The effect of cross-delisting on a firms' information environment and on the information asymmetry between a firm and its outsiders

The difference between firms from developed countries and firms from developing (emerging) countries

Abstract: This master thesis studies the effect of cross-delisting from three major U.S. stock exchanges on a firms' information environment and on the information asymmetry between a firm and its outsiders (investors). Especially, it studies the difference in the effect of cross-delisting on the information environment and on the information asymmetry between firms from developed countries (markets) and firms from developing countries (markets). Analyst following and accuracy are used in this study as proxies for the information environment and the bid-ask spread as proxy for the information asymmetry. I found that the cross-delisting of firms have no significant relation with the number of analyst that follow a firm, has a significant positive relation with analyst accuracy and a significant negative relation with the bid-ask spread. Besides that, I found that there is only a 'extra' negative effect for firms from developing countries on the bid-ask spread. There was not found a significant 'extra' effect for firms from developing countries on the analyst coverage and accuracy. These results indicate that cross-delisting from the U.S. does not have to lead to a worse information environment for investors and not to an increase in the information asymmetry between a firm and its investors.

Supervisor: Dr. M.H.R. Erkens
Student: B. Hager, BSc
Student number: 434116
Date: 19-07-2016
MSc: Accounting, Auditing and Control
Specialization: Accounting and Auditing

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1. Introduction

The purpose of this master thesis is to test the effect of cross-delisting on a firms' information environment. Especially, this master thesis will investigate the difference between firms from developing and developed countries on the effect of cross-delisting on a firms' information environment and the information asymmetry between a firm and its investors (outsiders). This thesis will research the effect of cross-delisting from three of the biggest American exchanges (NYSE, NASDAQ and AMEX) on the change in the analyst coverage (following), the accuracy of analysts' activity and on the bid-ask spread. In this master thesis the following question will be answered: *Is the effect of cross-delisting on the information environment and information asymmetry significantly different for firms from developing (emerging) countries compared to firms from developed countries?*

Providing an answer to this research question is important because it is not clear what will be the effect of and what the reasons are for firms to cross-delist from exchanges with relatively high standards. Possible explanations can be found in the theories about cross-(de)listing and the effect of cross-(de)listing on the information environment and especially the effect on information asymmetry between the management and the stakeholders of firms. Explanations for firms to cross-list include for example the compensation for the weak standards in their home country, increasing their liquidity (trading volume) and to provide better and more elaborate information to their investors. Explanations for firms to cross-delist range from the costs of reporting and complying with these higher standards, the less than expected effectiveness of cross-listing what can lead to less corporate governance advantages of cross-listing than expected, to firms that have no longer growth opportunities available so that cross-listing will no longer be beneficial (costs outweigh the benefits) to these firms. Two important theories for this research are the bonding theory and the avoiding theory that find there basis in the different standard levels between stock exchanges of countries. In this research especially the differences in standard levels between developing and developing (emerging) countries is of great importance.

The bonding hypothesis starts from the idea that firms in countries with weak institutional frameworks have difficulties in raising external finance (Leuz, 2006). According to Leuz (2006) these firms and their controlling insiders have an incentive to seek bonding devices that sufficiently reassure outside investors. A bonding device for these firms with weaker standards, often firms from developing (emerging) countries, is to cross-list on stock exchanges with higher institutional frameworks. On the other hand, the 'avoiding hypothesis'

states that firms avoid more regulated exchanges and regulators relax regulations for their foreign issuers (Witmer, 2005). The decision by a firm whether to cross-(delist) is made by comparing the benefits to the costs of cross-(delisting). In conclusion, it is not clear what the effect of the decision of firms to cross-delist is for the firms from countries with a relatively lower level of standards.

This study makes use of the statistical technique called the difference-in-difference method, and the event of interest that is examined by use of the difference-in-difference method is the cross-delisting of foreign firms from the three main stock exchanges in the U.S. (NYSE, NASDAQ and AMEX). The effect of cross-delisting, the event of interest in this study, on the information environment and on information asymmetry will be examined. The sample period of this study is from 2004 to 2012, this period is after the introduction of the Sarbanes-Oxley Act (2002). The measurement of the information environment will be done by two different proxies, namely analyst coverage and analyst accuracy. Information asymmetry will be measured by one proxy, namely the bid-ask spread of the companies' stocks. So, this study will use a difference-in-differences approach for the statistical analysis, which is a research approach than can examine the differential effect of X (cross-delisting) on Y (information environment and information asymmetry) for different groups of observations. In this study the moderating effect of interest is whether firms are from developing or from developed countries. So, this approach make is possible to investigate the differential effect of cross-delisting for firms from developing countries versus firms from developed countries.

This thesis and its findings will contribute to two different streams of literature. First, it relates to the literature about the reasons and consequences of cross-listing and the few literature that is discussing cross-delisting. The focus of this research is the literature that investigates the effect of cross-(de)listing on the information environment and information asymmetry. A large literature on international cross-listing suggests that information considerations are a key factor in cross-listing decisions (Lang, Lins & Miller, 2003). Lang, Lins & Miller (2003) show cross-sectionally that non-U.S. firms that are listed on U.S. exchanges have greater analyst coverage and increased forecast accuracy relative to other non-U.S. firms. This is in accordance with the bonding hypothesis discussed before, that firms from countries with relatively low standards are cross-listing to decrease the information asymmetry between the management and their stakeholders. According to Coffee (2002) cross-listing may in part be a signaling device that the firm has high growth prospects, in part a bonding mechanism to assure public investors that they will not be exploited, and in

part a means of attaining greater analyst attention and reducing informational asymmetries. In contrast to above views, Licht (2003) finds that cross-listing firms from emerging markets tend to avoid the high-disclosure NYSE and NASDAQ, which is in accordance with the avoiding hypothesis.

Second, this master thesis is contributing to the literature of information environment and information asymmetry. According to Healy & Palepu (2001) the demand for disclosure arises from information asymmetry and agency conflicts between managers and outside investors. The credibility of management disclosures (information) is enhanced by regulators, standard setters, auditors and other capital market intermediaries (Healy & Palepu, 2001). So, the rules made by standard setters and regulators can increase the credibility of management information. According to Fernandes & Ferreira (2008) a firm's commitment to a higher level of disclosure and scrutiny associated with cross-listing can alter the incentives for different types of informed market participant to collect and trade on private information and thereby influence a firms' information environment and stock price formation process. The richer disclosure and information environment should result in less information asymmetry among investors (Witmer, 2005). Typically, firms from countries with weak investor protection cross-list on markets with stronger protection, this can lead to lower information asymmetry between the company and its investors and to lower costs because of the lower risk investors will face (Daugherty & Georgiva, 2011). So, this research can add to the literature about information environment and information asymmetry because it will investigate the effect of cross-delisting of firms on the information environment of these delisting firms.

Above all, this research aims to contribute to the literature of cross-(de)listing by examining the effect of cross-delisting on the information environment. The notion of information environment in this thesis is similar to the notion used in Lang, Lins & Miller (2003), which broadly include the effects of corporate reporting, private information acquisition and information dissemination. There is done little empirical research on the effect of cross-delisting on the information environment of firms and information asymmetry between the firm and its stakeholders. This research is especially important, because according to Karolyi (2012) the number of foreign firms choosing to delist and/or deregister their shares form the major overseas markets that originally attracted them back in the 1990s is now outpacing that of those choosing to newly list there. According to Leuz, Triantis & Wang (2008) there are a lot of consequences of cross-delisting for the firm, for example a negative market reaction that can be caused because there is substantial information asymmetry about the firms' growth opportunities, prospects and financial health or because

outside shareholders see the cross-delisting as being primarily in insiders' interest that want to avoid outside scrutiny that comes with SEC reporting. This study focuses on these two different consequences, because the effect of cross-delisting on information asymmetry and on the information environment, which can be improved by informative disclosures and scrutiny of the SEC, are investigated in this paper. It is important to investigate these consequences, because they can have a huge effect on the wealth of the shareholders of a firm. Besides that, this is one of the first papers that will empirically investigate the difference on the effect of cross-(de)listing for firms from developing (emerging) countries in comparison to firms from developed countries. This is important because stock markets (financial markets) tend to develop as income per capita grows, this means that when the income per capita for a country grows the legal system will improve and thereby the rules, regulations and protection of minority rights will be improved (Claessens, Klingebiel & Schmukler, 2002). This means that the consequences of cross-delisting can differ between firms because of their different home countries, that can be due to differences in the legal system and the level of standards between the stock markets of developed and developing countries. The differences between the home countries will be investigated by using a separation between developed and developing (emerging) countries on basis of the income per capita. This rather unique approach to investigate empirically the effect of cross-delisting on the information environment and information asymmetry, will also contribute to the already extensive literature on information environment and information asymmetry.

The findings of this master thesis indicates that only the effect of cross-delisting on information asymmetry is different for firms cross-delisting from developing (emerging) countries compared to firms from developed countries. Although, this effect is opposed to the expected increase in the information asymmetry after cross-delisting. Besides that, in general cross-delisting has a positive effect on the information environment through the increase in the accuracy of the analysts' estimates and has a negative effect on the information asymmetry (Bid-Ask spread). This means that the cross-delisting by firms can even, as opposed to the expectation, have a positive effect on the firms' information environment and can lower the information asymmetry between the firm and its outsiders.

The results of this thesis could be relevant for firms that want to cross-delist from exchanges with higher standards (regulations) than in their home-countries. That these results will be relevant to those firms is because this study will research the effect of cross-delisting on the information environment and on the information asymmetry for these cross-delisting firms. Especially, these results can indicate the differences between firms from developing

countries compared to firms from developed countries what means that these results are more specific for those firms then when this separation was not made. The results of this study can also be relevant for the regulators in the developed countries that want to attract more firms to their exchanges, and especially wants to attract more growing and smaller firms from developing countries. The results of this study can be relevant for those regulators because of the possible change in information environment and information asymmetry after the cross-delisting can be an indication that the more regulated US exchanges under the Sarbanes-Oxley (SOX) act of 2002 are becoming less attractive to firms to cross-list on.

The findings of this research contribute to the existing knowledge, because these results indicates that the cross-delisting of firms from relatively high regulated markets like the United States do not have to lead to a worse information environment and higher information asymmetry for the firms that cross-delist. Besides that, it is especially not clear that firms from developing countries that the cross-delisting from these U.S. stock markets will have a huge negative effect on their information environment and that the information asymmetry between these developing firms and its outsider will increase enormously.

The remainder of the paper is organized as follows. Section 2 provides the literature review. Section 3 will develop the hypotheses that are relevant for this study. Section 4 describes the research design and the data used. Section 5 present the results of the study and a discussion of the empirical results. The final section provides the conclusions of the performed study.

2. Literature Review

In this section two different streams of literature and the differential effect of being a company from a developed or from a developing (emerging) country on both cross-(de) listing, the information environment and information asymmetry will be discussed. Firstly, the literature about information environment and information asymmetry in relation to cross-(de)listing will be reviewed. Besides that, in this section I will discuss the relation between analysts coverage/analyst forecast accuracy and information environment. Secondly, the literature about the reasons for and consequences of cross-(de)listing will be discussed. Also, the determinants of firms that cross-delist are discussed in this section. At last, I will take a look at the literature about the differences between developed and developing (countries) and the effect of these differences on cross-(de)listing and the information environment.

2.1 Information environment and information asymmetry in relation to cross-(de)listing

As said before, Healy & Palepu (2001) stipulate that the demand for financial reporting and disclosures arise from information asymmetry and agency conflicts between managers and outside investors. Information and incentive problems impede the efficient allocation of resources in a capital market economy, disclosure and institutions created to facilitate credible disclosure between mangers and investors play an important role in mitigating these problems (Healy & Palepu, 2001). Informational problems might arise if there is a difference between management's and investor's assessment of a firm and its value because management may have better information about the profitability of the firm that they cannot communicate credibly to the outside (Karolyi, 2006). There is information asymmetry between insiders (management) and outsiders when management have better information than outsiders (investors). To complement, informational problems (asymmetry) can lead to agency conflicts that according to Karolyi (2006) can arise as investors judge that management is making poor use of the capital provided, because management have their own objectives (incentives) that differ from those of the investors.

A reason for firms to cross-list on exchanges with stricter disclosure requirements is to improve the information disclosure, this can lead to an improvement in the information environment and therefore in a reduction of the information asymmetry between the management and outsiders (investors) of a firm (Lee & Valero, 2010). A richer disclosure and information environment should result in less information asymmetry among investors (Witmer, 2005). According to Daugherty & Georgieva (2011) compliance with higher and stricter disclosure requirements does not only provide much more information than their respective domestic country, but also sends positive signals to the investors about the information managers want to disclose. This positive signal can help to reduce the agency conflicts between management and outsiders (investors). So, the rules made by standard setters and regulators and the enforcement by supervisory bodies can increase the credibility of the information communicated by management. These rules and enforcement can lead to less information asymmetry and therefore to a better information environment. In conformity to the above, Lang, Lins & Miller (2003) find it is logical that the information environment is positively influenced by cross-listing because cross-listing subject firms to 1) increased enforcement by the Securities and Exchange Commission (SEC), 2) a more demanding litigation environment, and 3) enhanced disclosure and reconciliation to U.S. generally accepted accounting principles (GAAP). In addition, cross-listing firms may face more scrutiny from investors and analysts, more pressure to provide guidance than in their home

markets, and increased scrutiny from their auditors (Lang et al., 2003). According to Bailey, Karolyi & Salva (2006) the better protection of U.S. securities laws compared to the protection in a firm's home country does not only influence the decision whether to cross-(de)list, but also attract more U.S. based investors and analysts that are necessary to improve the information environment of the firm. The question is whether the enforcement by the SEC is really that effective and so whether the benefits of 'bonding' are really that clear (see section 2.2 for elaborate discussion about the effectiveness of the bonding mechanism). The possible benefits of cross-listing via the improvement of the information environment are clear for the firms, but there can also be significant costs associated with cross-listing (see section 2.2). As said before, firms compare the (possible) benefits of cross-(de)listing with the (possible) costs associated with cross-(de)listing and then decide whether they are going to cross-list and when they are already cross-listed whether they want to stay cross-listed or that they want to cross-delist.

Analysts play an important role as information intermediaries between the firm and the market, to play their role as information intermediaries they have to gather information from a wide array of both internal and external sources to assess the economic viability and investment potential of the firm (Lang, Lins & Miller, 2004). Lang & Lundholm (1996) found that firms with more informative disclosure policies have in general larger analyst following (coverage) and more accurate analyst earnings forecasts. Therefore, Cross-listing can have a positive effect on analyst following and analyst accuracy because of the higher disclosure requirements after cross-listing would reduce the cost of following a firm that can lead to increased analyst coverage and better forecast accuracy (Lang et al., 2003). Lang, Lins & Miller (2003) show that the change in value around cross-listing is positively correlated with changes in analyst following (coverage) and forecast accuracy, suggesting that cross-listing increases firm value through its effect on the information environment. This increase in analyst coverage and forecast accuracy will according to Lang, Lins & Miller (2003) lower the information asymmetry and therefore improve the information environment. On the other hand, if analysts are primarily information providers who compete with firm-provided disclosures than an increase in firm provided information can lead to a substitute for analyst reports (Lang & Lundholm, 1996). When an increase in firm provided information is a substitute for analyst reports, the demand for analyst services will decline what will lead to less analyst following (coverage) for a firm (lang & Lundholm, 1996). According to Alford & Berger (1999) additional public disclosure could drive out private information acquisition, which result in less analysts that are searching for private information because additional

information has been made public. In this case, increased informative disclosure by firms is a substitute for the information that can be found by analysts. Therefore, it is not clear whether cross-delisting will lead to more or less analyst following, because of the mixed results above there is some tension about the effect of lower disclosure requirements after cross-delisting on analyst following (coverage). The relation between forecast accuracy and increased disclosure/information is more straightforward, because when this firm-provided disclosure is informative about the earnings the analysts' forecast accuracy will increase (Lang & Lundholm, 1996). Even this is maybe not so clear, when the increased firm-provided disclosure is only a substitute for the information that was reported by the analysts. When it is a substitute, then there is no change in forecast accuracy after a firm cross-delist from an exchange with higher disclosure requirements than the exchange of the home country of a firm. As said before, not only the disclosure requirements are important to improve the information environment, but also the enforcement of the rules and the litigation and legal environment of a stock exchange are important.

