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LISTE DES ABRÉVIATIONS, SIGLES ET ACRONYMES

ADR	American Depositary Receipts
CRSP	Center for Research in Security Prices
EBITDA	Earnings before Interest, Taxes, Depreciation, and Amortization
ISIN	International Securities Identification Number
NASDAQ	National Association of Securities Dealers Automated Quotations
NYSE	New York Stock Exchange
OTC	Over-the-Counter
PORTAL	Private Offerings, Resales and Trading through Automated Linkages
PDI	Power Distance Index
QIB	Qualified Institutional Buyers
SEC	Securities and Exchange Commission
SOX	Sarbanes-Oxley
UAI	Uncertainty Avoidance Index
US GAAP	US Generally Accepted Accounting Principles

RÉSUMÉ

Cette thèse comprend trois articles visant à éclairer l'impact des inscriptions croisées et des activités des analystes sur l'environnement informationnel des entreprises à travers le monde.

Dans le premier article, nous étudions l'influence des inscriptions croisées sur la relation entre le cours boursier et le bénéfice tant actuel que futur de l'entreprise. Notre apport réside surtout dans une mesure intuitive d'informativité des prix et dans l'examen de l'association qui peut exister entre cette mesure et la décision de s'inscrire à la cote américaine. L'informativité des prix est approximée par la quantité d'informations sur les bénéfices futurs que contiennent les prix actuels des actions (des prix plus informatifs doivent refléter plus d'informations sur les bénéfices futurs de l'entreprise). Nos résultats suggèrent que l'inscription croisée à une bourse américaine ne contribue pas à intégrer plus d'informations sur les bénéfices futurs dans les prix de marché actuels. En général, il apparait que le mécanisme des inscriptions croisées n'a aucun impact sur l'environnement informationnel des firmes non américaines.

Le second article vise à clarifier l'impact des activités des analystes financiers sur l'informativité des prix. En particulier, nous examinons si ces activités améliorent le processus d'incorporation de l'information privée au niveau des prix de marché. L'habileté des analystes à prévoir ou influencer les prix des actifs financiers a fait l'objet de plusieurs études dans la littérature financière et comptable. Toutefois, il existe très peu de recherches qui associent de telles activités au processus de formation des prix (processus par lequel l'information est incorporée au prix de marché des actions). Nous espérons que cette étude va contribuer à une meilleure compréhension de l'impact des analystes sur le processus de formation des prix. Dans notre analyse, nous utilisons la même mesure d'informativité des prix qui est proposée dans le premier papier. Par conséquent, on considère qu'une plus grande informativité des prix est reliée à l'incorporation de plus d'informations sur les bénéfices futurs dans les prix de marché actuels. Nos résultats indiquent que le suivi des analystes, au niveau des marchés développés, permet aux prix des actions d'incorporer plus d'information au sujet des bénéfices futurs de la firme. Dans le cas des marchés émergents, nos résultats suggèrent que les analystes financiers agissent en tant que simples intermédiaires financiers au lieu d'agents capables de réduire les asymétries d'information au niveau des marchés financiers.

Le troisième article se focalise sur la relation entre l'inscription croisée et les contraintes financières des firmes. L'objectif de ce papier est d'examiner si l'inscription croisée à la cote américaine permet de réduire les contraintes financières des entreprises. Pour tester cette hypothèse, nous utilisons la relation entre l'investissement et les cash-flows comme une mesure d'approximation de la présence et de l'importance des contraintes de financement. Un important courant de recherche interprète une plus grande sensibilité de l'investissement aux cash-flows comme une preuve que les firmes ont des contraintes de financement élevées.

Dans notre étude, nous différencions les entreprises non US qui sont inscrites à la cote américaine des entreprises non inscrites, et comparons la sensibilité des dépenses d'investissement aux cash-flows entre les deux sous-échantillons. Nos résultats indiquent une réduction significative des contraintes de financement pour les sociétés non américaines qui ont coté leurs actions sur l'une des bourses US. De plus, les bénéfices financiers associés aux inscriptions à des bourses US (NASDAQ et NYSE) sont plus importants par rapport à ceux générés par les programmes privés (Rule 144A). D'un autre côté, les programmes qui se négocient sur le marché hors cote (Over-the-Counter) n'offrent pas de bénéfices financiers similaires à ceux des programmes boursiers et privés. Nos résultats indiquent aussi que la réduction des contraintes de financement est plus prononcée pour les entreprises originaires de marchés émergents.

Mots clés : Inscriptions croisées, Théorie du bonding, asymétrie d'information, activités des analystes, informativité des prix, prévisions des bénéfices, dépenses d'investissement, contraintes de financement

ABSTRACT

This thesis consists of three papers addressing the impact of US cross-listings and analysts' coverage on the information environment of corporations around the world.

In the first paper, we investigate how US cross-listings affect the relation between current stock prices, contemporaneous earnings and future earnings. Our main contribution is to propose an intuitive measure of stock price informativeness that relies on fundamental data, namely earnings, and examine its relation with the cross-listing decision. Our summary measure defines how much information current stocks prices contain about future earnings (more informative stocks prices contain more information about future earnings). We find that US exchange cross-listings do not contribute to impound more earnings information into stock prices, in accord with the view that US exchange cross-listings have a neutral effect on the firm's information environment. This result is robust to many aspects of our methodology. On the other hand, consistent with their minimal incremental disclosure requirements, non exchange cross-listings also experience an insignificant change in their price informativeness.

The second paper aims at clarifying the impact of analyst coverage on stock price informativeness. In particular, we examine whether analysts' activities improve the flow of private information into stock prices. The ability of analysts to predict or influence stock prices has been the subject of extensive analysis in accounting and finance. However, there has been little evidence showing that analyst coverage is related to price discovery (the process by which information is incorporated into stock prices). We expect this research to contribute to a better understanding of how analysts impact the price information process. In our analysis, we rely on the same measure of price informativeness we first used in paper 1. Therefore, we consider that higher stock price informativeness is associated with more information about future earnings being impounded in current prices. Our results indicate that analyst coverage, in developed markets, improves the flow of private information into stock prices. In emerging countries, our findings suggest that financial analysts act primary as intermediaries rather than private information providers.

The third paper focuses on the relation between US cross-listing and firm's financing constraints. The purpose of this paper is to investigate whether relaxation of financial constraints is an important outcome of the US cross-listing decision. To test such vital economic role, we use the relation between investment and cash flow as a proxy for the presence and importance of firm's financing constraints. Considerable research interprets greater investment-cash flow sensitivity as evidence that firms are financially constrained. In our study, we differentiate between cross-listed and non cross-listed firms and compare the investment-cash flow sensitivity between the two subsamples. Consistent with the bonding hypothesis, we find that US exchange cross-listing significantly alleviates firm's financing constraints. Further, the financial benefits associated with exchange cross-listings are larger in comparison to private placements listings (Rule 144A). On the other hand, over-the-Counter (OTC) programs do not offer comparable financial benefits as exchange or private

placements listings. Our results also indicate that the financial impact of US cross-listings is more pronounced for emerging markets firms.

Keywords: US cross-listings, bonding hypothesis, asymmetric information, analyst coverage, stock price informativeness, firm-specific information, earnings forecasts, investment spending, financing constraints

INTRODUCTION GÉNÉRALE

Un environnement informationnel enrichi en quantité, pertinence et précision, permet censément aux investisseurs de mieux appréhender la réalité économique de la firme. En effet, plus d'information pertinente et précise devrait réduire l'asymétrie d'information et rendre l'investisseur plus apte à évaluer l'avenir de la firme. Dans cette thèse, nous étudions l'impact de l'inscription croisée (surtout aux États-Unis) et du suivi des analystes financiers sur l'environnement informationnel des firmes. En particulier, deux articles de la présente thèse concernent les effets de l'inscription croisée sur le processus de formation des prix et sur les décisions d'investissements des firmes. Notre troisième article examine la manière dont les analystes financiers influent sur l'informativité des prix au niveau des marchés financiers. En gros, nous visons à vérifier si la cotation croisée au niveau du marché américain et un plus grand suivi de la part des analystes financiers sont associés à une meilleure accessibilité informationnelle.

Nous privilégions divers facteurs informationnels vu que ces derniers devraient augmenter la visibilité de la firme et le degré d'efficience des marchés. En effet, tant les asymétries d'information que les carences en matière de contrôle managérial et de protection des actionnaires minoritaires influent sur le financement et l'évaluation des entreprises. Le risque que les dirigeants de l'entreprise exploitent des informations privilégiées au détriment des actionnaires minoritaires engendre des coûts d'agence. En 1976, Jensen et Meckling ont mis en relief l'importance de la relation principal-agent puisque chaque groupe cherche à maximiser sa propre utilité au détriment de l'autre. Par conséquent, les conflits d'intérêts actionnaires-gestionnaires peuvent freiner la bonne marche de l'entreprise (difficultés de financement...).

Ce chapitre introductif est organisé de la manière suivante. En première partie, on aborde ce qui motive et résulte de l'inscription croisée. La seconde partie donne un aperçu sur le rôle des analystes financiers comme producteurs d'information. Dans ces deux parties, nous nous attacherons à situer notre travail de recherche par rapport à la littérature existante.

1. Motivations et conséquences de l'inscription croisée

Les études abondent sur les effets de l'inscription croisée à la cote américaine. Avant l'an 2000, la recherche, dans le domaine, est plutôt quantitative mesurant divers impacts de l'inscription croisée sur la valeur de la firme, sur son coût de capital et sur la liquidité de ses titres. Depuis 2000, le courant de recherche s'oriente vers les aspects qualitatifs, notamment la gouvernance d'entreprise et l'environnement informationnel des firmes. Avant de faire le point sur ces acquis quantitatifs et qualitatifs, nous présentons, dans un premier lieu, les différentes formes de la multicotation aux USA.

2. Les mécanismes de l'inscription croisée

Pour répondre aux besoins d'une vaste gamme d'entreprises, la place boursière américaine a crée plusieurs catégories d'inscription, chacune avec ses exigences et avantages potentiels pour l'investisseur. Ainsi, les entreprises non américaines peuvent choisir la cotation ordinaire, aussi prestigieuse qu'exigeante, ou encore, l'inscription via des émissions de certificats américains d'actions étrangères (dits «American Depositary Receipts» ou ADRs). Signalons que l'inscription croisée à la cote américaine se fait surtout via des ADRs. Ces derniers représentent des certificats négociables qui sont émis par une banque américaine et adossés à diverses quantités d'actions étrangères détenues en fiducie à l'étranger.

Il existe quatre programmes d'accès (ADRs) aux marchés financiers américains qu'on étiquette soit par les niveaux I, II et III ou par la régle144A. Les trois premiers sont ouverts au grand public. Par contre, l'accès via la règle 144A est réservé aux investisseurs institutionnels (Qualified Institutional Buyers ou QIBs).

- ✓ Les ADR de niveau I, également appelés «feuilles roses», se négocient sur le marché hors cote (OTC) et sont peu liquides. Les exigences d'information imposées à leur émetteur par la SEC sont minimales et les états financiers n'ont pas à être dressés selon les principes comptables généralement reconnus des États-Unis (US GAAP). Les ADR de niveau I ne permettent pas de lever des capitaux.

- ✓ Les ADR de niveau II sont choisis par les sociétés étrangères qui désirent coter leurs actions sur l'une des bourses américaines (NYSE et NASDAQ). Pour ce type de programme, la SEC exige des documents et des standards précis relatifs à la publication des informations financières et comptables ainsi que le respect des normes US GAAP. Les certificats de niveau II ne permettent pas la levée des capitaux.

- ✓ Les ADR de niveau III s'adressent aux entreprises étrangères qui souhaitent, à la fois, lever des capitaux et être cotées à une bourse américaine (NYSE et NASDAQ). En contrepartie, ces entreprises doivent convertir leur comptabilité aux standards américains et offrir le même niveau d'information que les entreprises américaines. Il s'agit de la procédure la plus élaborée mais aussi celle qui est la plus susceptible d'améliorer la liquidité des actions et les conditions de financement des entreprises étrangères.

- ✓ Les ADR de type 144A ne sont pas cotés en bourse mais permettent aux entreprises étrangères de lever des capitaux avec des contraintes limitées (prospectus aux normes US), à condition de ne vendre qu'à des investisseurs spécifiques (les QIBs).

3. Les aspects quantitatifs de l'inscription croisée

Les écrits d'avant 2000 sur l'inscription croisée abondent. Ils s'attachent surtout à ses effets sur :

a) la valeur des actions;

b) le coût du capital et l'exposition au risque; et,

c) la liquidité des actions.

En principe, l'inscription croisée aux USA n'a pas d'effet si les marchés concernés sont parfaitement intégrés. Comme ce n'est pas le cas, divers modèles avec barrières à l'investissement international sont apparus (Black, 1974; Stapleton et Subramanyam, 1977; Stultz, 1981; Errunza et Losq, 1985; etc). De tels modèles suggèrent que l'inscription croisée

sur deux marchés non intégrés a un effet positif sur le cours d'un titre et négatif sur sa prime de risque.

Plusieurs travaux indiquent que les actions intercotées croissent en valeur avant l'inscription aux USA et peu après. Toutefois, la hausse se dissiperait dans l'année qui suit. Dans la littérature, la baisse qu'accuse le cours de l'action est souvent attribuée non pas à l'intercotation en soi, mais à des facteurs propres à l'entreprise. Ainsi, on observe une dissipation de valeur plus prononcée pour les petites firmes.

En 1999, Miller étudie 181 entreprises qui annoncent pour la première fois une émission d'ADRs entre 1985 et 1995. Dans son analyse, Miller recours à l'approche événementielle classique. Il trouve une performance moyenne anormale significative de 1.15% dans les 3 jours ouvrables centrés sur l'annonce (-1, t=0, +1). De plus, en accumulant les rendements anormaux jusqu'à t=125; Miller voit disparaitre l'anormalité dans les rendements des titres. Quant à Foerster et Karolyi (1999), ils ont examiné 153 firmes émettrices d'ADRs de type II et III sur une fenêtre de 2 ans autour du jour de l'annonce. Leurs résultats suggèrent que les actions intercotées connaissent cumulativement un rendement anormal positif sur 53 semaines (- 1 an à + 1 semaine après le jour de l'annonce) et une baisse significative dans les 51 semaines subséquentes. Pour leur part, Errunza et Miller (2000) ont analysé l'impact de la multicotation sur le coût de capital de 126 firmes émettrices d'ADRs entre 1985 et 1994. Leurs résultats indiquent que la cotation élargie aux USA a réduit leur le coût de capital. Pareillement, Hail et Leuz (2009) observent aussi une baisse de ce coût suite à une cotation étendue aux USA.

Pour ce qui est de la liquidité et des frais de transactions, les résultats de plusieurs travaux empiriques (Foerster et Karolyi, 1998 ; Domowitz et al. 1998; et Smith et Sofianos, 1997) suggèrent que l'écart entre le cours acheteur-vendeur diminue sur le marché domestique une fois le titre est inscrit à la cote américaine. On a aussi noté, sans surprise, une hausse du volume total négocié. Par ailleurs, une liquidité accrue suite à une inscription croisée se répercute en frais de transactions amoindris (Foerster et Karolyi, 1998).

Jusqu'en 2000, l'hypothèse dominante voulait que l'inscription croisée profite plus aux firmes issues d'un marché non intégré avec ceux des USA. Depuis lors, plusieurs auteurs remettent en question cette hypothèse vu que :

a) même si la multicotation peut réduire le coût de capital, 9 firmes non américaines sur 10 n'y recourent pas (Doidge et al, 2004).

b) les firmes cotées sur des marchés non américains qui s'avèrent intégrés aux marchés US (le cas du Canada) bénéficient de l'inscription croisée tout autant que les firmes issues de marchés non intégrés; et,

c) malgré l'intégration croissante des marchés financiers, l'inscription croisée à la cote américaine demeure importante.

Devant le manque de convergences dans les résultats antérieurs, Coffee (1999) et Stulz (1999) ont amorcé un nouveau courant de recherche ou l'on relie l'inscription croisée à la gouvernance d'entreprise.

4. Les aspects qualitatifs de l'inscription croisée

L'inscription croisée aiderait la firme étrangère à contourner les sources de conflits d'intérêts entre les actionnaires et les gestionnaires. En effet, en élargissant son inscription boursière aux USA, la firme étrangère bénéficierait d'une meilleure régie du fait qu'elle se trouve liée par des normes de gouvernance très strictes. Coffee (1999) et Stulz (1999) ont été les premiers à suggérer cette motivation de l'inscription croisée (hypothèse de l'engagement dite «bonding hypothesis»). Ces auteurs estiment que l'inter-cotation oblige les dirigeants de l'entreprise à respecter des normes de gouvernance accrues et à renoncer à l'expropriation des actionnaires minoritaires, en contrepartie des bénéfices liés à cette opération.

L'hypothèse de l'engagement veut que :

a) L'information poussée, exigée de la firme étrangère par la SEC, atténue le risque que les dirigeants de l'entreprise exploitent des informations privilégiées.

b) La publication des états financiers selon les principes comptables américains pousse les entreprises étrangères à produire des états financiers plus informatifs en comparaison à ceux découlant de la seule application des normes comptables nationales.

c) L'inscription en bourse américaine enrichit l'environnement informationnel de la firme du fait d'une couverture accrue par les médias et les analystes financiers.

Les tests de la «théorie de l'engagement» portent à croire que l'inscription croisée en bourses américaines profite à l'investisseur (Resse et Weisbach, 2002 ; Doidge 2004 ; et Doidge et al, 2009). Nos articles 1 et 3 s'inscrivent dans ce courant de recherche qui s'intéresse aux liens entre la gouvernance d'entreprise et l'inscription croisée. Dans le premier, nous testons l'influence des inscriptions croisées sur le processus de formation des prix. En particulier, nous voyons si en s'inscrivant à la cote américaine, l'entreprise étrangère permet à ces prix d'intégrer plus d'informations au sujet des bénéfices futurs de la firme. Notre principale contribution consiste à proposer une mesure intuitive d'informativité des prix qui est utilisée pour la première fois au niveau de la littérature qui traite des effets de l'inscription croisée. Dans le 3éme article, nous testons s'il y a ce lien plausible entre la multicotation d'une firme et son financement à meilleur coût. En effet, si plus de transparence et moins d'asymétrie d'information résultent de la multicotation, l'investisseur potentiel devenu plus renseigné va en exiger un rendement plus bas.

5. Les analystes financiers et l'informativité des prix

Le rôle des analystes au sein des marchés financiers a fait l'objet de plusieurs études dans la littérature financière et comptable. Généralement, les analystes sont considérés comme des experts dont le rôle principal consiste à émettre des prévisions sur les résultats futurs de

l'entreprise et à analyser les entreprises qu'ils recommandent par la suite à l'achat ou à la vente. Ces agents financiers ont été étudiés, principalement, en rapport avec l'hypothèse d'efficience des marchés. Ils ont aussi fait l'objet de recherches qui confrontent l'hypothèse de la rationalité à celle des biais cognitifs (littérature behavioriste). Par ailleurs, certains auteurs se sont aussi intéressés aux motivations économiques des analystes financiers et de leurs employeurs (banques d'affaires et sociétés de courtage). À travers notre deuxième article, nous espérons apporter une contribution au niveau de l'impact des activités des analystes sur l'informativité des prix. Pour cela, nous utilisons la même mesure d'informativité des prix qui est proposée dans notre premier article. Notre objectif est de tester si un suivi plus accru de la part des analystes se traduit par des prix de marchés reflétant plus d'informations sur les bénéfices futurs de l'entreprise.

Dans la perspective de l'hypothèse d'efficience semi-forte, si les analystes financiers sont capables de collecter de l'information privée, la publication des résultats de leurs recherches devrait être associée à des rentabilités anormales. Plusieurs études ont analysé cette question fondamentale et les résultats de ces recherches montrent que les recommandations des analystes créent de la valeur pour leurs clients (Womack, 1996; Green, 2006 et Barber et al. 2010). En 1996, Womack teste la réaction des prix et du volume des transactions aux recommandations des analystes financiers. Ses résultats suggèrent que les rendements des actifs financiers augmentent en moyenne de 5% à la suite d'une recommandation à l'achat (recommandation favorable) et baissent de 11% suivant une recommandation à la vente (recommandation défavorable). Ceci signifie que les analystes financiers sont capables de sélectionner des titres sous-évalués ou surévalués. De leur côté, Mikhail et al. (2004) ont trouvé que les habiletés de sélection des analystes persistent dans le temps. En effet, Mikhail et al. (2004) ont identifié une persistance dans la réaction positive des prix des actions, et ce des mois après que des recommandations à l'achat ont été formulées. Cette persistance existe aussi dans le cas des réactions négatives des cours boursiers (recommandations défavorables). Dans le même état d'esprit, Barber et al. (2001) ont documenté des rendements anormaux de +4.13% annuellement suite à des recommandations d'achat et de -4.9% annuellement suite à des recommandations de vente. Dans une étude plus récente, Barber et al. (2010) confirment toujours la présence de rendements anormaux qui peuvent

être générés en conditionnant ses décisions d'investissement aux recommandations des analystes.

D'autres recherches estiment que les analystes financiers fournissent une meilleure mesure des bénéfices espérés futurs en comparaison à des modèles économétriques en séries temporelles qui extrapolent les bénéfices passés (Brown, 1978; Brown et Rozeff, 1978; Collins et Hopwood, 1980; Brown et al. 1987). De tels résultats suggèrent que les investisseurs peuvent «se fier» aux prévisions faites par les analystes au lieu de baser leurs décisions d'investissements sur de simples modèles mécanistes. Enfin, certaines contributions ont étudié le degré de précision des prévisions des résultats futurs en les comparants aux résultats réels de l'entreprise (erreur de prévision).

Dans notre deuxième article, nous proposons d'utiliser une mesure intuitive d'informativité des prix qui nous permet de juger si les prévisions des bénéfices par action (BPA) faites par les analystes sont des bons indicateurs des bénéfices futurs réels de l'entreprise. Notre mesure d'informativité des prix approxime la quantité d'information, au sujet des bénéfices futurs réels, qui est intégrée dans les prix de marché actuels. Par conséquent, si les activités des analystes financiers sont associées de façon positive à notre mesure d'informativité des prix, nous pouvons conclure que les prévisions des BPA faites par les analystes sont une bonne approximation de la valeur réelle des bénéfices futurs de l'entreprise. En d'autres termes, les analystes peuvent être considérés comme des agents financiers dont l'influence est bénéfique au niveau des marchés.

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CHAPITRE I

ARTICLE 1

INTERNATIONAL CROSS-LISTING AND CORPORATE DISCLOSURE POLICY

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INTERNATIONAL CROSS-LISTING AND CORPORATE DISCLOSURE POLICY

Abstract

We investigate whether cross-listing in the US contributes to impound more earnings information into stock prices. Our results indicate that US exchange cross-listings are not associated with more future earnings news reflected in current prices, in accord with the view that such mechanism does not improve the information environment of non US firms. This main finding is robust to many aspects of our methodology.

