Universidade do Minho
Escola de Economia e Gestão

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Effects of cross-listing on corporate cash holdings: evidence from US cross-listings

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Effects of cross-listing on corporate cash holdings: evidence from US cross-listings

Abstract

The impact of the decision to cross-list in the US on corporate cash holdings is a subject that has not deserved much attention by researchers. In this study, I analyse the changes in cash holdings post-cross-listing. Using a sample of 1954 American Depositary Receipts (ADRs) issued between 2000 and 2015 in the US by firms from 40 countries I obtain results that allow me to conclude that cash holdings increase after cross-listing for ADRs issued in a stock exchange. This result supports the bonding hypothesis, one of the theories that explains why firms decide to cross-list, which says that foreign firms are willing to adhere to strict legal and financial regulations in the US in order to benefit from higher visibility, a better financial and legal environment and improved market conditions in general. Since exchange-traded ADRs have stricter regulations in order to be issued, my results suggest that firms are indeed willing to commit to tighter rules so they can benefit from the access to the US market. In addition to this, I test if the effects of cross-listing are more noticeable in firms that come from countries with lower standards of corporate governance and development than the US, measured by investor protection, accounting standards, legal system and economic development. My results support the literature in this matter, since I find that firms that come from countries with worse conditions than the US benefit more from cross-listing, in particular in terms of cash holdings, the object of my study.

Keywords: cross-listing, cash holdings, bonding hypothesis, investor protection, American depositary receipts

Efeitos de cross-listing nas reservas de caixa das empresas: evidências de cross-listing nos EUA

Resumo

O impacto nas reservas de caixa da decisão das empresas de se listarem nos Estados Unidos da América é um tópico que até ao momento não mereceu grande atenção por parte dos investigadores. Neste estudo eu analiso as mudanças ocorridas em caixa e equivalentes após o cross-listing. Recorrendo a uma amostra de 1954 American Depositary Receipts (ADRs) emitidos entre 2000 e 2015 nos EUA por empresas de 40 países diferentes, eu obtenho resultados que me permitem concluir que as reservas de caixa aumentam após o cross-listing para empresas que emitiram ADRs numa das bolsas de valores americanas. Este resultado apoia a bonding hypothesis (hipótese de vinculação), uma das teorias que explica a decisão das empresas em se listarem nos EUA, e que postula que as empresas estrangeiras estão dispostas a aderir a exigentes regulamentos legais e financeiros de forma a poderem beneficiar de maior visibilidade, de um melhor ambiente económico, financeiro e legal e mais vantajosas condições de mercado no geral. Tendo em conta que os ADRs emitidos em bolsas de valores possuem regulamentações mais rigorosas, os meus resultados sugerem que as empresas estão efetivamente dispostas a comprometer-se com regras mais austeras de modo a beneficiar do acesso ao mercado dos EUA. Para além disto, eu testo se os efeitos do cross-listing são mais notórios em empresas que provêm de países com piores padrões de administração empresarial e desenvolvimento que os EUA, aspetos medidos através da proteção de investidores, padrões contabilísticos, sistema legal e desenvolvimento económico. Os meus resultados comprovam a literatura neste tema, uma vez que eu constato que empresas originárias de países com condições de mercado piores que os EUA beneficiam mais do cross-listing, em particular em termos de reservas de caixa, o objeto do meu estudo.

Palavras-chave: cross-listing, reservas de caixa, bonding hypothesis, proteção de investidores, American depositary receipts

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1. Introduction

The level of cash held by firms is a subject that can be widely analysed, as there are several different sources that may influence the amount of money detained by corporations. The objectives of this research are, therefore, to find if there is a relation between cross-listing and the level of cash holdings of firms, by studying the patterns that arise when firms cross-list in the US. Also, it is relevant to analyse if those differences are a consequence of the better conditions provided by the US in comparison with the home country of the firms being studied.

This is a study that has been previously done, namely by Huang, Elkinawy and Jain (2013), which is considered by the authors to be the first of its kind. In this paper the authors find evidence that proves that by bonding with US regulations, firms increase their cash holdings as a result of the higher valuation of their liquid assets. Additionally, the authors prove that firms from emerging economies face larger increases in cash, therefore benefiting more with the decision to cross-list than firms from developed markets. The same result is found when testing the impact of firms that come from countries with weaker investor protection and accounting standards.

Many other authors contributed with theories to explain the decision to cross-list in the US, in which the bonding hypothesis appears among the most relevant ones. This theory, proposed by Coffee (1999, 2002) and Stulz (1999), and then supported by Reese and Weisbach (2002), states that firms are willing to commit to US tight regulations and standards in order to be able to have access to their market in a more inclusive way.

In my study, I follow the empirical work of Huang et al. (2013) and find similar results. These results, however, are considered to be the opposite to what the theoretical literature would normally predict, since by cross-listing in a more developed market it would be expected that firms would decrease their cash holdings, reflecting a relaxation of their financial constraints. However, this is not what the empirical results show. In my research I show that the decision to cross-list in the US causes an increase of cash holdings, since the US is one of the markets that offers better conditions to its stakeholders and provides a new source for firms to raise capital when they need. In this particular subject, I find that this effect happens with firms that issued Level II or III ADRs specifically. However, I find no evidence that supports that the same happens to all firms that cross-list in the US.

Moreover, I also aim to analyse whether the gap in country-level governance standards and economic development between the domestic countries of the cross-listed firms and the US affects the level of corporate cash holdings of those firms. The result suggests that firms coming from less

developed countries and countries with weaker shareholder protection tend to hold more cash than their peers from better-governed countries. My study lends support to the bonding hypothesis, as I find that firms that come from countries with weaker institutions relatively to the US benefit more from cross-listing. This effect is visible through an increase in cash holdings, while as for the firms from countries with better institutions the impact is not significant and, therefore, it can be concluded that for them it is not an improvement in standards of corporate governance or development that drives them to cross-list.

The remainder of this study is organised as follows: Section 2 reviews the related literature and foundations for the construction of my hypotheses. Section 3 presents the hypotheses and the methodology used to test them. Section 4 describes the construction of my sample and some characteristics of the general data. Section 5 explains the empirical results obtained from my research, while Section 6 concludes the study with the most important remarks.

2. Literature review

The theory that firms cross-listing in a market that offers higher investor protection and lower agency costs, facilitates capital raising activities and reduces the need to accumulate excessive cash was first tested and proved by Huang et al. (2013), as until that point it had not been proven that this relation was true.

2.1 Motives and characteristics of cross-listing

Globalization is an ever-growing phenomenon. It was responsible for firms starting to look beyond their national borders for better market conditions, lower costs of capital, better investment opportunities and new investors for the company. Cross-listing appeared as an instrument of globalization for firms. Stulz (1999) studies the impact of globalization on the cost of equity capital. One of the roles of a manager is to raise capital that supports the investment in new projects, which may imply that the firm has to give up value to raise new equity. In this matter, Stulz (1999) relates the cost of capital with corporate governance, in a way that makes firm value dependent on information asymmetry and agency costs. The author points out that firms with poor governance will have to spend more to raise new capital. Globalization has then an impact on corporate governance, which may be both a positive and negative effect, depending not only on the market, but also on the decisions and strategies of the management. Stulz (1999) highlights four ways in which globalization affects a firm: new shareholders invest in the firm, competition among suppliers of capital increases, the market for corporate control changes, and there are new securities and

risk hedging mechanisms available to the firm. The new investors not only participate with capital, but also with skills and knowledge that improves the monitoring of management. Similarly, the appearance of new potential bidders will force the management to increase transparency, and therefore improve governance. Cross-listing, especially in the US, is another mechanism to decrease information asymmetry, in this case due to tighter regulations and to the access that firms gain to new investors and to new securities, which facilitates raising new capital with a lower cost and improves corporate governance.

Cross-listing can be defined as the action of listing the firm's shares in a foreign stock exchange. Even though the home country and the exchange's country are not the same, the firm still has to fulfil the same requirements as any other firm, including the national ones, in order to be able to list there. In their research, Reese and Weisbach (2002) point out several reasons to cross-list: market segmentation, liquidity and higher disclosure. The market segmentation works as a motive since firms are interested in avoiding cross-border barriers to investment. By cross-listing, a firm has access to more investors, lower transaction costs and lower cost of capital. The increase in disclosure and, therefore, a decrease in information asymmetry is related with the rise of the stock price, which makes the value of the firm grow, helping to increase shareholders' wealth.

Cross-listing is a financial policy that firms may adopt to reduce negative effects that arise from market segmentation caused by investment barriers, such as regulatory barriers, taxes, information constraints and transaction costs. Foerster and Karolyi (1999) demonstrate the hypothesis that the stock price of firms that come from segmented markets rises, while their expected returns decrease as a risk premium compensating the disappearance of the investment barriers. Also, the authors corroborate another hypothesis in which the stock price changes are due to investor recognition and liquidity factors, showing that indeed the relation is true. In order to test their hypotheses, the authors applied different methods, such as the one developed by Alexander, Eun and Janakiramanan (1987). This method has the purpose of solving the equilibrium asset-pricing problem that arises from firms listing in a foreign exchange as a financial policy that they adopt to reduce negative effects caused by different investment barriers, which can originate segmentation of international capital markets. Similarly, Errunza and Losq (1985) develop an empirical model of international capital asset pricing, which starts from the principle of unequal access to capital that different investors face, which reveals a mildly segmented world market close to reality. The existence of that market was tested using the new model that they created, which gave experimental support to that hypothesis. In both these methods, the authors prove that cross-

listing shares between segmented markets increases the equilibrium market price for a stock, but decreases the expected return.

Pagano, Röell and Zechner (2002) study the decision of companies to list abroad, supporting that the benefits obtained from an equity listing in a foreign capital market can be crucial to a firm. The companies included in their study have in common the fact that they are large, which, according to the authors, seems to imply that there are fixed costs that must be accounted for and economies of scale that can be exploited. If these companies decided to stay only in the domestic market, they would be losing access to foreign capital that is crucial to them, since there are investment opportunities abroad that can expand the growth of these corporations. Focusing only on US cross-listings, they find that these exchanges are more appropriate for high-tech companies, which have an active export activity and high-growth needs. The authors find that the US exchanges were growing more and becoming more attractive than European exchanges, due to the fact that they offer better conditions, mainly lower trading costs, tougher accounting standards and improved investor protection. These advantages translate into a lower cost of capital, which is good for companies seeking to raise new equity. For companies that are from outside Europe, the authors expect the US market to keep on being more attractive, when comparing with the attraction power of European exchanges.

In order to be able to list a firm in a US stock Exchange, besides complying with the requirements of the exchange, firms need to take into account some of the securities laws of the country. This means that they have to fulfil the requirements demanded by the Securities and Exchange Commission (SEC), as well as comply with the US Generally Accepted Accounting Principles (US GAAP). On the upside, firms cross-listed in the US have access to legal tools that are not available in their home country, such as class actions, which allow them to sue managers for the practice of corporate crimes, as described by Coffee (2002).