2.2 Reasons for and consequences of cross-(de)listing

Cross-listing is usually a strategic choice made by a firm to secondarily list its equity shares trading in a home market exchange on a new overseas market, it often impose different transparency, disclosure and governance-related requirements depending on the type of market being targeted (Karolyi, 2012). There are a lot of different explanations why firms do cross-list, a lot of explanations are based on theories about information asymmetry including the awareness, liquidity, bonding, signaling, and market timing hypothesis (Witmer, 2005). The most important explanation for cross-listing used in this study is that of the bonding hypothesis. According to Coffee (2002) the bonding argument states that: companies wishing to raise capital do cross-list on U.S. exchanges because by voluntarily subjecting themselves to the United States' higher disclosure standards and greater threat of enforcement, these companies partially compensate for the weak protection of minority interests under their own jurisdiction's laws and regulations. The fact that U.S. capital markets typically require more disclosure than the listing firms' home capital markets can lead to more relevant and reliable information disclosure to investors (Doidge, Karolyi & Stulz, 2004). According to Abdallah, Abdallah & Saad (2011) the bonding mechanism is used to send positive signals to investors about the firm's ability to meet the requirements of high-standard countries (like the U.S. and the U.K.) and about the firm's intention or commitment to protect their investors. The results of the study by Abdallah et al. (2011) indicate that firms that cross-list on more regulated

markets, in this case NASDAQ and NYSE, experience the highest increase in their post-cross-listing trading volume. These results give more evidence that the level of regulation matters to investors and that a higher level of regulation make it easier to raise more capital for companies.

According to Lel & Miller (2008) the bonding hypothesis predicts, ceteris paribus: cross-listed firms will have better corporate governance than non-cross listed firms, and the difference in governance between cross-listed firms and non-cross listed firms will be the greatest in the home-countries with the weakest standards and regulations. This indicates that firms from countries with relatively weak standards and regulations in comparison with other countries have more benefits from cross-listing on relatively high-standard capital markets, like that of the United States and the United Kingdom. In contrast to the bonding hypothesis, Licht (2003) suggest an opposing hypothesis namely the 'avoiding' hypothesis. This avoiding hypothesis states that firms avoid more regulated exchanges and regulators relax regulations for foreign users (Witmer, 2005). One reason to avoid more regulated exchanges are the costs that are made to comply to the reporting and compliance requirements of the Securities Exchange Commission (SEC), as well as legal costs and investment banking fees associated with listing (Doidge et al., 2004). The reporting and compliance requirements of the SEC are substantially increasing the costs a company faces, this is because when a firm is listed on the NYSE or the NASDAQ the firm must conform to US GAAP and complete all required filings of the SEC (Reese & Weisbach, 2002). Another reason to avoid more regulated exchanges is that the system of cross-listing is maybe not as effective as presumed by the bonding hypothesis and therefore the above described corporate governance advantages of cross-listing are not that clear. The findings of Lang, Raedy and Wilson (2006) indicate that the accounting data of cross-listed firms from weak investor protection environments are of lower quality even though cross-listed firms are required to follow similar accounting standards as the U.S. firms. According to Licht (2003) this can be due to the fact that the regime that the Securities Exchange Commission (SEC) applies to foreign issuers differs markedly (less strict) from the regime that applies to domestic U.S. firms. So, there is some tension about whether cross-listing is indeed as beneficial to firms as assumed by the bonding hypothesis.

Another reason to cross-list and 'bond' to a market with a better institutional framework, is because firms in countries with weak institutional frameworks have difficulties in raising external finance. According to Lang, Raedy & Wilson (2006) this is because controlling insiders in these countries with weak institutional frameworks, cannot sufficiently

assure to outside investors that they will not appropriate funds. These outside investors react to this commitment problem with price protection, which increases the cost of capital (COC) for financing growth opportunities that require outside funds (Lang et al., 2006). These outside funds are needed, because these firms are unable to raise the necessary capital in their home market to undertake all positive Net Positive Value (NPV) projects (Witmer, 2005). According to Foerster & Karolyi (1999) a higher risk premium, what results in a higher COC, is built into the expected returns of stocks as compensation for regulatory restrictions, costs and information problems that comprise barriers to investing in overseas securities. These regulatory restrictions can be overcome by cross-border listings in countries with better institutional frameworks like in the United States, as reaction to international listing stock prices are expected to rise and their subsequent returns should fall as the additional built-in risk premium (decrease in COC) compensating for these barriers dissipates (Foerster & Karolyi, 1999). The cost of capital (COC) can also decrease, because information effects can decrease both information asymmetry and as a consequence the COC (Hail & Leuz, 2009). The decrease of information asymmetry is correlated with significant changes in a firms' information environments around U.S. cross-listings, because of the increase in the disclosure quality (Lang, Lins & Miller, 2003). Hail & Leuz (2009) found that these effects on COC are sustained over time, and they also found no evidence that Sarbanes-Oxley Act has diminished the benefits of U.S. cross-listings. Reese & Weisbach (2002) found a large increase in both the number and value of equity offerings following cross-listings, and this increase should be larger for firms wherefore the shareholders protection rises relatively larger with the cross-listing. These firms from countries with weak shareholder protection are more likely to issue subsequent equity following cross-listing than are firms from countries with strong shareholder protection (Reese & Weisbach, 2002). This means that for these firms from countries with weak shareholder protection, a reason to cross-list is to raise external capital at a lower cost of capital (COC) to finance their business projects.

According to Karolyi (2012) since the 1990s there is a slowdown in the number of new listings and especially there is an increase in number of de-listings, but there are some exceptions as for example the Alternative Investment Market (AIM) in London. This changing landscape in the world of cross-listings has allowed scholars to re-examine the competing theories that rationalize the choice to cross-list (Karolyi, 2012). There has been done some research to the reasons and consequences of cross-delisting, but this research is still very limited. Firms that de-list from major U.S. stock exchanges often cite the low U.S. trading volume of foreign owned shares, the increased complexity of U.S. market capital

regulation which was increased by the implementation of the Sarbanes-Oxley Act in 2002, and the inability to meet regulatory standards (Chaplinsky & Ramchand, 2008). Especially, the last two implications are important for this study, because both the increased complexity of U.S. market capital regulation and the inability to meet regulatory standards are in line with the earlier mentioned 'avoiding' hypothesis. Siegel (2005) also indicates that the SEC have rarely been able to enforce U.S. securities laws against any U.S.-listed foreign firm, without effective enforcement the benefits of cross-listing can be lower. The weak enforcement by the SEC, or supervising institutions in other countries, can be a reason for firms to cross-delist because the weak enforcement can lead to lower benefits of 'bonding' to a high-standard exchange market. The decision whether to cross-(de)list is made by comparing the benefits to the costs of cross-(de)listing, so it is important to both know the possible benefits as the possible costs of cross-(de)listing.

There has been done some research on the determinants of firms that cross-delist, these determinants indicate the characteristics of firms that are most likely to cross-delist. According to Bailey, Karolyi & Salva (2006) the likelihood of cross-listing depends strongly and positively on market value and total assets. Therefore, the size of the company is an important factor that can influence the decision of foreign companies to cross-(de)list. Small firms are often less able to absorb the fixed costs associated with cross-listing, which can lead to the result that the costs will outweigh the benefits of cross-listing for small firms (Witmer, 2005). Especially, the implementation of SOX has increased the compliance costs for firms listed in the U.S. what means that possibly smaller firms are more eager to cross-delist, because with the implementation of SOX the costs can increase above the benefits of cross-listing for smaller firms (Doidge, Karolyi & Stulz, 2010). In accordance to the above, Chaplinsky & Ramchand (2008) found that foreign firms that are relatively small and have poor profitability numbers are more likely to cross-delist, firms that possess greater size and profitability at listing are historically firms that are associated with a higher level of survivorship on U.S. exchanges. Also, Doidge, Karolyi & Stulz (2010) found that deregistering firms are performing poorly compared to the benchmark firms that do not deregister. A possible reason for firms that are performing relatively poor to cross-delist, is that deregistration (delisting) could be a mechanism for managers to hide poor performance that might otherwise lead to dismissal, to protect them from legal liability especially after SOX, and to make it easier for insiders to extract private benefits of control (Leuz, Triantis & Wang, 2008). 'Going-dark', that remove the obligation to comply with SEC reporting requirements, could be a way for controlling insiders to avoid the great scrutiny that comes

with SEC reporting (leuz et al., 2008). According to Leuz et al. (2008) these 'Going-dark' firms continue to trade publicly (in contrast to firms that go private), after their deregistration from the U.S. market what means that there is still data available on the bid-ask spread. The bid-ask spread after the 'Going-dark' decision is retrieved from the stocks that are still being traded on the firms' home stock markets.

Another factor that can influence the decision to cross-delist, are the growth opportunities that are available to a firm. According to Doidge, Karolyi & Stulz (2004) cross-listing is of greater benefit to firms with growth opportunities, the incentives to cross-list arise when a firm have valuable growth opportunities but cannot exploited them without external funds. This is in accordance to the bonding hypothesis, because firms want to commit to higher standards by cross-listing to raise the external funds they need. The opposite expectation for firms that cross-delist is that firms that cross-delist have less valuable growth opportunities, because of the fact that these firms have exploited their growth opportunities during the time they were cross-listed. At the point that these firms cross-delist, these firms do not have valuable growth opportunities anymore that need external funds at the time of delisting or in the future (Doidge, Karolyi & Stulz, 2010)[1]. When these growth opportunities are no longer available, it can be that cross-listing is no longer valuable for insiders because the costs of a listing outweigh the benefits (Doidge, Karolyi & Stulz, 2010).

Another determinant that influence the decision to cross-delist is the leverage level of a firm. According to Healy & Palepu (2001) leverage is a major determinant of a firm's disclosure decisions, a higher leverage level is associated with a decrease in the commitment to disclosure. In accordance to the above, Leuz, Triantis & Wang (2008) found that firms that are 'going-dark' (cross-delist) from U.S. exchanges have significantly higher leverage than firms that stay on the U.S. exchanges. A possible explanation is that firms that have more leverage are less willing to disclose information because of the possible troublesome financial position these firms are in. Another possible explanation for the cross-delisting of firm that have significantly higher leverage is that these firms can be in financial trouble and the saving of compliance costs could make a significant difference for them (Doidge, Karolyi & Stulz, 2010).

Another factor that can influence the decision to cross-delist is the trading volume of

[1] Doidge, Karolyi & Stulz (2010) examined a sample of firms that voluntarily deregister from the SEC and leave the U.S. equity markets over the period from 2002 to 2008, this includes the implementation of the Sarbanes-Oxley Act (SOX).

the firms. In trading off the costs and benefits of SEC reporting, firms will also be more likely to cross-delist when there is a decline in capital market activity (Leuz, Triantis & Wang, 2008). In line with this idea, Leuz et al. (2008) found that the change in a firms' trading volume over the last fiscal year is negatively related to going dark, this is also in line with the decreased need and ability to access capital markets and that the cost savings are a rationality for going dark. Firms with a larger proportion of their trading volume (higher turnover) in the U.S. are less likely to cross-delist (Chaplinksy & Ramchand, 2008). For firms with higher trading volume, the benefits of access to foreign capital markets is more elaborate than for firms without a high trading volume. So, consisting with the costs savings rationale, cross-delisting firms are smaller and have and have poorer profitability (performance), higher leverage, lower trading volume, and fewer growth opportunities than firms that stay cross-listed.

2.3 Differences between firms from developed and developing (emerging) countries in relation to cross-(de)listing and the information environment

Stock markets (financial markets) tend to develop as income per capita grows, this means that when the income per capita for a country grows the legal system will improve and thereby the rules, regulations and protection of minority rights will be improved (Claessens, Klingebiel & Schmukler, 2002). This means that in general, the standards of a country will improve when the income per capita of the country increases. Therefore, you can conclude that the level of development of a country, in this case measured by income per capita, is correlated with the level of standards in that same country. Despite this trend, there are a lot of differences between developing (emerging) countries in trading volume what is presumably caused by institutional-driven differences (Claessens et al., 2002). This means that the group of developing (emerging) countries is a very differs group of countries, what is likely also the case for the group of developed countries.

In general it can be said that emerging (developing) equity markets have higher transaction costs, a greater likelihood of failed trades and most importantly for this study these emerging equity markets reflect poor financial information that reflects varied accounting practices, disclosure requirements and enforcement (Edison & Warnock, 2008). According to Edison & Warnock (2008) all these costs, both direct and informational, can be circumvented when foreign firms will list on exchange market with higher standards, for example in developed countries as the U.S. and the U.K. The cross-listed firms choose to bond themselves to the U.S. investor protection regulations, which includes reconciliation to

U.S. GAAP and adherence to the SEC's disclosure requirements and securities laws (Edison & Warnock, 2008). Lang, Raedy & Yetman (2003) provide descriptive evidence on the characteristics of accounting data for foreign firms that cross-list in the United States relative to a matched samples of foreign firms that are currently not cross-listed in the United States. This evidence suggests that cross-listed firms have higher quality local GAAP accounting information than non-cross-listed firms measured by several measures of income smoothing and earnings management, by various measures of the timeliness of loss recognition, and by associations of accounting information with share prices (Lang, Raedy & Yetman, 2003). The bonding to the U.S. exchange markets may cause firms to change their local GAAP reporting, for example firms cross-listing on the U.S. markets tend to raise more capital in local markets following cross-listing which indicates that firms cross-list to bond themselves to more transparency even in their home market (Lang, Raedy & Yetman (2003); Reese & Weisbach (2001)).

In conformity with the above, the positive effect of cross-listing on the information environment is stronger for firms from countries with weaker protection for minority shareholders, lower standards and that are from emerging (developing) markets than for firms from countries with higher protection, higher standards and that are from developed markets (Lee & Valero, 2010). Besides, good shareholders rights and laws that protect shareholders another important factor for a developed stock market (exchange) is a strong and effective enforcement of these shareholders rights (Claessens, Kingebiel & Smukler, 2002). The level of legality (also referred to as "rule of law" or "law and order"), in order words the degree to which the law is adhered to and is being enforced, has been shown to be a critical aspect of corporate governance (Licht, 2003). Claessens et al., 2002 found that both the 'law and order' and the shareholders rights are statistically significant, what suggest that the combination of law and order and a good level of shareholders rights are an important factor for a good developed exchange market. According to Chan & Hameed (2006) there is little enforcement of few regulations that relate to information disclosure in the emerging (developing) markets. This means that for firms from emerging exchange markets the enforcement and law and order (rule of law) advantages of bonding to developed exchange markets are bigger than for firms from developed exchange markets.

As said before the capital markets, compromising bond and stock markets, are more developed in high-income countries. Developed capital markets contains a well-established legal and regulatory framework (Financial Development Report (FDR), 2015/2016). Well-functioning capital markets aggregate information and reduce information asymmetries

between markets participants, facilitating the provision of long-term financing (FDR, 2015/2016). Claessens et al., 2002 found that institutional factors, including shareholder protection weighted by the degree of enforcement in the country, are related positively to the level of stock market development. Because the development of stock markets tend to increase as the income per capita grows, this means that for developed countries (high level of income per capita) the capital market is better functioning than capital markets of developing countries (low level of income per capita). This means that in general the development level of capital markets (stock exchanges) are higher in high-income (developed) countries than in low-income (developing) countries. So, the exchange markets from developed countries have in general better rights for minority shareholders, a higher level of law and order ("rule of law") and better enforcement of law and rules than exchange markets from developing countries. Therefore, the development level of capital markets in the home country of a firm is an important factor for firms to take into consideration when making a decision whether to cross-(de)list.

The results of Lee & Valero (2010) indicates that when foreign firms cross-list in the United States the analyst coverage intensity increases and that the recommendation dispersion will be reduced for these firms. In the contrary, Fernandes & Ferreira (2008) found that the added scrutiny and disclosure associated with the U.S. cross-listing will have opposing results on the price informativeness and thereby the stock market reaction for firms from emerging markets in comparison with firms developed markets. This means that the level of development has effect on the stock market reaction of cross-listing. Opposed to the bonding hypotheses Fernandes & Ferreira (2008) found that cross-listing improves price informativeness for developed market firms, but for firms in emerging markets cross-listing decreases price-informativeness. These result indicate that stricter disclosure can also have a counter effect on the information environment of the firms, especially because of the crowd-out effect on the private information collected by investors. After the implementation of SOX, firms and investors are turning away from the regulatory burden imposed by the rigorous U.S. securities framework, while some favor delisting others seek jurisdictions with less stringent regulation in which the costs of being a public company are comparatively lower (Mendoza, 2008).