Keywords: Stock price informativeness, US cross-listings, earnings response coefficients, bonding hypothesis, corporate governance

1.1. Introduction

In this paper, we investigate the relation between US cross-listings and stock price informativeness. In particular, we seek to measure the extent to which future earnings of newly cross-listed firms might be impounded in stock prices. The impact of US cross-listings on the information environment of non US firms is a much debated topic. Although the question is still open, the consensus is that foreign firms that list on US exchanges (NYSE and NASDAQ) become subject to stricter disclosure rules and to greater scrutiny and monitoring from the press and a variety of US market intermediaries (financial analysts, underwriters, etc.). Therefore, on a theoretical basis, a US cross-listing should improve transparency and reduce information asymmetries. It follows that cross-listed stocks should be priced more correctly than non cross-listed stocks.

To date, however, little evidence relates US cross-listing with stock transactions occurring at "fair" prices. Lang et al. (2003) find that cross-listed firms experience more analyst coverage and more accurate forecasts. Similarly, Baker et al. (2002) show that US cross-listings are associated with more analyst and media coverage. These findings suggest that US cross-border listings mitigate the information barriers by stimulating media coverage ("hits" in the *Wall Street Journal* and *Financial Times*) and increasing exposure to analysts monitoring.

On the other hand, the expected positive relation between US cross-listings and price informativeness has to be nuanced. For instance, Bailey et al. (2006) provide evidence suggesting that abnormal returns and trading volume, around earnings announcements by non-US companies, are economically and statistically larger after a US cross-listing. These results suggest that such decision is associated with increased uncertainty and less transparency. Bailey et al. (2006) argue that part of the problem is that researchers are still unable to determine clearly the motivations for pursuing international cross-listings in the first place. In fact, non US firms may be more attracted by higher liquidity, diversification gains, tax advantages and prestige rather than improving their information disclosure. Further, Fernando and Ferreira (2008) show that the added scrutiny and disclosure associated

with US cross-listing mechanism can have very different results for firm's stock price informativeness around the world. They find a significant positive link between US cross-listing and price informativeness for developed markets firms but a negative association for emerging markets firms. In the case of emerging markets firms, Fernando and Ferreira (2008) argue that actions intended to enable stricter disclosure obligations can actually have counter-effects. According to them, the increased disclosure associated with US exchange rules can crowd out private information collection. To address this issue, regulators should complement disclosure standards with other policy initiatives that encourage investment in the production of private information and minimize crowding out effects (Fernando and Ferreira, 2008).

In the same line of reasoning, several studies (Ball et al., 2000; Fan and Wong, 2002) have provided evidence that, in addition to accounting and disclosure standards, features of the institutional environment also play an important role in the improvement of corporate transparency. Their evidence indicates that despite efforts to impose stricter disclosure rules and standards, corporate transparency has been declining in many countries. In fact, while the more stringent disclosure and accounting rules may have increased the quantity of information, we can have reservations about the quality of this information.

In summary, some literature supports the expectation that cross-listed firms benefit from a richer information environment while other papers findings show neutral or negative associations between US cross-listings and stock price informativeness.

For our part, we attempt to make several contributions to the literature. First, we propose an intuitive approach to assess whether cross-listing in the US brings stock prices closer to their fully informed (i.e. fundamentals) levels, given the upgraded disclosure requirements involved. The latter should help investors better predict future cash-flows. More specifically, we test whether current stock prices of cross-listed firms contain more information about future earnings (as they should). If cross-listing in the US improves non-US firms' disclosure policies, it will leave less information about future earnings that can be privately discovered. Consequently, their stock prices should reflect more information about future earnings suggesting that the quality of the information environment has improved.

Second, the alleged benefits of US cross-listing are not easily ascertained (Fernandes and Ferreira, 2008; Lang et al., 2003), seemingly because direct measures of its effects are lacking. Most published studies involve indirect approaches focusing on coverage by analysts and media. Lang et al. (2003), for instance, equate information effects with the extent of analysts' coverage (their number) and the accuracy of their forecasts, whereas Baker et al. (2002) also rely on analysts' coverage in addition to print media attention as reflected in the *Wall Street Journal* and the *Financial Times*. To overcome the difficulties in accounting for the information effects undergone by cross-listed firms, we use a direct measure of price discovery that relies on fundamental data, namely earnings[1].

Third, we investigate the impact of the Sarbanes-Oxley (SOX) Act passed in 2002 on the relation between cross-listing in the US and corporate disclosure policy. The effect of US cross-listing on price informativeness could also vary across different institutional environments. Consequently, we partition our sample into subsamples arranged by legal origin (common law versus civil law countries) and financial markets development. The results of such analysis should provide some confidence that our conclusions are (are not) driven by a subset of countries or institutional environments.

Fourth, we tackle various complexities linked to cultural proximity and assets familiarity because many studies emphasize the importance of familiarity concerns and cultural homogeneity in cross-listing choices (Pagano et al. 2001, and Sarkissian and Schill, 2004).

Finally, empirical evidence suggests that many various plausible factors, such as earnings timeliness and firm size, affect our measure of price informativeness. Therefore, we see fit to include control variables to account for observed variations in the earnings–return relation deemed unrelated to the cross-listing decision.

[1] Note that Fernandes and Ferreira (2008) also propose a direct approach. In their study, they derive stock price informativeness from the market model (firm-specific return variability).

We find that US exchange cross-listings do not improve stock price informativeness despite the upgraded disclosure requirements of these programs. On the other hand, consistent with their minimal incremental disclosure requirements, non-exchange ADRs (Level I/Rule 144A) also experience an insignificant change in their price informativeness.

The paper proceeds as follows: In section 2, we describe the mechanisms of US cross-listings and summarize the cross-listing literature. In section 3, we present our empirical model and outline our methodology and testable hypotheses. We discuss our data and sample in section 4. Section 5 presents empirical results characterizing the relation between US cross-listing and stock price informativeness. Conclusions follow in section 6.

1.2. Previous research work

This paper investigates the hypothesis that information considerations, such as the commitment to increase levels of disclosure and reduce information asymmetries, are a key factor for cross-listing in the United States. However, the cross-listing literature supports other factors that affect US cross-listings, such as higher liquidity and lower financing costs. It is worth mentioning that these factors are not mutually exclusive and complement the information considerations emphasized in our paper. Before we summarize the literature that examines the relation between US cross-listings and the information environment of non-US firms, we, first, describe the mechanics of such a decision.

1.2.1 Mechanics of US cross-listings

Foreign firms can cross-list on US markets via direct listings, New York Registered shares, or American Depositary Receipts (ADRs). The vast majority of foreign firms choose to cross-list using ADRs. Some firms (mostly Canadian and Israeli) use direct listings (ordinary listings) rather than ADRs. ADRs are negotiable certificates that represent a foreign firm's publicly traded equity or debt. Non US firms that cross-list via ADRs can choose between four possibilities: level I, level II, Level III and Rule 144A. Level I ADRs trade over-the-counter (OTC) and offer limited liquidity. This type of ADR requires only minimal

US Securities and Exchange Commission (SEC) disclosure and no US generally accepted accounting principles (US GAAP) reconciliation. Level I programs don't raise capital. On the other hand, level II and III ADRs are exchange listed securities (NYSE/NASDAQ). Firms who choose level II and III programs must follow US GAAP and complete all required filings with the SEC. Moreover, level III listings, contrary to level II, allow foreign companies to raise capital. Finally, Rule 144A listings trade on the PORTAL (Private Offerings, Resales and Trading through Automated Linkages) with limited liquidities, do not require compliance with GAAP and allow firms to raise funds as private placements to qualified institutional buyers (QIBs).

The legal implications of ADRs II/III and direct cross-listings are essentially the same. Therefore, we treat direct listings by foreign firms as ADRs II/III. Further, because we are interested in whether cross-listing improves stock price informativeness, we focus our analysis on firms that list via levels II/III and ordinary listings. As mentioned earlier, these firms are required to conform to US GAAP and substantially increase their disclosure which is not the case for non-exchange listed ADRs (level I and Rule 144A). In the robustness section, we complement our main tests using non-exchange listed ADRs.

1.2.2. US cross-listings and the commitment to reveal information

The expected relation between US cross listings and stock price informativeness is commonly linked to the fact that high levels of disclosure stand to attract more investors. Voluntary disclosure makes investors more confident that stock transactions occur at "fair" prices (Bailey et al. 2006). To date, however, little direct evidence associates US cross-listing with stock transactions occurring at "fair" prices. For instance, Fernando and Ferreira (2008) use firm-specific return variation as a measure of stock price informativeness and test its possible association with the cross-listing decision. They find a significant positive relation between US cross-listing and price informativeness for developed markets firms but a negative relation in the case of emerging markets firms. Bailey et al. (2006) measure the magnitude of price and volume reactions to public information (earnings announcements) before and after the US listing. Knowing that more private information equates with higher

return volatility, Bailey et al. (2006) argue that if return volatility diminishes after the US listing, this could indicate less disagreement among investors. Their findings suggest that return volatility and volume reactions to earnings announcements increase significantly after a cross-listing on US markets, which runs contrary to the hypothesis that US cross-listings improve stock price informativeness. Other studies focus on indirect approaches using, for example, the characteristics of analysts' forecasts and media coverage as proxies for the firm's information environment. In particular, Lang et al. (2003) find that cross-listed firms experience more analyst coverage and accurate forecasts. Similarly, Baker et al. (2002) show that US cross-listings are positively related to analyst and media coverage.

In our paper, we propose a direct measure of stock price informativeness. Particularly, we intend to test if US cross-listing is associated with stock prices reflecting more information about future earnings. Since the primary role of firms' disclosure is to inform investors about future cash-flows, if current stock prices reflect more future earnings news after a US cross-listing, we can infer that there is, indeed, a positive direct association between cross-listing in the US and the commitment to reveal more information to investors.

Our research is also linked to the bonding hypothesis. Coffee (1999) and Stulz (1999) argue that firms can raise capital if they commit to return this capital to investors and to limit the expropriation of cash-flows by controlling shareholders and managers. Therefore, firms wishing to raise external capital respond by bonding themselves to greater transparency (Coffee, 1999 and Stulz, 1999). One way to accomplish this bonding and to signal its commitment is to cross-list on a US exchange whose legal system allows a better protection of minority investors. In fact, such decision obligates foreign firms to conform to US GAAP and complete all required filing with the SEC. It thus provides a mechanism by which non US firms can voluntarily subject themselves to better corporate governance practices under US securities laws (Coffee, 1999 and Stulz, 1999). Many papers in the literature examine the extent to which such voluntarily bonding explains the cross-listing behavior. Doidge (2004) finds that US exchange cross-listed firms have lower voting premiums in comparison to non cross-listed firms. In addition, the difference in voting premiums is larger for firms originating from countries with poor investor rights. Similarly, Doidge et al. (2009) examined the expected relations between private benefits of control, ownership and the cross-listing

decision. According to them, when private benefits are high, controlling shareholders are less likely to choose to list on US exchanges because they will be subject to strong US investors protection laws. Doidge et al. (2009) find that control rights, as well as the difference between control rights and cash flow rights, are significantly and negatively related to the existence of a US listing.

On the other hand, a number of other contributions challenge the bonding hypothesis. For instance, Licht (2001, 2003) argues that little is done by the SEC to enforce corporate governance rules for foreign issuers. He blames the «hand off» policy of the SEC and puts forward the avoiding hypothesis. According to Licht (2003), firms cross-list on US markets primarily to access cheaper finance and enhance their visibility rather than to improve their corporate governance. In the same line of reasoning, Siegel (2005) provides evidence of low SEC enforcement against Mexican firms with ADRs.

1.3. Hypotheses and methodology

Our main goal is to measure the association between current stock prices and future earnings for cross-listed and non cross-listed firms using data from 1990-2006 period. Many studies show that firms with more informative disclosures "bring the future forward" so that their current market prices reflect more future earnings news (Lundholm and Myers, 2002). Theoretically, the enhanced disclosure activities of US cross-listed firms should reveal credible and relevant information in the current period that changes expectations about future earnings. To test this hypothesis, we base our methodology on the work of Warfield and Wild (1992), Collins et al. (1994), Gelb and Zarowin (2002), and Lundholm and Myers (2002). In these papers, current returns are regressed against both current and future earnings:

$$R_t = \beta_0 + \beta_1 uce_t + \sum_{i=1}^{\infty} \beta_{2i} \Delta E_t(fe_{t+i}) + \varepsilon_t \qquad (1)$$

Where
R_t stands for current stock return in period t,
uce_t stands for synchronous unexpected current earnings,
$\Delta E_t(fe_{t+i})$ stands for change in expectations about future earnings, and
ε_t for the error term.

To better understand the intuition behind this model, we consider a firm over three periods and a discount rate of zero. We denote period t earnings by e_t, dividends by d_t and book value by BV_t. Following Lundholm and Myers (2002) and using the residual income valuation model (see Ohlson, 1995), prices at time 0 and time 1 can be expressed by:

$P_0 = BV_0 + E_0(e_1) + E_0(e_2) + E_0(e_3)$
$P_1 = BV_1 + E_1(e_2) + E_1(e_3)$

Assuming a clean surplus accounting system (see Lundholm and Myers, 2002), we can substitute BV_1 by $BV_0 + e_1 - d_1$. Hence, we get:

$P_1 = BV_0 + e_1 - d_1 + E_1(e_2) + E_1(e_3)$
$P_1 = P_0 - E_0(e_1) - E_0(e_2) - E_0(e_3) + e_1 - d_1 + E_1(e_2) + E_1(e_3)$
$P_1 - P_0 + d_1 = e_1 - E_0(e_1) + E_1(e_2) - E_0(e_2) + E_1(e_3) - E_0(e_3)$
$P_1 - P_0 + d_1 = Ue_1 + \Delta E_1(e_2) + \Delta E_1(e_3)$ (2)

Scaling equation (2) by P_0, the left-hand side equates with the annual return. The right-hand side becomes the scaled sum of the unexpected earnings for year 1 and the synchronous change in expectations during year (1) about earnings in year 2 and 3. As suggested by Lundholm and Myers (2002, p. 813): «the regressions coefficients in the more general model in (1) allow for many complications not present in the simple example shown in (2), such as time value, risk, and the precision of the proxies used to measure unexpected current earnings and changes in excepted future earnings» .

In equation (1), the aggregated coefficients on the future earnings (Sum of β_{2i}s) represent the association between current returns and future earnings. In the literature, authors (Lev and Zarowin, 1999; Francis and Schipper, 1999; Lundholm and Myers, 2002) use the level of earnings at periods (t) and (t-1) as a proxy for uce_t. According to Lundholm and Myers (2002), when we include the past year's earnings (e_{t-1}), we allow the regression to find the best representation of the prior expectation for current earnings. Lundholm and Myers (2002) argue that earnings are treated by the market as a random walk process when the coefficient on e_{t-1} is of similar magnitude but opposite sign as the coefficient on e_t (current earnings). On the other hand, if the coefficient on e_{t-1} is approximately zero then earnings are treated as a white noise process.

The proxies for $\Delta E_t(fe_{t+i})$ are the realized future earnings (e_{t+i}) and future returns (a proxy for the unexpected component of future earnings). Some papers (Beaver et al. 1980; Warfield and Wild, 1992) only use realized future earnings as a proxy for $\Delta E_t(fe_{t+i})$. However, relying on realized future earnings introduces an error in variables because future earnings have expected and unexpected components. To correct for the error and control for the unexpected component, we need an instrument that is correlated with the measurement error but uncorrelated with the dependent variable. Following Collins et al. (1994), we use future returns (R_{t+i}) since an unexpected shock to future earnings should have an impact on future returns. On the other hand, dropping future returns (R_{t+i}) from equation (1) does not affect our main findings.

Earnings variables in equation (1) are earnings before interest, taxes, depreciation, and amortization (EBITDA) divided by the market value of common equity at the beginning of the firm's fiscal year. Knowing that depreciation and amortization are among the components of income most vulnerable to differences in accounting measurements, we argue that relying on EBITDA is more appropriate for our purposes than net income. It allows us to mitigate some concerns about differences in accounting practices across countries. Furthermore, EBITDA is not sensitive to differences in capital structure (Durnev et al. 2003).

To test whether cross-listing in the US is associated with stock prices that are more informative about future earnings, we follow Lundholm and Myers (2002) methodology and estimate the following regression (panel regression):

$$R_t = b_0 + b_1 e_{t-1} + b_2 e_t + \sum_{i=1}^{3} (b_{3i} e_{t+i} + b_{4i} R_{t+i}) + \theta_0 CL_t + \theta_1 CL_t * e_{t-1} + \theta_2 CL_t * e_t$$
$$+ \sum_{i=1}^{3} (\theta_{3i} CL_t * e_{t+i} + \theta_{4i} CL_t * R_{t+i}) + \varepsilon_t \qquad (3)$$

CL_t is a dummy variable that takes the value 1 if the firm has an ADR that requires reconciliation to US GAAP (ADR II/III) and 0 otherwise. We use only three years of future earnings (e_{t+1}, e_{t+2} and e_{t+3}) and returns (R_{t+1}, R_{t+2} and R_{t+3}) because prior research has shown that amounts further out in time add little explanatory power (Collins et al. 1994). Our main interest in equation (3) centers on the estimates of the coefficients θ_{3i}. We hypothesize that the

quality of the information environment improves after a listing on US exchanges because of more stringent disclosure rules. In other words, stock prices of US exchange cross-listed firms should contain more information about future earnings in comparison to non cross-listed firms. Therefore, our first hypothesis predicts that the coefficients on CL_t*e_{t+i} will be positive and significant.

> Hypothesis 1: Cross-listing in the US allows more information about future earnings to be impounded directly into current returns.

This hypothesis implies the presence of an interaction effect between future earnings and the cross-listing decision. In fact, the interaction term CL_t*e_{t+i} proxies for the impact of cross-listing on the importance of future earnings news (more or less future earnings news that are reflected in current returns).

As discussed in Lundholm and Myers (2002), there are 17 independent variables in regression (3). To rewrite equation (3) with parsimony, we define:

e_{3t} as the sum of e_{t+1}, e_{t+2} and e_{t+3}
R_{3t} as the buy-and-hold return for the three-year period following year (t)
and estimate :

$$R_t = b_0 + b_1 e_{t-1} + b_2 e_t + b_3 e_{3t} + b_4 R_{3t} + \theta_0 CL_t + \theta_1 CL_t * e_{t-1} + \theta_2 CL_t * e_t + \theta_3 CL_t * e_{3t} + \theta_4 CL_t * R_{3t} + \varepsilon_t \quad (4)$$

By combining three years of data into one aggregate variable, we effectively force each year to have the same coefficient estimate, but we eliminate eight variables from regression (3) as noted by Lundholm and Myers (2002). Given that b_3 represents the coefficient on future earnings for non cross-listed firms, the coefficient on future earnings for US exchange cross-listed firms becomes $b_3+\theta_3$ and the percentage increase (decrease) is θ_3/ b_3. If θ_3 is positive and significant, cross-listing in the US is associated with more information being revealed about future earnings. On the other hand, if θ_3 is negative and significant, cross-listing in the US is not associated with more revealed information about future earnings.

We perform panel regressions using random or fixed effects models. In our panel data set, the residuals may be cross-correlated (i.e across firms) and autocorrelated (across time). Should cross-correlations and autocorrelations exist, OLS standard errors can be biased and the true variability of our coefficients will be misestimated. We need then to adjust the *t-statistics* in our regressions using clustered standards errors by firm and time (Petersen, 2009). Further, to choose between fixed effects and random effects models estimation, we use the Hausman specification test. The latter compares the fixed versus random effects under the null hypothesis that the individual effects are uncorrelated with the regressors in the model. If the null hypothesis is rejected, a random effects model produces biased estimators in comparison to a fixed effects model. Our Hausman test results reject the null hypothesis in favour of the fixed effects model. To control for industry, time and country fixed effects, we include industry, year and country dummies in our regression (4). For robustness, we re-estimate our regressions using fixed firm and year effects models instead of country and industry fixed effects models.

A remaining concern is endogeneity. Cross-listing is not a random decision and whenever an independent variable in a regression is the result of such a choice, it raises the possibility of an endogenous relation between the dependent variable and the chosen independent variable (CL_t). However, the panel data approach and our firm-fixed effects models address this issue to a certain extent (see, Doidge, 2004; and Hail and Leuz, 2009 for a discussion). In addition, some of the main determinants of the cross-listing decision from prior literature, namely size and growth, are already in our robustness tests regressions, so the residual error is already orthogonal to these sources of variation in CL_t.

To reinforce our conclusions about the relation between the cross-listing decision and stock price informativeness, it is useful to further investigate the potential differences between Rule 114A/level I programs and level II/III programs. Theoretically, non-exchange listed ADRs should experience an insignificant change in their price informativeness because of their minimal incremental disclosure requirements. This reasoning leads to the following hypothesis:

> Hypothesis 2: The extent to which future earnings news are reflected in current returns is less pronounced for firms that list in the US using Rule 144A or level I programs.

To verify hypothesis 2, we re-estimate equation (4) without considering US exchange cross-listings. In this case, CL_t becomes a dummy variable that takes the value 1 if the firm has a level I or Rule 144A listings and 0 otherwise. Meanwhile, we should also expect a more pronounced change in the quality of the firm's information environment for emerging markets. On a theoretical basis, US exchange listings should have a larger impact on firms originating from countries where disclosure rules are weak. Knowing that emerging markets firms are subject to less stringent information disclosure requirements, we can propose the following hypothesis:

> Hypothesis 3: The extent to which future earnings news are reflected in current returns is more pronounced for firms from emerging markets.

To investigate any differential impact based on the level of financial markets development, we estimate equation (4) separately for developed and emerging markets.

Finally, the introduction of the Sarbanes-Oxley (SOX) Act in 2002 is likely to have an effect on the intensity of the association between current stock returns and future earnings. The argument is that SOX imposes more severe disclosure rules to companies and their managers. In fact, as discussed in Doidge et al. (2009), this new legal environment creates significant legal exposures for firms as well as for executives. Therefore, on the basis of this argument, we can propose the following hypothesis:

> Hypothesis 4: The extent to which future earnings news are reflected in current returns is more pronounced after the enactment of the Sarbanes-Oxley (SOX) Act in 2002.

To test hypothesis 4, we use the results of regressions covering our data from 1990 through 2002 and from 2003 through 2006 and compare the coefficients on the future earnings before and after the passage of SOX.

Specification checks

An important empirical literature suggests that our measure of stock price informativeness is affected by a variety of factors (e.g. earnings timeliness and firm size). Therefore, we should include a set of variables in equation (4) to control for observed variations in the earnings–return relation that are likely due to causes other than firm's information environment. After controlling for these factors, our empirical measure should reflect informativeness.