The fact that firms are willing to commit to full disclosure and to respect shareholders' rights in order to be able to cross-list in the US is called the bonding hypothesis, as described by Coffee (1999, 2002) and Stulz (1999). The bonding hypothesis suggests that firms cross-list in order to raise new capital and to protect investors' interests, mainly small shareholders. This hypothesis is also discussed by Reese and Weisbach (2002), who offer some arguments regarding the importance of cross-listing to a firm. In their study they find that equity offerings increased in number and value after a cross-listing, firms from countries with weak investor protection are more inclined to issue equity and in larger quantities, and firms from countries with strong minority

shareholders protection are more likely to issue equity in the US after cross-listing, while the ones from countries with weak protection will search for equity outside the US. Also, Doidge (2004) finds evidence consistent with the bonding hypothesis, supporting the idea that cross-listing in the US has important corporate governance and legal implications.

Regarding the impact of cross-listing on corporate governance, Lel and Miller (2008) conduct some research that tests the bonding hypothesis in this particular indicator. Their findings support that theory, since they find that the relation between CEO turnover and poor performance is strong for firms that decided to cross-list in the US. This means that they find evidence that in fact the laws and securities existent in the US help to improve corporate governance of cross-listed firms. In order to strengthen their results, they also carry out tests to prove the robustness of this result. By doing so, they are able to exclude a set of potential explanatory motives for that improvement, namely that only well-governed firms cross-list; that the improvement is a consequence of merger, acquisitions, privatizations or changes in the board composition; that CEO's leave the firm to pursue a career in the US; and that firms replace their managers with professionals from the US.

The majority of foreign firms that wish to cross-list in the US choose to do so through American Depositary Receipts (ADRs). When a foreign company issues an ADR, the acquirer in the US will, therefore, own shares of that firm. This means that an ADR is a security traded in the US that represents a specified number of shares of a certain foreign firm. They pay dividends in US dollars, have to obey to US clearing and settlement conventions and are quoted and traded on American markets similar to regular stocks. The market in which they are traded depends on the type of ADR, which in total are three. The Level I ADRs, introduced as unlisted securities, can be found on the over-the-counter (OTC) market and are the easiest and least expensive ones to issue, since they have less strict regulations from the SEC. Both Level II and Level III ADRs are listed in stock exchanges and have tighter regulations from the SEC. However, they offer higher visibility, which translates into higher shareholder protection and information disclosure, and, for Level III ADRs, the issuers have the possibility of raising capital in US financial markets (Karolyi, 2004). In their research, Lel and Miller (2008) prove that issuers of Level II and Level III ADRs have higher improvements in corporate governance. This means that these types of ADRs have better effects on the firms that issue them comparing with Level I ADRs issuers, since for these firms the authors do not find any significant results that allow one to differentiate them from non-cross-listed firms.

As it can be seen from all the evidence, the strong shareholder protection offered by the US seems to be the main driver for foreign firms to cross-list in the country. Even though companies are attracted to US exchanges due to their benefits, some firms may choose to avoid this market. This phenomenon happens when the manager or controlling shareholders have satisfactory benefits and perks, which would be constrained by US laws. Even though minority shareholders would see the cross-listing decision as a way of having access to a better market and, therefore, see the firm's money better implemented, managers are most likely not willing to give up on their private benefits. This event is studied by Doidge (2004) and Doidge, Karolyi, Lins, Miller and Stulz (2009), in which they prove that the cross-listing decision will depend on the private benefits of managers and on who owns the firm. This means that the existence of private benefits will decrease the desire to cross-list, especially when the controlling shareholders are also the managers of the firm and if they think that the expected gains from cross-listing in the US are not worth the private benefits that are lost with that decision. They find the same results as Hope, Kang and Zang (2007) when it comes to the chance of losing private benefits.

Coffee (2002) also suggests that firms cross-list to increase value, which is achieved given the fact that their stock price rises. This increase in the stock price can be due to the fact that market segmentation was cancelled and liquidity increased, as Reese and Weisbach (2002) also mention. Firms that want to bond are those with high earnings prospects and high leverage, because they are willing to forgo some private benefits in order to have access to capital that they do not have in their home country. In this matter, also Stulz (1999) shows that an improvement in corporate governance, caused by various factors, which includes the tighter US regulations, helps to increase the firm's value. Therefore, the firm's managers are willing to bond with these regulations so they can increase the shareholders' wealth. As a result, the firm becomes more transparent and better governed.

The maximisation of the value of the firm is one of the goals of the manager, since the higher it is, the higher the shareholder's wealth will be. Doidge, Karolyi and Stulz (2004) find that firms cross-listed in the US have a higher Tobin's q ratio than the firms from the same country that are not listed in the US. This means that firms that do cross-list in the US have higher value, which corroborates the findings of other authors about the increase of the stock price. Doidge et al. (2004) argue that the fact that firms listed in the US are worth more is due to growth opportunities, which will be more valuable to cross-listed firms, since these firms have more capability to take advantage of them, but also because controlling shareholders will expropriate a smaller fraction of the firm's

resources. This happens because they believe that by committing to that the firm will be able to raise external capital at a lower cost in order to finance the growth opportunities, which is consistent with the findings of Doidge (2004), Doidge et al. (2009) and Hope et al. (2007) regarding the role of private benefits in the decision to cross-list.

Foucault and Frésard (2012) prove that by cross-listing in the US, managers are able to obtain more information from the stock market, which enables them to make more value-enhancing investment decisions. In fact, they show that the investment-to-price sensitivity, which is the correlation between investment and stock prices, is higher for cross-listed firms than for their domestic peers. When forecasting cash flows for investment projects, managers that want to maximise value must use all relevant available information, both private information and the one reflected into the stock price. Those forecasts will be more dependent on the signals provided by the stock price, which in the case of cross-listed firms, makes the firm's capital expenditures more sensitive to those signs, since cross-listing increases the informational content of stock prices for managers. With better signals obtained from stock prices, managers will be able to produce better forecasts of the cash flows of new investments, which combined with the tighter disclosure requirements, enables investors to form more accurate forecasts of the firm. The impact of more accurate forecasts facilitates the access to new capital at a lower cost and relaxes financial constraints, both positive consequences from the decision to list the firm in the US.

2.2 Determinants of cash holdings

Cash is the most liquid asset that a firm can own. Holding cash becomes more optimal when the costs of raising new capital are high, there are agency problems or due to financial constraints. Firms tend to hold on to more cash due to high transaction costs or for precautionary reasons, but also for tax reasons or because of agency problems, as Bates, Kahle and Stulz (2009) highlight. Regarding agency problems, although they may be responsible for high levels of cash holdings, they might get even worse when the firm holds excessive amounts of cash, as Ozkan and Ozkan (2004) point out. Firms with better investment/growth opportunities are expected to have higher cash holdings. Based on evidence collected from UK firms, the authors find that cash holdings are positively related with growth opportunities and cash flows, while being negatively influenced by leverage, liquid assets and bank debt.

Shareholder rights and the consequent agency problems that may arise from there are shown by Dittmar, Mahrt-Smith and Servaes (2003) to be important to determine corporate cash holdings. After controlling for investor protection, they find that firms hold more cash when debt

markets are more developed. They do not find evidence that suggests that firms from countries with weak investor protection hold more cash because raising external capital is more difficult in those countries. Instead, they believe that they are more likely to hold more cash if raising external funds is easier. Moreover, they also find evidence that larger firms hold less cash, while the more profitable firms have the tendency to hold more cash.

Opler, Pinkowitz, Stulz and Williamson (1999) postulate that the optimal level of cash holdings should be the one that equals the marginal cost of those holdings. The cost arises from a lower rate of return caused by a liquidity premium and tax disadvantages. However, they point out that there are advantages in holding cash, such as the transaction costs saved from raising new capital and the maintenance of other assets without having to sell them to obtain money. Information disclosure helps to facilitate raising new capital, since information asymmetries increase the cost of that new capital. The expected scenario is for firms from countries with low disclosure to hold more cash, since raising new capital is expensive and they do not want to lose investment opportunities. As they cross-list in a market with higher disclosure standards, their cash holdings will decrease. The authors find that firms that hold more cash are the ones with more growth opportunities, riskier activities and with smaller size. On the other hand, firms that are larger, with better credit rating and greater access to capital markets tend to hold less cash.

Bates et al. (2009) study the evolution of cash holdings of US firms from 1980 to 2006. They find that cash holdings increased due to a decrease in inventories, higher cash flow risk, lower capital expenditures and higher R&D expenditures. It is clear, as they point out, that the precautionary motive was the most critical determinant of the level of cash holdings of US firms in this period, as firms faced many risks that they simply could not hedge, risks that were created by the growth of the market for derivatives.

2.3 Impact of cross-listing on cash holdings

Frésard and Salva (2010) state that the decision to cross-list in the US works as a governance mechanism to prevent managers from turning cash into private benefits. Cross-listing in the US calls for legal and monitoring changes within the firm, since now the firm has to meet new requirements imposed by American regulators. Looking to historical evidence, they find that investors value more cash holdings from cross-listed firms than they do with non-cross-listed corporations. The tighter regulations existing in the US combined with the higher monitoring help investors to be sure that their money is safe and it is more likely to be better applied, since with those mechanisms firms cross-listed in the US have limits on the attribution of private benefits.

The latter aspect may cause the managers of a firm to decide not to cross-list in the US, as Doidge et al. (2009) and Hope et al. (2007) prove in their studies.

Regarding the different types of ADRs that foreign firms can issue, it is expected that the higher the level of the ADR the more advantageous the cross-listing is. Huang et al. (2013) find that Level III ADRs are associated with higher levels of cash holdings, exactly because of the stricter laws and regulations that those which issue them have to comply with. Similarly, Doidge et al. (2004) conclude that ADRs that are listed in an exchange are associated with a higher valuation of assets, especially Level III ADRs. This result sustains the theory that cross-listing provides more gains for firms that are willing to adhere to tighter regulations, therefore supporting the bonding hypothesis as explanation of cross-listing in the US.

In general, the previous literature does not provide a clear picture of the actual impact of cross-listing on corporate cash holdings. Huang et al. (2013) are pioneers in drawing a direct effect between the two subjects, discovering results that are not according to what was expected. In order to understand the possible effects of cross-listing on the levels of cash held by firms, one can use the findings of Stulz (1999), as the author describes cross-listing as a globalization method and inspires many other academics to investigate the topic. As mentioned before, the author suggests that firms cross-list so they can raise capital in an easier and less expensive manner, but also to have access to new financial instruments that increase the firm's value.

The first reason suggested by Stulz (1999) indicates that firms no longer have the need to hold large amounts of cash, which means that they will decrease their cash holdings after cross-listing. This motive has been broadly studied in the literature by many authors, such as Opler et al. (1999), Reese and Weisbach (2002), Pagano et al. (2002) and Coffee (1999, 2002). However, Dittmar et al. (2003) find evidence that the opposite happens, namely that easier access to external funds increases the possibilities of firms holding more cash. Moreover, by having access to more sources of capital, firms can relax their financial constraints and no longer hold cash for precautionary reasons, therefore reducing their cash holdings. This aspect is discussed by Bates et al. (2009) and Lins, Strickland and Zenner (2005). Also contributing to the decrease of cash holdings upon cross-listing are the improvements in economic development and corporate governance standards, which includes indicators as the investor protection. Chang and Noorbakhsh (2006) conduct one of the studies that proves this point.