According to Piotroski & Srinivasan (2008) U.S. exchanges are more likely to attract large firms and are less likely to attract firms from countries with relatively weaker institutions, including emerging (developing) markets, and firms with weaker governance. In this case only the large and high quality firms from emerging countries benefit from the

bonding to exchanges from countries with relatively strong institutions. The result for small companies from emerging markets is consistent with the claim that SOX imposed a negative effect on the competiveness of U.S. exchanges (Piotroski & Srinivasan). The implementation of SOX and the associated costs can be a reason for firms to cross-delist from U.S. exchanges. According to Chaplinsky & Ramchand (2008) firms from emerging markets are less likely to delist, one reason for this result can be that the home markets of the emerging markets firms are less able to raising the needed capital in comparison to the firms from developed markets. That companies from emerging markets can more easily raise funds by listing on developed markets is because of the bonding effect of subjecting to relatively higher standards. In conclusion, there are some differences in the reasons for cross-listing and cross-delisting for firms from developing (emerging) countries in comparisons to firms from developed countries. In this study, the effect of cross-delisting on the information environment and information asymmetry will be researched, with special attention for the difference in this effect between firms from developed and developing (emerging) countries. This research both wants to fill the gap in literature about the effects of cross-(de)listing on the information environment and want also to contribute to this literature by looking at the differential effect for firms from developed and developing (emerging) countries.

3. Hypothesis development

In this section the hypotheses of this study will be formulated, these hypotheses are based on the review of prior literature in the former section. The prevalence of potential agency conflicts in many firms around the world is a reason for firms to cross-list in foreign countries, this is in large part due to the fragile regulatory oversight, transparency, and disclosure requirements, and legal protections afforded minority shareholders (Karolyi, 2012). The so called bonding hypothesis posits that firms cross-listed on major U.S. stock exchange have better corporate governance than non-cross-listed firms from the same country, ceteris paribus, since cross-listed firms are subject to strong U.S. investor protections (Lel & Miller, 2008). According to Coffee (2002) the bonding argument states that: companies wishing to raise capital do cross-list on U.S. exchanges because by voluntarily subjecting themselves to the United States' higher disclosure standards and greater threat of enforcement, these companies partially compensate for the weak protection of minority interests under their own jurisdiction's laws and regulations. Besides that, Coffee (2002) argues that cross-listing may in part be a signaling device that the firm has high growth prospects, in part a bonding mechanism to assure public investors that they will not be

exploited, and in part a means of attaining greater analyst attention and reducing informational asymmetries. According to the bonding hypothesis for firms that will cross-delist, the opposite will happen in comparison with firms that cross-list. That means that when firms cross-delist they are no longer subject to higher disclosure standards and greater threat of enforcement, what can have consequences for the information environment of the firms and for the information asymmetry between the firm and their outsiders (investors).

Opposed to the bonding hypothesis, the 'avoiding hypothesis' states that firms are avoiding more regulated exchange because of the costs associated with the reporting and compliance requirements of those more regulated exchanges (Licht, 2003). Besides that, there are also other expected costs as the professional fees of lawyers and accountants and expected costs coming from the potential legal liability (Licht, 2003). Besides the 'direct' costs, there is also another reason for foreign firms to avoid the more regulated U.S. exchanges and this is because the SEC has different regimes for foreign companies than for U.S. companies for example on the field of enforcement and corporate governance (Licht, 2003). The SEC regime for foreign companies is less strict than for U.S. companies, this can lower the benefits from 'bonding' to the more regulated U.S. markets. Also, the implementation of SOX and the associated costs of SOX can be a reason for firms to cross-delist from U.S. exchanges, because these associated costs will cause that for some firms the benefits no longer outweigh the costs of cross-listing. In this study, I also research the possible determinants of firms that cross-delist. Consisting with the costs savings rationale (partly due to the implementation of SOX), cross-delisting firms are smaller and have and have poorer profitability (performance), higher leverage, lower trading volume, and fewer growth opportunities than firms that stay cross-listed. So, the question is whether the bonding hypothesis is still important in this time where more and more firms are cross-delisting. By looking at the effects on the information environment and information asymmetry for firms that cross-delist I want to indicate what the effects of cross-delisting for the firm itself as for the outsiders (investors) of these firms are.

According to Lel & Miller (2008) these cross-listed firms are subject to punishment by U.S. law enforcement, both by the Securities and Exchange Commission (SEC) as well as private investor law suits, and to increased scrutiny from intermediaries such as financial analysts and debt-rating agencies. The results of Lang, Lins & Miller (2003) indicate that Non-U.S. firms enjoy greater analyst coverage and a larger increase in forecast accuracy relative to other firms that are not cross-listed. This increase in analyst coverage and forecast accuracy will according to Lang, Lins & Miller (2003) lower the information asymmetry and

therefore improve the information environment. The analyst following (coverage) and the accuracy of the analyst's activity are important, because they are adding some scrutiny and can be important in corporate governance for providing extra information to investors (Lang, Lins & Miller, 2004). So, Analyst following and the accuracy (dispersion) in the analysts' activity can be used to measure the effect of cross-delisting on the information environment of firms, because analysts as outsiders are an important source for information and so are serving as information intermediaries between the firm and the market (Lang, Lins & Miller, 2004). On the other hand, if analysts are primarily information providers who compete with firm-provided disclosures than an increase in firm provided information can lead to a substitute for analyst reports (Lang & Lundholm, 1996). When an increase in firm provided information is a substitute for analyst reports, the demand for analyst services will decline what will lead to less analyst following (coverage) for a firm (lang & Lundholm, 1996). According to Alford & Berger (1999) additional public disclosure could drive out private information acquisition, which result in less analysts that are searching for private information because additional information has been made public. In this case, increased informative disclosure by firms is a substitute for the information that can be found by analysts. Therefore, it is not clear whether cross-delisting will lead to more or less analyst following, because of the mixed results above there is some tension about the effect of lower disclosure requirement after cross-delisting on analyst following (coverage). In general, I expect that as a result of the cross-delisting the information provision to outsiders (investors) of the firms will be of less quality, because of the lower disclosure requirements and the lower enforcement of these disclosures after the cross-delisting of firms.

The measurement of information asymmetry will be done by the bid-ask spread of the companies' stocks. Lee & Valero (2010) indicate that a reason to cross-list on exchanges with stricter disclosure requirements is to improve the information disclosure and the consequential decrease in the information asymmetry between the firm (management) and their investors. According to Shumway & Warther (1999) the bid-ask spreads of firms delisted for performance reasons increases dramatically, which can indicate that the information asymmetry has increased after the delisting. The question is whether the information asymmetry really increases when firms cross-delist, because it is not clear whether the cross-delisted firms will provide the same informative disclosure after their cross-delisting. When the information asymmetry does not increase after a cross-delisting, then the bid-ask spread is not affected by the cross-delisting. I expect that the bid-ask spread will increase after the cross-delisting of firms, because after the cross-delisting the disclosure

requirements and the enforcement of these disclosures are lower which can increase the information asymmetry between the firms and their investors. So, in general the expectation is that analysts following, the accuracy of the analysts' forecasts will decrease and that the bid-ask spread will be higher after the cross-delisting of firms. This because the cross-delisting is expected to lead to a decrease in the quality of the information environment and to an increase in the information asymmetry between the firms and their investors (outsiders). This expectation leads to the first hypothesis:

> ***H1:*** The cross-delisting of firms from the major U.S. stock exchanges will lead to less analysts following, less accuracy in the analyst's activity and a higher bid-ask spread.

The hypothesis above is stated in the alternative form. The corresponding null hypothesis is that the cross-delisting of firms from the major U.S. stock exchanges will lead to no change in analysts following, accuracy of analyst's activity and the bid-ask spread. When the alternative form is true, this can be an indication that the bonding hypothesis is still important for firms.

According to Siegel (2009) cross-listings has been identified as a useful bonding strategy for firms in emerging economies, this because cross-listings can promote outsiders' trust and provide benefits to firms, including improved market valuation and lower capital constraints. Leuz (2006) states that firms out of countries with weaker institutional frameworks, often developing countries, have an incentive to seek bonding devices that sufficiently reassure investors. Cross-listing of developing market stocks on developed market exchanges offers the investors greater legal protection (bonding hypothesis) because of more stringent information requirements by the developed listing markets, this effect is more evident for stocks from countries with poor investor protection (You, Parhizgari & Srivastava, 2012). You, Parhizagari & Srivastava (2012) extend the bonding hypothesis to the delisting event and postulate that the bonding effect would disappear if the stocks are delisted from foreign markets, and this effect would be especially significant for delisting from foreign markets with good investor protection levels.

According to Lang, Lins & Miller (2004) analysts are less likely to follow firms from countries with weak external shareholder protection. Besides that, Lee & Valero (2010) found that the increase in analyst coverage intensity from cross-listing is more profound among firms from emerging markets than those from developed markets. The above means that firms from developing (emerging) markets, that will have in general weaker shareholder protection and a lower level of disclosure requirements than developed markets, have less

analyst that will follow them. Besides weaker shareholders protection, the exchange markets from developing (emerging) countries have in general a lower level of capital market development, a lower level of law and order ("rule of law") and worse enforcement of law and rules than exchange markets from developed countries. Because, of the differences between capital markets of developing countries and developed countries, the effect of the 'bonding' is likely to be different between firms from developing and developed countries. Therefore the effect of bonding on the information environment and information asymmetry is also likely to be different for firms from developing compared to firms from developed countries. The generalizations above about the capital markets of developing countries leads to the expectation that the effect of cross-delisting from the major U.S. exchanges on the analysts following, analysts' accuracy and bid-ask spread will be greater for firms from developing (emerging) countries than for firms from developed countries. So, the expectation is that the analyst following and the analysts' accuracy will decrease more for firms from developing countries than for firms from developed countries, and that the bid-ask spread for firms from developing countries will increase more than for firms from developed countries. In conclusion, the above expectations lead to the following hypothesis:

> ***H2:*** For firms cross-delisting from the major U.S. stock exchanges both the negative effect on analysts following and analysts' accuracy, and the positive effect on the bid-ask spread will be greater for firms from developing (emerging) countries opposed to firms from developed countries.

The hypothesis above is stated in the alternative form. The corresponding null hypothesis is that for firms cross-delisting from the major U.S. stock exchanges both the negative effect on analysts following and analysts' accuracy and the positive effect on the bid-ask spread will not be different for firms from developing (emerging) countries opposed to firms from developed countries. In the next section the research design and the data used will be discussed.

4. Research design and data

In this section, the research design and the data I use in this study will be discussed. First, the theoretical relations and the way these theoretical relations are operationalized will be described. After that, there follows a description about the control variables that are included in this thesis. Then, the models that will be tested in this study will be discussed.

And at last, I elaborate on the sample that I use and on the way the data is collected that is needed to perform this study.

4.1 Theoretical relations and their operationalization

This study investigates the effect of cross-delisting on a firms' information environment and the information asymmetry between the firm and their investors (outsiders). The event of interest in this study is the cross-delisting of foreign firms from three major U.S. exchanges (NYSE, NASDAQ and AMEX). The cross-delisting firms and their dates of cross-delisting from the three major U.S. exchanges will be collected from the CRSP database. The firm's information environment will be operationalized by using two related proxies, namely analyst coverage and analyst forecast accuracy. The two proxies are related because forecast accuracy and analyst coverage (following) are determined simultaneously, with greater accuracy associated with higher analyst following (Alford & Berger, 1999). The information asymmetry will be operationalized by one proxy, namely the bid-ask spread.

Besides that, I will divide the foreign firms that cross-delist in two different groups of firms, namely in a group of cross-delisting firms from developed countries and in a group of cross-delisting firms from developing (emerging) countries. As explained before in section 2.3, the level of development of a country is related to the level of rules, regulation and disclosure requirements. In general, the more developed a country is the higher the standards of a country will be. These higher standards can be a reason for firms to 'bond' to the exchange markets of these countries, because this can give more protection to investors and this can lower the information asymmetry between the management of a firm and the outside investors (Lee & Valero, 2010).

It is hard to test the relation between a firm's information environment and cross-(de)listing, because it is impossible to directly measure a firm's information environment (Fernandes & Ferreira, 2008). The proxies I use to indirectly measure the quality of the information environment, analyst coverage and analyst accuracy, are heavily used in prior literature to operationalize the firm's information environment (e.g. Lang, Lins & Miller, 2003;Lee & Valero, 2010). According to Beyer, Cohen, Lys & Walther (2010) analysts decide whether to follow a firm (coverage), whether to issue earnings forecasts or a stock recommendation, and when to release a forecast. These choices are likely to reveal information because sell-side analysts have incentives to communicate strategically and face relatively limited regulation regarding their communication with investors (Beyer et al., 2010). This indicates that investors can infer information not only from the analysts' forecasts

itself but also from the fact that an analyst decided to follow a particular firm (Beyer et al., 2010). When analysts are primarily information intermediaries, the principle flow of information goes from the firm to the analysts who process the information and transmit it to the capital market, then an increase in firm-provided information means the analyst has a more valuable report to sell (Lang & Lundholm, 1996). This means that in this case increased disclosure increase the aggregate demand for analysts services, and therefore in isolation the number of analyst that follow a firm will increase in equilibrium (Lang & Lundholm, 1996). So, the number of analysts that follow a firm can be an indication that investors find the information that the analysts provide is valuable. And this valuable information can lead to an improvement in a firm's information environment, this because the work of the analysts tend to make more valuable information about the firms available. Besides that, to maximize the analysts reputation these analysts have the incentive to optimize their information acquisition process (collecting private and public information), this means that analysts have an incentive to maximize their forecast accuracy because this is tied to reputational concerns (Beyer et al., 2010). Because there are reputational concerns for the analysts, these analysts have incentive to find as much efficient information as possible and the communication to investors of the (private) information found can help to improve the information the investors receive and therefore can improve the information environment.

Lang, Lins & Miller (2003) found that cross-listed firms enjoy greater analyst coverage, greater forecast accuracy of analysts and that these cross-listed firms tend to get higher valuations. According to Bailey, Karolyi & Salva (2006) the better protection of U.S. securities laws compared to the protection in a firm's home country does not only influence the decision whether to cross-(de)list, but also attract more U.S. based investors and analysts that are necessary to improve the information environment of the firm. Analysts play an important role, as outsiders, as information intermediaries between the firm and the market, to play their role as information intermediaries they have to gather information from a wide array of both internal and external sources to assess the economic viability and investment potential of the firm (Lang, Lins & Miller, 2004). Analysts provide important scrutiny on management's actions and therefore can decrease the information asymmetry between managers and investors, what will result in an improvement in the information environment. Because of the fact that analysts play an important role in providing information to the outsiders of a firm, analyst coverage and analyst accuracy can be used as proxies for the information environment.

The proxies mentioned above are measured by using the database I/B/E/S, this

database includes the summary of historical estimates of analysts and thereof the number of analysts that follow a firm can be derived. The variable analyst coverage is measured by using the number of estimates (recommendations) of Earnings per share (EPS) that are made by analysts following a firm. So, the variable analyst coverage indicates the number of analysts that make a forecast about a firm. The number of analysts following a company are measured in the month that the company announces its annual earnings or in the month before, this month can deviate between the different companies. As explained above, the decision whether to cross-delist is expected to have impact on the amount of analysts that follow a firm. Analyst forecast accuracy is measured in this study by using a formula that was previously used by Lang, Lins & Miller (2003), this formula defines the forecast accuracy as the negative of the absolute value of the analyst forecast error deflated by the stock price. The formula I will use in this study is slightly different from the formula used by Lang et al. (2003), because I will use the actual and the estimated annual earnings per share (EPS) instead of the actual and estimated earnings. The amended formula for this study to measure forecast accuracy is:

$$Forecast\ Accuracy\ (t) = -\left|\frac{Actual\ EPS\ (t) - Estimated\ EPS\ (t)}{Stock\ Price\ (t)}\right|$$

The *t* in the above formula, indicates that the forecast accuracy, actual EPS, estimated EPS and stock price are calculated per year. The forecast accuracy formula derives the difference between the actual EPS and the median estimated EPS, the smaller the difference between these values the higher the ability to predict more accurately. The forecast accuracy will be measured in the same month as the analyst following, namely in the month the company announces its annual earnings per share (EPS). Sometimes the estimation of the month before the month the EPS are announced are taken, this depends on the exact day the estimations and the actual EPS are announced. The close stock price at the end of the month, this month corresponds to the month that is taken for a company to estimate the difference between actual EPS and estimate EPS, are used in the formula above. When cross-listing will increases the available information about a firm, because of a higher level of disclosure requirements, the analysts should be able to predict more accurately the earnings of Non U.S. firms (Lang et al., 2003). So, when firms cross-delist the expectation is that the available information will decrease because of the lower level of disclosure requirements these firms are subject to after the cross-delisting and this will lead to less accurate EPS forecasts.