Earnings timeliness refers to the speed with which earnings information is reflected in stock prices. For example, in industries with shorter operating cycles, current earnings will be considered as a better measure for value creation; and thus, the association between current returns and future earnings should be less pronounced in these industries in comparison to industries with longer operating cycles. To examine the length of the operating cycles, we follow Lundholm and Myers (2002) who consider two industry classes: industries with shorter accounting lags and industries with longer accounting lags. Lundholm and Myers (2002) label mining, construction and manufacturing as longer operating cycles' industries and the remaining industries as shorter operating cycles. We then pool firms according to this classification before estimating regression (4). Timeliness is also linked to growth. Firms with high expected growth should exhibit a strong relation between current returns and future earnings in comparison to mature firms, all else equal. Therefore, we should include a measure of firm growth opportunities to control for this factor. We define growth as the percentage growth in the firm's assets from year *t-5* to year *t*. For robustness, we also use the market-to-book ratio as a proxy for growth. Other determinants of the earnings response coefficient may intrinsically affect the relation between current returns and future earnings. For example, size might also be an important omitted variable because Freeman (1987) and Collins and Kothari (1989) find that returns of larger firms impound earnings on a more timely basis than returns of smaller firms. We use the log of market value of equity to measure firm's size.

A remaining concern is familiarity and cultural proximity. With regard to familiarity, Kang and Stultz (1997), and Dalhlquist and Roberston (2001) argue that foreign investors tend to hold larger positions in firms that produce tradable outputs. For example, US

investors tend to invest more in Japanese firms with large tradable outputs such as Sony and Honda. On the other hand, the same investors will be less inclined to invest in Japan Telecom because they are not familiar with their products (little tradable outputs). If familiarity is important to investing agents, we argue that it will also impact financing agents (corporations) decisions and probably creates some heterogeneity in the sample. In fact, in comparison to Japan Telecom, Sony and Honda may pay less attention to information asymmetry issues once they cross-list their shares in the US market. To tackle this issue, we classify all firms according to the type of produced goods (tradable versus little tradable outputs), before estimating equation (4). We follow Sarkissian and Schill (2004) and split our sample into tradable industries (consumer goods, electronics, oil and gas…) and non tradable industries (construction, leisure, retail, telecommunications…). With regard to cultural proximity, we also study how differences in national culture may lead corporations to respond differently to the information asymmetry issue. It's plausible that disclosure rules and corporate management laws that work well in the US may not be universal and fit with other national cultures. According to Hofstede, the core of culture is formed by values which shape people behavior as well as their perception of what is preferable and not. Therefore, if some US disclosure rules or corporate management laws are inconsistent with these values, foreign managers are likely to feel uncomfortable and uncommitted (Newman and Nollen, 1996). As a result, they may be less able or willing to respect these rules. In other words, what works for the Americans might work for some (e.g. Canadians or British) but not for all. For instance, in countries low on the Hofstede individualism dimension (IDV), national culture encourages and legitimizes deference to others decisions and interests rather than protecting its personal interests. In these nations, corporate management practices will be less compatible with giving power to investors and encouraging them to stand up and fight for their rights (Litch et al. 2005). This situation could create cross-sectional differences in the benefits of US cross-listing. Hence, we propose to include in our regressions Hofstede cultural variables (see more details on Hofstede cultural dimensions and scores in Table 1.9 and 1.10).

In our analysis, earnings variables are earnings before interests, taxes, depreciation, and amortization (EBITDA). As argued earlier, relying on EBITDA is more appropriate for our purposes because it allows us to mitigate some concerns about differences in accounting practices across countries. However, by ignoring interests, we do not consider the riskiness of debt and its potential impact on the return-earnings relation. Knowing that leverage could be considered as a proxy for credit risk (default risk), we propose to include this variable in our main equation. This additional test should control for potential differences in the earnings-return relation between high leverage and low leverage firms, because highly leveraged firms are associated with high stock return volatility. Leverage is the ratio of long term debt to total assets.

Finally, we also control for liquidity because there is evidence of important changes in firm's trading environment around US cross-listing (Mitto, 1992, 2001; Forester and Karolyi, 1998; Smith and Sofianos, 1997); and these changes could impact the informational environment of non US firms. The intuition behind this additional analysis is that more active trading, rather than cross-listing, could explain any possible improvement in price informativeness because market prices of actively traded stocks should react quickly to earnings information in comparison to less actively traded stocks. Liquidity is defined as volume divided by number of shares outstanding.

1.4. Data

Our sample construction starts by considering all firms included in the country list provided by Datastream from 1990 to 2006. From this list, cross-listed firms are identified. Sampling stops in 2006 instead of 2009 because some of our variables require three years of data beyond any sampling year. The data on ADRs listing comes from the Bank of New York (BNY), Citibank (CB), Deutsche Bank (DB), JP Morgan (JPM), the OTCBB, and The Pink Sheets. The information from these various datasets is manually cross-checked and verified. The websites of the major depositaries of ADRs provide the names, type of listings (Rule 144A private placements, level I OTC, Level II and III), listing dates, sponsorship status, country of origin, and the International Securities Identification Number (ISIN) of the

underlying share. Further, we obtain information on direct listings (Canadian and Israeli firms) from the NYSE and NASDAQ websites. The data provided by Citibank allows us to keep track of firms that had been delisted from the US market. Adding these delistings mitigates concerns about the survivorship bias. Combining all the data gives a sample of 2 586 cross-listings and 11 354 non cross-listed firms. Note our exclusion of financial and banking firms because the financial nature of their assets hinders accounting data comparisons with other firms.

Table (1.1) presents summary statistics for our sample. As expected, US exchange cross-listed firms are larger than non-cross-listed firms. The median size for exchange-listed firms is 14.855 while non cross-listed firms have a median size equal to 11.508. Further, cross-listed firms have higher returns and leverage in comparison to non-cross-listed firms.

Table 1.1: Descriptive statistics (reduced model: equation 4)

This table presents descriptive statistics for the reduced model (equation 4). **Return (t)** (Current return) for year (t) is the fiscal-year-end adjusted share price, plus the adjusted dividends, all divided by the adjusted price at the end of the previous fiscal year (t-1). **Return (3t)** (Future return) is the buy-and-hold return for the three-year period following the current year (for years t+1, t+2 and t+3). **Earnings (t)** (Current earnings) for year (t) is income before interest, taxes, depreciation and amortization (EBITDA) for year (t) divided by the market value of equity at the beginning of the firm's fiscal year. **Earnings (3t)** (Future earnings) is the sum of earnings for the three years following the current year (for years t+1, t+2 and t+3). Market value of equity is the share price times the previous year number of shares outstanding. **Size** is the logarithm of the market capitalization. **Leverage** is defined as the ratio of long-term debt to total assets. Exchange-listed firms are firms that are listed on U.S. exchanges (ADRs II/III and direct cross-listings). The sample period is from 1990 to 2006.

Variable	All firms				Non-cross-listed firms				Exchange-listed firms			
	Mean	median	Std dev	N	Mean	median	Std dev	N	Mean	median	Std dev	N
Stock returns and earnings statistics												
Return (t)	1.358	1.071	1.475	79457	1.355	1.068	1.485	77103	1.451	1.162	1.097	2354
Earnings (t)	0.225	0.154	0.719	72684	0.226	0.153	0.728	70482	0.196	0.156	0.270	2202
Earnings (3t)	0.625	0.459	1.356	78346	0.627	0.459	1.372	76015	0.550	0.464	0.651	2331
Returns (3t)	2.047	1.180	3.447	88651	2.041	1.173	3.463	86125	2.251	1.398	2.878	2526
Size	11.646	11.572	2.012	89394	11.550	11.508	1.946	86773	14.721	14.855	1.919	2621
Leverage	0.158	0.062	4.265	101251	0.1576	0.060	4.326	98411	0.182	0.163	0.152	2840

When we measure the Pearson correlations between our variables (reduced model), multicollinearity is not an issue since current earnings, future earnings (Earnings (3t)) and future return (Return (3t)) are not highly correlated (Table 1.2). The same conclusion holds for the detailed model (equation 3). In addition, we also use the variance inflation factor and find no evidence of multicollinarity. Our main hypothesis implies a positive interaction effect between the cross-listing decision and firm's future earnings. The negative correlation between $CL_{(t)}$ and Earnings (3t) in Table 1.2 does not confirm this hypothesis. However, we

argue that our tests are best performed using multivariate regression analysis because the conclusions from our univariate variables do not account for a variety of factors known to affect the earnings-return relation.

Table 1.2: Pearson correlations for the reduced model (p-values)

This table presents the correlations between variables of the condensed model.

	Return (t)	Return (3t)	Earnings (t-1)	Earnings (t)	Earnings (3t)	CL(t)
Return (t)	1.00000	0.25968 (0.0001)	0.03021 (0.0001)	0.13354 (0.0001)	-0.03231 (0.0001)	-0.00101 (0.7756)
Return (3t)	0.25968 (0.0001)	1.00000	0.01941 (0.0001)	0.03833 (0.0001)	0.09489 (0.0001)	-0.00581 (0.0838)
Earnings (t-1)	0.03021 (0.0001)	0.01941 (0.0001)	1.00000	0.22155 (0.0001)	0.22210 (0.0001)	-0.01041 (0.0086)
Earnings (t)	0.13354 (0.0001)	0.03833 (0.0001)	0.22155 (0.0001)	1.00000	0.27410 (0.0001)	-0.01027 (0.0056)
Earnings (3t)	-0.03231 (0.0001)	0.09489 (0.0001)	0.22210 (0.0001)	0.27410 (0.0001)	1.00000	-0.01478 (0.0001)
CL(t)	-0.00101 (0.7756)	-0.00581 (0.0838)	-0.01041 (0.0086)	-0.01027 (0.0056)	-0.01478 (0.0001)	1.00000

1.5. Empirical Results

Because we are interested in whether US cross-listing allows stock prices to impound more information about future earnings, we focus on the coefficient of the interaction variable CL_t*e_{3t} in equation (4). If US cross-listing is associated with prices reflecting more information about future earnings, the coefficient of the interaction term CL_t*e_{3t} should be positive and significant.

Table 1.3 reports the coefficients estimates of equation (4). Model 1 serves as our starting point in that we drop future returns from equation (4) and control for country and industry fixed effects. Note that standard errors in all models are adjusted for heteroskedasticity and clustering at the firm level. In model 2, we estimate equation (4) adding country and industry dummies. Model 1 and 2 yield similar results suggesting that our findings are not affected when we drop future returns from our main specification. For model 2, the coefficient of the interaction term CL_t*e_{3t} is -0.0997 with a *p-value* of 0.06. This result suggests that there is a significant (10% level) negative association between US exchange cross-listings and price

informativeness. In fact, US exchange cross-listed firms have lower future earnings response coefficient -0.1912 (-0.0915 + (-0.0997)) in comparison to non cross-listed firms -0.0915. On the other hand, when we control for year fixed effects (model 3 and 4) to account for residual correlations across firms in a given year (cross-sectional dependence), our primary results change and the coefficient of interest in both models becomes non significant (-0.0543 with a *p-value* of 0.266 for model 4). This finding suggests that the relation between current returns and future earnings is the same for cross-listed and non cross-listed firms. Further, adding year dummies in model 2 increases R^2 from 0.2144 to 0.2452.

So far, our evidence on how US cross-listing activity impacts the relation between current returns and future earnings is mixed. However, in table 1.3, we do not control for various plausible factors known to affect the earnings-return relation. In the literature, timeliness and firm size have been shown to be significantly related to current and future earnings response coefficients. Therefore, an alternative explanation for our primary findings is that the cross-listing variable (CL_t) is merely proxying for these fundamental determinants of the earnings response coefficients. To explore this issue, we include the percentage growth in the firm's assets and firm size as control variables in equation (4).

Table 1.3 : Panel regressions of current returns on current and future earnings and interactions with cross-listing (ADRs II/III)

$$R_t = b_0 + b_1 e_{t-1} + b_2 e_t + b_3 e_{3t} + b_4 R_{3t} + \theta_0 CL_t + \theta_1 CL_t * e_{t-1} + \theta_2 CL_t * e_t + \theta_3 CL_t * e_{3t} + \theta_4 CL_t * R_{3t} + \varepsilon_t$$

Return (t) (Current return) is the fiscal-year-end adjusted share price, plus the adjusted dividends, all divided by the adjusted price at the end of the previous fiscal year (t-1). **Return (3t)** (Future return) is the buy-and-hold return for the three-year period following the current year (for years t+1, t+2 and t+3). **Earnings (t)** (Current earnings) for year (t) is income before interest, taxes, depreciation and amortization (EBITDA) for year (t) divided by the market value of equity at the beginning of the firm's fiscal year. **Earnings (3t)** (Future earnings) is the sum of earnings for the three years following the current year (for years t+1, t+2 and t+3). $\mathbf{CL_t}$ is a dummy variable that takes the value 1 if the firm is cross-listed on U.S. exchanges, and zero otherwise. Standard errors are adjusted for heteroskedasticity and clustering at the firm level. P-values for two-tailed tests are in parentheses. To avoid drawing spurious inferences from extreme values, regressions results are robust to outliers. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively. Country, industry and year dummy variables are included but not reported

Independent Variables	Model (1)	Model (2)	Model (3)	Model (4)
Intercept	1.5074 (0.001)***	1.4528 (0.001)***	1.2484 (0.001)***	1.1103 (0.001)***
Earnings $_{(t-1)}$	0.0376 (0.007)***	0.0351 (0.014)**	0.0383 (0.005)***	0.0359 (0.010)**
Earnings $_{(t)}$	0.3436 (0.001)***	0.3369 (0.001)***	0.3324 (0.001)***	0.3253 (0.001)***
Earnings (3t)	-0.0668 (0.001)***	-0.0915 (0.001)***	-0.0583 (0.001)***	-0.0847 (0.001)***
Return (3t)		0.0726 (0.001)***		0.0822 (0.001)***
$\mathbf{CL_t}$	-0.0753 (0.081)*	-0.0324 (0.506)	-0.0660 (0.118)	-0.0340 (0.466)
$\mathbf{CL_t}$ * Earnings$_{(t-1)}$	0.0450 (0.699)	0.0208 (0.858)	0.0545 (0.574)	0.0243 (0.800)
$\mathbf{CL_t}$ * Earnings$_{(t)}$	0.4002 (0.024)**	0.3867 (0.028)**	0.2542 (0.094)*	0.2338 (0.117)
$\mathbf{CL_t}$ * Earnings (3t)	**-0.0984 (0.067)***	**-0.0997 (0.060)***	**-0.0577 (0.243)**	**-0.0543 (0.266)**
$\mathbf{CL_t}$ * Return (3t)		-0.0169 (0.385)		-0.0110 (0.550)
Country dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	No	No	Yes	Yes
Adjusted R^2	0.1946	0.2144	0.2209	0.2452
N	58139	57653	58139	57633

We also extend our robustness checks in many different ways. First, we propose to include leverage and liquidity into equation (4). Second, we explore whether differences in firms' operating cycles and institutional characteristics, familiarity and cultural proximity are associated with cross-differences in the benefits of the US cross-listing mechanism. We begin

by analysing whether the length of the operating cycles impacts our findings. The intuition behind this idea is that future earnings will be considered as a better measure of value creation for industries with longer operating cycles, but a less relevant measure for industries with shorter operating cycles. Therefore, any commitment to reveal more information about future cash-flows should be more effective in industries with longer operating cycles, since firms in these industries have more future earnings news to disclose (Lundholm and Myers, 2002). To test this argument, we consider two operating cycles (shorter versus longer operating cycles) and partition our sample according to this classification. The results (not tabulated) show that the cross-listing effect on stock price informativeness is the same for both industries suggesting that our results are not driven by a subset of firms with shorter operating cycles. The same conclusion holds when we partition our sample into subsamples arranged by legal origin (common versus civil law countries) and the type of produced goods (tradable versus little tradable outputs). Furthermore, adding assets growth, market-to-book ratio, firm's size, leverage and liquidity to equation (4) does not alter our primary results. In fact, the coefficients of the interaction term CL_t*e_{3t} in table 1.4 remain not significant in all specifications.

The above diagnostic checks have demonstrated that our primary empirical results are robust to controls for earnings timeliness, firm's size, leverage, differences in industry cycles and legal environment, familiarity and stock liquidity. As further robustness tests, we also study how differences in national culture may lead foreign managers to respond differently to the new legal environment they face once their firms' cross-list on US markets. Again, when we use Individualism (IDV) and Power Distance Index (PDI) as additional control variables in equation (4), the interaction effect between future earnings and the cross-listing mechanism remains not significant (model 3 in Table 1.4, where the coefficient of the interaction term CL_t*e_{3t} is -0.0043 with a *p-value* of 0.949).

Table 1.4 : Panel regressions with controls for the determinants of earnings response coefficients

$$R_t = b_0 + b_1 e_{t-1} + b_2 e_t + b_3 e_{3t} + b_4 R_{3t} + \theta_0 CL_t + \theta_1 CL_t * e_{t-1} + \theta_2 CL_t * e_t + \theta_3 CL_t * e_{3t} + \theta_4 CL_t * R_{3t} + \delta_0 Controls_t + \varepsilon_t$$

To avoid drawing spurious inferences from extreme values, regressions results are robust to outliers. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively. Country, industry and year dummy variables are included but not reported. Standard errors are adjusted for heteroskedasticity and clustering at the firm level. P-values for two-tailed tests are in parentheses

Independent Variables	Model (1)	Model(2)	Model(3)
Intercept	0.1894	0.1880	-6.2112
	(0.124)	(0.104)	(0.498)
Earnings $_{(t-1)}$	0.0287	0.0243	0.0290
	(0.001) ***	(0.002) ***	(0.001) ***
Earnings $_{(t)}$	0.3677	0.3229	0.3674
	(0.001) ***	(0.001) ***	(0.001) ***
Earnings (3t)	-0.0935	-0.0778	-0.0934
	(0.001) ***	(0.001) ***	(0.001) ***
Return (3t)	0.0898	0.0757	0.0897
	(0.001) ***	(0.001) ***	(0.001) ***
CL_t	-0.1862	-0.2372	-0.1857
	(0.048) **	(0.001) ***	(0.001) ***
CL_t * Earnings$_{(t-1)}$	0.0042	-0.0012	0.0049
	(0.976)	(0.993)	(0.972)
CL_t * Earnings$_{(t)}$	0.2401	0.2229	0.2403
	(0.123)	(0.179)	(0.125)
CL_t * Earnings (3t)	**-0.0051**	**-0.0414**	**-0.0043**
	(0.938)	**(0.539)**	**(0.949)**
CL_t * Return (3t)	-0.0243	-0.0133	-0.0254
	(0.086)	(0.369)	(0.077)
Growth$_t$	0.0000		0.0000
	(0.001) ***		(0.001) ***
Market-to-Book$_t$		-0.0001	
		(0.003) ***	
Size$_t$	0.0639	0.0760	0.0638
	(0.001) ***	(0.001) ***	(0.001) ***
Leverage$_t$	0.0002	-0.0000	0.0002
	(0.783)	(0.976)	(0.783)
Liquidity$_t$	-0.0004	-0.0003	-0.0004
	(0.045) **	(0.0635) *	(0.045) **
PDI			0.0049
			(0.849)
IDV			0.1700
			(0.546)
Country dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Adjusted R^2	0.2949	0.2274	0.2923
N	41 202	54 372	40 975

Next, we propose to re-estimate our regressions using fixed firm and year effects instead of country and industry fixed effects models. Firm fixed effects estimation accounts for time-invariant firm characteristics that are unobservable. As suggested earlier, this should mitigate concerns about correlated omitted variables and selection bias based on unobservable time-invariant firm characteristics. The firm fixed effects estimates are obtained by demeaning the observations with respect to the firm average for each variable. Year dummies are included in the estimation. Again, our primary findings remain unchanged when we re-estimate equation (4) based on fixed firm and year effects models (results not tabulated).

So far, our empirical evidence suggests that US exchange cross-listings do not improve stock price informativeness. In this paper, we also estimate the relation between stock price informativeness and US cross-listing separately for developed and emerging markets. This additional analysis allows us to isolate the effect of the cross-listing decision in these two sets of environments with different characteristics. Model 1 and 2 in Table 1.5 report the coefficient estimates for developed and emerging markets firms. The findings do not support the hypothesis of a differential effect across these two markets. For instance, in the case of developed markets, the coefficient of the interaction between US cross-listing and future earnings is positive (0.0095) but non significant (*p-value* of 0.922) while the same coefficient is negative and non significant (-0.0067 with a *p-value* of 0.936) for emerging markets.

Table 1.5 : Panel regressions using separate estimations for developed and emerging markets

$$R_t = b_0 + b_1 e_{t-1} + b_2 e_t + b_3 e_{3t} + b_4 R_{3t} + \theta_0 CL_t + \theta_1 CL_t * e_{t-1} + \theta_2 CL_t * e_t + \theta_3 CL_t * e_{3t} + \theta_4 CL_t * R_{3t} + \delta_0 Controls_t + \varepsilon_t$$

To avoid drawing spurious inferences from extreme values, regressions results are robust to outliers. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively. Country, industry and year dummy variables are included but not reported. Standard errors are adjusted for heteroskedasticity and clustering at the firm level. P-values for two-tailed tests are in parentheses

Independent Variables	Model (1) Developed markets	Model (2) Emerging markets
Intercept	0.1658	0.5948
	(0.373)	(0.021) **
Earnings $_{(t-1)}$	-0.0088	0.0439
	(0.573)	(0.001) ***
Earnings $_{(t)}$	0.5772	0.2587
	(0.001) ***	(0.001) ***
Earnings (3t)	-0.1300	-0.0526
	(0.001) ***	(0.001) ***
Return (3t)	0.1360	-0.0252
	(0.001) ***	(0.001) ***
CL_t	-0.1258	-0.2845
	(0.113)	(0.001) ***
CL_t * Earnings$_{(t-1)}$	0.0496	0.0177
	(0.826)	(0.914)
CL_t * Earnings$_{(t)}$	0.0060	0.4165
	(0.982)	(0.015) **
CL_t * Earnings (3t)	**0.0095**	**-0.0067**
	(0.922)	**(0.936)**
CL_t * Return (3t)	-0.0229	-0.0014
	(0.173)	(0.962)
Growth$_t$	0.0000	0.0000
	(0.799)	(0.001) ***
Size$_t$	0.0504	0.0783
	(0.001) ***	(0.001) ***
Leverage$_t$	0.0001	-0.0043
	(0.905)	(0.819)
Liquidity$_t$	-0.0006	-0.0004
	(0.937)	(0.029)
Country dummies	Yes	Yes
Industry dummies	Yes	Yes
Year dummies	Yes	Yes
Adjusted R^2	0.3744	0.1436
N	21 156	16 905

We now turn to investigate whether the introduction of the Sarbanes-Oxley (SOX) Act in 2002 is likely to have an impact on the intensity of the association between current returns and future earnings. The argument is that SOX creates severe legal exposures for firms as well as for managers. Therefore, this new legal environment should reinforce the commitment to reveal more information about future earnings. To examine this hypothesis, we re-estimate our equation (4) before and after the enactment of SOX and compare the

coefficients of the interaction term $CL_t * e_{3t}$. Our results (Table 1.6) suggest that the degree to which future earnings news are reflected in current prices is more pronounced after the passage of SOX (the interaction coefficient is 0.0658 for the period after SOX and -0.0808 for the period before SOX). However, the positive association between US exchange cross-listings and stock price informativeness after the enactment of SOX is not significant (coefficient of 0.0658 with a *p-value* of 0.575).