The second motive suggested by Stulz (1999) implies that by having the opportunity to increase their wealth, shareholders will be interested in having more money available to invest and,

therefore, they will increase the firm's cash holdings. This theory is supported by Coffee (2002) and Doidge et al. (2004). Furthermore, firms may hold more cash in order to be able to enjoy investment/growth opportunities, as suggested by Doidge et al. (2004), Foucault and Frésard (2012), Ozkan and Ozkan (2004), Opler et al. (1999) and Frésard and Salva (2010). Additionally, there is the research of Huang et al. (2013), which draws a direct relation between cross-listing and cash holdings. Their results point out that indeed cash holdings increase after cross-listing, showing that shareholders are interested in increasing the firm's wealth by taking advantage of better investment opportunities and a higher valuation of corporate assets.

2.4 Impact of different levels of shareholder protection and economic development

Several other authors study different perspectives of the benefits and reasons for firms to cross-list. Both Hope et al. (2007) and Khanna, Palepu and Srinivasan (2004) focus on relating cross-listing with disclosure practices and shareholder protection. In their study, the authors find that firms from countries with higher investor protection are more likely to cross-list in the US than companies from countries with lower protection, in order not to lose private benefits.

Coffee (2002) argues that cross-listing is strongly influenced by the existence of high legal standards and strong shareholder protection. He also suggests reputation as the reference of those indicators, being a key driver of the high number of cross-listings that happen in the US when comparing with other exchanges. The New York Stock Exchange specifically attracts more foreign firms than domestic ones possibly due exactly to reputation, suggesting that it surpasses technology as main attraction motive when it comes to cross-listing firms. In general, cross-listing in the US promotes efficiency, as noted by Coffee (1999), due to its higher standards of disclosure, which help to decrease agency costs and transaction costs; gives more access to legal mechanisms to control insiders, and also grants greater access to capital markets. Coffee (2002) suggests that firms that cross-list in the US come mainly from emerging economies, which are looking mainly for raising equity, while firms from developed economies, such as European countries, often look for acquiring currency to make stock transactions with American companies.

Hail and Leuz (2009) discuss the impact of cross-listing in the US on the decrease of foreign firms' cost of capital. They find evidence that cross-listing in American exchanges results in a decrease of the cost of equity capital significantly. Again, the authors find that the results are higher for firms that are from countries with weak disclosure regulation and investor protection.

Chang and Noorbakhsh (2006) examine the impact of globalization on corporate cash holdings. They find that high levels of shareholder protection lead to lower levels of cash holdings, as well as small firms tending to hold more cash than larger firms, which confirms the decrease in cash holdings after cross-listing in a market with high investor protection, which is the case of the US. Also, they find that Foreign Direct Investment (FDI) substitutes the capital that firms normally need to raise in their home markets, so they are inversely related with cash holdings, meaning that high levels of FDI inflows are associated with lower levels of cash. These results happen more in developed countries, since in less developed economies FDI inflows tend to complement corporate cash holdings. Moreover, the authors conclude that firms in countries that are influenced by Common Law hold less cash comparatively with firms in countries influenced by other legal systems. This happens because Common Law countries usually have better investor protection, which facilitates access to external financing.

Similarly, Dittmar et al. (2003) also prove that firms from countries with weak investor protection hold more cash. To be more precise, they find that those firms hold 25% more cash than those which come from countries with strong investor protection. Moreover, after controlling for other variables that have been proved to have an effect on cash holdings, firms from countries with low investor protection display levels of cash that are more than twice the levels exhibited by firms from countries with higher investor protection. Additionally, the authors find that firms from Common Law countries hold 35% less cash than those which are from Civil Law countries.

The improved access to external financing provided by ADRs and, thus, by cross-listing, is a feature that attracts firms from emerging countries, as proven by Lins et al. (2005). For these firms the external financing is costlier, which may mean ruling out certain investment opportunities. By cross-listing in the US they benefit from a wider range of sources of capital, which reduces their sensitivity of investment to cash flow and, therefore, relaxes financial constraints. The authors also believe that the benefits of cross-listing are less noticeable when firms come from environments that are more transparent, have stronger investor protection and better rule of law, and also have a more developed economy.

Regarding the excess cash premium, Frésard and Salva (2010) demonstrate that it is higher for companies from countries with weak institutions, being lower for countries that offer better conditions, as is the case of the US. Their study finds the same set of results when testing the effects of different levels of investor protection, transparency, anti-self-dealing, anti-director rights, accounting standards and economic development of the home country. In all these

indicators the effects are more significant for firms that come from countries with weaker conditions. Besides that, the effects are found to be larger for firms cross-listed using an ADR, and among those, they are particularly higher for Level II or III ADRs issuers, which is consistent with findings from other authors, as presented previously.

Both the anti-self-dealing and the anti-director rights are measures of investor or shareholder protection, which can be defined as the extent to which shareholders are protected from negative consequences that may arise from certain corporate investments or managerial decisions, or even from insider expropriation of the firm's assets. Anti-self-dealing refers precisely to regulations that a country applies to combat expropriation by insiders, which can include excessive compensations, self-benefiting executive decisions or direct corporate assets takeovers (Djankov, La Porta, Lopez-de-Silanes and Shleifer, 2008). Anti-director rights refer to practices that promote shareholders' rights inside a firm, particularly when it comes to shareholders' meetings and minorities representation (La Porta, Lopez-de-Silanes, Shleifer and Vishny, 1998).

In their paper, Huang et al. (2013) claim that higher levels of cash holdings are related with better investor protection and accounting standards. The authors see this result as a consequence of the higher valuation that cash has in the US, since the better shareholder protection and information disclosure assure the investors that their money is less likely to be appropriated by managers, and therefore will be better applied, contributing to increase their wealth. In the case of firms originating from countries with weak investor protection, the increase in cash holdings is higher, proving that the extent by which firms increase their cash holdings is directly related with the level of improvement in shareholder protection.

3. Hypotheses and Methodology

3.1 Hypotheses

Since I have the work of Huang et al. (2013) as a main reference to conduct my research, I expect to find similar results as theirs. Therefore, and considering the literature and findings presented before, my first hypothesis states that:

H1a: after cross-listing in the US, firms increase their cash holdings;

H1b: the impact of cross-listing on cash holdings is higher for firms that issued Exchange ADRs.

In order to provide a better understanding of the type of firms that benefit more from cross-listing, my second hypothesis postulates that:

> **H2:** the expected increase in cash holdings post-cross-listing is higher for firms from countries with weaker corporate governance standards and less economic development compared to the US.

The purpose of this hypothesis is to study the impact of different indicators, namely investor protection, accounting standards, legal system and economic development.

3.2 Methodology

In my first hypothesis I want to test what happens to the cash holdings of firms after cross-listing in the US. In order to do so, I construct my main regression using as reference the one used by Huang et al. (2013) in their study. Therefore, the main regression that I use in my research is the following:

$$\begin{aligned} NetCashRatio_{i,t} = {} & \alpha + \beta_1 CrossListing_{i,t} + \beta_2 ExchangeADR_{i,t} \\ & + \beta_3 (CrossListing{*}ExchangeADR)_{i,t} + \beta_4 Inflation_t + \beta_5 MarketBook_{i,t} \\ & + \beta_6 Size_{i,t} + \beta_7 CFAssets_{i,t} + \beta_8 WCAssets_{i,t} + \beta_9 Leverage_{i,t} \\ & + \beta_{10} IndustrySigma_{i,t} + \beta_{11} RDSales_{i,t} + \beta_{12} Dividend_{i,t} + \beta_{13} Capex_{i,t} \\ & + \eta + \omega + \nu + \varepsilon_{i,t} \end{aligned} \quad (1)$$

The dependent variable in this regression is *NetCashRatio*, which is the ratio of cash and net assets (cash divided by net assets). One of the main independent variables is *CrossListing*, which is a dummy variable that assumes the value 1 if in that year the firm is cross-listed in the US, and 0 otherwise. This dummy variable allows me to conclude if there was a statistically significant effect on cash holdings after the firm cross-listed in the US. Besides that, the regression includes another dummy, Exchange*ADR*, which assumes 1 if the firm issued a Level II or III ADR and 0 if it issued a Level I ADR. It is important to highlight that from now on, the Level II and III ADRs will be referenced as Exchange ADRs, since they have in common the fact that they are traded in a stock exchange. The next variable, *CrossListing*ExchangeADR*, is an interactive term between the variables *CrossListing* and *ExchangeADR*, resulting from the product between these two variables. This term is also important for my research, since it translates the effect of cross-listing on cash holdings of firms that issued Exchange ADRs.

For the control variables that help to explain the levels of cash holdings, I also draw on the above mentioned authors, as well as on the study by Opler et al. (1999) about the determinants of cash holdings. Therefore, the variable *MarketBook* refers to the market-to-book ratio; *Size* to the firm size (represented by the natural logarithm of total assets); *CFAssets* to the cash flows (earnings after interest, dividends and taxes but before depreciation) divided by net assets; *WCAssets* to the net working capital (current assets minus current liabilities and cash) divided by net assets; *Leverage* to the total leverage of the firm (total debt over total assets); *RDSales* to the ratio of Research and Development (R&D) expenses over net sales (firms that do not report R&D expenses are considered to not have that kind of expenses); *Dividend* to a dummy related with the payment of dividends (assuming 1 if the firm paid dividends that year, 0 otherwise), and *Capex* to the ratio of capital expenditures and net assets. Additionally, *IndustrySigma* refers to the sigma of the industry, which is a measure of volatility of the industry cash flows for a period of 10 years. To calculate this variable, I start by computing the rolling average of the previous 10 years of the ratio of cash flow to net assets for each firm, followed by calculating the standard deviation of the average cash-flow-to-net-assets ratio for each industry sector. This method is also suggested by Dittmar and Mahrt-Smith (2007).

Another key explanatory variable included by Huang et al. (2013) and that is not part of the research of Opler et al. (1999) is the inflation rate for each country and each year. The inclusion of this variable has economic reasons, since Ungern-Sternberg (1981) prove that the level of inflation affects the expenditures and income of firms, which consequently has an impact on its wealth and asset valuation and, thus, firms are obliged to adjust their cash holdings accordingly, an aspect that is particularly important for firms that come from countries with more unstable inflation rates.

Finally, the regression also includes fixed effects, represented by η (year), ω (country), and ν (industry), in order to control for differences among these variables. Additional information about the variables can be seen in Appendix A.