The bid-ask spread, the proxy that will be used to measure the information asymmetry between a firms' management and its outsider (investors), is heavily used in prior literature to

operationalize information asymmetry (e.g. Coller & Yohn, 1997;Leuz & Verrecchia, 2000). Bid-ask spread is thought to measure information asymmetry explicitly, because the bid-ask spread addresses the adverse selection problem that arises from a transaction in firm shares in the presence of information asymmetry between investors (Leuz & Verrecchia, 2000). Less information asymmetry indicates less adverse selection, which in turn implies a smaller bid-ask spread (Leuz & Verrecchia, 2000). Besides that, Coller & Yohn (1997) explain that theoretical models of the bid-ask spread hold a portion of the bid-ask arises because of asymmetric information, and this means that specialists (liquidity traders) widen the bid-ask spread when they perceive greater asymmetric information[2]. As said before, the expectation is that the bid-ask spread will increase after the cross-delisting of firms. According to Leuz & Verrecchia (2000) economic theory suggests that a commitment to an increased level of disclosure (for example by cross-listing) should in principle lead to lower information asymmetry. In contrast to this, the cross-delisting from exchange with relative high disclosure requirements can lead to an increase in the information asymmetry, which can lead to wider bid-ask spreads.

The bid-ask spread will be measured by using the daily stock information from Thomson Financial (Datastream). This database gives both the daily highest price (bid price) a prospective buyer is willing to pay for a security at a particular price, and the daily lowest price (ask price) a prospective seller would be willing to accept for a particular security. I will follow the methodology of Leuz & Verrecchia (2000) by using the relative bid-ask spread that is calculated by dividing the absolute spread by the average of bid and ask. The absolute spread is calculated by using the method of Erkens (2016) by subtracting the yearly median daily bid price from the yearly median daily ask price for every company. The yearly median value of the absolute bid-ask spread will be used to calculate the relative bid-ask spread. This is done by scaling the yearly median absolute value of the bid-ask spread by the average of the yearly median bid price and the yearly median ask price.

Besides measures for the information environment and for information asymmetry, to test hypothesis 2 the firms that cross-delist from all the three major U.S. exchanges must be divided in firms from developed countries and in firms from developing countries. The division of cross-(de)listed firms in two different groups, namely in a group with firms from

[2] According to Coller & Yohn (1997) these specialists duty is to maximize the turnover of capital, because specialists sustain losses from trading with informed traders (that do fundamental analysis) they widen the bid-ask spread when there is an increase in information asymmetry. This widening in the bid-ask spread is in order to recoup these losses.

developed countries and in a group with firms from developing (emerging) countries, will be done in the same way as Fernandes & Ferreira (2008) on basis of the division made by the Worldscope database. Worldscope classifies countries into developed markets and emerging (developing) markets, and their goal is to cover all listed companies for developed markets and a selection of emerging markets. Emerging markets are markets that have some characteristics of a developed market, but does not meet the criteria to be classified as a developed market. Over the years of the total test period 2002-2014, some firm has changes from classification but for the vast majority of countries their classification in developing/developed countries has not changed. Therefore, the current classification of Worldscope is used for the whole test period, this is the same manner as Fernandes & Ferreira used in their study.

The current classification of Worldscope includes for developed markets mostly Western-European countries like the Netherlands, France and Germany, but also countries like the U.S., New-Zealand, Japan and Hong Kong. The emerging markets classification of Worldscope include for example countries as Greece, South-Africa, Argentina, Korea and Russia.[3] According to Claessens, Kingebiel & Schmukler (2002) the migration of stock exchange activities to foreign exchanges, is especially important in the case of emerging markets. Therefore, many firms from emerging economies now cross-list on international exchanges (Claessens et al., 2002). Because the migration of stock exchange activities to foreign exchanges is assumed to be of relatively more importance to firms out of emerging markets/countries, the classification in developed and emerging markets can be useful to investigate the differential effect of cross-delisting for firms from developed markets/countries compared to firms from emerging (developing) markets/countries. So, in this study I will use the classification used by Worldscope in their database to divide the firms that cross-delist in two different groups of firms from developed and developing (emerging) countries.

4.2 Control variables

There are also other factors that influence the relation between the dependent variables of interest (analyst coverage, analyst accuracy and bid-ask spread) and the event of

[3] Full classification can be found on Worldscope. Item Developed includes: AUT, AUS, BEL, CHE, CAN, DNK, FRA, ESP, FIN, DUE, IRL, ITA, LUX, LIE, NLD, NOR, SWE, GBR, HKG, JPN, SGP, NZL and USA, and item Emerging includes: ARG, BRA, CHL, COL, MEX, PER, VEN, CZE, GRC, HUN, POL, RUS, PRT, PAK, SVK, ISR, ZAF, TUR, ZWE, CHN, IDN, KOR, LKA, MYS, PHL, THA, TWN and IND (included in item Emerging EmergingAsia Pacific).

cross-delisting. In this study, I try to control for these factors by including some control variables into my regression models. Firm size influences the number of analyst that follow a company and the accuracy of the analysts, because there are significant fixed costs to follow a company and the payoff from following a firm is related to the firm size (Chan & Hameed, 2006). The larger the firm size, the larger the number of shareholders will be, and the greater the demand for information that is produced by security analysts (Chan & Hameed, 2006). More profitable firms also have a larger proportion of their trading volume in the U.S. than less profitable firms and a higher turnover can lead to the attraction of more analysts and therefore these firms are less likely to cross-delist (Chaplinksy & Ramchand, 2008; Chan & Hammeed, 2006). Therefore, both a control variable for the size of the company as a control variable for the profitability of the company will be included. The firm's size will be measured by using the market capitalization of the company and the profitability will be measured by using the Return on Assets (ROA) of the company. Chaplinsky & Ramchand (2008) use Return on Assets (ROA) as measure for the profitability of companies, they found that on average firms with positive ROA stay listed, and voluntary delisting firms have negative ROA on average[4].

Another variable that can influence the information environment (analyst coverage and analyst accuracy) is the trading volume of the firms. The greater the trading volume of the company's stock the greater the analyst following (coverage) and this also indirectly enhance the accuracy of earnings forecasts about the firm, this is because stocks that are traded more will generate higher brokerage commissions for the analysts (Alford & Berger, 1999). So, the trading volume of the firm's stock influences analyst coverage and the analysts' forecasts accuracy, that's why I will include a control variable for the trading volume of a firm's stock.

Growth is also related to the analyst coverage and accuracy, because according to Lang et al. (2004) earnings growth is related to the fact that analyst are probably more attracted to high-growth firms. That analysts are probably more attracted to high-growth firms is because of the fact that for those firms the expectation (prospect) is that the profitability will grow relatively more than for low-growth firms in the future. This profitability will attract relatively more analyst, as previously explained when discussing the profitability control variable. Because of the expectation that growth prospects influences

[4] The negative average ROA for voluntarily delisting firms is over the periods: 1986-1990 and 1996-2000. Over the period 2001-2004 the average ROA for these firms improve. For more information about the results per period see Chaplinsky & Ramchand (2006)

analyst coverage and analyst forecasts accuracy I will include a control variable for the growth prospects of a firm. The proxy I will use to measure the growth prospects is the market-to-book (MTB) ratio, this measure gives the difference between a firm with high growth prospects (high MTB ratio) and a firm with low growth prospects (low MTB ratio). The MTB ratio is calculated by dividing market value of the equity by the book value of the equity of a firm.

As last control variable the variability of stock return is included in the regression model. According to Lang, Lins & Miller (2004) the variability of stock return is included as control variable, because it is likely to affect analyst following (accuracy) because they influence both analysts' incentives to gather information and the inherent difficulty in forecasting earnings. Lang & Lundholm (1993) found that the number of analysts following a U.S. firm is negatively related to the return variability. This means that analysts prefer to follow firms with less performance variability (Lang et al., 2004).

For the control variables needed in the empirical model measuring information asymmetry, with as dependent variable the bid-ask spread, I will follow the Leuz & Verrecchia (2000) paper. Leuz & Verrecchia (2000) includes numerous determinants of the bid-ask spread that are suggested by previous theoretical and empirical studies. These determinants are trading volume, share price volatility, firm size and presence of insiders (free float). To control for the firm size, the market value of the firm's equity is used. Firm size controls, at least partially, for the firm's information environment, because in general firms with greater size attracts more analysts that follow the company. When more analysts follow a firm this can lead to greater information provision to investors, what can lead to a decrease in the information asymmetry and therefore in a decrease in the bid-ask spread of a firms' securities.

The firm's free float is included as a control variable, because free float is an inverse proxy for the presence of insiders (Leuz & Verrecchia, 2000). This variable is included in the empirical model, because shareholders with large and closely held stakes of a firm generally have superior access to information about the firm than regular shareholders (Leuz & Verrecchia, 2000). When most of the shares of a firm shares are closely held (in possession of insiders), the holders of these shares have superior information about the firm and in that case the information asymmetry is greater between shareholders with large and closely held stakes of a firm and the regular shareholders of a firm. Consequentially, this greater information asymmetry leads to a higher bid-ask spread for the firm's securities. So, the expectation is

that the free float is negatively associated with the bid-ask spread this is because free float is an inverse proxy for the presence of insiders.

Trading volume is included as control variable, because this variable takes the increased liquidity of the company's shares into account. According to Witmer (2005) there is in general a positive liquidity effect for companies after cross-listing in the U.S., the benefit of cross-listing comes as a reduction in the firm's bid-ask spread what result in an increase in the firm valuation. The expectation is that for firms that cross-delist the liquidity of its shares will decrease, because of a possible increase of the information asymmetry after the cross-delisting. As said above, liquidity of a firms' share has influence on the bid-ask spread and therefore the trading volume is included in the regression model for the bid-ask spread (information asymmetry).

As last control variable, the share price volatility (standard deviation of return) is included. The expectation is that the bid-ask spread is positively associated with the share price volatility. According to Leuz & Verrecchia (2000) among investors, low levels of volatility suggest fewer information asymmetries. Low levels of volatility suggest fewer information asymmetries between a firms' management and investors (outsiders), and these lower information asymmetries can consequentially lead to lower bid-ask spread for the firms' securities. In conclusion, I will follow the paper of Leuz & Verrecchia and will include firm size, trading volume, share price volatility and free float as control variables in the empirical model that investigates the bid-ask spread (information asymmetry).

4.3 Regression model

The event of interest of this master thesis is the cross-delisting of foreign firms from the three main stock exchanges in the U.S. (NYSE, NASDAQ and AMEX). This study will use a difference-in-differences approach for the statistical analysis, which is a research approach than can examine the differential effect of X (cross-delisting) on Y (information environment and information asymmetry) for different groups of observations (firms from developing versus firms from developed countries). This difference-in-differences method allows to investigate the differential effect between a treatment group of firms that cross-delist and a control group of firm that stay cross-listed. Besides that, this difference-in-difference test, investigate the differential effect between a treatment group of firms from a developing country that cross-delist and a control group of firm from a developed country that cross-delist. So, this approach make is possible to investigate the differential effect of cross-delisting for firms from developing countries versus firms from developed countries.

Before the difference-in-difference tests are performed I will first perform a logit regression with as dependent variable (Y) the event of cross-delisting, and as independent variables (X) the determinants of cross-delisting discussed at the end of section 2.2. Most of these determinants are reasons for firms to cross-list, and in case of the five possible determinants used in the regression formula below I have the expectation that these factors will also influence the choice of firms to cross-delist (See explanation at the end of section 2.2. per determinant). These possible determinants of cross-delisting by firms are: the firm's size, the firm's profitability (ROA), the growth opportunities of a firm (MTB), the leverage level of a firm and the trading volume of a firm's securities. This test is performed to investigate whether the determinants found in the literature about cross-(de)listing are also statistically significant for the firms included in the sample of this study. The following formula will be used to for the OLS regression on the determinants of cross-delisting:

$$\boldsymbol{CrossDelisting = \beta_0 + \beta_1 log(Size)_{i,t} + \beta_2 ROA_{i,t} + \beta_3 MTB_{i,t} + \beta_4 LEV_{i,t} + \beta_5 Log(Volume)_{i,t} + \epsilon} \quad (\mathbf{1})$$

For every variable, t indicates the time in years and i indicates the specific company that cross-(delist) or stay cross-listed. The dependent variable used to measure cross-delisting (CrossDelising) is measured by using a dummy variable, which will equal 1 when companies cross-delist and 0 otherwise. In the case of the determinants test I follow the methodology of Chaplinsky & Ramchand (2008), which means that the CrossDelisting variable takes the value one in the year the firm cross-delist. For the delisted firms and for the firs that stay cross-listed the independent variables are measured one year prior to delisting. For the independent variable Log(Size), market capitalization, the expectation is that the coefficient is negative because smaller firms are more eager to cross-delist. The independent variable ROA (return on equity), that measures the profitability of a firm, is expected to have a negative relation with cross-delisting. The reason for this expected negative relation is that Doidge, Karolyi & Stulz (2010) found that deregistering firms are performing poorly compared to the benchmark firms that do not deregister. The expectation for the variable MTB (market-to-book ratio), that measures the growth opportunities of a firm, is a negative relation with cross-delisting because firms with less growth opportunities available are more likely to cross-delist. The variable LEV (leverage) is included in the regression, because the expectation is that firms cross-delist have significantly higher leverage levels than firms that do not cross-delist. The relation between LEV and cross-delisting is therefore expected to be positive. The last variable Log(Volume), measuring the trading volume of the firm's

securities, is included because firms are more likely to cross-delist when there is a decline in capital market activity. So, the coefficient of Volume is expected to be negative. See table 1 in the appendix, for the description of how each variable is operationalized.