Table 1.6 : Panel regressions using separate estimations before and after the enactment of SOX

$$R_t = b_0 + b_1 e_{t-1} + b_2 e_t + b_3 e_{3t} + b_4 R_{3t} + \theta_0 CL_t + \theta_1 CL_t * e_{t-1} + \theta_2 CL_t * e_t + \theta_3 CL_t * e_{3t} + \theta_4 CL_t * R_{3t} + \delta_0 Controls_t + \varepsilon_t$$

To avoid drawing spurious inferences from extreme values, regressions results are robust to outliers. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively. Country, industry and years dummy variables are included but not reported. Standard errors are adjusted for heteroskedasticity and clustering at the firm level. P-values for two-tailed tests are in

Independent Variables	Model (1) Before SOX (1990-2002)	Model (2) After SOX (2003-2006)
Intercept	0.7420	0.2651
	(0.001)***	(0.079)*
Earnings $_{(t-1)}$	0.0199	-0.0268
	(0.091)*	(0.031)**
Earnings $_{(t)}$	0.2794	0.6161
	(0.001)***	(0.001)***
Earnings (3t)	-0.0666	-0.1395
	(0.001)***	(0.001)***
Return (3t)	0.0962	0.0900
	(0.001)***	(0.001)***
CL_t	-0.0072	-0.2638
	(0.934)	(0.001)***
CL_t * Earnings$_{(t-1)}$	0.0839	- 0.1386
	(0.648)	(0.570)
CL_t * Earnings$_{(t)}$	0.2327	0.2605
	(0.229)	(0.419)
CL_t * Earnings (3t)	**-0.0808**	**0.0658**
	(0.334)	**(0.575)**
CL_t * Return (3t)	-0.0471	0.0039
	(0.025)**	(0.849)
$Growth_t$	0.0000	0.0000
	(0.001)***	(0.861)
$Size_t$	0.0629	0.0618
	(0.001)***	(0.001)***
$Leverage_t$	-0.0027	0.0002
	(0.597)	(0.786)
$Liquidity_t$	-0.0002	-0.0018
	(0.151)	(0.861)
Country dummies	Yes	Yes
Industry dummies	Yes	Yes
Year dummies	Yes	Yes
Adjusted R^2	0.4552	0.2209
N	22 911	14 870

Our final analysis addresses the relation between US cross-listing and stock price informativeness for non-exchange ADRs. As mentioned earlier, the legal and disclosure implications of ADRII/III and level I/Rule 144A programs are different because non-exchange listings require minimal disclosure and US GAAP reconciliation. In Table 1.7, CL_t becomes a dummy variable that takes the value 1 if the firm has a level I or Rule 144A listings and 0 otherwise. Consistent with our hypothesis 2, non-exchange ADRs experience an insignificant change in their stock price informativeness (table 1.7). For instance, In the case of OTC listings, the coefficient of the interaction term $CL_t * e_{3t}$ is -0.0219 with a *p-value* of 0.666

Table 1.7 : Panel regressions for non-exchange ADRs (Level1/Rule144A)

$$R_t = b_0 + b_1 e_{t-1} + b_2 e_t + b_3 e_{3t} + b_4 R_{3t} + \theta_0 CL_t + \theta_1 CL_t * e_{t-1} + \theta_2 CL_t * e_t + \theta_3 CL_t * e_{3t} + \theta_4 CL_t * R_{3t} + \varepsilon_t$$

To avoid drawing spurious inferences from extreme values, regressions results are robust to outliers. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively. Country, industry and years dummy variables are included but not reported. Standard errors are adjusted for heteroskedasticity and clustering at the firm level. P-values for two-tailed tests are in parentheses

Independent Variables	Model (1) 144A cross-listings	Model (3) OTC cross-listings
Intercept	1.2147 (0.001) ***	0.8880 (0.001) ***
Earnings $_{(t-1)}$	0.0327 (0.026) **	0.0328 (0.023) **
Earnings $_{(t)}$	0.3388 (0.001) ***	0.3284 (0.001) ***
Earnings (3t)	-0.0911 (0.001) ***	-0.0842 (0.001) ***
Return (3t)	0.0734 (0.001) ***	0.0838 (0.001) ***
CL_t	0.1190 (0.010) **	0.0767 (0.042) **
CL_t * Earnings$_{(t-1)}$	0.1044 (0.058) *	0.0257 (0.739)
CL_t * Earnings$_{(t)}$	-0.1329 (0.239)	0.1476 (0.210)
CL_t * Earnings (3t)	**0.0163 (0.749)**	**-0.0219 (0.666)**
CL_t * Return (3t)	-0.0966 (0.001) ***	-0.0845 (0.001) ***
Country dummies	Yes	Yes
Industry dummies	Yes	Yes
Year dummies	Yes	Yes
Adjusted R^2	0.2110	0.2419
N	55697	54869

1.6. Conclusion

In this paper, we examine whether US cross-listings affect the information environment of non US corporations. We hypothesize that the quality of the information environment improves after a listing on US exchanges because of more stringent disclosure rules. However, our results indicate that such mechanism is not associated with more future earnings news reflected in current prices, which is consistent with the view that cross-listings in US exchanges do not improve stock price informativeness. This finding is robust to many aspects of our methodology. As Fernandes and Ferreira (2008), we argue that the enhanced disclosure standards associated with US exchange cross-listings can crowd out private information collection. In fact, it is possible that the commitment to reveal more information substitutes for the collection of private information by some market participants, so that, on balance, an insignificant amount of future earnings news will be impounded into stock prices. Therefore, other type of policies should be developed by regulators in order to complement the US stricter disclosure requirements and minimize the crowding out effect. This is particularly important because a necessary condition for better functioning stock markets is that stock prices track firm fundamentals closely.

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Table 1.8 : Cross-listings and delistings by country: 1990 to 2008

This table shows the number of cross-listings and delistings in the U.S by country. We obtain data on ADRs listing from the Bank of New York (BNY), Citibank (CB), Deutsche Bank (DB), JP Morgan (JPM), the OTCBB, The Pink Sheets, and CRSP. Information on direct listings (Canadian and Israeli firms) is from the NYSE and NASDAQ websites. The data provided by Citibank and CRSP allows us to keep track of firms that had been delisted by June 2008. Firms can cross-list in the US via Rule 144A private placement, level I Over-the-Counter, and Level II and III.

	US cross-listings			US delistings	
Country	Rule 144A	OTC	Exchange	OTC	Exchange
Argentina	7	3	16	6	8
Australia	6	92	13	37	33
Austria	3	10	0	0	0
Bahamas	0	0	3	0	0
Belgium	1	3	1	2	1
Bermuda	0	1	56	1	1
Bolivia	0	1	0	0	0
Brazil	27	25	38	36	13
Brit. Virgin Islands	1	0	20	0	0
Canada	0	0	123	0	0
Cayman Islands	0	0	16	0	0
Chile	3	1	12	1	18
China	4	28	67	2	4
Colombia	0	2	1	1	1
Croatia	4	0	0	0	0
Czech Republic	2	0	0	0	0
Denmark	1	0	2	1	4
Ecuador	0	1	0	0	0
Egypt	10	2	0	0	0
Estonia	1	0	0	0	0
Finland	1	2	2	2	4
France	3	16	12	9	19
Germany	0	23	18	6	13
Greece	3	3	12	0	1
Hong Kong	1	89	14	38	10
Hungary	4	3	1	2	0
India	74	2	13	1	3
Indonesia	3	5	2	1	1
Ireland	3	8	10	4	25
Israel	2	5	68	0	5
Italy	8	7	7	3	9
Jamaica	0	3	0	1	0
Japan	0	35	24	4	9
Jordan	1	2	0	0	0
Kazakhstan	9	1	0	0	0
Korea	17	5	9	1	4
Kuwait	1	0	0	0	0
Lebanon	3	0	0	0	0
Lithuania	2	0	0	0	0
Luxembourg	1	0	4	2	6
Malaysia	0	9	0	4	0
Malta	1	0	0	0	0

Table 1.8: Continued

	US cross-listings			US delistings	
Country	Rule 144A	OTC	Exchange	OTC	Exchange
Marshall Islands	0	0	15	0	0
México	13	21	21	26	23
Netherlands	2	14	16	17	5
New Zealand	0	2	1	1	12
Nigeria	3	0	0	0	0
Norway	1	6	3	16	5
Oman	1	0	0	0	0
Pakistan	7	0	0	0	0
Panamá	0	2	3	0	0
Perú	1	4	1	0	2
Philippines	4	4	2	3	0
Poland	12	2	0	1	0
Portugal	1	4	1	2	2
Puerto Rico	0	0	9	0	0
Qatar	1	0	0	0	0
Russia	36	39	5	4	1
Singapore	2	13	5	6	1
South Africa	5	30	7	17	6
Spain	2	2	3	2	10
Sri Lanka	1	0	0	0	0
Sweden	0	8	2	9	19
Switzerland	3	7	8	11	9
Taiwan	47	0	6	0	1
Thailand	0	14	0	4	0
Tunisia	1	0	0	0	0
Turkey	15	5	1	3	0
Ukraine	3	10	0	0	0
United Kingdom	9	65	41	99	166
Venezuela	1	5	0	6	4

Table 1.9: Hofstede cultural dimensions

Variable	Definition
Power distance index (PDI)	Degree to which the less powerful members of organizations and institutions (like the family) accept that power is unequally distributed.
Individualism/Collectivism (IDV)	Refers to the ties between individuals: in some societies, where everyone is expected to look after him/herself and his/her immediate family, these ties are weak. In other societies, individuals are integrated into strong cohesive groups.
Masculinity/Femininity (MAS)	Refers to the distribution of the roles between genders.
Uncertainty avoidance index (UAI)	Degree to which members of a society tolerate uncertainty and ambiguity
Long term/short term orientations (LTO)	Values associated with long term orientation are thrift and perseverance; while values associated with short term orientation are respect for tradition, fulfilling social obligations, and protecting one's 'face'.

Source : www.geert-hofstede.com

Table 1.10 : Hofstede cultural scores

Country	PDI	IDV	MAS	UAI	LTO
Arab World (Egypt, Iraq, Kuwait, Lebanon, Libya, Saudi Arabia, United Arab Emirates)	80	38	52	68	
Argentina	49	46	56	86	
Australia	36	90	61	51	31
Austria	11	55	79	70	
Belgium	65	75	54	94	
Brazil	69	38	49	76	65
Canada	39	80	52	48	23
Chile	63	23	28	86	
China	80	20	66	30	118
Colombia	67	13	64	80	
Czech Republic	57	58	57	74	13
Denmark	18	74	16	23	
Estonia	40	60	30	60	
Finland	33	63	26	59	
France	68	71	43	86	
Germany	35	67	66	65	31
Greece	60	35	57	112	
Hong Kong	68	25	57	29	96
Hungary	46	80	88	82	50
India	77	48	56	40	61
Indonesia	78	14	46	48	
Ireland	28	70	68	35	
Israel	13	54	47	81	
Italy	50	76	70	75	
Jamaica	45	39	68	13	
Japan	54	46	95	92	80
Malaysia	104	26	50	36	
Malta	56	59	47	96	
Mexico	81	30	69	82	
Netherlands	38	80	14	53	44
New Zealand	22	79	58	49	30
Norway	31	69	8	50	20
Pakistan	55	14	50	70	0
Peru	64	16	42	87	

Philippines	94	32	64	44	19
Poland	68	60	64	93	32
Portugal	63	27	31	104	
Russia	93	39	36	95	
Singapore	74	20	48	8	48
South Africa	49	65	63	49	
South Korea	60	18	39	85	75
Spain	57	51	42	86	
Sweden	31	71	5	29	33
Switzerland	34	68	70	58	
Taiwan	58	17	45	69	87
Thailand	64	20	34	64	56
Turkey	66	37	45	85	
United Kingdom	35	89	66	35	25
United States	40	91	62	46	29
Venezuela	81	12	73	76	

Source : www.geert-hofstede.com

CHAPITRE II

ARTICLE 2

STOCK PRICE INFORMATIVENESS AND ANALYST COVERAGE

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STOCK PRICE INFORMATIVENESS AND ANALYST COVERAGE

Abstract

This paper examines whether more analyst coverage translates into more informative stock prices. The examination is applied to both developed and emerging markets. Our results indicate that analyst coverage in developed markets improves the flow of private information into stock prices. In parallel, we find that increased coverage in emerging markets translates into less future earnings information being impounded in stock prices, in accord with the view that financial analysts would act as intermediaries rather than private information providers.

Keywords: analyst coverage, stock price informativeness, firm-specific information, earnings forecasts.

2.1. Introduction

In this paper, we propose to clarify the impact of analyst coverage on stock price informativeness. Allegedly, security analysts impact capital markets by providing firm-specific information, including foremost earnings forecasts. Their activities are meant to reduce the information asymmetry between market participants, thereby contributing to keep stock prices in line with firm fundamentals. Such informational role is deemed important, given that innumerable small investors lack both time and resources to fully appraise firm stocks.

The impact of analysts' activities on the firm's information environment has been the subject of extensive analysis in accounting and finance. However, there has been little evidence showing that analyst coverage is related to price discovery (process by which information is incorporated into stock prices). Using a statistical methodology developed by Collins et al. (1994), we try to address this deficiency in the literature by examining the relation between analysts' coverage and a direct measure of price discovery that relies on fundamental data, namely earnings. We expect this research to contribute to a better understanding of how analysts impact the price information process. Indeed, it's not clear whether financial analysts act as intermediaries (filtering channels) or true providers of private information. Such intermediation, according to Lang and Lundholm (1996), calls for the information to go from the firm to analysts who then process and transmit it to capital markets. Hence, analysts do not really compete with firm disclosure sources and act mainly as outside filtering channels, the information asymmetry reducing role being left to firm insiders. Thus viewed, analysts essentially access a large amount of market-wide information. In contrast, assuming that financial analysts act primarily as private information providers, their coverage should entail more firm-specific information being transmitted to the markets, better value-related forecasts and stock prices more in line with firm fundamentals.

We consider that higher stock price informativeness is associated with more information about future earnings being impounded in current prices, in accord with a growing literature. For instance, Gelb and Zarowin (2002), Lundholm and Myers (2002) as well as Durnev et al. (2003) define price informativeness along this line. To measure the association, they regress current returns against both current and future earnings (more informative stock prices should contain more information about future earnings). Therefore, we choose future earnings response coefficients as our proxy for price informativeness in our own regressions and expect that it will correlate positively with the level of analyst coverage.

We claim that our study makes several contributions. First, we propose a novel approach to assess whether financial analysts perform a vital economic role by reducing information asymmetries between market participants. To our knowledge, and despite its common sense appeal, our approach has yet to appear in the literature. Should we find a positive association between our proxy of stock price informativeness and the level of analyst coverage, we will have indications that analysts' earnings forecasts act as valid signals for real future earnings. Second, through a global investigation, we cover analysts' activities in both developed and emerging markets. So far, few studies focus on the potential cross-sectional differences in the role played by analysts in different economic and institutional environments. Obviously, in countries with weak institutions and less stringent information disclosure requirements, financial analysts stand at a disadvantage over insiders in accessing firm-specific information. Hence, we expect a weaker link between our measure of price informativeness and analyst coverage for firms originating from countries with weak institutions. Finally, as suggested by Piotroski and Roulstone (2004), the existing literature does not provide conclusive evidence regarding whether a firm's information environment induces higher analyst coverage, or whether greater analyst coverage leads to an improvement in price informativeness. Therefore, we propose to supplement our main regression analysis with a more robust specification that controls for the simultaneous effects between our adopted proxies.

We document two primary empirical results. First, we find that analysts' forecasting activities improve the flow of private information into stock prices developed markets. Second, analyst coverage can produce different results depending on a country's home environment. In fact, the positive impact of analysts' activities is concentrated in countries with stronger institutions and stricter disclosure rules. In emerging countries, our results suggest that financial analysts' activities do not reduce information asymmetries between market participants.

The remainder of the paper is organized as follows. Section 2 reviews previous work on analyst activity and our price informativeness measure. In section 3, we present our empirical model and outline our methodology and testable hypotheses. We discuss our data and sample in section 4. Section 5 presents and analyses our main empirical results, which is followed by concluding remarks in section 6.

2.2. Previous research work

Our study is related to two streams of literature: (1) research on the impact of analysts' activities, and (2) research on stock price informativeness measures.

2.2.1. Analyst coverage and market efficiency

The typical investor does not have the time nor the resources for performing detailed firm evaluations. Therefore, there is a demand for security analysts who produce information for small investors. The ability of analysts to predict or influence stock prices is a much debated topic. Although the question is still open, numerous studies show that investors can profit from the publicly available recommendations of security analysts. Theoretically, the semi-strong form of market efficiency posits that investors should not be able to trade profitably on the basis of public information, such as analysts' recommendations. On the other hand, we have brokerage firms that spend millions of dollars in collecting data, analyzing, and publishing research and recommendations. In a rational world, these activities must be compensated by profits in the form of underwriting fees and trading commissions.

Actually, abundant evidence exists which supports the argument that analysts' earnings forecasts are informative for investors. For instance, several papers compare the predictive ability of analysts' earnings forecasts with time-series models (Brown, 1978; Brown and Rozeff, 1978; Collins and Hopwood, 1980; Brown et al. 1987). Their results suggest that security analysts' earnings forecasts are more accurate than time-series model forecasts. In 1996, Womack analyses the price and volume reactions to different types of analysts' recommendations. His results suggest that stock prices adjust either up 5% (for buy recommendations) or down 11% (for sell recommendations) over the next several months. These findings offer evidence that security analysts have market timing and stock picking abilities. In addition, Mikhail et al. (2004) investigate whether analysts stock picking abilities persist in the future. They find that security analysts whose recommendations earned the highest returns in the past continue to outperform in the future.

In the same line of reasoning, Barber et al. (2001) examine whether investors can profit from the publicly available recommendations of financial analysts. Barber et al. (2001) document that purchasing (short selling) stocks with the most (least) favorable consensus analysts' recommendations provide an average annual abnormal gross return of 4.13% (-4.91%). In a more recent study, Barber et al. (2010) confirm their previous results and show that investment returns may be enhanced by conditioning on financial analysts' recommendations. According to Barber et al. (2010), the predictive power of analysts' recommendations reflects analysts' ability to generate valuable private information. Further, the abnormal returns to analysts' recommendations stem both from the ratings levels assigned and the changes in those ratings (Barber et al. 2010). As for Green (2006), he finds that financial analysts' recommendations do provide brokerage firms clients with incremental investment value. Indeed, after controlling for transactions costs, Green (2006) shows that purchasing (selling) quickly following upgrades (downgrades) by financial analysts results in an average two-day returns of 1.02% (1.50%). Similarly, Jegadeesh et al. (2004) investigate the source of investment value provided by analysts' recommendations and changes in recommendations. They find that the marginal predictive ability of the level of analysts' recommendations is not significant. However, the predictive power of changes (revisions) in

analysts' recommendations is more robust than the predictive power of the level of their recommendations.

In other studies, financial analysts have been found to issue, on average, earnings' forecasts that tend to be systematically above the actual value of earnings. For instance, Hong and Kubik (2003) find that brokerage houses reward optimistic analysts who promote stocks. Further, Lim (2001) argues that financial analysts have incentives to issue earnings forecasts that tend to be upward biased, because optimistic forecasts can improve access to management. Lim (2001) proposes a model in which analysts optimistic forecasts are rational and intentional. In the same line of reasoning, Mest and Plummer (2003) show that analysts upward bias tend to decrease when optimistic forecasts are less likely to affect management relations. This result suggests that financial analysts behave rationally.

Finally, a number of other contributions indicate that higher analyst coverage equates with more market-wide information and less firm-specific information. For instance, Piotroski and Roulstone (2004) find that, in the US, stock return variation attributable to the general market and industry movements is positively associated with analysts' activities, consistent with analysts decreasing the amount of firm-specific information that is incorporated into stock prices. For emerging markets, the results of Chan and Hameed (2006) also show that stock return synchronicity with the market is positively correlated with analyst coverage, providing more evidence supporting the fact that security analysts increase the amount of market level information in prices.

As for us, we fashion our own way to estimate the extent to which analyst coverage enhances, or lessens, the impounding of firm-specific information into stock prices. Using a measure of stock price informativeness based on fundamentals, we examine its relation with the intensity of analyst activity, as rendered at firm level by the number of analysts issuing earnings forecasts.

2.2.2. Stock price informativeness:

Our proxy of stock price informativeness is based on Collins et al. (1994). It is meant to measure directly the association between current stock prices and future earnings. In fact, this measure defines how much information current stock prices contain about future earnings. Informative prices should «bring the future» so that they can track and reflect more future earnings news. We estimate that many papers (Gelb and Zarowin, 2002; Lundholm and Myers, 2002; Durnev et al. 2003) support the relation between our proxy and price informativeness. In these papers, current returns are regressed against both current and future earnings:

$$R_t = \beta_0 + \beta_1 uce_t + \sum_{i=1}^{\infty} \beta_{2i} \Delta E_t(fe_{t+i}) + \varepsilon_t \qquad (1)$$

Where

R_t current stock return (period *t*)
uce_t unexpected current earnings (period *t*)
$\Delta E_t(fe_{t+i})$ change in expectations about future earnings
ε_t error term

The explanatory variables in regression (1) being unobservable, similar proxies are used by authors such Lev and Zarowin (1999), Francis and Schipper (1999), Lundholm and Myers (2002), and Durnev et al. (2003). To proxy for the unexpected current earnings in period t, these authors rely on the level of earnings at periods (t) and (t-1). Lundholm and Myers (2002) argue that the inclusion of the past year earnings (e_{t-1}) allows the regression to dictate the best representation of the prior expectation for current earnings. If earnings are treated by the market as a random walk process, then the coefficient on e_{t-1} and e_t are of similar magnitude but opposite signs. In contrast, if the coefficient on e_{t-1} is approximately zero then earnings are treated as a white noise process (Lundholm and Myers, 2002).