The regression that I need to test my second hypothesis is very similar to the first one. In this hypothesis I test the impact that differences in several financial, legal and economic indicators have on cash holdings upon cross-listing, by using six different indices, as it will be explained further ahead. Therefore, the regression for my second hypothesis is the following:

$$NetCashRatio_{i,t} = \alpha + \beta_1 CrossListing_{i,t} + \beta_2 ExchangeADR_{i,t} + \beta_3 (CrossListing*ExchangeADR)_{i,t} + \beta_4 Index_t + \beta_5 (CrossListing*Index)_{i,t} + \beta_6 Inflation_t + \beta_7 MarketBook_{i,t} + \beta_8 Size_{i,t} + \beta_9 CFAssets_{i,t} + \beta_{10} WCAssets_{i,t} + \beta_{11} Leverage_{i,t} + \beta_{12} IndustrySigma_{i,t} + \beta_{13} RDSales_{i,t} + \beta_{14} Dividend_{i,t} + \beta_{15} Capex_{i,t} + \eta + \omega + \nu + \varepsilon_{i,t} \quad (2)$$

Comparatively with regression (1), this one adds two new variables. The variable *Index* is a dummy variable which assumes the value 1 if the firm comes from a country that has a value in the index that is below the value of the US in that index, and 0 otherwise. All the values used to create this dummy variable are compared with the value that the US has in that same index. The purpose of that is to draw a more conclusive impact of cross-listing in the US, by studying if firms that come from countries that have worse corporate governance standards and economic development indicators than the US benefit more from that than the others, as the literature states.

Additionally, this regression adds a second interactive term, *CrossListing*Index*, which results from the product of the dummy variables *CrossListing* and *Index*. This term also has a great importance for my research, since it indicates what happens after cross-listing to the cash holdings of a firm that comes from a country with worse conditions in that index than the US, in comparison with firms from countries with better conditions than the US. A positive statistically significant result in this variable allows me to confirm the literature and also my hypothesis.

The remainder of this regression follows what was explained for regression (1).

4. Data

4.1 Data description

In my study I use a sample of firms that are cross-listed in the US. Following the research of Loureiro and Silva (2015a, 2015b), the list of firms that issued an ADR is collected from the Citibank website. In order to be eligible for my sample, the ADRs must have been issued between 2000 and 2015. In my sample I can only have one observation per firm, with the exception of firms that have held ADRs in more than one distinct time period or firms that changed the type of ADR during the time period that I am considering in my sample. Moreover, the ADR must have been held for at least two years, in order to have a window large enough to extract relevant information to my study.

The financial and accounting data was collected from Worldscope and Datastream in US dollars[1]. Since the currency for all firms and countries is the US dollar, the inflation rate was obtained using the US Consumer Price Index (as it reflects the change in the index from one year to the next), which was also obtained from Datastream. As usual in the literature, the sample does not include financial firms (SIC codes between 6000 and 6999) or utilities (SIC codes between 4900 and 4949). The SIC code, obtained from Worldscope, is also used to calculate the industry sigma, since it is the first two digits of the SIC code that I use to define the industry sector, following Opler et al. (1999). Additionally, I only include countries that had at least 4 ADR-issuing firms in my time period.

Regarding the financial variables, I follow the extant literature and exclude all observations that had negative values in the market value, current liabilities, total debt, net sales and capital expenditures. Additionally, I eliminate those that had total assets lower than $1 million. Moreover, before calculating the firm size, I adjust the total assets using the Consumer Price Index of 2015 in order to update all values in this variable to 2015 prices. Also, all firm-related variables are winsorized at 1% in each tail of the distribution in order to reduce the effect of outliers.

After the preliminary screening my sample is composed of 1943 firms, which correspond to 1954 observations from 40 countries. Once again, the difference in the number of firms and observations arises from the fact that I have 6 firms that changed the type of ADR during my time period and 5 firms that held ADRs in two distinct time periods. Furthermore, in my sample I have 1671 Level I or OTC ADRs and 283 Exchange ADRs.

Moreover, the necessary country-related data to test my second hypothesis was collected from a variety of sources. The legal system of each country was obtained from the CIA World Factbook, while the economic development status came from the Standard & Poor's Dow Jones Indices Country Classification and the FTSE Classification of Markets, as both sources agree in their classification. Regarding the indices, the investor protection index was constructed using the method described by Kaufmann, Kraay and Mastruzzi (2009) using data obtained from the World Bank website. Both the anti-director rights and the accounting standards scores were collected from the research of La Porta et al. (1998), while the anti-self-dealing index results came from the study of Djankov et al. (2008).

[1] See Appendix A for more information about the variables and Datastream and Worldscope codes.

4.2 Summary statistics

Table 1 presents descriptive statistics of the variables used in my study. The dependent variable in my regressions, the cash-to-net-assets ratio, has an average value of 17% in my sample, a value that is the same as the one obtained by Opler et al. (1999) and close to the result of Huang et al. (2013), which is 23%. The remaining variables display average values in my sample that are similar to the ones obtained by those authors.

Table 1 - Summary statistics of key variables

This Table presents summary statistics for all variables included in the regressions, apart from the dummy variables. These variables were collected for the 1943 firms that comprise the sample used in this study for the time period of 2000-2015. More information about the variables can be found in Appendix A.

Variable	Firm-year Observations	Mean	Median	Standard Deviation
Cash/Net assets	16,474	0.17	0.11	0.19
Inflation	22,478	2.21	2.30	1.14
Market-to-book ratio	15,304	0.00	0.00	0.00
Firm size	16,478	15.54	15.36	1.11
Cash flow/Net assets	16,192	0.08	0.07	0.07
Working capital/Net assets	16,118	-0.03	-0.02	0.18
Total leverage	16,476	0.27	0.26	0.17
Industry sigma	21,962	0.07	0.05	0.06
R&D/Sales	16,525	0.01	0.00	0.03
Capital expenditures/Net assets	16,383	0.05	0.04	0.04

The list of countries represented in my sample can be seen in both Table 2 and Table 3. Table 2 exhibits descriptive statistics for those countries. China and the United Kingdom are the countries with more firms represented, with 249 and 223 firms, respectively. Conversely, Luxembourg and Peru are the countries with fewer firms, counting only 4. With regard to the types of ADRs, Japan and the United Kingdom have the most issues of OTC ADRs with 199 and 194, respectively. In general, countries tend to have more OTC ADRs than Exchange ADRs, since they are easier and less costly to issue, as can be seen by the difference between the number of OTC ADRs and the number of Exchange ADRs that comprise my sample. Peculiarly, Taiwan does not have any firm issuing OTC ADRs in my sample. Besides Taiwan, also Chile and India have more issues of Level II or III than Level I ADRs, while Peru has the same number in both types. Furthermore, China is the country with more issues of Exchange ADRs, with 119, which corresponds to about 42% of the total of this type of ADRs in my sample. The next country, the United Kingdom, only has 31 issues of this type, which shows the large difference that exists in my sample. Moreover, there are 9 countries in my sample that do not have any issue of Exchange

ADRs, which are Finland, Indonesia, Malaysia, New Zealand, Philippines, Poland, Portugal, Singapore and Thailand. Regarding the cash-to-net-assets ratio, China once again appears on the top of the list, with a ratio of 29%, followed by Hong Kong with 23%. In contrast, Denmark has the lowest ratio (9%), alongside with Chile, Finland, New Zealand and Thailand, all with a ratio of 10%.

Table 2 - Descriptive statistics by country

This table presents statistics for each country represented in the final sample. The last column contains average values of the dependent variable of the regressions, the net cash ratio. The last row presents the total value for the number of firms, OTC ADRs, Exchange ADRs, and firm-year observations and the average value of the net cash ratio. More information about the variables can be found in Appendix A.

Country	No. of Firms	OTC ADRs	Exchange ADRs	Firm-year observations	Cash/net assets
Argentina	5	3	2	57	0.11
Australia	177	171	8	1,341	0.11
Austria	16	15	1	167	0.15
Belgium	24	19	5	324	0.12
Brazil	51	31	20	619	0.20
Chile	6	1	5	85	0.10
China	249	130	119	2,640	0.29
Denmark	20	18	2	244	0.09
Finland	19	19	0	256	0.10
France	87	81	7	1,208	0.14
Germany	94	88	6	1,199	0.14
Greece	14	13	1	130	0.18
Hong Kong	139	135	4	1,442	0.23
India	15	6	10	177	0.20
Indonesia	41	41	0	383	0.19
Ireland	17	14	3	197	0.22
Israel	24	16	8	250	0.11
Italy	51	47	4	642	0.16
Japan	201	199	4	2,955	0.22
Korea	8	6	2	85	0.17
Luxembourg	4	3	1	59	0.16
Malaysia	5	5	0	46	0.14
Mexico	31	19	12	412	0.12
Netherlands	28	25	3	385	0.11
New Zealand	22	22	0	169	0.10
Norway	29	28	2	356	0.13
Peru	4	2	2	14	0.14
Philippines	18	18	0	184	0.19
Poland	14	14	0	150	0.16
Portugal	13	13	0	195	0.13
Russia	26	22	4	353	0.11
Singapore	51	52	0	555	0.19

South Africa	45	44	2	503	0.16
Spain	25	24	1	359	0.16
Sweden	43	42	1	491	0.11
Switzerland	48	43	5	565	0.22
Taiwan	7	0	7	86	0.21
Thailand	25	25	0	275	0.10
Turkey	24	23	1	305	0.19
United Kingdom	223	194	31	2,615	0.12
Total/Average	**1,943**	**1,671**	**283**	**22,478**	**0.17**

The indices and measures that are used to test my second hypothesis are presented in Table 3. Since my analysis is done considering the US' results in the same indices and measures, the country's scores are also displayed at the bottom of this table. As said before, the index dummy variable included in the second hypothesis' regression assumes the value 1 if the score of the home country of that firm in that index is lower than the US score or if the result is different from the US for the legal system and economic development. Therefore, and starting with the non-numerical measures, my sample includes firms from 29 Civil Law countries and 11 Common Law countries, while regarding the economic development, 17 emerging economies and 23 developed countries are represented. Concerning the indices, the investor protection index constructed with the method of Kaufmann et al. (2009) ranges from 0 to 100. Finland has the highest score, 98.52, while Russia has the lowest one, 27.57. For my analysis I have 24 countries which score lower than the US (85.12). The next index, the anti-self-dealing index, was constructed by Djankov et al. (2008) and ranges from 0 to 1. Singapore scores the highest value possible in this index, being the only country in my sample with a perfect score. On the opposite side is Mexico with a score of 0.17. Comparing with the US score (0.65), in my sample I have 28 countries with lower scores than that. Finally, there are the indices built by La Porta et al. (1998). First, the anti-director rights index, which ranges from 0 to 6. This index does not include values for China, Luxembourg, Poland and Russia, so these countries are considered to have a score lower than the US. Regarding the other countries, Chile, Hong Kong, India, South Africa and the United Kingdom have the highest value in my sample (5), while Belgium has the lowest score possible (0). Since the US score is 5 in this index, the group of countries with a lower score is quite large (35). As for the accounting standards, which range from 0 to 100, once again there are countries that do not have scores available, which are China, Indonesia, Ireland, Luxembourg, Poland and Russia. As before, these countries are considered to have scores lower than the US in this index. Moreover, Sweden has

the highest score (83), while Portugal has the lowest (36). Once again the list of countries with scores lower than the US is extensive (33).

Table 3 - Descriptive statistics of the indices by country

This table presents the scores for each country of each index and measure used to test the second hypothesis. In order to construct the dummy variable for each index and measure, the scores are compared with the score of the US, which can be seen in the last row. The countries that have no values are assumed to have a score lower than the US' score in that index.