After the first test about the determinants of cross-delisting, I will perform three difference-in-difference tests with three different dependent variables (analyst coverage, analyst accuracy and bid-ask spread). The control variables discussed in section 4.2 will be included in these difference-in-difference tests. First, the difference-in-difference tests that measure the information environment, by two different proxies (analyst coverage and analyst accuracy), are explained below. Second, the difference-in-difference test that measure the information asymmetry (average relative bid-ask spread) is explained below. The following formulas will be used for the OLS regression on information environment (analyst coverage (AnaCov) and analyst accuracy (AccAna)) and on information asymmetry (relative bid-ask spread (Bid-Ask)) :

$$\boldsymbol{Information\ environment}\left(\boldsymbol{AnaCov_{i,t}, AccAna_{i,t}}\right)$$
$$= \boldsymbol{\beta_0} + \boldsymbol{\beta_1 CrossDelisting} + \boldsymbol{\beta_2 Post} + \boldsymbol{\beta_3 Developing}$$
$$+ \boldsymbol{\beta_4 CrossDelisting} * \boldsymbol{POST} + \boldsymbol{\beta_5 POST} * \boldsymbol{Developing}$$
$$+ \boldsymbol{\beta_6 CrossDelisting} * \boldsymbol{Developing} + \boldsymbol{\beta_7 CrossDelisting}$$
$$* \boldsymbol{Developing} * \boldsymbol{Post} + \boldsymbol{\beta_8 Log}(\boldsymbol{Size})_{i,t} + \boldsymbol{\beta_9 ROA_{i,t}}$$
$$+ \boldsymbol{\beta_{10}}\ \boldsymbol{Log}(\boldsymbol{Volume})_{i,t} + \boldsymbol{\beta_{11}}\ \boldsymbol{MTB_{i,t}} + \boldsymbol{\beta_{12} Log}(\boldsymbol{Volatility})_{i,t} + \boldsymbol{\epsilon} \qquad (\mathbf{2})$$

$$\boldsymbol{Information\ asymmetry}\ (\boldsymbol{Bid - Ask})$$
$$= \boldsymbol{\beta_0} + \boldsymbol{\beta_1 CrossDelisting} + \boldsymbol{\beta_2 Post} + \boldsymbol{\beta_3 Developing}$$
$$+ \boldsymbol{\beta_4 CrossDelisting} * \boldsymbol{POST} + \boldsymbol{\beta_5 POST} * \boldsymbol{Developing}$$
$$+ \boldsymbol{\beta_6 CrossDelisting} * \boldsymbol{Developing} + \boldsymbol{\beta_7 CrossDelisting}$$
$$* \boldsymbol{Developing} * \boldsymbol{Post} + \boldsymbol{\beta_8 Log}(\boldsymbol{Size})_{i,t} + \boldsymbol{\beta_9 Log}(\boldsymbol{Volume})_{i,t}$$
$$+ \boldsymbol{\beta_{10} Log}(\boldsymbol{Volatility})_{i,t} + \boldsymbol{\beta_{11} Log}(\boldsymbol{Free - Float})_{i,t} + \boldsymbol{\epsilon} \qquad (\mathbf{3})$$

For every variable, t indicates the time in years and i indicates the specific company that cross-(delist) or stay cross-listed. Log(.) stands for the natural logarithm. It is straightforward to measure cross-delisting (CrossDelisting) by using a dummy variable, which will equal 1 when companies cross-delist and 0 otherwise. The cross-delisted companies are retrieved by using the CRSP database, and these cross-delisted firms are cross-delisted in the period from 2004 to 2012. The year wherein a company cross-delist is set equal to t=0, and for every company that cross-delist the variables are measured for a period of two years before and two years after the year of cross-delisting. For every company that

cross-delist (treatment group), I need a company that stay cross-listed (control group). These companies in the control group have ideally similar characteristics as companies in the treatment group. This approach is also called the matched sample approach, and I will follow Chaplinksy & Ramchand (2008) that stipulate that each foreign cross-delisted firm is matched to a stay listed firm from the same country. When it is not possible to match all foreign cross-delisted firms to stay listed firms from the same country, the remaining cross-delisting firms will be matched to stay listed firms from other countries that belong to the same categorization in developed/developing countries. That means that when there are for example not enough stay cross-listed Australian firms over the period 2002-2014, the remaining Australian (developed country) cross-delisting firms will be matched to stay cross-listed firms from other developed countries.

Other important independent variables included in the OLS regression formula are the following: POST and Developing. The variable POST is a dummy variable that equal 1 in the period after cross-delisting (year $0<t\leq2$) and will equal 0 before the period of cross-delisting (year $-2\leq t\leq0$). This dummy variable will be used to measure the difference in information environment and information asymmetry before the cross-delisting and after the cross-delisting for the firms. Both the period before and after the cross-delisting lasts two years (from year t-2 up until and including year t+2) what means that all variables, except the dummy variables, must be taken annually for the year of cross-delisting (t=0), and the period of two years before ($-2\leq t<0$) and two years after ($0<t\leq2$) the year that a firm cross-delist. The firms in the control (matching) group are firms that stay cross-listed during the whole test period (2002-2014), and these firms are matched to cross-delisting firms. Therefore the POST variable is also matched, what means that when a firm for example cross-delist in 2007 the POST variable is equal to zero before and in 2007, and is equal to one after 2007 for both the cross-delisted firm as for the firm that stays cross-listed during the whole test period and that is matched to a particular cross-delisted firm. This is the same method as used by Chaplinsky & Ramchand (2008), the matched cross-listed firm is then as explained above assigned to the same delisting date (year) as its paired cross-delisted firm. Therefore, the variables included in regression models 2 and 3 are computed for both the cross-delisted firms as for the firms that stay cross-listed for the year of cross-delisting (t=0), and for two years prior ($-2\leq t<0$) and two years after ($0<t\leq2$) the paired delisting date. The other important independent variable included is the Developing variable, this is also a dummy variable that equal 1 if the firm that cross-delist or stay cross-listed is a firm from a developing (emerging) country and will equal 0 if the firm that cross-delist or stay cross-listed is a firm from a developed country.

The expectations for the control variables of formula 2 are as follows: for Log (Size), Log (Volume), ROA and MTB the expectation is a positive sign and for the control variable Log(Volatility) the expectation is a negative sign. This is because a firm that is greater in size, has a higher profitability (ROA), has more valuable growth opportunities (MTB), has a higher trading volume and has a lower return variability of their securities compared to other firms, will have in general greater analyst coverage and better analyst accuracy relative to other firms. The expectations for the control variables of formula 3 are as follows: for the control variables Log (Size), Log (Volume) and Log(Free-Float) the expectation is a negative sign, and for the variable Log(Volatility) the expectation is a positive sign. This is because a firm that is greater, has larger trading volume, has a higher free-float percentage and has lower share price volatility compared to other firms, will have in general a lower bid-ask spread relative to other firms. See section 4.2, for more information about the reason why control variables are included in both formula 2 and formula 3. See table 1 in the appendix, for the description of how each variable is operationalized.

The interaction coefficient $\boldsymbol{\beta_4}$ is important for testing hypothesis 1, because it investigates whether the cross-delisting of firms will have an extra effect on the information environment (AnaCov, AccAna) and on information asymmetry (Bid-Ask). Besides that the interaction coefficient $\boldsymbol{\beta_7}$ is important for testing hypothesis 2, because it will investigate whether there is an extra effect for firms from developing countries that cross-delist in comparison to firms from developed countries that cross-delist. The prediction is that both $\boldsymbol{\beta_4}$ and $\boldsymbol{\beta_7}$ will be negative in case of the two proxies for information environment. The coefficient $\boldsymbol{\beta_4}$ will be negative, because the expectation is that the cross-delisting of firms will decrease the analyst coverage and the analyst accuracy, in contrast to the firms that stay cross-listed. The coefficient $\boldsymbol{\beta_7}$ will be negative, because the expectation is that the negative effect of cross-delisting for firms from developing countries on analyst coverage and the analyst accuracy is greater in comparison to the negative effect of cross-delisting on analyst coverage and analyst accuracy for firms from developed countries. Besides that, the prediction in case of the bid-ask spread as measurement of information asymmetry is that both $\boldsymbol{\beta_4}$ and $\boldsymbol{\beta_7}$ will be positive. The coefficient $\boldsymbol{\beta_4}$ will be positive, because the expectation is that the cross-delisting of firms will increase the bid-ask spread, in contrast to the firms that stay cross-listed. The coefficient $\boldsymbol{\beta_7}$ will be positive, because the expectation is that the positive effect of cross-delisting for firms from developing countries on the bid-ask spread is

greater in comparison to the positive effect of cross-delisting on the bid-ask spread for firms from developed countries.

4.4 Sample and Data

All the data about the delistings from the US markets, which includes the date these firms delist, the reason why these firms delist according to CRSP delisting codes, and the share code what indicates the security type, are collected from CRSP. This data is selected for the cross-delisting sample period used in this study from 2004 to 2012. As beginning year of the sample 2004 is taken, because this is after the introduction of the Sarbanes-Oxley act (SOX) that was implemented on 30 July 2002. The implementation of SOX combined with subsequent regulatory pronouncements mandates that U.S. registered firms (includes cross-listed firms) adopt stricter governance practices than those required prior to SOX (Piotroski & Srinivasan, 2007). SOX has changed a firm's foreign listing decision, this decision depends on the relative costs and benefits of cross-listing for firms on U.S. exchange markets. Because of the impact that SOX has on firms that want to cross-(de)list, the beginning year of the sample (2004) is after the implementation of SOX. The sample period includes the implementation of a new rule by the SEC, namely the Exchange Act Rule 12h-6 on March 21, 2007, this rule makes it much easier for foreign firms to deregister[5] (Doidge, Karolyi, 2010). Rule 12h-6 can have influence on the amount of firms that cross-delist after the implementation in 2007. The ending year of the sample is 2012, this is because this study investigates the impact of cross-delisting two years before and two years after the date of cross-delisting. This means that the test period of this study is from 2002 to 2014, so that I have a time period of two years before and after for all the cross-delisting firms over the period 2004 to 2012. So, the sample used in this research allows me to analyze the cross-delistings in the period after the implementation of SOX, which also includes a period wherein the cross-delisting is much easier namely after the introduction of Rule 12h-6 in 2007.

I will follow the methodology of Chaplinsky & Ramchand (2008) and Witmer (2006), which make use of the CRSP share codes to identify all the foreign firms listed on the major U.S. exchanges (NYSE, NASDAQ and AMEX) in the CRSP dataset. The share codes used in

[5] By eliminating conditions that had been considered a barrier to entry, the amended rules will encourage participation in U.S. markets and increase investor choice. With the New Exchange Act Rule 12h-6 it becomes easier for a foreign issuer to terminate its Exchange Act registration. Retrieved from: https://www.sec.gov/news/press/2007/2007-55.htm

this study are 12, 30 and 31, code 12 refers to ordinary shares listed by a firm incorporated outside the U.S. and share codes of 30 and 31 denote American Depositary Receipts (ADRs) (Chaplinksy & Ramchand, 2008). Almost all non-U.S. companies that list their share on U.S. exchanges do so by creating American Depository Receipts (ADRs) (Foerster & Karolyi, 1999). These ADRs were developed by JP Morgan in 1927 as a vehicle for investors to register and earn dividends on non-U.S. stock without direct access to the overseas market itself (Foerster & Karolyi, 1999). According to Chaplinksy & Ramchand (2008) because of the use of exchange listing, the sample of this study includes Level II and III of ADRs and ordinary share listing, but does not include Level I and Rule 144A ADRs[6]. Only the exchange listings (level II and III ADRs) are subject to the GAAP reconciliation and SEC disclosure requirements, and therefore only these exchange listings are useful for this study.

This study includes both firms that cross-delist as consequence of a voluntary decision and firms that are cross-delisted by an exchange as a result of a firm's inability to comply with one or more of the exchange's listing requirements (Marosi & Massoud, 2007). This means that in this study both voluntary and involuntary cross-delisting firms are included. The reason for including both voluntary and involuntary cross-delisting firms is that Chaplinsky & Ramchand (2008) found that firms that are voluntarily delisting are almost exclusively from developed countries. That firms from developed countries are delisting voluntarily is because the home markets of these firms, in contrast to the home markets of firms from emerging countries, are of sufficient size to meet their needs (Chaplinsky & Ramchand, 2008). Because firms from emerging (developing) countries are less likely to voluntarily delist, firms from emerging countries that delist are often involuntary delistings. So, these firms are cross-delisting because they do not comply to the U.S. exchange (NASDAQ, NYSE or AMEX) listing requirements. The above is the reason that both voluntary and involuntary cross-delistings are included in this study's sample, so that the sample will include a better distribution between cross-listed firms from developed and developing (emerging) countries.

To classify cross-delisting firms in voluntary and involuntary cross-delisting firms, I make use of the CRSP delisting codes. According to Chaplinsky & Ramchand (2008) Firms that are removed from major exchanges are classified into mergers and acquisition (CRSP

[6] Level I ADRs and Rule 144A ADRs are not subject to SEC disclosure requirements, and needs not to comply with U.S. GAAP. Level II ADRs are traded on NYSE, NASDAQ or AMEX, they are subject to GAAP reconciliation and SEC registration and disclosure requirements. Level III ADRs are similar to Level II ADRs, except that they raise new capital along with their cross-listing. Information retrieved from Lee & Valero, 2010.

codes 200-400), involuntary (CRSP codes ≥ 400, excluding 570 and 573), or voluntarily delistings (CRSP codes 570) [7]. Code 570 is described as delisted by current exchange because of company request (no reason given), so delistings with code 570 are not imposed by the exchange or regulator and therefore these delistings are voluntarily. In case of this study, also CRSP delisting codes 514, 519 and 520 are considered as voluntary because these codes stand for issues that stop trading the current exchange (NYSE, NASDAQ or AMEX), and start to trade on the Montreal Exchange in Canada (code 514), Toronto Stock Exchange in Canada (code 519) or start to trade their securities Over-the-Counter (OTC) which is not a formal exchange (code 520). In this study, all the involuntary codes are included except 501, 502, 503, 505, 510, 513, 516 and 517, these codes are removed because these stocks moved to another U.S. exchange. Besides that the delisting codes 572, 574 and 575 are excluded because these stocks went bankrupt. Also, the CRSP codes 200-400 that are classified as stocks that are delisting because of mergers and acquisition are removed from the cross-delisting sample of this study.

To collect this study's cross-delisting sample over the period 2004-2012, the first step is to indicate via CRSP all the data on the delistings from the NASDAQ, NYSE and the AMEX. Selecting the delisting data from CRSP only over the time period of 2004-2012, results in 4,351 company observations that delist from the three major U.S. exchanges. Via CRSP the delisting date, the CRSP delisting codes, the share codes and company codes (including CUSIP code) are retrieved for all company observations. This delisting data is firstly reduced to foreign companies that delist from the U.S. exchanges, by filtering this data on share codes 12 (ordinary shares), 30 and 31 (ADRs). The filtering on these specific share codes, resulted in a sample of 554 foreign companies that delisted over the period 2004-2012 from the U.S. exchanges. After the selection on basis of share codes, the sample is reduced to 296 companies by filtering on basis of the CRSP delisting codes. This filtering is done on basis of the selected CRSP delisting codes for this study, as explained in the preceding paragraph. Chaplinsky & Ramchand (2008) indicate that CRSP codes are noisy indicators of the reasons for delisting, they found for example that some code 570 delistings are in fact the result of a previously agreed merger or tender and must be reclassified as Merger and Acquisition delistings. Therefore, I will use the Worldscope database to do research whether

[7] The CRSP delisting codes are classified in seven major categories, namely active (100-170), mergers (200-290), exchanges (300-390), liquidations (400-490), dropped (500-591), expirations (600-610) and domestics that became foreign (900-903). In this study, only the category dropped (code 500-591) is important. Retrieved from: http://www.crsp.com/products/documentation/delisting-codes

the 296 companies are still active on their home stock exchange markets after the U.S. delisting and whether the delisting was not because of reasons like acquisition, merger or firms that are going private. This check resulted in a lot of companies that are excluded from the final sample, these companies are excluded from the sample because of merger, liquidation, acquisition, being listed again on the NASDAQ, NYSE or AMEX, become privately held and because companies are only traded on OTC after delisting. Companies that only trade on OTC markets after delisting, are not active on a home exchange market and therefore these companies are nog included as cross-delisting firms. Also, some firms are excluded from the sample because these firms were not foreign companies and are in fact U.S. companies. There were also firms that had changed their name after the delisting, the name changes of firms were also checked on Worldscope on basis of CUSIP codes and on these companies' websites. These checks results in a sample of 136 companies that cross-delisted from three major U.S. exchanges (NASDAQ, NYSE or AMEX). See table 2 in the appendix for more information about the sample selection process.

This sample of 136 firms that cross-delist from the NASDAQ, NYSE or AMEX consists of 106 companies from developed countries/markets and of 30 companies from developing countries/markets. Most companies that cross-delist from U.S. exchanges are doing this because of voluntary reasons and not because of involuntary reasons, namely 103 companies were cross-delisting out of voluntary considerations and the remaining 33 companies were cross-delisted because they did not met the exchange listing requirements anymore. When looking at the cross-delistings per year it is noticeable that in 2007 the most firms are cross-delisting, namely 51 firms. Also, in 2008 and 2009 there are relatively much companies cross-delisting, with respectively 16 and 21 firms. This can be due to the earlier explained implementation of rule 12h-6 in 2007, which made it easier for foreign firms to cross-delist from U.S. exchanges. As explained in section 4.3, the control sample consists of firms that stay cross-listed and that are matched with the firms that cross-delist in the period 2004-2012. The stay cross-listing firms are matched to cross-delisted firms in the sample on basis of these firms country of origin, but for some countries there are not enough firms that stay cross-listed over the whole test period from 2002 till 2014 to match every cross-delisting firm to a stay cross-listed firm with the same country of origin. The data of the cross-listing control sample is retrieved from Compustat North-America, this database give information about which firms are listed on either the NASDAQ, NYSE or AMEX during the whole test period (2002-2014). Besides that, Compustat also gives information about the country of origin. Whether these companies are not only listed on the U.S. exchanges, but are cross-

listed is checked by using Worldscope. So, it is checked on Worldscope whether these companies are also listed on other stock markets than the U.S. exchanges. See table 3 in the appendix for more information about the cross-delistings sample and the cross-listing control sample used in this study.

