reduction in the cost of adverse information suggests an improvement in information quality after US listing. It would be interesting to see if the decrease in the information asymmetry cost is sustained in the long run.

Second, the results in the second study suggest an improvement in information environment one year after the cross-listing date. However, the analysis in the third study does not show any significant change in the quality of information environment for cross-listed firms after controlling for information environment of the local market. The results from the two chapters do not provide consistent support for the “bonding” hypothesis. The inconsistent results may be due to the fact that the cost of

information asymmetry in the second study is not adjusted for the average cost of information asymmetry in the local market. To test this conjecture, I also use a shorter event window and find qualitatively similar results. Still, ideally, I would like to control for the market effect.

For the time being, this task is difficult because it requires an enormous amount of intraday data for a large number of stocks across thirty countries in my sample. In addition, data for many stock markets, especially emerging markets, are incomplete or have not yet been configured. Incomplete data would bias the adjustment for the average cost of information asymmetry in the local market. I intend to revisit this issue as soon as the computational and data problems have been solved.

Third, some researchers have recently raised concerns about the quality of earnings announcement dates provided by I/B/E/S. I note that this problem appears to be more serious for countries with emerging economies and lower institutional quality. Although this problem does not likely affect the main results reported in the last empirical study (as reported in my discussion of the robustness tests), there are still some interesting questions to be answered. For example, how serious is the problem with I/B/E/S earnings announcement dates, and are there alternative data sources (for instance, Bloomberg)? If a better data source can be found, it would be interesting to test if this problem affects the results of prior studies using I/B/E/S earnings announcement dates.

Last but not least, the last empirical study shows a puzzling divergence in the quality of information environment between developed and emerging countries. It is

important to investigate the causes for this divergence. Possible reasons include changes in the number of analysts, changes in the amount and quality of earnings-unrelated information, changes in ownership composition, and changes in disclosure requirements over time. I leave this issue for future research.

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