Country	Investor Protection Index	Anti-director rights Index	Anti-self-dealing Index	Accounting Standards	Legal System	Economic Status
Argentina	40.69	4	0.34	45	Civil	Emerging
Australia	92.54	4	0.76	75	Common	Developed
Austria	93.56	2	0.21	54	Civil	Developed
Belgium	87.70	0	0.54	61	Civil	Developed
Brazil	52.16	3	0.27	54	Civil	Emerging
Chile	83.72	5	0.63	52	Civil	Emerging
China	36.48	-	0.76	-	Civil	Emerging
Denmark	96.47	2	0.46	62	Civil	Developed
Finland	98.52	3	0.46	77	Civil	Developed
France	84.31	3	0.38	69	Civil	Developed
Germany	90.19	1	0.28	62	Civil	Developed
Greece	67.49	2	0.22	55	Civil	Emerging
Hong Kong	86.85	5	0.96	69	Common	Developed
India	43.86	5	0.58	57	Common	Emerging
Indonesia	33.46	2	0.65	-	Civil	Emerging
Ireland	91.96	4	0.79	-	Common	Developed
Israel	67.76	3	0.73	64	Common	Developed
Italy	69.63	1	0.42	62	Civil	Developed
Japan	84.95	4	0.50	65	Civil	Developed
Korea	71.98	2	0.47	62	Civil	Developed
Luxembourg	96.08	-	0.28	-	Civil	Developed
Malaysia	61.64	4	0.95	76	Common	Emerging
Mexico	47.87	1	0.17	60	Civil	Emerging
Netherlands	94.69	2	0.20	64	Civil	Developed
New Zealand	96.95	4	0.95	70	Common	Developed
Norway	95.87	4	0.42	74	Civil	Developed
Peru	42.69	3	0.45	38	Civil	Emerging
Philippines	39.66	3	0.22	65	Civil	Emerging
Poland	71.89	-	0.29	-	Civil	Emerging
Portugal	82.47	3	0.44	36	Civil	Developed
Russia	27.57	-	0.44	-	Civil	Emerging
Singapore	87.32	4	1.00	78	Common	Developed
South Africa	60.98	5	0.81	70	Common	Emerging

Spain	77.61	4	0.37	64	Civil	Developed
Sweden	96.59	3	0.33	83	Civil	Developed
Switzerland	96.68	2	0.27	68	Civil	Developed
Taiwan	77.15	3	0.56	65	Civil	Emerging
Thailand	47.90	2	0.81	64	Common	Emerging
Turkey	49.41	2	0.43	51	Civil	Emerging
United Kingdom	88.15	5	0.95	78	Common	Developed
United States	85.12	5	0.65	71	Common	Developed

5. Empirical Results

5.1 Cross-listing impact on cash holdings

In my first analysis, I estimate equation (1) in order to test the real impact of cross-listing on corporate cash holdings. The results of this study are displayed in Table 4. For the overall sample, exhibited in column (1), the after cross-listing dummy variable coefficient is not statistically significant, which, therefore, does not allow to draw conclusions relatively to the whole sample about the impact of such event on firms' cash holdings. In this case I cannot conclude the same as Huang et al. (2013), who find that for the whole sample there is evidence of an increase in cash holdings upon cross-listing.

Table 4 - Cross-listing effects on cash holdings

This table contains the results for the first hypothesis by applying regression (1). The first column presents the regression applied to the full sample. The second column restricts the regression only for the Exchange ADRs. The third column tests only the OTC ADRs. More information about the variables can be found in Appendix A. Robust t-statistics are in parentheses. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Variables	**(1)** **Net cash ratio**	**(2)** **Net cash ratio**	**(3)** **Net cash ratio**
Constant	0.594***	0.572***	0.422***
	(18.63)	(6.78)	(12.62)
CrossListing	0.003	0.041***	0.003
	(0.89)	(3.85)	(0.83)
ExchangeADR	-0.015*		
	(-1.80)		
*CrossListing * ExchangeADR*	0.028***		
	(3.09)		
Inflation	-0.003	0.002	-0.004*
	(-1.42)	(0.32)	(-1.70)
MarketBook	5.288***	4.431*	5.416***
	(6.46)	(1.95)	(6.11)
Size	-0.023***	-0.029***	-0.019***

	(-16.97)	(-6.06)	(-13.32)
CFAssets	0.563***	0.461***	0.552***
	(17.68)	(5.54)	(16.40)
WCAssets	-0.295***	-0.222***	-0.290***
	(-22.85)	(-4.81)	(-21.14)
Leverage	-0.262***	-0.168***	-0.272***
	(-24.83)	(-3.84)	(-24.83)
IndustrySigma	0.111**	0.446***	0.046
	(2.57)	(3.84)	(1.06)
RDSales	0.980***	1.392***	0.893***
	(13.40)	(5.98)	(11.99)
Dividend	-0.031***	-0.017*	-0.029***
	(-7.63)	(-1.71)	(-6.84)
Capex	-0.616***	-0.782***	-0.579***
	(-16.55)	(-7.43)	(-14.37)
Observations	14,657	1,419	13,238
R-squared	0.363	0.654	0.345

However, there are other variables that provide important information. One of them is the interactive term between the after cross-listing dummy and the Exchange ADR dummy. In this one, the coefficient is 0.028 and statistically significant. This means that firms that issued Exchange ADRs increase, after cross-listing, their cash holdings 2.8 percentage points more than the ones that issued OTC ADRs. This can be related with the benefits that Exchange ADRs provide to their issuers. Even though they are costlier and more stringent, they offer significantly more gains to those that issue them. Among those benefits are the access to more sources of capital and more profitable securities, which suggests and supports the decision of firms to increase their cash holdings in order to make shareholders' wealth grow, as Stulz (1999), Coffee (2002) and Doidge et al. (2004) also suggest.

To provide additional support for this finding, I divide the sample into two according to the types of ADR and run regression (1) with a few changes. Since this time I have two samples that differ from each other in their ADR type, I exclude the Exchange ADR dummy variable and the interactive term between the two dummy variables as they are not going to be testing anything in this case. Therefore, column (2) of Table 1 presents the results only for the Exchange ADRs, while column (3) displays the results considering only the OTC ADRs. By looking at the after cross-listing dummy variable it is possible to see that, for the Exchange ADRs, the coefficient is positive and statistically significant, suggesting that after cross-listing firms that issue this type of ADR increase their cash holdings by 4.1 percentage points. As for the OTC ADRs, the coefficient in this variable

is not statistically significant, which means that cross-listing has no significant impact on the cash holdings of firms that issue this type of ADR. The conjugation of these two results imply that indeed cross-listing has a significant impact on cash holdings for firms that issue Exchange ADRs.

In conclusion, I cannot accept my hypothesis H1a, which states that after cross-listing firms increase their cash holdings, relatively to my whole sample. Nothing can be concluded about what happens to corporate cash holdings when considering all types of ADRs. However, there is proof that firms that issued Exchange ADRs increase their cash holdings upon cross-listing, which allows me to accept my hypothesis H1b. A possible explanation – also invoked by Huang et al. (2013) - is the investors' expectations that their money will be better applied by companies after they cross-list in the US, as the level of shareholder protection is better. In other words, the better legal protection environment helps decrease the agency problems of excessive cash holdings.

5.2 Robustness test of sample selection bias

In order to test if my sample is affected by a sample selection bias concerning the types of ADRs, I apply the Heckman (1979) approach. This procedure is also used by several other authors, such as Loureiro (2010) and Doidge et al. (2004), the latter also in the context of cross-listing and bonding hypothesis' tests. The purpose of this test is to verify if my sample is random or if it is biased, which means that I want to test if the Exchange ADR-issuing firms that are included in my sample took the decision to issue that type of ADR based on independent factors instead of doing so due to specific reasons, such as increased financial capability.

The first step in this method is to estimate a probit regression which uses as dependent variable a dummy variable that I want to test for bias, which in my case is the type of ADR. Therefore, the probit regression is as follows:

$$\begin{aligned} ExchangeADR_{i,t} = {} & \beta_1 CrossListing_{i,t} + \beta_2 Inflation_t + \beta_3 MarketBook_{i,t} + \beta_4 Size_{i,t} \\ & + \beta_5 CFAssets_{i,t} + \beta_6 WCAssets_{i,t} + \beta_7 Leverage_{i,t} + \beta_8 IndustrySigma_{i,t} \\ & + \beta_9 RDSales_{i,t} + \beta_{10} Dividend_{i,t} + \beta_{11} Capex_{i,t} + \beta_{12} ExternalFinance_{i,t} \\ & + \eta + \omega + \nu + \varepsilon_{i,t} \end{aligned} \quad (3)$$

The explanatory variables used in this regression are the same that are used in regression (1), but excluding the variable *ExchangeADR*, which is now the dependent variable, and the interactive term *CrossListing*ExchangeADR.* Additionally, it includes a new variable, *ExternalFinance*, which is a measure of dependence on external finance that was developed by Rajan and Zingales (1998). This variable is calculated as the sum of the operational cash flow and

capital expenditures, which is then divided by capital expenditures. It provides the percentage of the operational cash flow that covers the capital expenditures of the firm and, therefore, shows the need of the firm to resort to external finance. Since one of the main motives for firms to cross-list in the US is the access to new sources of capital, this variable is a good determinant of cross-listing, which supports the choice to include this variable in the probit regression.

It is also important to highlight that although equation (3) includes fixed effects, I also applied the regression without them, in order to also test if they have an impact on my results.

Table 5 presents the results of this robustness test. In columns (1) and (2) it is possible to see the results of the probit regression, both with and without fixed effects. In both situations, the new variable, *ExternalFinance*, is statistically significant, which supports the choice of this variable as a determinant of cross-listing in the US.