The dependent variables analyst coverage (AnaCov) and analyst forecast accuracy (AccAna) are retrieved for both the firms in the delisting sample as the firms in the control sample from the database I/B/E/S. For all the variables retrieved from I/B/E/S the I/B/E/S tickers are used in WRDS, these tickers are retrieved from the Thomson One Banker excel add-in by using the SEDOL codes from the companies' home markets that are manually retrieved from Worldscope. Analyst coverage is measured by the variable called number of estimates, this variables gives the total number of estimates made by analysts for a particular company. For every company the number of estimates (analysts that follow a company) is taken in the month or the month before the actual EPS is announced. The forecast accuracy is measured by using the formula explained in section 4.1, the variables used in this formula are retrieved from I/B/E/S and from Datastream. All the variables retrieved from datastream are collected by using the Thomson One Banker excel add-in and the SEDOL codes of all the companies in the delisting and control sample. From I/B/E/S the variable called mean EPS estimate and the variable called actual EPS value are used to measure the accuracy of the analyst forecasts. The analyst accuracy is scaled by the closed company's stock price at the end of the month the actual EPS is announced or at the end of the month before the actual EPS is announced. The month wherein the above variables are measured depends on the precise date the actual EPS value is announced in relation to the precise date the estimates are announced. This means that ideally the variables are measured in the month the actual value of EPS is announced, but sometimes when the actual EPS of a company is announced in the beginning days of a month the estimates are taken in the month before the actual EPS are announced.

The variables used to calculate the bid-ask spread for the companies in both the delisting as the control sample are retrieved from Datastream. Via Datastream the daily close ask and the daily closed bid price of the companies' stocks are retrieved. The absolute bid-ask spread is calculated by subtracting the yearly median closed bid price from the yearly median closed ask price. This absolute bid-ask spread is than scaled by the average of the yearly median closed bid price and the yearly median closed ask price. For every company by using their SEDOL codes, it is determined via the Worldscope variable Emerging whether a company is from a country with a developing or an emerging stock market. This fact is used

for the variable Developing, that equal 1 when a firm is from a country with an emerging (developing) stock market and equal 0 when a firm is from a country with a developed stock market.

All the data needed to calculate the control variables used in this master thesis are retrieved with help of the Thomson One Banker excel add-in and the SEDOL codes of the companies' home stock markets. The variables retrieved via this add-in are Log(Size), ROA, MTB, LEV, log(Volume) and Free-float. The exact way these variables are retrieved and calculated are explained in table 1 in the appendix of this thesis.

5. Empirical results and analysis

In this section the empirical analysis on both the determinants of cross-delisting and on the three dependent variables (AnaCov, AnaAcc and Bid-Ask) to test H1 and H2 will be performed. First, the number of observations of the dependent variables and the way how I will account for outliers will be discussed. Second, I will discuss the descriptive statistics of the variables that are used in this master thesis. After that, the empirical analysis on the possible determinants of cross-delisting is performed. As last, Hypothesis 1 and Hypothesis 2 are tested by performing regression on all the three dependent variables used to test these hypotheses. Also, a robustness test is performed to check for an alternative classification of the cross-delisting year.

5.1 Number of observations and outliers

For all the variables the maximum amount of company-year observations over the period of interest (event) was 1,360, the event period includes the year of delisting and both two years before and two year after the year of delisting. After merging the different variables and data in STATA, there remain 1,240 company-year observations for the dependent variable analyst coverage (AnaCov) over the event period. Of these 1,240 company-year observations 255 belong to firms from developing (emerging) countries. For some of the total companies of 272 in the delisting and control sample, there were no data on the number of estimates on I/B/E/S and therefore these companies have no company-year observation for analyst coverage (AnaCov). For the dependent variable analyst accuracy (AnaAcc) there were 940 company-year observations, that are less observation than for AnaCov. Of these 940 company-year observations 130 belong to firms from developing (emerging) countries. That there are less observations for AnaAcc is because of the fact that in some years the number of estimates were equal to zero for some companies what means that there was not

made an estimate for these particular companies and therefore the analyst forecast accuracy could not be calculated. At last, for the dependent variable bid-ask spread (Bid-Ask) there were retrieved 895 company-year observations. Of these 895 company-year observations 95 belong to firms from developing (emerging) countries. For some years there was no information about both the daily bid as the daily ask spread for particular companies, these numbers were not available by the Thomson One Banker excel-add that uses Datastream as source for both the daily end bid price as for the daily end ask price. The above means that some companies do not have observations for the whole event period of five years, but only for some year of the five year period. These Bid-Ask spread and analyst accuracy company-year observations were removed, because in this case I cannot observe the development of the Bid-Ask spread and the forecast accuracy for these particular companies over the whole five year period of interest.

Outliers in the variables used in the regression can have an enormous impact on the regressions performed. Therefore for all the control variables the outliers will be filtered by winsorizing the variables at the 1st and 99th percentiles of their distribution. Only the dependent variables analyst coverage (AnaCov), analyst accuracy (AnaAcc) and Bid-Ask are not winsorized because we want to keep the exact number of analysts that follow a company, and the exact analyst accuracy and Bid-Ask spread for all the companies over the event years. The dependent variable AnaCov is opposed to being winsorized transformed to a natural log variable, because this can also mitigate the use of outliers. The dependent variables Bid-Ask and Analyst Accuracy (AnaAcc) are not winsorized and not transformed to log variables, because these variables are already scaled. The Bid-Ask spread is scaled by the average of the yearly median ask and the yearly median bid price. And the Analyst Accuracy is scaled by the stock price at the end of the actual EPS announcement month. The control variables Volume, Size, Volatility, Free-Float will also be transformed to a natural log variable. This because despite the winsorizing there are still some outliers, less extreme than before the winsorizing, but these outliers can still have impact on the regression results. So it is still important to mitigate the use of these outliers in the regression model.

5.2 Descriptive statistics

Table 4, on the following pages, presents the descriptive statistics of the variables used in this study. The descriptive statistics are sorted in different categories, namely into all firms, cross-delisting firms, stay cross-listed firms, firms from developing countries and firms from developed countries. These different categories of firms are important in this study to

Table 4

Descriptive Statistics for 272 Delisting and stay Cross-listed firms over a five year event period[1,2]

Panel A: Dependent Variables[3]

Variable	Reporting	Number[4]	Mean	Median	Std Dev
Analyst Coverage	All Firms	1240	13.35	12	11.21
	If Cross-delisting = 1	600	11.74	10	10.41
	If Cross-delisting = 0	660	14.85	13	11.72
	If Developing = 1	255	6.21	2	10.27
	If Developing = 0	985	13.34	12	11.21
Analyst Accuracy	All Firms	940	-0.0188	-0.0042	0.0570
	If Cross-delisting = 1	410	-0.0261	-0.0060	0.0778
	If Cross-delisting = 0	530	-0.0131	-0.0031	0.0318
	If Developing = 1	130	-0.0147	-0.0059	0.0263
	If Developing = 0	810	-0.0194	-0.0039	0.0605
Bid-Ask spread	All Firms	895	0.0032	0.0011	0.0067
	If Cross-delisting = 1	450	0.0041	0.0014	0.0074
	If Cross-delisting = 0	445	0.0023	0.0008	0.0058
	If Developing = 1	95	0.0036	0.0018	0.0071
	If Developing = 0	800	0.0031	0.0010	0.0067

Panel B: Control Variables (Firm Characteristics)[5]

Variable	Reporting	Number	Mean	Median	Std Dev
Size	All Firms	1284	21291	7185	31367
	If Cross-delisting = 1	628	11602	3585	18625
	If Cross-delisting = 0	656	30567	14422	37669
	If Developing = 1	279	5761	1828	8328
	If Developing = 0	1005	25602	10239	33948
LEV	All Firms	1299	30.65	27.55	25.73
	If Cross-delisting = 1	625	31.14	29.90	25.49
	If Cross-delisting = 0	674	30.19	25.97	25.96
	If Developing = 1	289	27.06	22.83	27.55
	If Developing = 0	1010	31.67	29.28	25.10
MTB	All Firms	1283	2.41	1.80	2.21
	If Cross-delisting = 1	622	2.06	1.52	2.24
	If Cross-delisting = 0	661	2.73	2.12	2.13
	If Developing = 1	280	2.01	1.54	1.80
	If Developing = 0	1003	2.52	1.88	2.30
ROA	All Firms	1290	1.98	4.40	14.85
	If Cross-delisting = 1	633	-0.51	3.43	16.79
	If Cross-delisting = 0	657	4.38	5.50	12.25
	If Developing = 1	284	3.78	5.05	12.08
	If Developing = 0	1006	1.48	4.23	15.51
(Trading)Volume	All Firms	1302	7.66	1.56	15.90
	If Cross-delisting = 1	642	4.61	1.04	9.12
	If Cross-delisting = 0	660	10.64	2.56	20.00
	If Developing = 1	285	5.53	0.54	11.99
	If Developing = 0	1017	8.26	2.064	16.79

Table 4 --- Continued

Variable	Reporting	Number	Mean	Median	Std Dev
Volatility	All Firms	1260	828.45	90.55	2384.54
	If Cross-delisting = 1	633	639.30	73.86	1819.09
	If Cross-delisting = 0	627	1019.41	113.65	3000.23
	If Developing = 1	273	795.21	57.80	2674.89
	If Developing = 0	987	837.65	103.09	2430.61
Free-Float	All Firms	1142	73.39	78.83	24.46
	If Cross-delisting = 1	554	69.02	72.70	23.96
	If Cross-delisting = 0	588	77.51	86.30	24.22
	If Developing = 1	219	57.54	54.34	24.67
	If Developing = 0	923	77.15	83.87	22.86

[1]The five year event period depends per firm on the date of delisting. The event period includes the year of delisting and two years before and two years after the year of delisting. These firms are delisting in the period of 2004 up and including 2012, therefore the whole test period includes the period 2002-2014.

[2] The mean, median and standard deviation (Std Dev) are based on the variables that are winsorized at the 1st and 99th percentiles of their distribution.

[3] Analyst Coverage is the number of analysts covering a firm i at year t. Analyst accuracy is the negative of the absolute value of the summary analyst forecast (EPS) accuracy of firm i at year t. Bid-Ask spread is the relative bid-ask spread for a firm i at year t.

[4] N stands for the number of company-year observations per variable.

[5] Size is the market capitalization of firm i at the end of year t in million dollars. LEV is the ratio of long-term debt to total assets of firm i at year t. MTB is calculated in the following way: Market Price-Year End / Book value Per Share for company i at the end of year t. ROA is calculated through: ((Net income before Preferred Dividends + Interest expense on Debt-Interest Capitalized)*(1-Tax Rate)) / Last Year's Total Assets *100% for company i at year t. Volume is the annual average of daily trading volume of firm i over year t. The trading Volume is given in thousand shares. Volatility Is the annual standard deviation of stock return, calculated by using the daily stock (investment) returns of firm i at year t. These returns are the daily 12-month return assuming dividends are reinvested. Free-Float is the annual percentage of shares that are not closely held for firm i at year t, Free float is calculated by: 100-((Number of closely held shares / Common shares outstanding) x 100%).

test this study's hypotheses. Panel A presents the descriptive statistics for the dependent variables used in this study, namely analyst coverage, analyst accuracy and the bid-ask spread. The dependent variables analyst coverage and analyst accuracy are used as proxies for the information environment of the firms. And the dependent variable bid-ask spread is used as a proxy for the information asymmetry between the firms and its outsiders (investors). When looking at means for the different categories of analyst coverage, there is a clear difference between the analyst following of cross-delisting firms (11.74) and stay cross-listed firms (14.85). There is also a clear difference in analyst coverage between firms from developing (emerging) markets and firms from developed markets, the mean of firms from developing markets is namely 6.21 opposed to the much higher mean (13.34) of firms from developed markets. The above differences in means between the different categories is in accordance with the expectation that the development level of the firms' home country and

the fact whether firms cross-delist have impact on the number of analysts that follow a particular firm.

When looking at the analyst forecast accuracy, the mean of firms that cross-delist is more negative than for firms that stay cross-listed. This indicates that the estimates of EPS made by analysts that follow cross-delisting firms in average is less accurate than the forecast accuracy of analysts that follow firms that stay cross-listed in the United States. This can be an indication that the expectation that cross-delisting by firms have a negative relation with the forecast accuracy of analysts is right. When looking at the difference in the mean of forecast accuracy between firms from developed and developing markets, there is not much difference between the forecast accuracy of EPS by analysts. The forecast accuracy for firms from developing countries is even slightly better.

The average bid-ask spread is slightly higher for firms that cross-delist from the United States exchanges, than for the firms that stay cross-listed on the U.S. exchanges. The mean of the bid-ask spread is for the cross-delisting firms namely 0.0041 and the mean of the bid-ask spread is for the stay cross-listed firms equal to 0.0023. This can be an indication that the expectation about the increase in the bid-ask spread of firms that cross-delist is right. The difference in the bid-ask spread between firms from developing markets and developed markets is negligible, with a mean of 0.0031 for firms from developed markets and a mean of 0.0036 for firms from developing markets. The question is whether there are enough bid-ask spread company-year observations for firms from developing markets. For firms from developing markets I have only 95 company-year observations, compared to the 790 company-year observations for firms from developed markets. The above gives an indication about what can be expected from the regression analysis, but these descriptive statistics can give only an indication. The regression analysis will be used to reject or accept this study's hypotheses.

Panel B in table 4 provides descriptive statistics for the controlling variables, company characteristics, used in this study. Out of these descriptive statistics it becomes clear that there is a difference between firms from developing and developed markets/countries. These differences confirm the importance of controlling for these variables in the regressions that will be executed. And that there is also a clear difference in the firm characteristics between firms that cross-delist and firms that stay cross-listed on the U.S. stock exchanges. Companies that cross-delist are in general smaller in size, have a lower MTB, have a lower ROA, have a higher leverage level, and a lower trading volume in shares. This is in

accordance with the fact that these variables are stipulated in the literature review as determinants of cross-delisting.

5.3 Determinants of Cross-delisting

Table 5 presents the results for the univariate analyzes and multivariate analysis of the possible determinants of the cross-delisting decision by firms. The univariate analyzes for all the possible determinants (Log(Size),LEV, MTB, ROA and Log(Volume)) have the expected sign. For the firms' size this means that the firms size is negatively related to the decision to cross-delist. The significant coefficient, at the 1% level, of -0.268 means that when the firm size increases, the probability that a firm will cross-delist will decrease. The coefficient of LEV is not significant in the univariate analysis, what means that long-term debt leverage level is not relevant for the cross-delisting decision of firms. The coefficient of the variable MTB (-0.242) is statistically significant at the 1% level, this means that when a firm has a higher Market-to-Book ratio the probability that a firm cross-delist will decrease. The coefficient of the variable ROA (-0.021) is statistically significant at the 5% level, means that when a firms has a higher Return on Assets the probability that a firm cross-delist will decrease. At last, the coefficient of the variable Log(Volume) (-0.185) is statistically significant at the 1% level, this means that when a firm has a higher trading volume in thousands of shares the probability of a firm to make the choice to cross-delist will decrease. Firms size has the highest pseudo R^2 with a value of 0.073, what means that firm size has the best predictive ability of these possible determinants. The pseudo R^2 of MTB and ROA is equal to 0.038 and the pseudo R^2 of the variable Volume is equal to 0.020. The variable LEV is not significant and therefore the pseudo R^2 is not of importance.