Furthermore, to proxy for the changes in the expected future earnings, we follow the standard practice in the literature (Collins et al. 1994; Gelb and Zarowin, 2002; Lundholm and Myers, 2002; and Durnev et al. 2003) and use the realized future earnings (e_{t+i}) and future returns (R_{t+i}) as proxies. Note that Beaver et al. (1980) and Warfield and Wild (1992) proxy for $\Delta E_t(fe_{t+i})$ by using only realized future earnings. However, Collins et al. (1994)

recommend including future stock returns as an additional control variable. They argue that the omission of this variable introduces an error in variables because realized future earnings have expected and unexpected components. To correct for this bias and control for the unexpected component, an instrument (future returns) is needed that correlates with the measurement error but not with the dependent variable. The underlying intuition being that an unexpected shock to future earnings (t+i) should have an impact on future returns (R_{t+i}).

The regression we estimate to proxy for stock price informativeness goes as follows:

$$R_t = b_0 + b_1 e_{t-1} + b_2 e_t + \sum_{i=1}^{3} (b_{3i} e_{t+i} + b_{4i} R_{t+i}) + \varepsilon_t \qquad (2)$$

We use only three years of future earnings (e_{t+1}, e_{t+2} and e_{t+3}) and corresponding returns (R_{t+1}, R_{t+2} and R_{t+3}) because prior research has shown that amounts further out in time add little explanatory power (Collins et al. 1994). The aggregated coefficients on the future earnings (Sum of b_{3i}) represent the association between current return and realized future earnings. The more current return, R_t, contains information about future earnings, the higher the coefficients are expected to be. When we measure the Pearson correlations between variables in equation (2), multicollinearity is not an issue since current earnings, future earnings and future returns are not highly correlated. We also use the variance inflation factor and find no evidence of multicollinarity.

R_t are the buy-and-hold returns for the 12 months period starting at the fiscal-year-end[2]. Earnings e_t equates with income before interest, taxes, depreciation and amortization (EBITDA), recorded at the end of fiscal year (t) divided by the initial market value of equity recorded at (t-1). The equity is valued at (t-1) by taking stock price times the number of shares outstanding. It is worth mentioning that interest, taxes, depreciation, and amortization are quite sensitive to differences in discretionary accounting rules. Knowing that such differences in the accounting practices are country-or industry-specific, the advantage of relying on EBITDA is increasing with trans-industry and transnational sampling. Therefore, we will circumvent needless noises by relying on raw EBITDA rather than net income.

[2] The fiscal-year-end adjusted share price, plus the adjusted dividends, all divided by the adjusted price at the end of the previous fiscal year (t-1). The adjustment factor reflects stocks splits that occurred during the fiscal year.

Furthermore, the country or the industry fixed effects in our regressions models are likely to pick up these differences in the accounting rules (see, Hail and Leuz, 2006, 2009 for a discussion).

We measure stock price informativeness by the sum of the coefficients on future earnings:

$$PI = \sum_{i=1}^{3} b_{3i} \qquad (3)$$

This variable cumulates the sensitivities of current prices to future earnings. Thus, PI is likely to reflect how well current prices predict future earnings. On the other hand, an important empirical literature (Gelb and Zarowin, 2002; Lundholm and Myers, 2002; and Durnev et al. 2003) suggests that our measure of price informativeness is affected by a variety of factors (e.g. size, growth, earnings volatility...). Therefore, we should include in our regressions a set of variables to control for observed variations in the earnings–return relation that are likely due to causes other than analyst following. After controlling for these factors, our empirical measure should reflect informativeness.

2.3. Hypotheses and tests

In this section, we define our variables and their measures, state our key hypotheses and describe our methodology for testing the latter. The main purpose is to measure directly the association between stock price informativeness and analyst coverage.

2.3.1. Construction of variables

Most of our variables can be found in the existing literature. The measures can differ, including our own.

2.3.1.1. Price informativeness (PI).

As defined earlier, PI represents the amount of information about future earnings that is reflected in current prices (future earnings response coefficients). To estimate PI, we follow Durnev et al. (2003); Piotroski and Roulstone (2004) and use a cross-section of similar firms (pooling firms in the same industry). This approach consists of measuring PI estimates each year for all firms in a given two-digit industry. We do not estimate PI for each firm for three main reasons. First, it's not possible to measure PI for each firm and each year because we use annual data frequencies in equation (2). Second, if we intend to calculate PI for each firm over the 1990-2006 period, the problem is that we will use few observations for our estimation purpose (maximum 17 observations). The result could be unreliable measures for PI. Finally, as stressed by Durnev et al. (2003), polling years of data for each firm to estimate stock price informativeness may be problematic because changes in macroeconomic environment, industry conditions, accounting rules, and financial regulations can cause intertemporal changes in our future earnings coefficients.

The simple correlations between PI estimates and analyst activity, as measured by coverage, are of interest. However, our analysis is best performed using a multivariate regressions framework. Of course, we need to include control variables in our regressions and the most recurrent in the literature being earnings timeliness and earnings volatility.

2.3.1.2. Earnings timeliness:

Earnings timeliness refers to the speed at which stock prices respond to earnings news. For example, growth stocks compared to mature stocks, should display a much stronger relation between current returns and future earnings, all else equal. Therefore, we should include in our regressions a measure of firm growth opportunities to control for this factor. Growth is defined as the percentage growth in the firm's assets from year *t-5* to year *t*. Furthermore, the relation between returns and earnings can also vary when the firm is releasing good news or bad news. Basu (1997) shows that due to conservatism principle in accounting; bad news is impounded in earnings more quickly than good news. An

implication is that good news firms should exhibit a strong relation between current returns and future earnings than bad news firms. Basu (1997) suggests that the sign of the current stock return can be used as a proxy for bad news (negative sign) versus good news (positive sign). Therefore, as a further check, we include the current return as an additional control variable. Finally, size might also be an important omitted variable. Freeman (1987) and Collins and Kothari (1989) find that returns of larger firms impound earnings on a more timely basis than returns of smaller firms. To measure the size, we use the log of firm's market value of equity.

2.3.1.3. Earnings volatility:

Other determinants of the earnings response coefficients may intrinsically affect our measure of price informativeness. For example, volatile earnings may be hard to forecast. Thus, firms with more volatile earnings should have a lower relation between current returns and future earnings. To control for this factor, we add earnings standard deviation over the previous 5 years as an independent variable.

2.3.1.4. Analyst coverage:

We measure analyst following as the average number of analysts who issued earnings forecasts for all firms in a given two-digit industry during a given fiscal-year. We gather data on the number of analysts issuing forecasts through I/B/E/S. As suggested by Piotroski and Roulstone (2004), if I/B/E/S does not report an analyst forecast for firm i in year t, we assume that the number of analysts following that firm is zero. In our robustness checks, we also perform our analysis by excluding firms with no earnings forecasts.

Analysts' forecasting activity should be dependent on the associated costs and benefits. For instance, larger companies tend to attract more analysts because there are significant fixed costs in following larger companies. Indeed, Bhushan (1989) shows that the number of analysts is increasing in firm size. Furthermore, in larger companies, there is greater separation between ownership and control, which can create potential agency problems and

thus increase the need for analyst monitoring. As a consequence, we should expect a positive association between firm size and the number of analysts. Furthermore, because there is more private information when return volatility is higher, analyst following should be positively related to the standard deviation of firm's returns. We measure returns volatility as the average standard deviation of returns over the previous five years.

Finally, trading volume can also affects the incentives of security analysts to follow the activities of the firm. Barth et al. (2001), and Alford and Berger (1999) show that analyst coverage is increasing in trading volume. We argue that analysts have an incentive to cover firms with high trading volumes because such firms are associated with more brokerage commissions. Therefore, we should expect a positive relation between the number of analysts and our trading volume variable.

2.3.2. Empirical methodology:

To test whether analyst following influences stock price informativeness, we estimate the following regression for developed markets, emerging markets and U.S market:

$$PI_{i,t} = \alpha + \beta_1 \log(1 + NA_{i,t}) + \beta_2 \log(S_{i,t}) + \beta_3 (GR_{i,t}) + \beta_4 (EV_{i,t}) + \beta_5 (controls_{i,t}) + \sum_{k=1} \delta_k ID^k_{i,t} + \varepsilon_{i,t} \quad (4)$$

Note that i indexes two-digit SIC industries and t indexes years. The two-digit SIC industry approach consists of pooling all firms in a two-digit industry and calculate the corresponding variables. Therefore, in equation (4), we regress our industry average price informativeness estimates on industry average analysts following and industry average measures of our control variables. All variables in equation (4) are defined in table (2.1).

We assume that security analysts collect, process, and produce firm-specific information that is useful in identifying undervalued or overvalued stocks. Therefore, our first hypothesis predicts that analysts' coverage allows stock prices to track firms' fundamentals closely:

Hypothesis 1: Financial analysts' activities bring more scrutiny and provide the market with more precise firm-specific information

In our study, we also examine analysts' activities around the world. An important issue is to verify if there are cross-sectional differences between countries that stem from economic and institutional environments. On a theoretical basis, in countries with weak institutions and less stringent information disclosure requirements, financial analysts should have less informational advantage over insiders due to the difficulties associated with accessing firm-specific information. Furthermore, as suggested by Morck et al. (2000), weak property rights might discourage arbitrage based on private information (firm-specific information). Therefore, there will be fewer benefits for analysts to gather firm-specific information in countries with weak property rights. Consequently, we expect less pronounced associations between our measure of price informativeness and analyst coverage for firms originating from countries with weaker legal institutions. This reasoning leads to the following hypothesis:

Hypothesis 2: The association between price informativeness and analyst following is more pronounced for firms originating from countries with stronger legal institutions (developed markets and U.S market versus emerging markets).

Table 2.1 : Variables definitions and measures

Variable	Definition
$PI_{i,t}$	Price informativeness equates with the future earnings response coefficients. This measure represents the sum of the coefficients on future earnings (t=1, 2, 3) from regression (2). The regression is performed on a two-digit SIC industry cross-section of firms.
$NA_{i,t}$	Number of analysts is measured by the average number of analysts who issued earnings forecasts during year (t) for all firms in a two-digit industry
$S_{i,t}$	Size. Measured by the log of firm's market value of equity. We use the average size of all firms in a two-digit industry.
$GR_{i,t}$	Growth. We use two-digit industry average growth in the firms' assets from year *t-5* to year *t*.
$EV_{i,t}$	Earnings volatility. We use two-digit industry average earnings volatility over the previous 5 years.
$CR_{i,t}$	Current return. We use two-digit industry value-weighted return in (t)
$RV_{i,t}$	Returns volatility. We use two-digit industry average returns volatility over the previous 5 years.
$TV_{i,t}$	Trading volume. We use two-digit industry average trading volume. We take the logarithm of the respective realization of that proxy.
$NF_{i,t}$	Square root of the number of firms in the industry used in estimating PI.
ID	Dummy variable to control for industry-level fixed effects.
YD	Dummy variable to control for year-fixed effects.
CD	Dummy variable to control for country-fixed effects.

2.4. Data

Different sources of data are used for the construction of our variables. We obtain data on analysts' following and their earnings forecasts from I/B/E/S. Information on stock prices,

returns and firm-level accounting data are drawn from Datastream and Worldscope. Our sample construction begins with all firms included in the country list provided by Datastream from 1990 to 2006. The sample period stops in 2006 because in some of our variables construction, we need data up to 2009. The second step consists of matching firms from I/B/E/S and Datastream. Note our exclusion of financial and banking firms because the financial nature of their assets hinders accounting data comparisons with other firms.

2.5. Empirical results

2.5.1. Descriptive statistics

Table 2.2 presents a summary of the sample firms included in the study. The sample includes firms from 42 countries (22 developed countries, 19 emerging countries and the US). The sample period is from 1990 to 2006. To enhance the comparability of our study with prior literature, we do not include the US market into our developed countries sample.

Table 2.2 : Number of firm-year observations in the sample

US market		Developed markets		Emerging markets	
Year	Number of firm-years	Year	Number of firm-years	Year	Number of firm-years
1990	378	1990	1040	1990	-
1991	390	1991	1287	1991	-
1992	406	1992	1590	1992	-
1993	484	1993	1829	1993	-
1994	578	1994	1969	1994	234
1995	638	1995	1878	1995	382
1996	858	1996	2242	1996	636
1997	985	1997	2603	1997	939
1998	1103	1998	2943	1998	1104
1999	1233	1999	3175	1999	1201
2000	1460	2000	3596	2000	1377
2001	1595	2001	4290	2001	1737
2002	1759	2002	5293	2002	2196
2003	1832	2003	5605	2003	2520
2004	1758	2004	5928	2004	3450
2005	1806	2005	6217	2005	3737
2006	1855	2006	5955	2006	3338
Total	19 118	Total	57 440	Total	22 851

Table 2.3 presents univariate statistics for our sample. Firms, in table 2.3, are partitioned into two groups based on the number of analysts covering the firm. The first group includes firms followed by less than four analysts. The second group contains firms covered by more than four analysts. The intuition behind this classification is to investigate potential differences in our main estimates between firms with low analyst coverage and firms with high analyst coverage. For US and emerging markets, stock price informativeness tends to decrease for firms with more analyst coverage, suggesting a negative relation between our price informativeness measure and analyst activity. For instance, The PI measure is -0.259 for US firms covered by less than four analysts and -0.278 for US firms with more than four analysts. In the case of developed markets firms, we find that stock price informativeness is positively correlated with analyst coverage. In fact, the PI statistics are -0.203 and -0.142 for the groups with low numbers of analysts and the groups with high numbers of analysts, respectively.

Table 2.3 : Descriptive statistics

This table presents descriptive statistics for two portfolios. The first portfolio includes firms followed by less than four analysts. The second portfolio contains firms followed by more than four analysts. N is the number of firm-year observations for each group. The sample includes firms from 42 countries (22 developed countries, 19 emerging countries and the US). All variables are defined in table 2.1. The sample period is from 1990 to 2006. All observations, including those firms with zero analyst coverage, are used in the estimation. All variables are constructed using two-digit SIC cross-industry approach. This approach is conducted by polling firms in a two-digit SIC industry to calculate the corresponding measures. The mean of a variable is calculated as the average across all industries and years, and the corresponding standard deviation is indicated in parentheses.

Variable	US market		Developed markets		Emerging markets	
	Less than four analysts	More than four analysts	Less than four analysts	More than four analysts	Less than four analysts	More than four analysts
PI	-0.259	-0.278	-0.203	-0.142	-0.301	-0.626
	(0.252)	(0.103)	(0.129)	(0.127)	(0.330)	(0.216)
S	12.627	13.609	12.175	12.79	11.653	12.889
	(0.331)	(0.696)	(0.500)	(0.410)	(0.621)	(0.627)
GR	2.230	1.166	1.208	1.052	3.731	5.642
	(1.593)	(0.578)	(0.850)	(0.290)	(2.081)	(1.733)
EV	0.316	0.350	0.285	0.332	0.262	0.057
	(0.234)	(0.335)	(0.236)	(0.269)	(0.120)	(0.074)
RV	0.608	0.415	0.530	0.665	1.432	0.493
	(0.269)	(0.171)	(0.097)	(0.275)	(1.037)	(0.586)
TV	9.318	9.646	8.990	9.928	9.296	8.340
	(0.371)	(0.222)	(0.38)	(0.280)	(0.492)	(0.640)
N	12 206	6912	55 818	1622	21 069	1782

It is worth mentioning that these mixed preliminary results only represent a univariate relation. Our tests are best performed using multivariate regression analysis because PI is also affected by other factors (size, growth...). On the other hand, consistent with associations documented in prior literature, we find that the number of analysts is correlated with other variables. For instance, the firm size is generally higher for groups with higher number of analysts, suggesting that large companies tend to attract more analysts. In addition, analyst coverage is also increasing in trading volume (US and developed markets).

Table 2.4 presents correlations between our key variables. If analysts forecasting activities provide the market with more precise firm-specific information, we should expect a positive correlation between stock price informativeness and analyst following. Several key relations are apparent in table 2.4. First, stock price informativeness and analyst following display an insignificant correlation in all cases (developed, emerging and US markets). Second, in the case of developed and emerging markets, the Pearson correlations between firm size and stock price informativeness are significantly negative. Third, we have a positive

and significant correlation between analyst activity and market capitalization (Size). Finally, the relation between stock price informativeness and assets growth is significantly negative for developed and emerging markets firms. So far, our univariate evidence on how analyst activity impacts stock price informativeness is mixed. However, in tables 2.3 and 2.4, we do not control for various plausible factors known to affect our PI estimates.

Table 2.4 : Pearson Correlations (p-values):

This table presents the correlations between variables. All observations, including those firms with zero analyst coverage, are used in the estimation. All variables are defined in table 2.1. The sample period is from 1990 to 2006. All variables are constructed using two-digit SIC cross-industry approach. This approach is conducted by polling firms in a two-digit SIC industry to calculate the corresponding measures.

Panel A: US market:

	PI	NA	S	GR	EV	CR	RV	TV
PI	1.0000	-0.0766	-0.0944	0.0671	0.0403	0.0361	0.0217	0.1168
		(0.2261)	(0.1355)	(0.2985)	(0.5252)	(0.5702)	(0.7318)	(0.0645)
NA	-0.0766	1.0000	0.4416	-0.0834	-0.0009	-0.0344	-0.0509	-0.0392
	(0.2261)		(0.0001)	(0.1303)	(0.9863)	(0.5277)	(0.3486)	(0.4702)
S	-0.0944	0.4416	1.0000	-0.1127	-0.0251	-0.0298	-0.1531	0.3548
	(0.1355)	(0.0001)		(0.0406)	(0.6449)	(0.5851)	(0.0046)	(0.0001)
GR	0.0671	-0.0834	-0.1127	1.0000	-0.0121	0.1071	0.2136	0.3024
	(0.2985)	(0.1303)	(0.0406)		(0.8256)	(0.0525)	(0.0001)	(0.0001)
EV	0.0403	-0.0009	-0.0251	-0.0121	1.0000	0.3294	0.0524	0.0684
	(0.5252)	(0.9863)	(0.6449)	(0.8256)		(0.0001)	(0.3241)	(0.2085)
CR	0.0361	-0.0344	-0.0298	0.1071	0.3294	1.0000	0.1422	0.1321
	(0.5702)	(0.5277)	(0.5851)	(0.0525)	(0.0001)		(0.0073)	(0.0150)
RV	0.0217	-0.0509	-0.1531	0.2136	0.0524	0.1422	1.0000	0.3162
	(0.7318)	(0.3486)	(0.0046)	(0.0001)	(0.3241)	(0.0073)		(0.0001)
TV	0.1168	-0.0392	0.3548	0.3024	0.0684	0.1321	0.3162	1.0000
	(0.0645)	(0.4702)	(0.0001)	(0.0001)	(0.2085)	(0.0150)	(0.0001)	

Table 2.4-continued
Panel B: Developed markets:

	PI	NA	S	GR	EV	CR	RV	TV
PI	1.0000	0.0439	-0.1874	-0.3474	0.1113	-0.0004	-0.0251	0.1688
		(0.3866)	(0.0002)	(0.0001)	(0.0278)	(0.9929)	(0.6200)	(0.0008)
NA	0.0439	1.0000	0.3531	0.1314	0.0346	-0.1475	-0.1434	0.3831
	(0.3866)		(0.0001)	(0.0078)	(0.4854)	(0.0035)	(0.0037)	(0.0001)
S	-0.1874	0.3531	1.0000	0.1002	-0.2846	0.0335	-0.2589	-0.0755
	(0.0002)	(0.0001)		(0.0429)	(0.0001)	(0.5093)	(0.0001)	(0.1278)
GR	-0.3474	0.1314	0.1002	1.0000	-0.0256	-0.0174	0.1894	0.1798
	(0.0001)	(0.0078)	(0.0429)		(0.6049)	(0.7319)	(0.0001)	(0.0003)
EV	0.1113	0.0346	-0.2846	-0.0256	1.0000	-0.1440	0.0920	0.2655
	(0.0278)	(0.4854)	(0.0001)	(0.6049)		(0.0044)	(0.0632)	(0.0001)
CR	-0.0004	-0.1475	0.0335	-0.0174	-0.1440	1.0000	-0.0231	-0.2873
	(0.9929)	(0.0035)	(0.5093)	(0.7319)	(0.0044)		(0.6494)	(0.0001)
RV	-0.0251	-0.1434	-0.2589	0.1894	0.0920	-0.0231	1.0000	0.3000
	(0.6200)	(0.0037)	(0.0046)	(0.0001)	(0.0632)	(0.6494)		(0.0001)
TV	0.1688	0.3831	-0.0755	0.1798	0.2655	-0.2873	0.3000	1.0000
	(0.0008)	(0.0001)	(0.1278)	(0.0003)	(0.0001)	(0.0001)	(0.0001)	

Panel C: Emerging markets:

	PI	NA	S	GR	EV	CR	RV	TV
PI	1.0000	-0.0615	-0.2309	-0.5685	0.1081	0.0272	0.0520	-0.0837
		(0.3144)	(0.0001)	(0.0001)	(0.0779)	(0.6755)	(0.3979)	(0.1789)
NA	-0.0615	1.0000	0.3284	0.0140	-0.2317	-0.0030	-0.0479	0.1231
	(0.3144)		(0.0001)	(0.7914)	(0.0001)	(0.9523)	(0.3521)	(0.0131)
S	-0.2309	0.3284	1.0000	0.0862	-0.1943	0.0012	-0.0555	0.1862
	(0.0001)	(0.0001)		(0.1029)	(0.0002)	(0.9808)	(0.2816)	(0.0002)
GR	-0.5685	0.0140	0.0862	1.0000	-0.0501	-0.0121	-0.0178	0.0216
	(0.0001)	(0.7914)	(0.1029)		(0.3664)	(0.8273)	(0.7470)	(0.6821)
EV	0.1081	-0.2317	-0.1943	-0.0501	1.0000	0.0328	-0.0264	0.2312
	(0.0779)	(0.0001)	(0.0002)	(0.3664)		(0.5495)	(0.6137)	(0.0001)
CR	0.0272	-0.0030	0.0012	-0.0121	0.0328	1.0000	-0.0065	0.0018
	(0.6755)	(0.9523)	(0.9808)	(0.8273)	(0.5495)		(0.9040)	(0.9721)
RV	0.0520	-0.0479	-0.0555	-0.0178	-0.0264	-0.0065	1.0000	-0.0165
	(0.3979)	(0.3521)	(0.2816)	(0.7470)	(0.6137)	(0.9040)		(0.7546)
TV	-0.0837	0.1231	0.1862	0.0216	0.2312	0.0018	-0.0165	1.0000
	(0.1789)	(0.0131)	(0.0002)	(0.6821)	(0.0001)	(0.9721)	(0.7546)	

2.5.2. Multivariate regression analysis

To test whether analysts forecasting activities influence stock price informativeness, we estimate variants of our equation (4):

$$PI_{i,t} = \alpha + \beta_1 \log(1 + NA_{i,t}) + \beta_2 \log(S_{i,t}) + \beta_3 (GR_{i,t}) + \beta_4 (EV_{i,t}) + \beta_5 (controls_{i,t}) + \sum_{k=1} \delta_k ID^k_{i,t} + \varepsilon_{i,t}$$

The dependent variable PI is computed based on equation (3):

$$PI = \sum_{i=1}^{3} b_{3i}$$

In the case of developed and emerging markets estimations, our cross-industry approach consists of polling firms originating from different countries according to their two-digit SIC code. This approach might control for industry-specific impacts on PI, but it will poorly take into consideration potential country-specific impacts on PI. Therefore, to ascertain the robustness of our empirical findings, we add country dummies to equation (2) before estimating PI.

$$R_t = b_0 + b_1 e_{t-1} + b_2 e_t + \sum_{i=1}^{3} (b_{3i} e_{t+i} + b_{4i} R_{t+i}) + Countrydummies + \varepsilon_t$$

Later, we will re-estimate our equation (4) by pooling firms according to their country of origin rather than their industry code. Table 2.5 reports the coefficients estimates of panel regressions of equation (4). All observations, including those firms with zero analyst coverage, are used in the estimation. Model (1) serves as our starting point in that we include firm size and assets growth as additional control variables. To control further for differences among industries, we follow Durnev et al. (2003) and use a one-digit industry-fixed effects model (we do not use two-digit industry dummies to conserve degrees of freedom). The coefficients on the industry dummy variables (ID^k) are not tabulated for parsimony. In equation (4), year dummies are not included to conserve degrees of freedom, but standard errors in all models are adjusted for clustering at the time level. However, adding year dummies in equation (4) does not alter our findings.