Table 5 - Robustness test of sample selection bias

This table contains the results for the robustness test, following Heckman's (1979) method, by applying regressions (3) and (4). Columns (1) and (2) present the results of the probit regression (3), while the two last columns present the results of regression (4). Moreover, both columns (1) and (3) include fixed effects, while the other two columns do not include them. More information about the variables can be found in Appendix A. Robust t-statistics are in parentheses. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Variables	**(1)** **Exchange ADR**	**(2)** **Exchange ADR**	**(3)** **Net Cash ratio**	**(4)** **Net Cash ratio**
Constant			0.769***	0.623***
			(6.59)	(3.66)
CrossListing	0.049***	0.066***	-0.009	0.010
	(9.97)	(13.70)	(-0.87)	(0.74)
ExchangeADR			-0.018**	-0.028***
			(-2.11)	(-3.90)
*CrossListing * ExchangeADR*			0.032***	0.042***
			(3.21)	(4.78)
Inflation	0.014***	0.009***	-0.006	-0.005***
	(4.49)	(4.93)	(-1.58)	(-2.66)
MarketBook	0.706	-2.864**	5.285***	1.471
	(0.72)	(-2.39)	(5.08)	(1.60)
Size	0.039***	0.036***	-0.033***	-0.026***
	(23.44)	(20.45)	(-4.80)	(-3.96)
CFAssets	0.074***	0.239***	0.545***	0.536***
	(2.63)	(6.51)	(13.42)	(9.89)
WCAssets	-0.051***	-0.084***	-0.261***	-0.302***
	(-3.93)	(-6.04)	(-15.87)	(-15.98)
Leverage	-0.021	-0.001	-0.244***	-0.291***
	(-1.55)	(-0.05)	(-17.87)	(-29.45)

IndustrySigma	-0.038	0.247***	0.108**	0.174***
	(-0.89)	(8.31)	(2.01)	(3.33)
RDSales	0.509***	0.268***	0.875***	0.961***
	(10.08)	(3.94)	(7.36)	(12.33)
Dividend	-0.021***	-0.037***	-0.033***	-0.010
	(-3.33)	(-4.88)	(-5.35)	(-1.36)
Capex	0.164***	0.617***	-0.626***	-0.614***
	(4.15)	(14.35)	(-12.17)	(-5.59)
ExternalFinance	-0.000*	-0.000***		
	(-1.69)	(-2.60)		
InverseMills			-0.022	-0.005
			(-1.40)	(-0.19)
Observations	10,151	14,634	10,150	14,633
R-squared			0.339	0.259
Pseudo R-squared	0.434	0.156		
Actual Prob.	0.126	0.0967		

The next step in the Heckman (1979) method is to apply my original regression but including an extra element, the "inverse Mills ratio". This new regression is the following:

$$\begin{aligned} NetCashRatio_{i,t} = {} & \alpha + \beta_1 CrossListing_{i,t} + \beta_2 ExchangeADR_{i,t} \\ & + \beta_3 (CrossListing{*}ExchangeADR)_{i,t} + \beta_4 Inflation_t + \beta_5 MarketBook_{i,t} \\ & + \beta_6 Size_{i,t} + \beta_7 CFAssets_{i,t} + \beta_8 WCAssets_{i,t} + \beta_9 Leverage_{i,t} \\ & + \beta_{10} IndustrySigma_{i,t} + \beta_{11} RDSales_{i,t} + \beta_{12} Dividend_{i,t} + \beta_{13} Capex_{i,t} \\ & + \beta_{14} InverseMills_{i,t} + \eta + \omega + \nu + \varepsilon_{i,t} \end{aligned} \quad (4)$$

The new variable, defined as *InverseMills* in equation (4), is computed as explained by Heckman (1979) and demonstrated by Doidge et al. (2004), and is generated using the results of the previous probit model. The inclusion of this term in the regression allows to correct it for self-selection. Also, as I do with the probit regression, I also estimate this regression both with and without fixed effects.

The results of applying regression (4) are shown in columns (3) and (4) of Table 5. By including this new element in the regression, we can see that the results in my main variables, *CrossListing* and *CrossListing*ExchangeADR*, follow the same pattern as before. In other words, after controlling for self-selection, I am still not able to conclude anything about the effects of cross-listing on cash holdings for the whole sample, but considering only Exchange ADRs I again find that firms that issue this type of ADR increase their cash holdings after cross-listing. The increase, however, is larger in this case comparatively with the results that are shown in Table 4. Before

correcting for self-selection, the increase in cash holdings found after cross-listing is 2.8 percentage points. After controlling for bias, the increase is 3.2 percentage points when including fixed effects, while without fixed effects the increase is 4.2 percentage points.

In conclusion, given these results, there is no proof of bias in my sample. Furthermore, it can also be proven that fixed effects do not change the pattern of my results, even though without them the increase in cash holdings is higher.

5.3 Importance of a better financial and legal environment for cross-listing

My second hypothesis has the purpose of testing the veracity of the bonding hypothesis as an explanation for the decision of foreign firms to cross-list in the US. As presented before, the bonding hypothesis states that firms are willing to commit to tighter regulations, higher disclosure and respect shareholders' rights in order to have access to the US market, which includes access to more sources of capital, new securities and more financial and legal tools, as researched by Coffee (1999, 2002), Stulz (1999) and Reese and Weisbach (2002). In my hypothesis, I want to test if by cross-listing, firms that come from countries with higher disparities in economic development and corporate governance standards relatively to the US benefit more from that decision, which means having a larger impact on cash holdings.

To test this hypothesis, I run regression (2) using my whole sample. Additionally, and given the results that I obtain in my first hypothesis, I also run the regression using only the Exchange ADRs, in order to study differences that may arise.

Table 6 presents the results of the regression using three indices related with investor protection: the investor protection index designed by Kaufmann et al. (2009), the anti-director rights index and the anti-self-dealing index. As I do in the first hypothesis, when using a sample with only one type of ADR, I exclude the Exchange ADRs dummy and the interactive term between that dummy and the after cross-listing dummy variable. In this table, the variable of interest is the interactive term between the index dummy and the after cross-listing dummy variable. Starting with the investor protection index, for the whole sample displayed in column (1), the statistically significant coefficient on the interactive term means that firms that come from countries with weaker investor protection than the US increase their cash holdings after cross-listing 1.2 percentage points more than firms that come from countries with better or equal investor protection than the US. This result proves that cross-listing is beneficial for firms that come from countries with worse conditions than the US, in this case investor protection. These findings support what other authors had already proved, as is the case of Huang et al. (2013), Frésard and Salva (2010)

and Dittmar et al. (2003). Looking only at firms that issued Exchange ADRs in column (2), nothing can be concluded, which may suggest that for this type of firms the improvement in financial indicators is not a main driver of cross-listing. However, further analysis is required to be able to claim that. Similarly, nothing can be concluded about the impact of improvements in anti-director rights (columns (3) and (4)) and anti-self-dealing (columns (5) and (6)) regulations. Again, further studies are needed to better understand the impact of these two measures of investor protection, especially for firms that issued Exchange ADRs.

Table 6 - Cross-listing effects on cash holdings given differences in investor protection among countries

This table contains results for the second hypothesis by applying regression (2) and using different investor protection indices. The first and second columns use the investor protection index theorised by Kaufmann et al. (2009). The third and fourth columns use the anti-director rights index created by La Porta et al. (1998). The fifth and sixth columns use the anti-self-dealing index designed by Djankov et al. (2008). Regarding the sample, columns (1), (3) and (5) use the entire sample, while the remaining columns only consider Exchange ADRs. More information about the variables can be found in Appendix A. Robust t-statistics are in parentheses. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Variables	**(1) Net Cash ratio**	**(2) Net Cash ratio**	**(3) Net Cash ratio**	**(4) Net Cash ratio**	**(5) Net Cash ratio**	**(6) Net Cash ratio**
Constant	0.601***	0.590***	0.578***	0.422***	0.561***	0.424***
	(18.05)	(6.67)	(22.64)	(6.03)	(17.56)	(6.01)
CrossListing	-0.001	0.037***	-0.004	0.031*	0.002	0.031*
	(-0.26)	(2.81)	(-0.67)	(1.91)	(0.51)	(1.76)
ExchangeADR	-0.012		-0.016**		-0.015*	
	(-1.38)		(-1.98)		(-1.80)	
*CrossListing * ExchangeADR*	0.024**		0.029***		0.028***	
	(2.53)		(3.26)		(3.09)	
Index (Investor Protection Index)	-0.009	-0.005				
	(-1.41)	(-0.22)				
*CrossListing * Index*	0.012**	0.004				
	(2.12)	(0.22)				
Index (Anti-director Rights Index)			0.014	0.140***		
			(0.56)	(3.93)		
*CrossListing * Index*			0.009	0.017		
			(1.47)	(0.91)		
Index (Anti-self-dealing Index)					0.033	0.145***
					(1.03)	(4.03)
*CrossListing * Index*					0.001	0.015
					(0.20)	(0.76)
Inflation	-0.003	0.001	-0.003	0.002	-0.003	0.002
	(-1.19)	(0.23)	(-1.38)	(0.37)	(-1.41)	(0.32)
MarketBook	5.429***	4.239*	5.297***	4.432*	5.293***	4.458*

	(6.37)	(1.80)	(6.47)	(1.95)	(6.47)	(1.96)
Size	-0.023***	-0.030***	-0.023***	-0.029***	-0.023***	-0.029***
	(-16.72)	(-6.01)	(-17.00)	(-6.05)	(-16.97)	(-6.06)
CFAssets	0.570***	0.452***	0.564***	0.460***	0.563***	0.462***
	(17.42)	(5.27)	(17.69)	(5.53)	(17.67)	(5.52)
WCAssets	-0.298***	-0.220***	-0.294***	-0.222***	-0.295***	-0.222***
	(-22.50)	(-4.60)	(-22.84)	(-4.82)	(-22.85)	(-4.83)
Leverage	-0.260***	-0.154***	-0.262***	-0.170***	-0.262***	-0.169***
	(-23.91)	(-3.46)	(-24.83)	(-3.90)	(-24.83)	(-3.85)
IndustrySigma	0.097**	0.425***	0.111**	0.451***	0.111**	0.453***
	(2.20)	(3.64)	(2.56)	(3.89)	(2.57)	(3.92)
RDSales	0.991***	1.435***	0.979***	1.380***	0.980***	1.385***
	(13.25)	(5.93)	(13.37)	(5.85)	(13.38)	(5.86)
Dividend	-0.033***	-0.020**	-0.031***	-0.016*	-0.031***	-0.016*
	(-7.74)	(-1.96)	(-7.60)	(-1.67)	(-7.62)	(-1.67)
Capex	-0.638***	-0.806***	-0.615***	-0.779***	-0.616***	-0.781***
	(-16.54)	(-7.55)	(-16.53)	(-7.36)	(-16.53)	(-7.41)
Observations	14,105	1,355	14,657	1,419	14,657	1,419
R-squared	0.364	0.663	0.364	0.654	0.363	0.654

Furthermore, Table 7 presents the results of the regression using three other measures: accounting standards, legal system and economic development. The legal system, which is displayed in columns (3) and (4), shows no statistically significant results and requires further analysis. As for the other two, there are some results that allow some conclusions to be reached. Starting with the accounting standards, for the whole sample, which is presented in column (1), the positive and statistically significant coefficient on the interactive term means that firms that come from countries with worse accounting standards than the US increase their cash holdings after cross-listing 1 percentage point more than those which come from countries with equal or better accounting standards than the US. This result proves what Huang et al. (2013), Frésard and Salva (2010) and Pagano et al. (2002) find relatively to the importance of the accounting standards on the decision to cross-list in the US. Again, there is evidence to support that an improvement in corporate governance standards, proposed by the bonding hypothesis, is a driver of cross-listing. To add support to this theory there is the economic development. The results I obtain using my whole sample, which is displayed in column (5), support the idea that firms that come from emerging countries benefit more from cross-listing than those which come from developed countries, as is the US. In my research, firms that come from emerging countries increase their cash holdings after cross-listing 1.8 percentage points more than firms which come from developed

countries. As I show before, the importance of cross-listing to emerging countries is also proven by Coffee (2002), Lins et al. (2005) and Huang et al. (2013).