The coefficients of the possible determinants of the choice to cross-delist are also in the multivariate analysis all equal to the expected sign. In the multivariate analysis only the variable Log(Size), LEV and MTB are statistically significant. Log(Size) and MTB are significant at the 5% level, and the variable LEV is significant at the 10% level. In this case, when Log(Size) and MTB are higher the probability of a firms' choice to cross-delist is decreasing. And when the variable LEV is higher this means that the probability of a firm to cross-delist will increase. The pseudo R^2 is not very high with 0.080, what means that the predictive power of these variables on the decision to cross-delist from the U.S. exchanges is not very high. In conclusion, the variables ROA, MTB, Log(Size) and Log(Volume) are statistically significant in the univariate analysis and have an effect on the probability of a firm to cross-delist. And in the multivariate analysis only the variable Log(Size), MTB and

Table 5

Logit regression of possible determinants on Cross-delisting dummy[1]

Panel A: Univariate analyzes of determinants[2,3,4]					
Variable	Exp. Sign	Coefficient	Std. Error	z-statistic	p-value
Intercept		2.220	0.483	4.60*	0.000*
Log(Size)	-	-0.268	0.055	-4.83*	0.000*
Observations	*262*			*Pseudo R^2*	*0.073*
Intercept		-0.200	0.194	1.03	0.303
LEV	+	0.007	0.005	0.93	0.353
Observations	*262*			*Pseudo R^2*	*0.003*
Intercept		0.519	0.215	2.41**	0.016**
MTB	-	-0.242	0.072	-3.36*	0.001*
Observations	*257*			*Pseudo R^2*	*0.038*
Intercept		-0.000	0.126	-0.00	0.998
ROA	-	-0.021	0.008	-2.56**	0.011**
Observations	*262*			*Pseudo R^2*	*0.020*
Intercept		-0.007	0.127	-0.05	0.956
Log(Volume)	-	-0.185	0.051	-3.62*	0.000*
Observations	*263*			*Pseudo R^2*	*0.038*

Panel B: Multivariate analysis of determinants					
Variable	Exp. Sign	Coefficient	Std. Error	z-statistic	p-value
Intercept		1.706	0.729	2.34**	0.019**
Log(Size)	-	-0.208	0.095	-2.19**	0.028**
LEV	+	0.013	0.007	1.92***	0.055***
MTB	-	-0.160	0.075	-2.13**	0.033**
ROA	-	-0.001	0.011	-0.09	0.930
Log(Volume)	-	-0.047	0.077	-0.61	0.540
Observations	*242*			*Pseudo R^2*	0.080

[1]An univariate analysis is executed for each possible determinant of cross-delisting. These variables are Log(Size), LEV, MTB, ROA and Log(Volume).

[2] Size is the market capitalization of firm i at the end of year t in million dollars. LEV is the ratio of long-term debt to total assets of firm i at year t. MTB is calculated in the following way: Market Price-Year End / Book value Per Share for company i at the end of year t. ROA is calculated through: ((Net income before Preferred Dividends + Interest expense on Debt-Interest Capitalized)*(1-Tax Rate)) / Last Year's Total Assets *100% for company i at year t. Volume is the annual average of daily trading volume of firm i over year t. The trading Volume is given in thousand shares.

[3] *, **, *** Denotes significance at the 0.01, 0.05 and 0.10 significance levels, respectively, using z-statistics.

[4] Observations stands for the number of company observations per regression.

LEV have a statistically significant effect on the probability of a firm to cross-delist. The conclusion is that only the variables Log(Size) and MTB are in both the univariate and multivariate analysis statistically significant, and for these variables it can be concluded that they are determinants of the decision of a firm to cross-delist. For the other variables is not

explicitly clear that they are determinants of the decision to cross-delist.

5.4 Regression results to test H1 and H2

To test H1 and H2, three different regressions with three different dependent variables (AnaCov, AnaAcc and BidAsk) are performed and table 6 presents the results of these regressions. According to the regression on the analyst coverage in panel A, both the coefficient of the variable CrossDelisting*Post and the variable CrossDelisting* Post* Developing are not statistically significant. This means that there is no evidence that the cross-delisting of firms from the major U.S. stock exchanges will lead to less analysts following a firm, but also no evidence that cross-delisting of firms will lead to more analysts that follow a firm. Besides that, the insignificant coefficient of the variable CrossDelisting* Post*Developing indicates that there is not a greater negative or positive effect on the analyst following for firms from developing (emerging) that cross-delist in comparison to firms from developed countries that cross-delist. The only variables that are statistically significant are CrossDelisting, Log(Size) and Log(Volume) at the 1% level, and Post and CrossDelisting* Developing at the 5% level. The positive coefficient of the variable CrossDelisting (0.271) indicates that firms that CrossDelist have in general a higher analyst following over the whole five year event period than firms that stay Cross-listed on the major U.S. exchanges over the whole five year event period. This can only be a sign that firms that CrossDelist do not have less but in general even more analyst that follow a firm than firms that stay Cross-listed over the whole event period. Because this is over the whole event period we cannot make a conclusion about the effect that cross-delisting has on analyst following. The variable Post is also significant, but from this variable we cannot make any conclusions because this only indicates that for the event period year +1 and +2 the analyst coverage is higher for both the companies that cross-delist and the companies that stay cross-listed. The significant variable CrossDelisting*Developing only indicates that firms that are cross-delisting and are developing have in general over the whole event period have less analyst following their companies than the other companies included in the sample. Of the control variables only the coefficients of Log(Size) and Log(Volume) are statistically significant, and have the expected positive sign. This indicates that the bigger the company and the higher the trading volume of the shares of a company the higher the analyst coverage of a company will be.

According to the regression results on Analyst accuracy in panel B of table 6, the coefficient of CrossDelisting*Post (0.0142) is significant at the 10% level and the sign of this

Table 6

Results of Regressions to test H1 and H2 for a sample of 136 firms that cross-delist and 136 firms that stay cross-listed on three major U.S. exchanges (NYSE, AMEX and NASDAQ)

Panel A: Analyst Coverage[1,2,3]

$Log(AnaCov_{i,t}) = \alpha_0 + \alpha_1 CrossDelisting + \alpha_2 Post + \alpha_3 Developing + \alpha_4 CrossDelisting*Post + \alpha_5 Post* Developing + \alpha_6 CrossDelisting*Developing + \alpha_7 CrossDelisting*Developing*Post + \alpha_8 Log(Size_{i,t}) + \alpha_9 ROA_{i,t} + \alpha_{10} Log(Volume_{i,t}) + \alpha_{11} MTB_{i,t} + \alpha_{12} Log(Volatility_{i,t}) + \epsilon_{i,t}$

Variable	Coefficient	Std. Error	t-statistics	p-value
Intercept	-0.301	0.131	-2.34**	0.019**
CrossDelisting	0.271	0.060	4.49*	0.000*
Post	0.131	0.066	1.97**	0.049**
Developing	-0.609	0.089	-6.86*	0.000*
Cross-Delisting* Post	-0.138	0.093	-1.49	0.137
Post*Developing	-0.054	0.140	-0.39	0.699
CrossDelisting* Developing	-0.296	0.128	-2.32**	0.021**
CrossDelisting*Developing* Post	-0.040	0.207	-0.19	0.847
Log(Size)	0.303	0.015	20.71*	0.000*
ROA	-0.002	0.002	-1.03	0.590
Log(Volume)	0.050	0.011	4.51*	0.000*
MTB	-0.005	0.010	-0.54	0.590
Log(Volatility)	-0.008	0011	-0.70	0.484

Observations *1,067* *Adjusted* R^2 *0.623*

Panel B: Analyst Accuracy[1,2,3]

$AnaAcc_{i,t} = \alpha_0 + \alpha_1 CrossDelisting + \alpha_2 Post + \alpha_3 Developing + \alpha_4 CrossDelisting*Post + \alpha_5 Post* Developing + \alpha_6 CrossDelisting*Developing + \alpha_7 CrossDelisting*Developing*Post + \alpha_8 Log(Size_{i,t}) + \alpha_9 ROA_{i,t} + \alpha_{10} Log(Volume_{i,t}) + \alpha_{11} MTB_{i,t} + \alpha_{12} Log(Volatility_{i,t}) + \epsilon_{i,t}$

Variable	Coefficient	Std. Error	t-statistics	p-value
Intercept	-0.0822	0.014	-5.91*	0.000*
CrossDelisting	-0.0146	0.005	-2.66*	0.008*
Post	-0.0009	0.006	-0.17	0.868
Developing	0.0016	0.008	0.18	0.854
Cross-Delisting* Post	0.0142	0.008	1.71***	0.088***
Post*Developing	-0.0053	0.013	-0.40	0.691
CrossDelisting* Developing	0.0243	0..017	1.45	0.147
CrossDelisting*Developing* Post	-0.0194	0.026	-0.74	0.461
Log(Size)	0.0057	0.001	3.83*	0.000*
ROA	-0.0009	0.000	4.65*	0.000*
Log(Volume)	-0.0030	0.001	-2.56**	0.011**
MTB	0.0023	0.001	2.52**	0.012**
Log(Volatility)	0.0013	0.001	1.34	0.179

Observations *865* *Adjusted* R^2 *0.089*

Table 6 --- Continued

Panel B: Bid-Ask spread[1,2,3]

$Bid\text{-}Ask_{i,t} = \alpha_0 + \alpha_1 CrossDelisting + \alpha_2 Post + \alpha_3 Developing + \alpha_4 CrossDelisting*Post + \alpha_5 Post* Developing + \alpha_6 CrossDelisting*Developing + \alpha_7 CrossDelisting*Developing*Post + \alpha_8 Log(Size_{i,t}) + \alpha_9 Log(Volume_{i,t}) + \alpha_{10} Log(Volatility_{i,t}) + \alpha_{11} Log(Free\text{-}Float_{i,t}) + \epsilon_{i,t}$

Variable	Coefficient	Std. Error	t-statistics	p-value
Intercept	-0.0275	0.002	12.65*	0.000*
CrossDelisting	-0.0011	0.001	-2.14**	0.033**
Post	0.0013	0.001	2.22**	0.027**
Developing	-0.0027	0.001	-2.52*	0.012**
Cross-Delisting* Post	-0.0015	0.001	-1.86***	0.064***
Post*Developing	-0.0011	0.002	-0.65	0.515
CrossDelisting* Developing	0.0073	0.002	3.85*	0.000*
CrossDelisting*Developing* Post	-0.0061	0.003	-2.21**	0.027**
Log(Size)	-0.0020	0.000	-15.70*	0.000*
Log(Volume)	-0.0004	0.000	-3.10*	0.002*
Log(Volatility)	0.0000	0.000	0.14	0.887
Log(Free-Float)	-0.0013	0.002	-3.02*	0.003*
Observations 753			*Adjusted* R^2	0.447

[1] Analyst Coverage is the number of analysts covering a firm i at year t. Analyst accuracy is the negative of the absolute value of the summary analyst forecast (EPS) accuracy of firm i at year t. Bid-Ask spread is the relative bid-ask spread for a firm i at year t. Size is the market capitalization of firm i at the end of year t in million dollars. MTB is calculated in the following way: Market Price-Year End / Book value Per Share for company i at the end of year t. ROA is calculated through: ((Net income before Preferred Dividends + Interest expense on Debt-Interest Capitalized)*(1-Tax Rate)) / Last Year's Total Assets *100% for company i at year t. Volume is the annual average of daily trading volume of firm i over year t. The trading Volume is given in thousand shares. Volatility Is the annual standard deviation of stock return, calculated by using the daily stock (investment) returns of firm i at year t. These returns are the daily 12-month return assuming dividends are reinvested. Free-Float is the annual percentage of shares that are not closely held for firm i at year t, Free float is calculated by: 100-((Number of closely held shares / Common shares outstanding) x 100%).

[2] *, **, *** Denotes significance at the 0.01, 0.05 and 0.10 significance levels, respectively, using t-statistics.

[3] Observations stands for the number of company-year observations per regression.

coefficient is positive. This indicates that the analyst accuracy will increase for firms that cross-delist from major U.S. exchanges over the two years period after the cross-delisting. This is in opposite to the expectation that the analyst accuracy will decrease after a firm cross-delist. This result can have a relation with the unclear relation between firms that cross-delist and the analysts that follow a firm from the regression performed in panel A. Because the forecasts accuracy of analyst have a high correlation with the number of analysts that follow a firm, it can be the case that for some firms that cross-delist the number of analysts will increase and therefore the accuracy of the analysts' estimates. The accuracy of analysts

can increase after a firm cross-delist, because after cross-delisting there is a higher incentive for analysts to collect private information. Finding private information can be more attractive to analysts after cross-delisting of a firm, when less information is mandatorily disclosed by firms because of these firms are no longer subject to higher standards that are associated with cross-listing on major U.S. exchanges. The coefficient of the variable CrossDelisting*Post* Developing is not statistically significant, so there is no evidence that the effect of cross-delisting on the forecast accuracy is different for firms from developing (emerging) markets than for firms from developed markets. The adjusted R-squared of this regression is equal to 0.089 what means that the variables included in this regression explain around 8.9% of the change in analyst accuracy. Therefore, the predictive ability is not very high of this regression and therefore the results must be interpreted with more caution than when the adjusted R-squared was higher.

The coefficient of variable CrossDelisting is negative and significant at the 1% level, this only indicates that over the whole event period the firms that cross-delist have lower analyst accuracy than firms that stay cross-listed. Because this is over the whole event period, this give no evidence about the effect of cross-delisting on the analysts forecast accuracy. When looking at the control variables, almost all the variables are significant except for the variable Log(Volatiliy). The control variables Log(Size) an ROA are significant at the 1% level, and the control variables Log(Volume) and MTB are significant at the 5% level. The coefficients of variables Log(Size) and MTB are positive, what indicates that a firm with a higher MTB and that is bigger in size the forecast accuracy of analysts will be better. The coefficients of variables ROA and Log(Volume) are negative, what indicates that for firms with a higher ROA and a higher trading volume in shares the forecast of analyst will be less accurate. That firms with a higher ROA and trading volume have less accurate forecasts of analyst is against the expectation. The control variable Log(Volatility) is statistically insignificant.

As last, in panel C the regression on the Bid-Ask spread is performed. As opposed to the expectation both the coefficient of the variable CrossDelisting*Post and the coefficient of the variable CrossDelisting*Post*Developing are negative. The expectation was that for firms that cross-delist the information asymmetry will increase and therefore the bid-ask spread of these companies' stocks will increase. And for firms from developing countries the expectation was that this positive effect on the bid-ask spread would be even greater. When looking at the results of the regression performed, the coefficient of CrossDelisting*Post was negative (-0.0015) and statistically significant at the 10% level. This indicates that when

firms cross-delist the information asymmetry will not increase, but decrease. This effect can be caused by the fact that when firms cross-delist from the U.S. exchanges, they do not want to change their disclosure policies and even see some room to disclose more information voluntarily. So, when firms decide to disclose the same or even more information after they cross-delist there could be no or a negative effect on the bid-ask spread. Also, the coefficient of CrossDelisting*Post* Developing was negative and significant at the 5% level. This indicates that the negative effect of cross-delisting on the bid-ask spread is even greater for firms from developing (emerging) markets. The explanation for this can be that these companies have even a greater incentive to not change their disclosure policies and even disclose more information voluntarily. Besides that, the possible incentive for analysts to collect private information after a firm cross-delist can also have a negative effect on the bid-ask spread, by decreasing the information asymmetry between the management of the firms and its outsiders (investors).

The coefficients of the variables CrossDelisting and Post are significant at the 5% level. The coefficient of CrossDelisting is negative, what indicates that firms that cross-delist have over the whole event period a lower bid-ask spread. This says nothing about the effect of cross-delisting on the bid-ask spread of companies. The variable Post is positive and significant, but this variable does not say much about the effect of cross-delisting. The coefficient of variable Developing is negative and significant at the 5% level, what indicates that firms from developing countries have in general lower bid-ask spread in comparison to firms from developed countries. All these variables say nothing useful about the effect of cross-delisting on the bid-ask spread. The control variables Log(Size), Log(Volume) and Log(Free-Float) are negative and significant at the 1% level. This is in accordance with the expectation that bigger firms, firms with more trading volume in shares and higher Free-Float have a negative effect on the bid-ask spread. The control variable Log(Volatility) is insignificant.