Model (1) reports estimates of the basic equation using market capitalization and assets growth as control variables. For the US market, the analyst coverage coefficient is 0.1069 with a p-value of 0.005. This result indicates a positive and significant (1% level) association between analyst following and stock price informativeness. Further, the results of model (1) also confirm a positive and significant (5% level) relation between analyst following and price informativeness in developed countries. However, this relation becomes neutral in the case of emerging countries firms (the coefficient of interest is -0.0136 with a p-value of 0.817).

Table 2.5 : Stock price informativeness and analyst coverage: Primary results

This table reports the results of the following regression:

$$PI_{i,t} = \alpha + \beta_1 \log(1 + NA_{i,t}) + \beta_2 \log(S_{i,t}) + \beta_3 (GR_{i,t}) + \beta_4 (EV_{i,t}) + \sum_{k=1} \delta_k ID^k_{i,t} + \varepsilon_{i,t}$$

Where i indexes two-digit SIC industries and t indexes years. The two-digit SIC industry approach consists of pooling all firms in a two-digit industry and calculate the corresponding variables. For the US market, the sample size of specifications 1 and 2 is 24 two-digit industries constructed using 2903 firms. For developed markets, the sample size of specifications 1 and 2 and is 24 two-digit industries constructed using 8741 firms. For emerging markets specifications, the sample size is 24 two-digit industries constructed using 5553 firms. Financial industries are omitted. All variables are defined in table (2.1). Industry dummy variables are included but not reported. Standard errors are adjusted for clustering at the time level. P-values for two-tailed tests are in parentheses. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively.

Independent variables	US market		Developed markets		Emerging markets	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept	3.0325	3.0655	1.1288	1.0487	0.3959	0.2006
	(0.001)***	**(0.001)*****	**(0.005)*****	**(0.019)****	(0.565)	(0.774)
Analyst activity	0.1069	0.1073	0.0519	0.0513	-0.0136	-0.0093
	(0.005)***	**(0.008)*****	**(0.048)****	**(0.051)***	(0.817)	(0.878)
Size	-0.2750	-0.2777	-0.1140	-0.1094	-0.0981	-0.0812
	(0.001)***	**(0.001)*****	**(0.003)*****	**(0.005)*****	**(0.100)***	(0.180)
Growth	-0.0050	-0.0051	-0.0157	-0.0157	-0.0000	-0.0000
	(0.302)	(0.298)	**(0.069)***	**(0.069)***	**(0.001)*****	**(0.001)*****
Earnings volatility		0.0000		0.0263		0.1469
		(0.988)		(0.632)		(0.118)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.1610	0.1628	0.1754	0.1759	0.4051	0.4095
N	242	241	390	390	240	239

When we include earnings volatility (model 2), the evidence of a positive and significant association between stock price informativeness and analyst following remains consistent for both U.S and developed markets firms. In addition, our emerging markets primary findings are not affected when we add earnings volatility as an additional control variable. In fact, model (2) results show an analyst activity coefficient of -0.0093 with a p-value of 0.878.

Overall, our primary results establish a positive and significant relation between stock price informativeness and analyst coverage for US and developed markets. In these countries, financial analysts act primarily as private information providers, so that their activities bring more scrutiny and provide market participants with more precise information. On the other hand, consistent with our second hypothesis, our findings show a neutral relation between stock price informativness and analyst coverage in the case of emerging markets firms. Therefore, it seems that financial analysts have less informational advantage over insiders in countries with weaker legal institutions. As suggested by Morck et al. (2000), the weak property rights in emerging countries may discourage arbitrage based on private information, so that there will be fewer benefits for financial analysts to gather firm-specific information.

2.5.3. Robustness tests

For our robustness checks, we conduct our analyses in many different ways:

2.5.3.1. Elimination of observations with zero analysts following

Our main analysis includes firms with no earnings forecasts. A potential concern is that our results can be influenced by these observations. In fact, as suggested by Chan and Hameed (2006), the presence of zero analyst coverage could mean that there is no analyst coverage or that the data for the firm were not captured by I/B/E/S. Therefore, we also perform our tests without these observations. Estimations excluding observations without analyst activity are reported in table 2.6. For the US market, the results of our first robustness checks show that the positive association between stock price informativeness and analyst activity is robust to the elimination of observations with zero analyst coverage. On the other hand, the weaker relation between stock price informativeness and the forecasting activities of analysts, in emerging markets, becomes more pronounced. In fact, two of the three coefficients on analyst following are negative and significant in the case of emerging markets estimations. For instance, in model (3) (table 2.6), the coefficient of interest is -0.0505 with a p-value of 0.030 suggesting that emerging countries analysts act mainly as intermediaries rather than private information providers. This additional evidence provides further support

for our second hypothesis. Finally, the relation between price informativeness and analyst activity becomes non significant in developed markets estimations.

Table 2.6 : Stock price informativeness and analyst coverage excluding zero coverage cases

This table reports the results of the following regression:

$$PI_{i,t} = \alpha + \beta_1 \log(1 + NA_{i,t}) + \beta_2 \log(S_{i,t}) + \beta_3 (GR_{i,t}) + \beta_4 (EV_{i,t}) + \sum_{k=1} \delta_k ID^k_{i,t} + \varepsilon_{i,t}$$

Where *i* indexes two-digit SIC industries and *t* indexes years. The two-digit SIC industry approach consists of pooling all firms in a two-digit industry and calculate the corresponding variables. Observations with zero analyst coverage are excluded from the estimation. Industry dummy variables are included but not reported. Standard errors are adjusted for clustering at the time level. P-values for two-tailed tests are in parentheses. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively.

Independent variables	US market			Developed markets			Emerging markets		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Intercept	1.4029	1.4997	1.4956	1.1627	1.1675	1.0759	0.2394	-0.4038	-0.5709
	(0.067)*	**(0.055)***	**(0.057)***	**(0.005)*****	**(0.005)*****	**(0.018)****	(0.738)	(0.524)	(0.372)
Analyst activity	0.4967	0.4753	0.4720	0.0078	0.0178	0.0166	-0.0061	-0.0526	-0.0505
	(0.031)**	**(0.046)****	**(0.052)***	(0.660)	(0.293)	(0.324)	(0.824)	**(0.023)****	**(0.030)****
Size	-0.1921	-0.1963	-0.1952	-0.1077	-0.1126	-0.1065	-0.1738	-0.0087	0.0051
	(0.005)***	**(0.006)*****	**(0.007)*****	**(0.009)*****	**(0.007)*****	**(0.009)*****	**(0.010)*****	(0.878)	(0.929)
Growth		-0.0024	-0.0023		-0.0149	-0.0148		-0.0000	-0.0000
		(0.669)	(0.687)		**(0.087)***	**(0.088)***		**(0.001)*****	**(0.001)*****
Earnings volatility			0.0004			0.0268			0.1227
			(0.920)			(0.635)			(0.184)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.2067	0.2135	0.2136	0.0632	0.1599	0.1604	0.3580	0.4726	0.4780
N	251	242	241	390	390	390	268	240	239

2.5.3.2. Joint analysis of the role played by financial analysts around the world

We conduct our joint analysis by using the entire data set in one regression and adding a dummy variable to distinguish between firms originating from countries with stronger legal institutions (developed and US markets) and firms from countries with weaker legal institutions (emerging countries). The following model is used:

$$PI_{i,t} = \alpha + \beta_1 \log(1 + NA_{i,t}) + \beta_2 \log(S_{i,t}) + \beta_3 (GR_{i,t}) + \beta_4 (EV_{i,t}) + \theta_0 D_{i,t} + \theta_1 D_{i,t} \times \log(1 + NA_{i,t})$$

$$+ \theta_2 D_{i,t} \times \log(S_{i,t}) + \theta_3 D_{i,t} \times GR_{i,t} + \theta_4 D_{i,t} \times EV_{i,t} + \sum_{k=1} \delta_k ID^k_{i,t} + \sum_{m=1} \lambda_m YD^m_{i,t} + \varepsilon_{i,t} \qquad (5)$$

Where, $D_{i,t}$ is a dummy variable that takes the value of 1 for emerging countries and 0 otherwise. The results of our joint analysis are reported in table 2.7.

Table 2.7 provides some interesting conclusions. First, it shows that stock prices fail to reflect more information about future earnings in emerging countries markets (negative coefficient for the dummy variable). Second, the coefficient of the interaction term $D_{i,t}$*log(1+$NA_{i,t}$) is -0.0236 with a p-value of 0.069. This result suggests that the relation between price informativeness and analyst activity is less pronounced for firms originating from emerging countries.

Table 2.7 : Stock price informativeness and analyst activity: Regression analysis using the entire data set

This table reports the results of the following regression:

$$PI_{i,t} = \alpha + \beta_1 \log(1+NA_{i,t}) + \beta_2 \log(S_{i,t}) + \beta_3 (GR_{i,t}) + \beta_4 (EV_{i,t}) + \theta_0 D_{i,t} + \theta_1 D_{i,t} \times \log(1+NA_{i,t})$$

$$+ \theta_2 D_{i,t} \times \log(S_{i,t}) + \theta_3 D_{i,t} \times GR_{i,t} + \theta_4 D_{i,t} \times EV_{i,t} + \sum_{k=1} \delta_k ID^k_{i,t} + + \sum_{m=1} \lambda_m YD^m_{i,t} + \varepsilon_{i,t}$$

Where i indexes two-digit SIC industries and t indexes years. The two-digit SIC industry approach consists of pooling all firms in a two-digit industry and calculate the corresponding variables. All observations, including those firms with zero analyst coverage, are used in the estimation. $D_{i,t}$ is a dummy variable that takes the value of 1 for emerging countries and 0 otherwise. All other variables are defined in table 2.1. The sample period is from 1990 to 2006. Industry and year dummy variables are included but not reported. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively.

Independent variables	Joint analysis	
	Coefficient	p-value
Intercept	1.2775	0.001***
Analyst activity	0.0315	0.059*
Size	-0.1211	0.001***
Growth	-0.0117	0.001***
Earnings volatility	0.0016	0.609
Dummy	-0.9059	0.660
Dummy * Analyst activity	-0.0236	0.069*
Dummy * Size	0.0660	0.147
Dummy * Growth	0.0117	0.001***
Dummy * Earnings volatility	0.1784	0.085*
Industry dummies	Yes	
Year dummies	Yes	
R^2	0.211	
N	872	

To allow a clearer interpretation of our joint analysis checks, table 2.7 results show that the coefficient on analyst activity is 0.0315 for US and developed markets and 0.0079 (0.0315 +(-0.0236)) for emerging markets; a decrease of 75 percent. In addition, this decrease is economically significant at 10% level.

We interpret these results as follows: when a country's environment is characterized by poor governance practices, weak institutions, and less stringent information disclosure rules; financial analysts' fail to provide the market with more precise firm-specific information. Therefore, analysts' activities in emerging markets are associated with less efficient capital allocation and investment decisions. These findings are consistent with the results of Chan and Hameed (2006) who show that analyst following is negatively related to firm-specific return variation.

2.5.3.3. Alternative measures of PI and additional control variables

In the literature, Some papers (Beaver et al. 1980; Warfield and Wild, 1992) only use realized future earnings as a proxy for $\Delta E_t(fe_{t+i})$ in equation (1). For robustness, we drop future returns from equation (2) and reestimate our PI measures. Using the new PI estimates in equation (4) yield similar results (not tabulated), suggesting that our main findings are not affected when we drop future returns from equation (2). Moreover, our results are also robust to the use of only two years of future earnings (e_{t+1} and e_{t+2}) in equation (2) instead of three years. Finally, in the interest of parsimony, we define:

e_{3t} as the sum of e_{t+1}, e_{t+2} and e_{t+3}
R_{3t} as the buy-and-hold return for the three-year period following year (t)
and estimate :

$$R_t = b_0 + b_1 e_{t-1} + b_2 e_t + b_3 e_{3t} + b_4 R_{3t} + countrydummies + \varepsilon_t \qquad (6)$$

Relying on equation (6), our measure of stock price informativeness becomes b_3 (one coefficient) rather than the sum of three coefficients on future earnings (equation 3). Again, our main results remain unchanged when we combine three years of future earnings data into one aggregate variable.

Further, to be consistent with Durnev et al. (2003) and Piotroski and Roulstone (2004), we add the square root of the number of firms in the industry used in estimating PI as an additional independent variable in equation (4). This variable is expected to control for any differences in R^2 arising from differences in sample size used for estimation purposes (see Piotroski and Roulstone, 2004 for a discussion). We also include in equation (4) the current return as an additional control variable. As suggested by Basu (1997), the sign of the current stock return can be used as a proxy for bad news (negative sign) versus good news (positive sign). Basu (1997) shows that due to conservatism principle in accounting; bad news is impounded in earnings more quickly than good news. An implication is that good news firms could exhibit a strong relation between current returns and future earnings in comparison to bad news firms. Knowing that these potential differences in the future earnings response coefficients might create some heterogeneity in the sample, we propose to add current stock return in equation (4). When we add these two additional explanatory variables, our main findings remain unchanged (table 2.8).

Table 2.8 : Stock price informativeness and analyst activity: additional tests

This table reports the results of the following regression:

$$PI_{i,t} = \alpha + \beta_1 \log(1 + NA_{i,t}) + \beta_2 \log(S_{i,t}) + \beta_3 (GR_{i,t}) + \beta_4 (EV_{i,t}) + \beta_5 controls + \sum_{k=1} \delta_k ID^k_{i,t} + \varepsilon_{i,t}$$

Where i indexes two-digit SIC industries and t indexes years. The two-digit SIC industry approach consists of pooling all firms in a two-digit industry and calculate the corresponding variables. For the US market, the sample size of specifications 1 and 2 is 24 two-digit industries constructed using 2903 firms. For developed markets, the sample size of specifications 1 and 2 is 24 two-digit industries constructed using 8741 firms. For emerging markets specifications, the sample size is 24 two-digit industries constructed using 5553 firms. Financial industries are omitted. All variables are defined in table (2.1). Industry dummy variables are included but not reported. Standard errors are adjusted for clustering at the time level. P-values for two-tailed tests are in parentheses. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively.

Independent variables	US market		Developed markets		Emerging markets	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept	3.0655	2.8586	1.0487	0.9580	0.2006	0.3289
	(0.001)***	**(0.001)*****	**(0.019)****	**(0.064)***	(0.774)	(0.616)
Analyst activity	0.1073	0.1001	0.0513	0.0521	-0.0093	-0.0170
	(0.008)***	**(0.023)****	**(0.051)***	**(0.059)***	(0.878)	(0.760)
Size	-0.2777	-0.2615	-0.1094	-0.1046	-0.0812	-0.0682
	(0.001)***	**(0.001)*****	**(0.005)*****	**(0.026)****	(0.180)	(0.232)
Growth	-0.0051	-0.0085	-0.0157	-0.0157	-0.0000	-0.0000
	(0.298)	(0.146)	**(0.069)***	**(0.071)***	**(0.001)*****	**(0.001)*****
Earnings volatility	0.0000	-0.0000	0.0263	0.0298	0.1469	0.0536
	(0.988)	(0.983)	(0.632)	(0.643)	(0.118)	(0.532)
Current return		0.0115		0.0131		0.0001
		(0.521)		(0.667)		(0.360)
Number of firms		0.0006		-0.0009		0.0011
		(0.117)		(0.978)		**(0.006)*****
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.1628	0.1654	0.1759	0.1761	0.4095	0.4926
N	241	239	390	371	239	210

2.5.3.4. Polling firms based on their country of origin

As suggested earlier, our cross-industry approach might control for industry-specific impacts on PI, but it will poorly consider potential country-specific impacts on PI. Therefore, we extend our analyses of the relation between stock price informativeness and analyst activity by pooling firms according to their country of origin. We also add industry dummies to equation (2) before estimating PI.

Table 2.9 provides coefficient estimates of regressions based on a cross-country approach. Again, our primary findings remain unchanged when we pool firms according to their country of origin. In the case of developed countries, the results of all models confirm the positive and significant relation we found in tables 2.5 and 2.8. In addition, the coefficients on analyst activity are higher in magnitude in comparison to those reported in tables 2.5 and 2.8. For emerging countries, the cross-country methodology provides further evidence of the weak association between stock price informativeness and analyst activity in these countries. In fact, all the coefficients on analyst activity are non significant for emerging market specifications.

Table 2.9 : Stock price informativeness and analyst activity: a cross-country approach

This table reports the results of the following regression:

$$PI_{i,t} = \alpha + \beta_1 \log(1 + NA_{i,t}) + \beta_2 \log(S_{i,t}) + \beta_3 (GR_{i,t}) + \beta_4 (EV_{i,t}) + \beta_5 controls + \sum_{k=1} \delta_k CD^k_{i,t} + \varepsilon_{i,t}$$

Where i indexes countries and t indexes years. The cross-country approach consists of pooling all firms according to their country of origin before calculating the corresponding variables. For developed markets, the sample size of specifications 1, 2, 3 and 4 is 22 countries constructed using 8741 firms. For emerging markets specifications, the sample size is 19 countries constructed using 5553 firms. All variables are defined in table (2.1). Country dummy variables are included but not reported. Standard errors are adjusted for clustering at the time level. P-values for two-tailed tests are in parentheses. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively.

Independent variables	Developed Countries				Emerging countries			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Intercept	1.7872	1.6971	1.7322	1.9580	0.9308	0.8831	1.1554	1.2976
	(0.007)***	**(0.012)****	**(0.014)****	**(0.040)****	**(0.075)***	**(0.095)***	**(0.042)****	**(0.050)****
Analyst activity	0.2083	0.1952	0.2146	0.2293	0.0332	0.0409	0.0211	0.0518
	(0.032)**	**(0.041)****	**(0.022)****	**(0.053)***	(0.129)	(0.127)	(0.475)	(0.110)
Size	-0.1616	-0.1546	-0.1582	-0.1765	-0.1031	-0.0989	-0.1123	-0.1356
	(0.006)***	**(0.010)*****	**(0.011)****	**(0.031)****	**(0.035)****	**(0.043)****	**(0.025)****	**(0.026)****
Growth		0.0064	0.0061	0.0064		-0.0049	-0.0030	-0.0036
		(0.082)*	**(0.095)***	**(0.087)***		(0.414)	(0.561)	(0.388)
Earnings volatility			0.0065	-0.0097			-0.1553	-0.1550
			(0.729)	(0.242)			**(0.037)****	**(0.049)****
Current return				0.0007				-0.0003
				(0.110)				(0.755)
Number of firms				-0.0001				0.0005
				(0.671)				(0.208)
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.1552	0.1603	0.1619	0.1674	0.1508	0.1560	0.1855	0.2759
N	346	346	340	331	205	204	192	141

2.5.3.5. Simultaneous equations estimation

Finally, given the potential endogeneity between stock price informativeness and security analysts' activities, our estimates of equation (4) are likely to be biased and inconsistent. For instance, security analysts could self-select the firm they follow based on the higher quality of its information environment. In the same line of reasoning, firm prices could be more informative because there are more analysts covering the firm, bringing higher scrutiny and monitoring. Therefore, knowing that stock price informativeness and analyst coverage could affect each other simultaneously, we test our hypotheses based on the following simultaneous system:

$$PI_{i,t} = \beta_0 + \beta_1 \log(1 + NA_{i,t}) + \beta_2 \log(S_{i,t}) + \beta_3 (GR_{i,t}) + \beta_4 (EV_{i,t}) + \sum_{k=1} \delta_k ID^k_{i,t} + \sum_{m=1} \theta_m YD^m_{i,t} + \varepsilon_{i,t}$$

$$Log\ (1 + NA_{i,t}) = \alpha_0 + \alpha_1 PI_{i,t} + \alpha_2 \log(S_{i,t}) + \alpha_3 (RV_{i,t}) + \alpha_4 \log(TV_{i,t}) + \sum_{k=1} \delta_k ID^k_{i,t} + \sum_{m=1} \theta_m YD^m_{i,t} + \varepsilon_{i,t} \quad (7)$$

All variables in our simultaneous equations system are previously defined in table (2.1). The above system will be estimated based on two-stage least squares method (2SLS). In equation (7), we expect the coefficient associated with log ($S_{i,t}$) to have a positive sign, because there are significant fixed costs in following larger companies. In addition, the coefficient associated with log ($TV_{i,t}$) should also have a positive sign because high trading volumes are associated with more brokerage commissions. Thus, more analysts will be following stocks that trade more frequently. Finally, the likely relation between analyst coverage and stock price informativeness in equation (7) is unclear. In fact, transparent corporations should reduce analysts' competitive advantage by driving out private information acquisition. Therefore, this should lead to a negative relation between analyst coverage and stock price informativeness. In other words, when stock prices track firm fundamentals closely, financial analysts have less incentive to cover the firm because there is less private information to collect. In this case, financial analysts should be considered as

private information providers who compete with firm-provided disclosure made directly to investors (Lang and Lundholm, 1996). On the other hand, it is also possible that firm's disclosures and the information produced by analysts complement each other, suggesting that analysts might be attracted to firms with more informative disclosure policies. The previous argument suggests that financial analysts act primarily as information intermediaries relying heavily on additional disclosures by corporations to collect firm-specific information. Therefore, more informative stock prices should be associated with higher analyst coverage.

After controlling for the effects of simultaneity, we confirm again our primary results, although some of the coefficient estimates are even stronger. Table 2.10 presents the results of our simultaneous equations estimation. In the equations that explain stock price informativeness, the coefficients on analyst activity are positive and significant in the case of US and developed markets. For emerging markets, the same coefficient is negative and non significant. Furthermore, the signs of the coefficient estimates in equation (7) are in general intuitive and consistent with prior literature, suggesting that our simultaneous equations system is estimated properly. More specifically, the negative coefficient on PI for developed markets, and the positive coefficient on PI in the case of emerging market specification further support the fact that financial analysts act primarily as private information providers in developed countries and information intermediaries in emerging countries.