Table 7 - Cross-listing effects on cash holdings given differences in economic development and corporate governance standards among countries

This table contains results for the second hypothesis by applying regression (2) and using different market indicators. The first and second columns use the accounting standards computed by La Porta et al. (1998). The third and fourth columns use the legal system of the country. The fifth and sixth columns use the economic development. Regarding the sample, columns (1), (3) and (5) use the entire sample, while the remaining columns only consider Exchange ADRs. More information about the variables can be found in Appendix A. Robust t-statistics are in parentheses. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Variables	**(1) Net Cash ratio**	**(2) Net Cash ratio**	**(3) Net Cash ratio**	**(4) Net Cash ratio**	**(5) Net Cash ratio**	**(6) Net Cash ratio**
Constant	0.566***	0.616***	0.563***	0.313***	0.666***	0.528***
	(17.62)	(6.99)	(17.60)	(2.94)	(22.44)	(4.83)
CrossListing	-0.005	0.034**	-0.001	0.029*	-0.000	0.047***
	(-0.88)	(2.18)	(-0.22)	(1.72)	(-0.07)	(3.89)
ExchangeADR	-0.016*		-0.015*		-0.011	
	(-1.92)		(-1.89)		(-1.40)	
*CrossListing * Exchange ADR*	0.029***		0.028***		0.023**	
	(3.21)		(3.17)		(2.53)	
Index (Accounting Standards)	0.027	-0.046				
	(0.84)	(-1.43)				
*CrossListing * Index*	0.010*	0.011				
	(1.89)	(0.58)				
Index (Legal System)			0.030	0.245***		
			(0.92)	(3.79)		
*CrossListing * Index*			0.006	0.021		
			(1.15)	(1.10)		
Index (Economic Development)					-0.084***	0.052
					(-2.82)	(0.65)
*CrossListing * Index*					0.018***	-0.013
					(2.68)	(-0.69)
Inflation	-0.003	0.002	-0.003	0.002	-0.003	0.002
	(-1.42)	(0.33)	(-1.39)	(0.37)	(-1.53)	(0.31)
MarketBook	5.316***	4.454*	5.309***	4.470**	5.252***	4.437*
	(6.49)	(1.96)	(6.48)	(1.96)	(6.42)	(1.95)
Size	-0.023***	-0.029***	-0.023***	-0.029***	-0.023***	-0.029***
	(-17.00)	(-6.06)	(-16.99)	(-5.97)	(-16.93)	(-6.07)
CFAssets	0.563***	0.462***	0.563***	0.460***	0.565***	0.459***
	(17.66)	(5.52)	(17.66)	(5.52)	(17.70)	(5.45)
WCAssets	-0.295***	-0.223***	-0.294***	-0.222***	-0.295***	-0.221***
	(-22.84)	(-4.82)	(-22.83)	(-4.81)	(-22.84)	(-4.81)
Leverage	-0.262***	-0.169***	-0.262***	-0.171***	-0.262***	-0.169***

	(-24.84)	(-3.86)	(-24.84)	(-3.94)	(-24.81)	(-3.84)
IndustrySigma	0.113***	0.451***	0.112**	0.455***	0.110**	0.442***
	(2.59)	(3.89)	(2.57)	(3.92)	(2.54)	(3.83)
RDSales	0.978***	1.386***	0.979***	1.376***	0.982***	1.391***
	(13.35)	(5.87)	(13.37)	(5.84)	(13.44)	(5.99)
Dividend	-0.031***	-0.016*	-0.031***	-0.016	-0.031***	-0.017*
	(-7.60)	(-1.69)	(-7.61)	(-1.64)	(-7.66)	(-1.72)
Capex	-0.614***	-0.781***	-0.615***	-0.776***	-0.615***	-0.779***
	(-16.51)	(-7.42)	(-16.51)	(-7.31)	(-16.55)	(-7.41)
Observations	14,657	1,419	14,657	1,419	14,657	1,419
R-squared	0.364	0.654	0.364	0.654	0.364	0.654

Given the fact that I was not able to find any statistically significant results when testing with only Exchange ADRs I present now an additional analysis to try to prove that there is also an impact in these specific type of ADRs caused by an improvement in economic development and corporate governance standards. The regression I use in this particular case is very similar to regression (2), but excluding the Exchange ADRs dummy and the interactive term between that dummy and the after cross-listing dummy, since I only use Exchange ADRs, and also excluding the index dummy and the interactive term between that variable and the after cross-listing dummy, since now I split the Exchange ADRs sample into two groups depending on the value on each of the indices. Therefore, for each index, I split the Exchange ADRs observations into two groups depending on the value of the home country in that index comparatively to the US score in that same index and run the regression for each group separately. In this case, the variable of interest is the after cross-listing dummy.

Table 8 displays the results for each of the three investor protection measures. Starting with the investor protection index, for the firms that come from countries with weaker investor protection than the US, the positive and statistically significant coefficient in column (1) means that these firms that issued Exchange ADRs increase their cash holdings by 4.6 percentage points after cross-listing. The lack of a statistically significant coefficient in column (2) for the firms from countries with better investor protection than the US means that for those firms cross-listing does not cause a significant impact and, therefore, is not a main driver for them to cross-list in the US. This result for the Exchange ADRs is, thus, the same that I find for the whole sample, which means that the same happens to this group in particular. Regarding the anti-director rights, for the firms from countries with worse anti-director rights' regulations than the US displayed in column (3), after cross-listing they increase their cash holdings by 4.3 percentage points. As for the firms from

countries with better anti-director rights' regulations, there are no statistically significant results in column (4) that allow to derive any crucial impact of cross-listing to those firms. This result supports what Frésard and Salva (2010) conclude regarding the importance of the improvement on this particular indicator, as it shows that cross-listing benefits more firms that come from countries with worse anti-director rights' regulations. Finally, the anti-self-dealing has statistically significant results for both groups. In column (5) it is possible to see that Exchange ADR-issuing firms that come from countries with worse anti-self-dealing regulations than the US increase their cash holdings after cross-listing by 4.4 percentage points, while in column (6) it is shown that firms from countries with better anti-self-dealing regulations increase their cash holdings by 4.7 percentage points after cross-listing. By performing a z-test[2] it can be concluded that this difference in these two coefficients is not statistically significant, which means that it cannot be said that one of the groups increases more than the other. What can be derived from these results is that for Exchange ADRs the anti-self-dealing is not a main driver, since firms which come from environments with either worse or better regulations seem to increase their cash holdings and that difference in coefficients is not statistically significant. Regarding this particular aspect, Frésard and Salva (2010) find that this indicator was a driver for cross-listing, a conclusion for which I do not find support.

Table 8 - Cross-listing effects on cash holdings for Exchange ADRs' issuers given differences in investor protection among countries

This table contains results for the second hypothesis by applying regression (2), using different investor protection indices and only considering Exchange ADRs. The first and second columns use the investor protection index theorised by Kaufmann et al. (2009). The third and fourth columns use the anti-director rights index created by La Porta et al. (1998). The fifth and sixth columns use the anti-self-dealing index designed by Djankov et al. (2008). Regarding the sample, columns (1), (3) and (5) use the issuers from countries with scores lower than the US' score, while the remaining columns only consider firms from countries with higher results in those indices. More information about the variables can be found in Appendix A. Robust t-statistics are in parentheses. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Variables	**(1) Net Cash ratio**	**(2) Net Cash ratio**	**(3) Net Cash ratio**	**(4) Net Cash ratio**	**(5) Net Cash ratio**	**(6) Net Cash ratio**
Constant	0.760***	0.309**	0.451***	0.052	0.419***	0.463***
	(6.65)	(2.13)	(3.49)	(0.40)	(3.60)	(2.82)
CrossListing	0.046**	0.021	0.043***	0.009	0.044***	0.047**
	(2.57)	(1.39)	(3.20)	(0.55)	(3.32)	(2.30)
Inflation	0.000	-0.004	-0.002	0.007	0.012	-0.012
	(0.02)	(-0.35)	(-0.23)	(0.79)	(1.59)	(-1.29)
MarketBook	5.354	1.581	11.592***	-2.423	-0.021	10.865***

[2] See Appendix B for more information about the z-test performed.

	(1.30)	(0.67)	(3.53)	(-0.80)	(-0.01)	(3.39)
Size	-0.045***	-0.012	-0.027***	-0.008	-0.020***	-0.020**
	(-6.92)	(-1.55)	(-3.62)	(-0.92)	(-3.71)	(-2.11)
CFAssets	0.716***	0.043	0.661***	0.230	0.507***	0.286**
	(6.13)	(0.36)	(6.70)	(1.57)	(5.02)	(2.37)
WCAssets	-0.146**	-0.282***	-0.152***	-0.150*	-0.136***	-0.356***
	(-2.54)	(-3.22)	(-2.64)	(-1.95)	(-2.61)	(-4.28)
Leverage	-0.008	-0.366***	-0.082	-0.368***	-0.051	-0.411***
	(-0.14)	(-5.05)	(-1.63)	(-4.38)	(-1.09)	(-4.68)
IndustrySigma	0.349***	0.445**	0.252***	0.797***	0.252***	0.536**
	(3.10)	(2.19)	(2.79)	(2.99)	(2.87)	(2.25)
RDSales	1.454***	1.209***	1.293***	0.411*	0.758***	0.754**
	(4.80)	(3.84)	(5.30)	(1.68)	(3.38)	(2.18)
Dividend	-0.045***	0.004	-0.043***	-0.005	-0.009	-0.014
	(-3.13)	(0.27)	(-3.49)	(-0.34)	(-0.92)	(-0.74)
Capex	-1.040***	0.252	-0.941***	-0.141	-0.833***	-0.368*
	(-7.94)	(1.17)	(-7.69)	(-0.77)	(-7.23)	(-1.88)
Observations	882	473	1,035	384	914	505
R-squared	0.718	0.545	0.729	0.561	0.477	0.795

The other three measures are displayed in Table 9. The results for the accounting standards presented in columns (1) and (2) show that the Exchange ADRs follow the same pattern as the whole sample evidenced earlier. In column (1) it is visible that firms from countries with worse accounting standards than the US increase their cash holdings after cross-listing by 4.4 percentage points, while for the other ones the impact is not statistically significant, meaning that cross-listing is driven by an improvement in accounting standards for firms that issued Exchange ADRs, the same that is demonstrated before for the whole sample. Regarding the legal system, in column (3) it is shown that firms that come from countries influenced by the Civil Law increase their cash holdings upon cross-listing by 4.9 percentage points. For firms from Common Law countries, the coefficient in column (4) is not statistically significant. Therefore, the effects that the legal system has in a country, mainly in terms of regulations and corporate governance, is proven to be also a driver of cross-listing, as those that come from a country influenced by a different legal system than the US suffer a significant impact on cash holdings. These results support the findings of Dittmar et al. (2003) and Chang and Noorbakhsh (2006) regarding firms from Civil Law countries holding more cash. Finally, in columns (5) and (6) one can see the impact of coming from an emerging or a developed country, respectively. In both cases the results are statistically significant. For the emerging countries, the increase in cash holdings after cross-listing is 3.4 percentage points, while for developed countries the increase is 2.5 percentage points. However, by performing

a z-test[3], the difference between the two coefficients is proven not to be statistically significant. Therefore, it cannot be concluded that for Exchange ADRs the change in economic development of the environment in which the firm is operating is a main driver for cross-listing, contrary to what I find for the full sample and also to what is found in the literature.