The results of the regressions in table 6, indicate that the alternative hypotheses cannot be accepted. This because, the results for CrossDelisting*Post and CrossDelisting*Post* Developing are statistically insignificant for the dependent variable AnaCov what indicates that nothing can be said about the effect of cross-delisting on the analyst coverage. So, also not about the ‘extra’ effect of cross-delisting on analyst coverage for firms from developing markets. Besides that, the variable CrossDelisting*Post is significant for the dependent variable AnaAcc, but the coefficient has not the sign that was expected beforehand. This means that this result is in opposite to alternative hypothesis 1. Also, the coefficient of the

variable CrossDelisting*Post*Developing is not statistically significant what means that there is not found a 'extra' effect of cross-delisting on the analyst accuracy for firms from developing countries. As last, the CrossDelisting*Post and CrossDelisting*Post*Developing are significant in the regression on bid-ask spread, but also not in the direction that was expected beforehand. This means that there was not found a positive effect on the bid-ask spread of the decision by firms to cross-delist. And, therefore also no extra positive effect on the bid-ask spread for firms from developing countries that cross-delist. In conclusion, on basis of the results of the regressions in table 6 both alternative Hypothesis 1 and alternative Hypothesis 2 cannot be accepted. The alternative hypothesis 1 cannot be accepted because the cross-delisting of firms from the major U.S. exchanges will not lead to less analysts following, less accuracy in the analysts' activity and a higher bid-ask spread. The alternative hypothesis 2 cannot be accepted because the negative effect on analysts' following and on analysts' accuracy and the positive effect on the bid-ask spread will not be greater for firms from developing countries that cross-delist compared to firms from developed countries. This indicates that the information environment (Analyst coverage and Analyst accuracy) is not worsened after the firms cross-delist and the information asymmetry (Bid-Ask spread) between the management of the firms and firms' outsiders (investors) has not increased after the firms cross-delist.

I also perform a robustness check by changing the Post variable by shifting the cross-delisting year to the period after the delisting. This means that when the Post dummy is equal to 1, this includes the year of delisting and the two year after the cross-delisting. And the Post dummy is equal to 0, the two years before the delisting year. This robustness check will be performed, because the cross-delisting can happen at every date during a year and therefore it is not clear whether the cross-delisting must be included in the period before or after the cross-delisting in the Post dummy. The results of the regressions based on the changed Post dummy variable are not included in this master thesis, but I have performed this regression analysis. The coefficient of the variables CrossDelisting*Post and CrossDelisting*Post* Developing still remain insignificant for the dependent variable Analyst coverage (AnaCov). The regression performed on AnaAcc has some different results in comparison to the results in table 6, because both the CrossDelisting* Post and CrossDelisting*Post*Developing are insignificant. The coefficient of the variable CrossDelisting*Post was significant and positive in the regression performed on AnaAcc in table 6. As opposed to the results of the regression on Bid-Ask, the coefficient of variable CrossDelisting*Post is not significant anymore. The coefficient of the variable CrossDelisting*Post*Developing is also as the regression

performed in table 6 significant (1% significance level) and has also a negative sign. The results of this robustness check, do not change the result dramatically. Therefore, the alternative hypotheses that are tested in this study, are still not accepted in case of the regressions performed in the robustness check.

6. Conclusions

The purpose of this master thesis is to test the effect of cross-delisting on a firms' information environment and on the information asymmetry between a firms' management and its outsiders (investors). In particular, the difference between firms from developing and developed countries (markets) on the effect of cross-delisting on a firms' information environment and the information asymmetry was investigated. So, the research question of this master thesis is whether the effect of cross-delisting on the information environment and information asymmetry is significantly different for firms from developing (emerging) countries compared to firms from developed countries. The information environment of firms is measured by using two proxies, namely the analyst coverage and analyst accuracy. And the information asymmetry has been measured by using the bid-ask spread of a companies' stock. The expectation of the first alternative hypothesis is that the cross-delisting of firms from the major U.S. stock exchanges (NYSE, AMEX and NASDAQ) will lead to less analyst following, less accuracy in the analysts' activity and a higher bid-ask spread. Besides that, to test the possible 'extra' effect of cross-delisting for firms from developing countries the second alternative hypothesis is that for these firms the negative effect on the analyst following and the analysts' accuracy and the positive effect on the bid-ask spread will be greater than for firms from developed countries.

By using panel data over a five year event period of 136 firms that cross-delisted from U.S. exchanges and of 136 firms that stay cross-listed on these exchanges, I test whether the two alternative hypotheses can be accepted. The cross-delisted firms in the sample did cross-delist from the U.S. exchanges in the period 2004-2012. Because, the event period includes five year the whole test period of this study includes the period 2002-2014. For the dependent variable Analyst Coverage I didn't find a significant relation between the cross-delisting of firms and the number of analysts that follow a firm. Therefore, it is not clear whether the cross-delisting by firms will lead to more or to less analyst that follow a firm. There was also no 'extra' effect for firms from developing countries that cross-delist on the analyst coverage. The results of the regression on analyst accuracy did provide a significant relation at the 10%

level between the cross-delisting of firms and the accuracy of the estimates of analysts. This is a positive relation, what is against the expectation beforehand. So, this means that the cross-delisting by firms from the U.S. exchanges will lead to an increase in the forecast accuracy. This can be due to the fact that firms only cross-delist because of the high costs that are associated with cross-listing in the U.S., and want to keep the information disclosure level at the same or even a higher level than when they were cross-listing on the US exchanges. In this case there was also not found a significant 'extra' effect for firms from developing countries that cross-delist. The last regression was performed on the dependent variable Bid-Ask spread, this results in a negative significant relation between cross-delisting of firms and the bid-ask spread. This means that opposed to the expectation beforehand, that the cross-delisting of firms led to a lower bid-ask spread. This can be due to the fact that the information asymmetry may not be worsened after the cross-delisting, because firms have still the incentive to maintain the high disclosure standard that was mandatory under the listing requirements of the U.S. exchanges. Besides that, there was also found a negative significant coefficient for the 'extra' effect for firms form developing countries compared to firms from developed countries. This is also against the expectation before the regression was performed, this can be due to the fact that firms from developing countries that cross-delist have even more incentives to not led the information asymmetry increase. And these firms from developing markets maybe have even more incentives to lower the information asymmetry between the firm and its outsiders (investors) after the cross-delisting than firms from developed markets.

Another possible reason, for these results found is that the less than expected effectiveness of cross-listing in the United States what can lead to less corporate governance advantages of cross-listing than expected. This can lead to the situation wherein the actual benefits of cross-listing are lower than the costs of cross-listing, so the lower than expected benefits can lead to the decision by firms to cross-delist. It can also be the case that firms that cross-delist know in advance that the consequences of their cross-delisting will be limited and this situation can lead to findings that are not as expected beforehand. When looking at the determinants of cross-delisting it can be the case that especially firms that are smaller and that have lower growth opportunities left (MTB-ratio) know that the consequences of their cross-delisting will be limited. These determinants are namely found to be significant determinants of the firms that cross-delist in this study.

In conclusion, these results means that both alternative hypotheses cannot be accepted. This means that only the effect of cross-delisting on the information asymmetry is

different for firms from developing (emerging) countries compared to firms from developed countries. Although, this effect is different from the expected effect. Besides that, in general cross-delisting has a positive effect on the information environment through the increase in the accuracy of the analysts' estimates and has a negative effect on the information asymmetry (Bid-Ask spread). This means that the cross-delisting by firms can even, as opposed to the expectation, have a positive effect on the firms' information environment and can lower the information asymmetry between the firm and its outsiders.

These results contribute to the existing body of knowledge about cross-(de)listing, because this is one of the first studies that investigate the effect of cross-delisting on the information environment and information asymmetry. Besides that, this is one of the first studies that investigates the differential effect of cross-delisting for firms from developing countries compared to firms from developed countries. These findings contribute to the existing knowledge, that the cross-delisting of firms from relatively high regulated markets like the United States do not have to lead to a worse information environment and higher information asymmetry for the firms that cross-delist. Besides that, it is especially not clear that firms from developing countries that cross-delist from these U.S. stock markets will have a huge negative effect on their information environment and that the information asymmetry between these developing firms and its outsider will increase enormously. This can be a lesson for the management of firms that cross-delisting is maybe not a decision that per definition will harm their companies' information environment. Cross-delisting from high regulated stock markets can even be a chance to get rid of the high costs associated with the cross-listing in the U.S., that not per se have to lead to a worse information environment for their investors. This also can be a signal to regulator of stock markets that their markets are maybe not that efficient to improve the information environment of firms as thought before by for example Leuz, Triantis & Wang (2008).

A limitation of this research is the far from equal distribution between firms from developing countries and developed countries, only 30 of the 136 companies that cross-delist are from developing countries. And especially, for the regression on the bid-ask spread this is an important issue because only 95 company-year observations for firms from developing countries are available. This means that for both the cross-delisting firms as for the firms in the control sample there are only 95 company-year observations, what is equal to around 19 firms. This means that these results on the 'extra' effect of cross-delisting for firms from developing countries (markets) must be interpreted with caution. Another limitation is the fact that the cross-delisting firms are not filtered on industry characteristics. It can be possible

that for firms from some industries the effects of cross-delisting are completely different than for firms from other industries. This means that the results of this master thesis could be different when the industry the firm belongs to is taken into account. Also, the effect of the implementation of the Exchange Act Rule 12h-6 in 2007 is not taken into account in this research. In 2007 by far the most countries are cross-delisting from the NYSE, AMEX or NASDAQ and maybe these firms have other characteristics than the average firm that cross-delist in other years. So, maybe the effect of cross-delisting for the firms that cross-delist in 2007 because of this new rule is different than for the other firms that cross-delist.

Further research can take into account the industry characteristics of the firms that cross-delist and look per industry what is the effect of cross-delisting on the information environment and information asymmetry. Besides that, an interesting avenue for further research is whether the same results will also be found for firms that cross-delist from other exchanges than exchanges out of the United States. Are for example the results the same for firms that cross-delist from the London Stock Exchange or the Tokyo Stock Exchange or are the results for firms that cross-delist from these exchanges completely different. Besides that, there can also be done research on the effect of cross-delisting on the information environment for firms that cross-delist from less regulated exchanges. An example of such an exchange for instance is the Alternative Investment Market (AIM) in London. As last, it can be interesting to take other time periods and check whether the results are comparable to the time period used in this study (2004-2012).

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Appendix:

Table 1: Variable Definitions

Variables	Definition and Source
Analyst following	Log (1+number of analysts), is the natural logarithm of the number of analysts covering a firm i at year t (Chan & Hameed, 2006). Number of estimates per firm retrieved from I/B/E/S.
Forecast (analyst) accuracy	Is the negative of the absolute value of the summary analyst forecast accuracy of firm i at year t. Retrieved from I/B/E/S. Close stock price at the end of the month is retrieved from Datastream (DS.PriceClose). Both EPS estimates and actuals as the close stock price are measured in local currency.
Bid-Ask spread	Is the relative bid-ask spread for a firm i at year t, calculated by dividing the yearly median of the absolute daily bid-ask spread by the average of the yearly median bid and yearly median ask price. Retrieved from Datastream (DS.BidPrice;DS.AskPrice). This calculation follows the methodology of Erkens (2016).
Cross-delisting	A dummy variable equal to 1 for firms that cross-delist, and 0 otherwise. Retrieved from CRSP.
Post	A dummy variable equal to 1 in the period after cross-delisting (year $0<t\leq2$), and 0 (year $-2\leq t\leq0$) otherwise.
Developing	A dummy variable equal to 1 if the firm that cross-(de)list is a firm from a developing (emerging) country and 0 otherwise.
Log(Size)	The natural logarithm of the market capitalization of firm i at the end of year t in million dollars. Retrieved from Worldscope (#07210) in US dollars ($), and calculated by: Market Price-Year End * Common shares outstanding.
ROA	The Return on Assets (ROA) retrieved from Worldscope (#08326) is: ((Net income before Preferred Dividends + Interest expense on Debt-Interest Capitalized)*(1-Tax Rate)) / Last Year's Total Assets *100% for company i at year t.
MTB	The MTB-ratio (or price to book ratio) retrieved from Worldscope (#09304/#09307): Market Price-Year End / Book value Per Share for company i at the end of year t.
LEV	Ratio of long-term debt to total assets of firm i at year t, retrieved by Worldscope (#03245). Calculated by: Long Term Debt/Total Capital * 100%.
Log(Volume)	Is the natural logarithm of the annual average of daily trading volume of firm i over year t. The average of daily trading volume is calculated by Thomson One Banker Analytics by using Datastream items (UVO, VO). Of these daily averages I will calculated an annual average. The trading volume is in thousand shares.
Log(Volatility)	Is the natural logartihm of the annual standard deviation of stock return, calculated by using the daily stock (investment) returns of firm i at year t. Daily stock (investment) returns are retrieved from Datastream (DS.ReturnIndex). These returns are the daily 12-month return assuming dividends are reinvested.
Log(Free-Float)	Is the natural logarithm of the annual percentage of shares that are not closely held for firm i at year t, Free float is calculated by: 100-((Number of closely held shares / Common shares outstanding) x 100%). The percentage of shares that are closely held is retrieved from Worldscope (#08021).

Table 2: Sample Selection Process

Selection Procedure for Sample of Cross-delisted companies over the period 2004-2012

Selection Criteria	*Observations*
Step 1: All the delisting data from CRSP	4,351
Less: Companies without share codes 12, 30 or 31	(3,797)
Step 2: Foreign companies with share codes 12, 30 or 31	554
Less: Companies without delisting code used in this study [1]	(258)
Step 3: Foreign companies with the appropriate delisting codes used in this study[1]	296
Less: Companies excluded because of noisy delisting codes[2]	160
Step 4: Sample after controlling for noisy delisting codes	136

[1] Delisting codes used in this study are al codes from (500-599), except 501, 502, 503, 505, 510, 513, 516, 517 572, 574 and 575.

[2] The noisy CRSP delisting codes are checked on Worldscope, so whether the delistings of firms were not because of acquisition, liquidation or merger. Also was checked whether the delisting firms are again listed on the NASDAQ, NYSE or AMEX after their delisting, went private or there securities after the delisting are only traded on the OTC market.

Table 3

Cross-(de)listing firms per country and divided in firms from developing and developed countries/markets over the period 2004-2012

Countries/Markets	*Voluntary Delists*	*Involuntary Delists*	*Total Delists*	*Cross-listing control sample*[1]
Panel A: Developed Countries/Markets				
Australia	7	2	9	4
Austria	1	-	1	-
Canada	9	7	16	25
Denmark	-	1	1	1
Finland	3	-	3	1
France	12	2	14	7
Germany	10	-	10	3
Hong Kong	4	-	4	4
Ireland	1	-	1	3
Italy	1	-	1	4
Japan	5	5	10	11
Luxembourg	1	2	3	2
Netherlands	8	1	9	7
Norway	3	-	3	1
Singapore	3	-	3	1
Spain	2	1	3	3
Sweden	3	-	3	2
Switzerland	1	-	1	6
United Kingdom	9	2	11	21
Developed markets	83	23	106	106
Panel B: Emerging Countries/Markets				
Chile	4	1	5	5
China	-	-	-	2
Greece	1	-	1	-
Hungary	1	-	1	-
India	2	-	2	2
Israel	5	4	9	9
Korea (South)	1	2	3	4
Mexico	1	2	3	3
Russian Federation	1	-	1	-
South Africa	2	1	3	3
Taiwan	1	-	1	2
Thailand	1	-	1	-
Emerging markets	20	10	30	30

Panel C: Delistings per year			
2004	2	1	3
2005	5	4	9
2006	7	1	8
2007	48	3	51
2008	11	5	16
2009	15	6	21
2010	9	2	11
2011	3	5	8
2012	3	6	9
Total	103	33	136

[1] The cross-listing control sample is matched with the cross-delisting sample per firm and for every cross-delisting firm, as long as it is possible, a firm that stays cross-listed over the period 2002-2014 is selected from the same country. This means that for example in the case of Australia, eight companies are cross-delisted in the sample, but only four Australian companies have stayed cross-listed over the whole test period (2002-2014) so it is not possible to match the cross-delisted firms from Australia completely with stay cross-listed firms from Australia. In that case, the remaining four cross-delisting companies are matched with firms from other countries, these countries come from the same category (developed or developing countries/markets) as the cross-delisting firms from Australia.