Table 2.10 : Simultaneous estimation of the relation between stock price informativeness and analyst activity

This table reports the results of the following system:

$$PI_{i,t} = \beta_0 + \beta_1 \log(1 + NA_{i,t}) + \beta_2 \log(S_{i,t}) + \beta_3 (GR_{i,t}) + \beta_4 (EV_{i,t}) + \sum_{k=1} \delta_k ID^k_{i,t} + \sum_{m=1} \theta_m YD^m_{i,t} + \varepsilon_{i,t}$$

$$Log\ (1 + NA_{i,t}) = \alpha_0 + \alpha_1 PI_{i,t} + \alpha_2 \log(S_{i,t}) + \alpha_3 (RV_{i,t}) + \alpha_4 \log(TV_{i,t}) + \sum_{k=1} \delta_k ID^k_{i,t} + \sum_{m=1} \theta_m YD^m_{i,t} + \varepsilon_{i,t}$$

Where i indexes two-digit SIC industries and t indexes years. The two-digit SIC industry approach consists of pooling all firms in a two-digit industry and calculate the corresponding variables. P-values for two-tailed tests are in parentheses. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively.

Dependent variable (PI)	US market	Developed markets	Emerging markets
Intercept	2.5379 **(0.006)*****	0.8011 **(0.040)****	-1.8381 (0.485)
Analyst activity	0.4226 **(0.036)****	0.7826 **(0.001)*****	-0.3240 (0.347)
Size	-0.2439 **(0.003)*****	-0.1297 **(0.001)*****	0.1913 (0.550)
Growth	-0.0049 (0.419)	-0.0177 **(0.001)*****	-0.0000 **(0.001)*****
Earnings volatility	-0.0000 (0.985)	0.0348 (0.521)	-0.3034 (0.425)
R^2	0.1431	0.0630	0.0330
Dependent variable (NA)	**US market**	**Developed markets**	**Emerging markets**
Intercept	-4.9400 **(0.001)*****	-1.0915 **(0.001)*****	-1.1953 **(0.001)*****
Price informativeness	0.1493 (0.785)	-0.1912 **(0.026)****	0.0473 **(0.105)***
Size	0.2303 **(0.017)****	0.0434 **(0.025)****	0.1661 **(0.001)*****
Returns volatility	-0.0020 (0.820)	-0.4083 **(0.001)*****	-0.0031 (0.348)
Trading volume	0.3144 **(0.001)*****	0.1697 **(0.001)*****	-0.0288 **(0.004)*****
R^2	0.7202	0.2827	0.5076

2.6. Conclusion

In this paper, we examine whether analysts' following affects stock price informativeness. If financial analysts' activity is meant to reduce the information asymmetry between market participants, stock prices which are covered by more analysts should contain more information about future earnings. We attempt to make two main contributions to the literature. First, we propose an intuitive approach to assess the role played by financial analysts. More specifically, our price informativeness proxy measures how much information current stock prices contain about future earnings (more informative stock prices should reflect more information about future earnings). To our best knowledge, our approach is applied for the first time in the analyst coverage literature.

Our second main contribution is to document cross-sectional differences in the role played by financial analysts around the word. In countries with stronger institutions, our results suggest that increased analyst coverage fosters the production of private information, and thus contributes to better capital allocation and investment decisions. However, in countries with weaker institutions, analysts' activities are associated with smaller amount of information about future earnings embedded in stock prices. Therefore, analyst coverage can provide different results depending on a country's home environment.

The results presented in our paper have some implications for emerging market regulators who are striving to promote stricter disclosure rules in their countries. In fact, this research shows the importance of actions intended to promote accounting transparency and improve corporate governance practices in emerging countries. This is particularly important because a necessary condition for better functioning stock markets is that stock prices track firm fundamentals closely.

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CHAPITRE III

ARTICLE 3

FINANCING CONSTRAINTS AND INTERNATIONAL CROSS-LISTING

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FINANCING CONSTRAINTS AND INTERNATIONAL CROSS-LISTING

Abstract

This study investigates whether relaxation of financial constraints is an important outcome of the US cross-listing mechanism. Consistent with the bonding argument, our results suggest that a foreign firm's cross-listing on a US exchange would contribute to alleviate its financial constraints. In addition, the financial benefits associated with exchange cross-listings are larger in comparison to private placements listings (Rule 144A). On the other hand, over the counter (OTC) programs have no effect on firm's financing constraints. Our findings also indicate that the financial impact of US cross-listings is more pronounced for emerging markets firms. Finally, we show that US exchange cross-listing benefits have not been eroded by the enactment of the Sarbanes-Oxley Act (SOX) in 2002.

Keywords: US cross-listings; bonding hypothesis; investment spending; financing constraints

3.1. Introduction

In this paper, we examine whether cross-listing in the US alleviates firms' financing constraints. Several theories (market segmentation, investor recognition, bonding, etc.) have been offered to explain the benefits of the cross-listing decision. In early academic studies, the focus was on the valuation effects, liquidity effects, and the impact of cross-listing on the firm's cost of capital, shareholder base, visibility and prestige (Karolyi, 2006). In the more recent years, we have witnessed an increasing number of studies that depart from earlier conventional market segmentation focus. The new research initiatives stem in part from the effects of globalized equity issuance and trading, but especially concern risk factors connected with agency conflicts, information asymmetry problems, and a host of other corporate governance issues (Karolyi, 2006). The empirical evidence supports the notion that U.S cross-listings offer substantial benefits.

To date, however, there is limited direct evidence on the relation between firms' financing constraints and US cross-listing. One strand of literature tests the changes in risk exposure and cost of capital for firms interlisting their shares in the US market. For instance, Foerster and Karolyi (1999) find that exposure to the local market risk has diminished and exposure to global market risk has not significantly changed for firms that cross-list on US markets. Errunza and Miller (2000) investigate the impact of the introduction of ADRs on the cost of capital. They document a significant decline of 42% in the cost of capital. Similarly, Hail and Leuz (2009) find that firms with cross-listings on US exchanges experience a decrease in their cost of capital between 70 and 120 basis points. Other studies findings suggest that US listing makes it easier for the firm to raise external capital. For instance, Reese and Weisbach (2002) examined the expected relations between cross-listings, shareholder protection, and equity offerings. Their main result was that cross-listed firms significantly increase their equity offerings. In addition, this increase in equity offerings is stronger for companies from weaker legal systems. In the same line of reasoning, Lins et al. (2005) investigate whether relaxation of capital constraints is an important result of the cross-listing decision. Their findings suggest that non US firms benefit from a US listing through

an enhanced access to external funding. However, one important question that remains unanswered by the existing literature is whether and to what extent US cross-listing alleviates firm's financing constraints.

Financing constraints appear to matter because external funds are not a perfect substitute for internal capital. Explanations why debt financing and new shares issues are more costly than internal funds abound. Among the most prominent are agency problems and asymmetric information (Myers and Majluf, 1984; Greenwald et al. 1984; Fazzari et al. 1988). In fact, when the cost differential between internal and external finance is large, firms are more likely to face binding financial constraints. As discussed by Coffee (1999, 2002) and Stulz (1999), US cross-listing typically improves transparency and reduces information asymmetries by imposing disclosure requirements on non US firms that are stronger than their domestic disclosure requirements. In addition, foreign firms that list in US exchanges (NYSE and NASDAQ) are also subject to U.S laws and to greater scrutiny and monitoring from the press and a variety of US market intermediaries (financial analysts, underwriters, etc.), which further reduce the information incompleteness and increase the protection of minority shareholders. Therefore, firms that cross-list in US markets are bonding themselves to an increased level of transparency, disclosure and scrutiny. Such bonding mechanism should reduce information asymmetries between market participants, which in turn lead to less financing constraints on investment. If this hypothesis is correct, we can infer that cross-listed firms are priced correctly in comparison to non cross-listed firms and that cross-listings in the US lead to more efficient capital allocation and investment decisions.

To test such vital economic role, we follow the approach advocated by Fazzari et al. (1988) who argue that investments decisions of financially constrained firms are more sensitive to internal cash flow. Considerable research examines the relation between investment and cash flow to test for the presence and importance of financing constraints. These studies interpret greater investment-cash flow sensitivity as evidence that firms are financially constrained. In our study, we differentiate between cross-listed and non cross-listed firms and compare the investment-cash flow sensitivity between the two subsamples. By relying on this measure, we address the following questions related to the benefits of the cross-listing decision: (1) does cross-listing in the US alleviates firms financing constraints?

(2) To what extent US cross-listing reduces the differential cost between internal and external finance?

This study makes several contributions. First, we propose an intuitive approach to asses if U.S cross-listings lead to more efficient capital allocation and investment decisions. To our best knowledge, Lins et al. (2005) paper is the only research that directly addresses how a commonly used measure of financial constraints is related to the US cross listing decision. However, Lins et al. (2005) examine the sensitivity of investment to cash flow only for ADRs listings (before and following the US listing). In their study, they do not differentiate between cross-listed and non cross-listed firms and compare the investment-cash flow sensitivity between the two subsamples. In addition, Lins et al. (2005) limit their analysis to a sample of NYSE and NASDAQ ADRs listings. Over the counter (OTC) listings in developed countries and private programs are not investigated. In our study, we examine the impact of all types of ADRs on firm's financing constraints.

Second, we argue that our research provides a valuable setting that directly examines the relation between US cross-listings and shareholder protection. This is important because the bonding hypothesis proposed by Coffee (1999, 2002) and Stulz (1999) have been questioned within the literature (Siegel, 2005; and Litch, 2003). In fact, if non US firms voluntarily subject themselves to better corporate governance practices under US securities laws (coffee, 1999); providers of external funding should be able to better assess the investment opportunities of US cross-listed firms. This will reduce the cost premium that these firms must pay for external finance and ultimately alleviate their financing constraints.

Third, we innovate by attempting to document if the passage of SOX had effects on the relation between US cross-listing and firms' financing constraints. In the literature, it has been argued that SOX act has imposed substantial costs on cross-listed firms that may outweigh any potential benefits of the cross-listing decision. Therefore, it is important to examine if US exchange listings still have unique governance benefits for non US firms even after the enactment of SOX in 2002.

Consistent with the bonding hypothesis, we find that US exchange cross-listing significantly alleviates firm's financing constraints. In addition, the financial benefits associated with exchange listings are larger in comparison to the other types of ADRs. We also find evidence that private placements allow foreign firms to strengthen their financial status. However, in contrast to exchange and private placements programs, OTC listings exhibit a significant increase in their investment-cash flow sensitivity suggesting that these programs are not well received by outside investors. Further corroborating the bonding argument, our findings also indicate that the degree to which US exchange cross-listing alleviates firm financial constraints is more pronounced for firms from countries that provide poor legal protection to minority investors. Finally, we show that the significant financial benefits associated with exchange cross-listings are still present after the passage of SOX in 2002.

The paper proceeds as follow: In section 2, we review the existing literature. In section 3, we present our empirical model and outline our methodology and testable hypotheses. We discuss our data and sample in section 4. Section 5 presents empirical results characterizing the relation between US cross-listing and firms' financing constraints. Conclusions are offered in section 6.

3.2. Previous research work

Our study is related to two streams of literature: (1) research on the motivations and benefits of the cross-listing decision, and (2) research on the measures of firm's financial constraints.

3.2.1. Why do firms cross-list in the US?

Before we review the literature that examines the motivations and benefits of the cross-listing decision, we, first, describe the mechanics of such decision.

3.2.1.1. Mechanics of US cross-listings

A non US firm can list its shares on US markets via direct listings or via an American Depositary Receipts program (ADRs). The vast majority of foreign firms choose to cross-list in the US using ADRs. There are four types of ADRs (level I, level II, Level III and Rule 144A), and the choice of a specific ADR listing depends on firm's objectives. For firms that want access to new capital, level III and Rule 144A listings provide such opportunity. Firms who choose to cross-list via level III must follow US generally accepted accounting principles (US GAAP) and complete all required filings with the Securities and Exchange Commission (SEC). However, Rule 144A listings do not require compliance with GAAP and SEC disclosure rules. In addition, Rule 144A programs trade on the PORTAL (Private Offerings, Resales and Trading through Automated Linkages), and allow firms to raise funds as private placements to qualified institutional buyers (QIBs). Level I ADRs trade over-the-counter (OTC), offer limited liquidity, and are exempt from SEC disclosure rules and US GAAP reconciliation. On the other hand, level II listings allow firms to broaden their shareholder base and improve the liquidity of their shares. The legal implications of level II/III listings are essentially the same. The only main difference is that level II programs don't raise capital.

3.2.1.2. A review of early academic research on US cross-listings

3.2.1.2.1. Share price reactions to cross-listing in US markets.

During the 1990s, many empirical studies addressed share price behavior around cross-listings using, as a rule, event-study methodology. Their main prediction is that stock prices will rise in the home country in response to a cross-listing on US markets. The most comprehensive studies include those of Foerster and Karolyi (1999) and Miller (1999). According to Foerster and Karolyi (1999), foreign firms earn cumulative abnormal returns of 19% during the year before listing on US exchanges and an additional 1.20% during the listing week, but incur an abnormal loss of 14% during the year following listing. Moreover, they find price changes to be robust to changing market exposure and related to an expansion of the shareholder base. Finally, they argue that their findings provide support for the market

segmentation hypothesis and Merton's (1987) investor recognition hypothesis. Miller (1999) finds that 1.15% average abnormal return coincides with the dates of 183 ADR initiating announcements during the 1985-1995 period. Abnormal returns in Miller's analysis are large for firms that list on major US exchanges (NYSE/NASDAQ) and small for firms that list on PORTAL. In addition, significantly higher announcement price reactions were obtained for emerging markets firms. According to Miller (1999), these findings are consistent with the fact that investment barriers and low investor recognition segment capital markets.

3.2.1.2.2. Market risk exposure, cost of capital and the cross-listing decision

According to international asset pricing models, segmented economies stand to benefit from access to the international capital market, because diversified capital sources means a lower cost of capital. These models imply that cross-listing firms may experience significant changes in their local and global market risk exposures. Numerous empirical studies tested the changes in risk exposure and cost of capital for firms interlisting their shares in the US market. For instance, Foerster and Karolyi (1999) find that local market risk exposure has diminished for US cross-listed firms, while their global market risk exposure remains unchanged. As for Errunza and Miller (2000), they document a significant decline in the cost of capital for firms with ADRs listings. Similarly, Hail and Leuz (2009) find that firms with cross-listings on US exchanges experience a decrease in their cost of capital between 70 and 120 basis points.

3.2.1.2.3. Liquidity

As discussed in Karolyi (2006), surveys of corporate managers that have initiated overseas listings for their firms (Mittoo, 1992b) often cite increased liquidity as the primary motivation or benefit. So do, Bancel and Mittoo (2001) after investigating the perceptions of 79 European managers. Bancel and Mittoo (2001) find that liquidity is significantly correlated with total trading volume after cross-listing. Most of the contributions surveyed by Karolyi (1998, 2006) examine patterns in bid-ask spreads, price volatility and trading volumes after a cross-listing on US markets. For example, Foerster and Karolyi (1998) report 29% increase in intraday volume and a 44 basis points decline in intraday effective spreads

for 52 Canadian cross-listing companies. Similarly, Glen and Madhavan (1998) examined weekly returns, volatility and volume of 25 cross-listed Mexican firms and show that higher volume and lower market costs arise for these firms. For a sample of 128 NYSE cross-listed companies, Smith and Sofianos (1997) document an increase in their combined value of trading from $ 260 million to $ 340 million per day.

3.2.1.3. A review of the new research initiatives

According to Karolyi (2006), recent research is mainly fuelled by a general dissatisfaction with the «conventional wisdom» based on capital market segmentation argument. In fact, many authors criticize the market segmentation hypothesis. A major criticism stems from the fact that foreign firms originated from countries, like Canada, that are substantially integrated with the US market (see Calvet, 1994; Mittoo, 1992) also benefit from the cross-listing decision. For example, Foerster and Karolyi (1999) show that Canadian firms experience similar price reactions to US listings when compared to European and Asian firms. Furthermore, cross-listings on US markets have continued to generate positive announcement effects and to grow even after international capital markets have become more integrated (Karolyi, 2006). In the same line of reasoning, an implicit criticism lies in the fact that only a minority of foreign firms cross-list their shares on US markets when we expect a majority to do so in the face of sizable investment barriers. In fact, Doidge et al. (2004) document that only one in ten large companies from outside the US choose to cross-list their shares on US markets. As a result of these criticisms, a new strand of studies explores other potential benefits and costs for the cross-listing decision. The focus of the new research is mainly on legal and corporate governance issues.

3.2.1.3.1. Legal bonding and the cross-listing decision

Under the bonding hypothesis, US exchange listings (Level II-III and direct listings) are viewed as a mechanism by which non US firms can voluntarily subject themselves to better corporate governance practices under US securities laws. According to Coffee (1999) and Stulz (1999), foreign firms can use a US listing to overcome their weak domestic legal environment and enhance the protection of minority investors. Many papers in the literature

examine the extent to which such voluntarily bonding explains the cross-listing behaviour. For instance, Reese and Weisbach (2002) examined the expected relations between cross-listings, shareholder protection, and equity offerings. They surveyed 1158 cross-listings and benchmarked them with 17 387 domestic firms. Using logistic regression analysis, Reese and Weisbach (2002) find that firms from weak investors' protection environments are more likely to cross-list. Their other main finding was that cross-listed firms significantly increase their equity offerings. In addition, this increase in equity offerings is stronger for companies from weaker legal systems, which is consistent with the legal bonding hypothesis.

Along the same vein, Doidge (2004) shows that cross-listed firms have significantly lower voting premiums in comparison to non cross-listed firms. Furthermore, the difference in voting premiums is larger for firms originated from countries with poorer investor rights. This evidence is interpreted as a direct empirical support for the bonding hypothesis. As for Frésard and Salva (2008), they investigated how the value of corporate cash holdings changes when non U.S firms list their shares in the US Frésard and Salva (2008) focus on the value of cash because it is the type of assets that is easier to expropriate when managers do not act in the best interests of shareholders. They argue that a unit of cash under insiders' control is worth less than a unit for investors when insiders pursue their own interests. Therefore, if cross-listings in the US constrain insiders from expropriating shareholders, investors should raise their valuation of cash. Accordingly, Frésard and Salva (2008) find that investors raise their valuation of cash once a firm cross-list in the US and this relation is strongest for firms from countries that provide poor protection to minority investors. These results suggest that investors view cross-listing as an effective mechanism that enhances their protection.

From a different perspective, Lel and Miller (2008) test the bonding hypothesis by examining a direct outcome of corporate governance: the propensity to identify and terminate poorly performing CEOs. They argue that a necessary component of effective corporate governance is the ability to identify and replace poorly performing CEOs. To investigate this prediction, they construct a database of 10 976 firm-year observations from 47 countries and find that cross-listed firms originated from countries with weak investor protection regimes are more likely to terminate poorly performing CEOs, in comparison to non cross-listed

firms. Further, their results show that OTC and Rule 144A listings are not associated with a higher propensity to terminate poorly performing CEOs.

On the other hand, a number of other contributions question the bonding argument. For instance, Licht (2001, 2003) argues that little is done by the SEC to enforce corporate governance rules for foreign issuers. According to Licht (2003), non US firms' cross-list on US markets primarily to enhance their visibility rather than to improve their corporate governance. In the same line of reasoning, Siegel (2005) provides evidence of low SEC enforcement against Mexican firms with ADRs.

3.2.2. Corporate investment and financing constraints

Under the perfect and complete capital markets assumptions, Modigliani and Miller (1958) argue that firm's investment decisions are independent from the financing sources. However, many studies appeal to problems in capital markets, especially asymmetric information, to suggest that financial structure is relevant to the investment decisions. For example, Myers and Majluf (1984), Greenwald et al. (1984), and Myers (1984) provide strong support of the fact that external funds are not a perfect substitute for internal capital. As a result, the cost of external finance may differ substantially from internal capital. According to this view, investment expenditures may depend on financial factors, such as the availability of internal funds (Fazzari et al. 1988). When the wedge between internal and external cost of capital increases, firms are considered as financially constrained (Kaplan and Zingales, 1997).

To study the impact of US cross-listing on firm's financial constraints, we exploit an approach advocated by Fazzari et al. (1988). In particular, we use the relation between investment and cash flow to test for the presence and extent of financing constraints. In the literature, the investment-cash flow sensitivity has been extensively used as a measure of financial constraints. According to Fazzari et al. (1988), firm's internal cash flow may impact investment expenditures because of a «financing hierarchy» in which internal capital have a cost advantage over external capital. The intuition behind this assertion is that a value maximizing firm will issue new debt or shares only after it exhausts internal capital (Fazzari

et al. 1988). In fact, more financially constrained firms will increase investment when they have enough cash flow to do so. Therefore, we should expect high investment-cash flow sensitivity for constrained firms. In contrast, unconstrained firms have the possibility to increase their investment expenditures even when they do not have enough cash flow. Hence, unconstrained firms should exhibit low investment-cash flow sensitivity.

A number of empirical studies have provided strong support for the «financing hierarchy hypothesis». The traditional approach of this research is to sort firms according to a variety of characteristics (dividend payout, size, etc.) before measuring the investment-cash flow sensitivity. The main results of these papers suggest that investment expenditures are more sensitive to internal funds for firms with high levels of financial constraints. For instance, Hoshi et al. (1991) rely on the Fazzari et al. (1988) methodology to examine the investment behaviour of two sets of Japanese firms. In the first group, firms are members of a Keiretsu and have close ties to large Japanese banks that serve as their primary source of external finance. According to Hoshi et al. (1991), the first set of firms is likely to face lower financial constraints. The second set of firms has weaker links to banks and presumably faces higher financing constraints. Their findings show large investment-cash flow sensitivity for the second set of firms. On the other hand, investment spending of firms affiliated with Japanese banks is not sensitive to internal capital. Oliner and Rudebusch (1992) use proxies of information asymmetry based on firm age, exchange listing and firm's patterns of insider trading. Their results suggest that investment-cash flow sensitivity is higher for stocks traded over-the-counter, firms tended to be young, and that exhibit patterns of insider trading behaviour. Scaller (1993) studies the investment behaviour of 212 Canadian firms. He uses the maturity of the firm, the ownership concentration, and the availability of collateral as proxies for information asymmetry. According to Scaller (1993), mature firms are less likely to face informational problems because they have extended and repeated relationships with lenders. Similarly, the availability of collateral reduces the importance of informational asymmetries between the firm and potential lenders. He shows that investment spending of young firms is more influenced by cash flow in comparison to mature firms. In addition, Scaller empirical results suggest that firms with unspecialized assets, which can serve as collateral, have lower investment-cash flow sensitivity.