Table 9 - Cross-listing effects on cash holdings for Exchange ADRs' issuers given differences in economic development and corporate governance standards among countries

This table contains results for the second hypothesis by applying regression (2), using different market indicators and only considering Exchange ADRs. The first and second columns use the accounting standards computed by La Porta et al. (1998). The third and fourth columns use the legal system of the country. The fifth and sixth columns use the economic development. Regarding the sample, column (1) uses the issuers from countries with scores lower than the US' score, while column (2) only considers firms from countries with higher results in that index. Column (3) only uses firms from Civil Law countries, whereas column (4) represents firms from Common Law countries. Column (5) uses only firms from emerging countries, while column (6) considers solely firms from developed countries. More information about the variables can be found in Appendix A. Robust t-statistics are in parentheses. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level.

Variables	**(1) Net Cash ratio**	**(2) Net Cash ratio**	**(3) Net Cash ratio**	**(4) Net Cash ratio**	**(5) Net Cash ratio**	**(6) Net Cash ratio**
Constant	0.626***	0.435***	0.428***	0.223	0.788***	0.283**
	(6.16)	(2.83)	(3.67)	(1.42)	(7.12)	(2.08)
CrossListing	0.044***	-0.011	0.049***	-0.001	0.034*	0.025*
	(3.19)	(-0.70)	(3.82)	(-0.06)	(1.71)	(1.82)
Inflation	0.005	-0.015*	0.003	-0.002	0.001	-0.002
	(0.60)	(-1.77)	(0.40)	(-0.23)	(0.09)	(-0.20)
MarketBook	7.911**	1.237	13.034***	-0.252	1.371	0.343
	(2.27)	(0.53)	(3.45)	(-0.09)	(0.32)	(0.17)
Size	-0.037***	-0.022***	-0.029***	-0.007	-0.048***	-0.009
	(-6.34)	(-2.62)	(-4.55)	(-0.82)	(-7.59)	(-1.22)
CFAssets	0.642***	0.070	0.686***	0.179	0.711***	0.074
	(6.19)	(0.60)	(6.53)	(1.31)	(5.99)	(0.66)
WCAssets	-0.192***	-0.261**	-0.148**	-0.144*	-0.157***	-0.153***
	(-3.66)	(-2.37)	(-2.56)	(-1.78)	(-2.96)	(-3.04)
Leverage	-0.117**	-0.271***	-0.088*	-0.366***	-0.018	-0.329***
	(-2.24)	(-4.04)	(-1.73)	(-4.32)	(-0.31)	(-5.13)
IndustrySigma	0.316***	0.969***	0.272***	0.800***	0.323**	0.333**
	(3.13)	(2.68)	(2.98)	(3.15)	(2.46)	(2.25)
RDSales	1.433***	0.432	1.323***	0.408*	1.139***	1.119***
	(5.64)	(1.60)	(5.35)	(1.67)	(3.41)	(3.62)
Dividend	-0.026**	-0.005	-0.036***	-0.003	-0.033**	-0.007
	(-2.05)	(-0.35)	(-2.87)	(-0.20)	(-2.16)	(-0.66)

[3] See Appendix B for more information about the z-test performed.

Capex	-0.942***	0.273	-0.972***	-0.048	-0.904***	0.118
	(-8.00)	(1.56)	(-7.96)	(-0.25)	(-7.01)	(0.60)
Observations	1,116	303	1,039	380	834	585
R-squared	0.683	0.611	0.735	0.543	0.727	0.520

In conclusion, the results that I find in general allow me to accept my second hypothesis. All the statistically significant results that I get indicate that firms increase more their cash holdings if they come from a country that has worse corporate governance standards and lower economic development than the US. However, it is important to highlight that I do not find those results for all the conditions that I test, and for some I just find significant results for a portion of the sample. Nevertheless, the majority of them are according to what is expected given the literature and, therefore, the bonding hypothesis seems to hold as an explanation for the decision of foreign firms to cross-list in the US.

6. Conclusions

My study provides an additional test of the impact of cross-listing on corporate cash holdings, an issue that has not deserved much attention in the finance literature. Globalisation and internationalisation are subjects that have gained importance in recent years and for some firms they have been what has saved them from closing doors. For others, it has allowed them to find new markets, enabling them to grow in ways that would not be possible if they only remained in their home market. Cross-listing is one of the tools used by those firms that started looking beyond their national borders for growth opportunities that were waiting for them. There is still much to study regarding this topic, its implications and motives. In my particular case I study one of its implications: the levels of cash held by firms.

By association, it would be expected to find that, by cross-listing in one of the most developed markets of the world, the necessity to hold cash would be closer to zero. However, as some authors previously state, that may not always be the case. Indeed, firms no longer need to hold cash due to precautionary reasons, but they find that their money can be better invested in this new market, which allows them to increase immensely their wealth and, therefore, shareholders' wealth.

In my research I obtain results that allow me to concur with them. Firms that issue Exchange ADRs (the most stringent type of ADR, but also the one that provides more attractive benefits) increase more their cash holdings than those that choose to issue ADRs in over-the-

counter markets. This result points to the fact that issuers of Exchange ADRs are aware that they have the opportunity to have a better valuation of their liquid assets and, thus, to increase their wealth.

Besides that, with my study I am able to construct a profile of the firms that benefit more from cross-listing. When including all types of ADRs, I find that the firms that increase more their cash holdings after cross-listing are the ones that come from emerging economies and countries with worse investor protection and accounting standards than the US. Moreover, when considering only Exchange ADRs, I find that those that benefit more from cross-listing are the firms that come from countries influenced by Civil Law and that have worse investor protection, anti-director rights regulations and accounting standards than the US.

It is imperative to note that given the results I get from my first hypothesis, the conclusions that I find in respect to Exchange ADRs have an increased importance. My research provides special contribution to the effects of issuing Exchange ADRs, proving that the bonding hypothesis appears to be the most accurate explanation for the decision to cross-list in the US. Firms are willing to adhere to stricter regulations in order to have access to a wider market in terms of investors and securities.

Finally, it is important to point out that there is still much to be found and discussed. Although there are already some databases that cover the topic, they need to be improved in order to offer options that allow other types of studies to be performed. The research opportunities for this subject are various and undoubtedly they will start to be taken so that the literature can keep growing and the databases consequently improved.

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Appendix A – Variables' Description

Variable	Description
NetCashRatio	Ratio of cash (WC02001) and net assets. Net assets computed as total assets (WC02999) minus cash (WC02001).
CrossListing	Dummy variable. Assumes 1 if in that year the firm was holding an ADR, 0 otherwise. For the year of issuance, it assumes 1 and for the year of closure it assumes 0. Date of issue and closure of ADR obtained in the Citibank website.
ExchangeADR	Dummy variable. Assumes 1 if the firm issued a Level II or III ADR and 0 if it issued a Level I ADR. For firms with both types during the time period considered (2000-2015), two observations are created. Type of ADR obtained in the Citibank website.
*CrossListing * ExchangeADR*	Interactive term. Results from the product of *CrossListing* and *ExchangeADR*.
Inflation	Inflation rate of the US. Obtained using the Consumer Price Index (growth rate from one year to another). CPI collected from Datastream.
MarketBook	Market-to-book ratio. Computed dividing the market value (MV) by the book value of equity (WC03501).
Size	Firm size. Computed as the natural logarithm of total assets (WC02999).
CFAssets	Ratio of cash flows and net assets. Cash flows calculated as earnings before interest, taxes, dividends and depreciations (WC18198) minus interest (WC01251), taxes (WC01451) and common dividends (WC05376). Net assets computed as total assets (WC02999) minus cash (WC02001).
WCAssets	Ratio of net working capital and net assets. Net working capital calculated as current assets (WC02201) minus current liabilities (WC03101) and cash (WC02001). Net assets computed as total assets (WC02999) minus cash (WC02001).
Leverage	Total leverage of the firm. Computed as the ratio of total debt (WC03255) and total assets (WC02999).

IndustrySigma	Sigma of the industry (measure of volatility of the industry cash flows) for a period of 10 years. Computed as the rolling average of the previous 10 years of the ratio of cash flow to net assets for each firm, followed by calculating the standard deviation of the average cash-flow-to-net-assets ratio for each industry sector. Cash flows calculated as earnings before interest, taxes, dividends and depreciations (WC18198) minus interest (WC01251), taxes (WC01451) and common dividends (WC05376). Net assets computed as total assets (WC02999) minus cash (WC02001). Industry sector given by the first two digits of the SIC code (WC07021).
RDSales	Ratio of Research and Development expenses (WC01201) and net sales (WC01001).
Dividend	Dummy variable. Assumes 1 if the firm paid dividends in that year, 0 otherwise. Information about dividends collect from Worldscope (WC09504).
Capex	Ratio of capital expenditures (WC04601) and net assets. Net assets computed as total assets (WC02999) minus cash (WC02001).
ExternalFinance	Measure of dependence on external finance. Computed as the ratio of capital expenditures (WC04601) minus earnings before interest, taxes, dividends and depreciations (WC18198) and capital expenditures (WC04601).
InverseMills	"Inverse Mills ratio" described in Heckman's (1979) method and demonstrated by Doidge et al. (2004).
Index	Dummy variable. Assumes 1 if the firm comes from: - a country that has a value in the index that is below the value of the US in that index (for the investor protection index, anti-director rights index, anti-self-dealing index and accounting standards); - a Civil Law country; - an emerging country. It assumes 0 otherwise. The countries that do not exhibit values in the anti-director rights index and accounting standards are assumed to have a score lower than the US and, therefore, assume 1 in this dummy variable.
*CrossListing * Index*	Interactive term. Results from the product of *CrossListing* and *Index*.

Appendix B – Z-tests

In order to test if the difference between the coefficient of the same variable applied to different samples is statistically significant, I perform a z-test. The purpose of that is to test if the coefficients are the same in the two subsamples. The null hypothesis in this case is that both coefficients are the same.

I apply this test in two situations. Both include only Exchange ADRs and the sample split is based on high and low anti-self-dealing regulations, and emerging and developed countries. The general formula of the test is:

$$z = \frac{(\beta_1 - \beta_2)}{(se(\beta_1)^2 + se(\beta_2)^2)^{\frac{1}{2}}} \sim N(0,1) \quad (5)$$

Firstly, I use this method with the anti-self-dealing index created by Djankov et al. (2008). The values used to calculate the z-test are the following:

	Lower than the US	**Higher than the US**
Coefficient β	0.0437592	0.0470885
Standard error	0.0131629	0.0204859

The z-stat is, therefore, -0.137 and the correspondent p-value is 0.446. It cannot be concluded that the results obtained with the sample split are statistically different from each other.

The second application of this method is with the economic development. The values used for the z-test in this case are the following:

	Emerging	**Developed**
Coefficient β	0.0336263	0.0247845
Standard error	0.0196503	0.0136011

The z-stat in this situation is -0.370 and the correspondent p-value is 0.356. Once again it can be concluded that there is no statistical significance that supports the necessity of estimating two different models, as the coefficients resulting from them are not statistically different from each other.