As for Gilchrist and Himmelberg (1995), they find no excess sensitivity of investment to internal funds for firms with easy access to publicly traded debt. On the other hand, investments spending of firms with only limited access to public debt markets appear to be highly sensitive to fluctuations in cash flow (Gilchrist and Himmelberg, 1995). A related study by Ascioglu et al. (2008) examines investment-cash flow sensitivity by employing three direct measures of information asymmetry (relative effective spread, price impact of trade, and probability of information trading (PIN)). Their findings suggest that firms facing high information asymmetry problems have greater investment-cash flow sensitivity. In the same line of reasoning, Guariglia (2008) find that investment-cash flow sensitivity tends to increase monotonically with the degree of external financial constraints faced by firms. Finally, Lins et al. (2005) examine whether relaxation of financial constraints is an important result of the US cross-listing mechanism. They use only cross-listings on NASDAQ and NYSE and find a significant decline in the investment-cash flow sensitivity following the US listing. The financial benefits of the cross-listing decision are limited to emerging market firms. In contrast, Lins et al. (2005) find no changes in the investment-cash flow sensitivity for developed markets firms with ADRs.

3.3. Hypotheses and methodology

The major focus of our methodology is to compare investment-cash flow sensitivity across two different groups of firms (US cross-listed firms versus non cross-listed firms). Under the bonding hypothesis, coffee (1999, 2002) and Stultz (1999) argue that firms can raise capital if they commit to return this capital to investors and to limit expropriation of cash-flow. One way to signal firm's commitment to better corporate governance practices is to cross-list on a US exchange whose legal system allows a better protection of investors. Therefore, US cross-listing should improve transparency, reduce information asymmetries between market participants, and ultimately alleviate firm's financial constraints. To test this hypothesis, we base our empirical investigation on the work of Fazzari et al. (1988).

In previous studies (Fazzari et al. 1988; Kaplan and Zingales, 1997; Lins et al. 2005; Cleary, 2006), the estimation of investment-cash flow sensitivity is based on the following equation:

$$(I/K)_{i,t} = f(X/K)_{i,t} + g(CF/K)_{i,t} + \varepsilon_{i,t} \qquad (1)$$

Where $I_{i,t}$ represents investment in plant and equipment for firm *i* during period *t*; following Lins et al. (2005), K denotes the beginning-of-period value of total assets and CF is the sum of income before extraordinary items and depreciation net of cash dividends (we also measure CF as : net income + depreciation and/or amortization + changes in deferred taxes); *f*(X/K) is a function of a vector of variables related to investment opportunities; g(CF/K) is a function of the firm's internal cash flow (it represents the investment-cash flow sensitivity). According to Fazzari et al. (1988), the investment spending of constrained firms should be more sensitive to fluctuations in cash flow. In our study, we hypothesize that US cross-listings enhance the protection of outside investors, which in turn makes it easier for firms to raise external capital. Therefore, our main hypothesis predicts that cross-listed firms should face lower financial constraints in comparison to non cross-listed firms.

To test whether cross-listing in the US is associated with less investment-cash flow sensitivity; we run pooled regressions for the two groups with a dummy variable for US cross-listed firms:

$$(I/K)_{i,t} = \beta_0 + \beta_1(CF/K)_{i,t} + \beta_2(M/B)_{i,t-1} + \beta_3(Size)_{i,t-1} + \theta_0 CL_{i,t} + \theta_1 CL_{i,t} * (CF/K)_{i,t}$$
$$+ \theta_2 CL_{i,t} * (M/B)_{i,t-1} + \theta_3 CL_{i,t} * (Size)_{i,t-1} + \varepsilon_{i,t} \qquad (2)$$

$CL_{i,t}$ is a dummy variable that takes the value of 1 if the firm has an ADR and 0 otherwise; M/B denotes the market to book ratio, and Size denotes the natural logarithm of firm size. The market to book ratio is a proxy for investment opportunities and growth, while size variable controls for potential market imperfections related to firm size. As stressed by Fazzari et al. (1988), it is possible to include lagged values of firm investment or cash flow in equation (2). Given that β_1 represents the investment-cash flow sensitivity for non cross-listed firms, the investment-cash flow sensitivity for cross-listed firms (direct listings, OTC, ADRs II/III, and 144A listings) becomes $\beta_1+\theta_1$ and the percentage increase (decrease) is θ_1/β_1.

Our main interest in equation (2) centers on the estimate of θ_1, the coefficient in which cash flow is interacted with the cross-listing dummy. If θ_1 is negative and significant, cross-listing in the US is associated with lower investment-cash flow sensitivity suggesting that the cross-listing mechanism alleviates firm's financial constraints. Hence, our first hypothesis predicts that the coefficient of $CL_{i,t} * (CF/K)_{i,t}$ will be negative and significant:

> Hypothesis 1: Investment spending of cross-listed firms has lower sensitivity to internal funds than that of non cross-listed firms.

To reinforce our conclusions about the relation between US cross-listing and firm's financial constraints; it is useful to further examine the potential differences between all types of US cross-listings. For instance, given the regulatory consequences of exchange listings (direct listings and ADRsII/III), we hypothesize that the financial benefits should be higher for these programs. This reasoning leads to the following hypothesis:

> Hypothesis 2: The degree to which US cross-listing alleviates firm's financial constraints is more pronounced for firms that cross-list on U.S exchanges.

To verify hypothesis (2), $CL_{i,t}$ in equation (2) becomes a dummy variable that takes the value of 1 if the firm has an exchange listing and 0 otherwise. On the other hand, it is not clear whether private placement listings (Rule 144A) should experience any reduction in investment-cash flow sensitivity. Theoretically, Rule 144A programs do not require compliance with GAAP or any additional disclosures rules. Therefore, we should not expect any reduction in information asymmetries. However, knowing that Rule 144A listings allow firms to raise funds as private placements to qualified institutional buyers, such mechanism entails giving a specific group of investors' privileged access to firm-specific information, which in turn makes it easier for the firm to raise external capital from institutional investors. Consistent with this claim, we should also expect lower investment-cash flow sensitivity for Rule 144A cross-listings:

Hypothesis 3: Private placements listings make it easier for non US firms to raise capital.

The bonding argument suggests that a US listing should have a larger impact on firms originating from countries where investors are poorly protected. Prior research findings support this argument and suggest that the benefits of US cross-listing may differ across countries based on the country's level of development. Obviously, in emerging markets, outside investors stand at a disadvantage over insiders in accessing firm-specific information. Hence, emerging markets cross-listed firms should benefit from stronger reductions in their financial constraints. On basis of these arguments, we can propose the following hypothesis:

Hypothesis 4: The degree to which US cross-listing alleviates firm's financial constraints is more pronounced for firms originating from emerging markets.

Finally, the debate about the potential costs of the SOX act questions whether US cross-listing benefits are still present after the passage of SOX. In the literature, it has been argued that SOX has imposed substantial costs on cross-listed firms that may outweigh any potential benefits of the cross-listing decision. However, recent studies (Doidge el al.2009, Hail and Leuz, 2009, and Boubakri et al. 2010) show that US cross-listing benefits have not been eroded by SOX. In fact, as discussed in Doidge et al. (2009), the new legal environment imposed by SOX creates significant legal exposures for firms as well as for executives. Therefore, US exchange listing still has unique governance benefits for non US firms even after the passage of SOX in 2002 (Doidge el al.2009). Consistent with this argument, we hypothesize that US cross-listings benefits should be sustained after the SOX act.

Hypothesis 5: US cross-listing benefits have not been eroded by the enactment of SOX in 2002.

3.4. Data

Our sample consists of an unbalanced panel of firms over the 1995-2007 period. We start by considering all firms included in the country lists provided by Datastream. From these lists, we identify cross-listed firms. We obtain a complete list of ADRs from the Bank of New York (BNY), Citibank (CB), Deutsche Bank (DB), JP Morgan (JPM), the OTCBB, and

The Pink Sheets. The information from these various datasets is manually cross-checked and verified. In addition, NYSE and NASDAQ websites provide information on direct listings. The data provided by Citibank allows us to keep track of firms that had been delisted from US exchanges. Adding these delistings mitigates concerns about the survivorship bias. To be consistent with Lins et al. (2005), financial and banking firms were deleted from the initial sample. As noticed by Lins et al. (2005), the Fazzari et al. (1988) methodology cannot be applied easily to financial firms because accounting figures for firms in finance and banking are not comparable with other firms. Further, these firms are highly regulated in most countries. Combining all the data gives a final sample of 550 ADRs listings and 22 048 non cross-listed firms. Knowing that the legal implications of ADRs II-III and direct cross-listings are essentially the same, we treat direct listings in US exchanges as ADRs II-III. Our final sample includes 148 Level I, 86 Rule 144A, and 316 level II-III ADRs. We obtain firm-specific information such as investment spending, cash flow, and dividends payout from both Wordscope and Datastream.

3.5. Empirical results

3.5.1. Descriptive statistics

In our study, we examine the investment behavior of two sets of firms (US Cross-listed versus non cross-listed firms). Our main hypothesis is that cross-listed firms are less financially constrained. Therefore, these firms should exhibit lower investment-cash flow sensitivity. However, before undertaking our multivariate regression tests, we propose to compare the estimates of a set of variables designed to measure directly firm's financial constraints. In fact, the standard practice in corporate investment literature is to classify firms, first, into most financially constrained and least financially constrained according to a variety of characteristics (dividend payout ratio, size, debt ratio etc.), and then estimate the investment-cash flow sensitivity across the two groups. For instance, Fazzari et al. (1988) classify firms with high dividend payout ratios as unconstrained and firms with low dividend payout ratios (dividends/EBIT) as financially constrained. Other studies categorize companies according to size (Kadapakkam et al. 1998). Following this univariate measure of

firm's financial constraints, smaller firms are considered to be more financially constrained because they face higher information asymmetry problems. As for Gilchrist and Himmelberg (1995), they find no excess sensitivity of investment to internal funds for firms with easy access to publicly traded debt. On the other hand, investment spending of firms with only limited access to public debt appears to be highly sensitive to fluctuations in cash flow (Gilchrist and Himmelberg, 1995).

In our paper, we adopt a different approach by classifying firms, first, according to their cross-listing status. As noticed earlier, we assume that US cross-listed firms and non cross-listed firms are respectively less constrained and most constrained. Second, we compare our set of variables between the two subsamples in order to verify if US cross-listed firms have indeed higher dividend payout, size, cash flow, and debt ratios because firms with such characteristics are supposed to be less financially constrained. Finally, we perform our multivariate analysis according to Fazzari et al. (1988) methodology.

Several descriptive statistics for the firms in each class are presented in table (3.1). In addition, we also perform mean difference tests to examine the statistical significance of the differences among our sets of firms. The results are reported in table (3.2). Our univariate findings indicate that US cross-listed firms have significantly higher dividends payout, size, and cash flow. For instance, the overall mean firm size is 14.146 for cross-listed firms and 11.470 for non cross-listed firms (NCL). In the case of dividends payout, the statistics are 0.1884 and 0.1511 for the group firms with a US cross-listing and the group firms without a US cross-listing, respectively. These results clearly support the view that US cross-listed firms are less financially constrained. To reinforce our conclusions about the relation between US cross-listing and firm's financial constraints; we tried further splits of US cross-listed firms based on the type of the listing program.

Table 3.1: Descriptive statistics

This table presents descriptive statistics related to a variety of firm-level variables. All financial variables are for the beginning of the fiscal year, expect for investment and cash flow. The sample period is from 1995 to 2007. To deal with outliers, we winsorize the upper and lower 1% univariate extremes.

Panel A: Non cross-listed firms			
Variable	NCL firms		
	Mean	Std dev	N
Investment (I/K)	0.0620	0.7813	138 327
Cash flow (CF/K)	0.0425	4.7139	138 327
Size	11.470	1.9784	111 890
Market-to-Book (M/B)	2.0756	5.3667	112 481
Dividend payout	0.1511	1.4144	128 172
Debt ratio	0.2273	1.0281	138 327
Panel B: Cross-listed firms			
Variable	144A, OTC, and Exchange listings		
	Mean	Std dev	N
Investment (I/K)	0.0619	0.0631	5168
Cash flow (CF/K)	0.0975	1.2923	5168
Size	14.146	2.1030	4687
Market-to-Book (M/B)	2.2278	4.1054	4555
Dividend payout	0.1884	0.5854	4976
Debt ratio	0.2357	0.3257	5168
Panel C: Exchange listed firms			
Variable	Direct listings and ADRII-III		
	Mean	Std dev	N
Investment (I/K)	0.0736	0.0720	2797
Cash flow (CF/K)	0.0796	0.1443	2797
Size	14.777	2.0430	2495
Market-to-Book (M/B)	2.6795	4.9851	2410
Dividend payout	0.1747	0.4887	2727
Debt ratio	0.2193	0.1910	2797
Panel D: Private listings			
Variable	144A listings		
	Mean	Std dev	N
Investment (I/K)	0.0721	0.0752	871
Cash flow (CF/K)	0.0941	0.0811	871
Size	13.831	1.4980	799
Market-to-Book (M/B)	1.9989	1.9339	770
Dividend payout	0.1409	0.7427	808
Debt ratio	0.2202	0.1658	871
Panel E: Over-the-Counter listings			
Variable	OTC listings		
	Mean	Std dev	N
Investment (I/K)	0.0537	0.0640	1500
Cash flow (CF/K)	0.1075	2.0523	1500
Size	13.184	2.0354	1393
Market-to-Book (M/B)	1.7287	2.9320	1375
Dividend payout	0.1985	0.5372	1441
Debt ratio	0.2430	0.4671	1500

Our second hypothesis suggests that the potential financial benefits should be higher for US exchange cross-listings. Indeed, when we compare exchange listings with private placements and OTC listings, we find that exchange listed firms have significantly higher size value.

Overall, our univariate evidence indicates that US cross-listings make it easier for foreign firms to raise capital. In addition, the degree to which US cross-listings alleviate firm's financial constraints is more pronounced for companies that cross-list on US exchanges. However, it is worth mentioning that these preliminary results only represent a univariate data analysis. Our tests are best performed using multivariate regression analyses, because the conclusions from our univariate variables do not account for the potential interrelationships among these variables.

Table 3.2: Z-test results for differences in the means

This table presents mean difference tests. All financial variables are for the beginning of the fiscal year, expect for cash flow. The sample period is from 1995 to 2007.

	(1) CL firms	(2) NCL firms	(3) Exchange listings	(4) Private listings	(5) OTC listings	Z-test (1) vs. (2)	Z-test (3) vs. (4)	Z-test (3) vs. (5)	Z-test (3) vs. (2)
Size	14.146	11.470	14.777	13.831	13.184	85.54***	14.14***	14.12***	80.02***
Dividend payout	0.1884	0.1511	0.1747	0.1409	0.1985	4.05***	1.21	-1.40	2.23**
Debt ratio	0.2357	0.2273	0.2193	0.2202	0.2430	1.58	-0.13	-1.88*	-1.75
Cash flow	0.0975	0.0425	0.0796	0.0941	0.1075	2.50**	-3.74***	-0.52	2.86***

3.5.2. Multivariate regression analysis

We employ an empirical specification derived from Fazzari et al. (1988). Based on this approach, investment is determined according to equation (1). In our study, we do not run separate regressions for US cross-listed firms (CL) and non cross-listed firms (NCL) according to equation (1). Instead, we run pooled regressions for the two groups with a dummy variable for CL firms (equation 2). Table 3.3 provides estimates of the investment-cash flow sensitivity for CL and NCL firms. The equations were performed using fixed effects models. To control for industry, time and country fixed effects, we include industry, year and country dummies in equation (2). Standard errors in all specifications are adjusted

for heteroskedasticity and clustering at the firm level. Model (1) serves as our starting point in that we have $CL_{i,t}$ as a dummy variable that takes the value of 1 if the firm has an ADR and 0 otherwise. The results of model (1) in table (3.3) show large estimated cash flow coefficient for NCL firms (0.7149), which suggests that investment spending of NCL firms is highly sensitive to the availability of internal capital. This positive and significant relation between investment and internal capital is consistent with the existence of a financial hierarchy. More important, NCL firms exhibit higher investment-cash flow sensitivity in comparison to US CL firms. In model (1), the coefficient of the interaction term $CL_{i,t} * (CF/K)_{i,t}$ is -0.0170 with a *p-value* of 0.001, indicating a cash flow coefficient of 0.6979 (0.7149 – 0.0170) for U.S CL firms. Based on model (1) findings, it appears that the cross-listing impact is not economically significant. In fact, US CL firms only witness a reduction of 2.37% (0.0170/0.7149) in their investment-cash flow sensitivity. It is not surprising to find such weaker cross-listing effect because not all types of ADRs are required to comply with US GAAP and SEC disclosure rules. Therefore, it is important to further investigate any potential differences in the estimated cash flow coefficients across all types of ADRs. We argue that the cross-listing impact should be stronger for exchange listings because of the regulatory consequences of these programs. To test this hypothesis, we estimate model (2) in table (3.3) where $CL_{i,t}$ is a dummy variable that takes the value of 1 if the firm has an Exchange ADR and 0 otherwise. Again, our results indicate a large estimated cash flow coefficient for NCL firms (0.7070). On the other hand, when we examine the coefficient of the interaction term $CL_{i,t} * (CF/K)_{i,t}$, we find that investment outlays of exchange listed firms are significantly less sensitive to internal capital in comparison to NCL firms. More important, the reduction in the investment-cash flow sensitivity is economically significant. In fact, based on model (2) results, the cash flow coefficient for exchange listed firms is 0.1237 (0.7070 – 0.5833) which indicates a decrease of 82% in investment-cash flow sensitivity once a foreign firm cross-lists it shares on US exchanges.

Table 3.3 : US cross-listing and Investment-Cash flow sensitivity: primary results

This table presents the results of the following regression:

$$(I/K)_{i,t} = \beta_0 + \beta_1(CF/K)_{i,t} + \beta_2(M/B)_{i,t-1} + \beta_3(Size)_{i,t-1} + \theta_0 CL_{i,t} + \theta_1 CL_{i,t} * (CF/K)_{i,t} + \theta_2 CL_{i,t} * (M/B)_{i,t-1} + \theta_3 CL_{i,t} * (Size)_{i,t-1} + \varepsilon_{i,t}$$

Investment spending divided by total assets (I/K) is the dependent variable. Cash flow/total assets (CF/K), Firm's market-to-book ratio (M/B), firm's size are the independent variables. In model (1), $CL_{i,t}$ is a dummy variable that takes the value of 1 if the firm has an ADR and 0 otherwise. In model (2), $CL_{i,t}$ is a dummy variable that takes the value of 1 if the firm has an Exchange ADR and 0 otherwise. In model (3), $CL_{i,t}$ is a dummy variable that takes the value of 1 if the firm has a private placement listing (Rule 144A) and 0 otherwise. In model (4), $CL_{i,t}$ is a dummy variable that takes the value of 1 if the firm has an Over-the-Counter listing (OTC) and 0 otherwise. Standard errors are adjusted for heteroskedasticity and clustering at the firm level. P-values for two-tailed tests are in parentheses. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively. Country, industry and year dummy variables are included but not reported

Independent Variables	***Model 1*** NCL versus All ADRs	***Model 2*** NCL versus Exch listings	***Model 3*** NCL versus 144A listings	***Model 4*** NCL versus OTC listings
Intercept	-1.2685	-1.3884	-1.3580	-1.8006
	(0.011)**	(0.005)***	(0.006)***	(0.001)***
Cash Flow	0.7149	0.7070	0.7113	0.6313
	(0.001)***	(0.001)***	(0.001)***	(0.001)***
Market-to-Book	-0.0002	-0.0003	-0.0003	-0.0002
	(0.939)	(0.918)	(0.922)	(0.937)
Size	0.1506	0.1609	0.1590	0.1954
	(0.001)***	(0.001)***	(0.001)***	(0.001)***
CL	-1.3920	0.3218	-0.3617	-1.0759
	(0.160)	(0.060)*	(0.025)**	(0.001)***
CL * Cash Flow	**-0.0170**	**-0.5833**	**-0.1335**	**0.1419**
	(0.001)***	**(0.001)*****	**(0.001)*****	**(0.001)*****
CL * Market-to-Book	-0.0196	0.0003	-0.0495	-0.0268
	(0.225)	(0.944)	(0.160)	(0.071)*
CL * Size	0.1145	-0.0440	0.2014	0.0602
	(0.101)	(0.028)**	(0.001)***	(0.001)***
Country dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Adjusted R^2	0.07	0.07	0.07	0.07
N	106829	106829	106829	106829

This primary finding clearly supports the fact that exchange listed firms' face lower binding financing constraints in comparison to NCL firms. In addition, the observed differences in levels of financing constraints between NCL firms and exchange listed firms are statistically (1% level) significant.

Next, we extend our primary analysis in two different ways. First, we estimate model (3) in table (3.3) where $CL_{i,t}$ is a dummy variable that takes the value of 1 if the firm has a private placement listing (Rule 144A) and 0 otherwise. This additional test is performed in order to examine the financial impact of private placements listings. Theoretically, as Rule 144A

programs have only weak regulatory consequences, we should expect them to have no effect on firm's financing constraints. However, we argue that private placements can still alleviate binding firm's financing constraints because such mechanism entails giving a specific group of investors (institutional investors) privileged access to firm-specific information. Consistent with this hypothesis, we find strong evidence that private placements listings significantly reduce firm's financing constraints. To allow a clearer interpretation of our private placements tests, the results of model (3) in table (3.3) indicate that the coefficient on cash flow is 0.7113 for NCL firms and 0.5778 for Rule 144A listings; a decrease equivalent to 18.76%. Even though private placements significantly reduce the investment-cash flow sensitivity for foreign firms, the estimated effects are smaller in comparison to exchange listings effects. Second, we also predict that OTC listings do not offer comparable financial benefits as exchange or private placements listings. Model (4) in table (3.3) provides coefficient estimates of our OTC listings tests. In contrast to exchange and private placements programs, the positive and significant coefficient of the interaction variable $CL_{i,t}$ * $(CF/K)_{i,t}$ suggests that OTC listings are associated with higher investment-cash flow sensitivity.

In sum, our primary empirical result is that investment decisions of exchange cross-listed firms are found to be significantly less sensitive to firm internal funds, which is consistent with the fact that US exchange cross-listing alleviates firm financing constraints. Further, the reduction in investment-cash flow sensitivity is larger for US exchange listings in comparison to the other types of ADRs. In the case of private placements, the results suggest that US cross-listing makes it easier for foreign firms to raise external finance even though these programs do not require compliance with US disclosure rules. On the other hand, we show that OTC listings exhibit a significant increase in their investment-cash flow sensitivity. So far, consistent with the bonding hypothesis, we have established that US exchange cross-listings enhance the protection of outside investors which in turn makes it easier for the firm to raise external capital. The bonding argument also implies that US cross-listing benefits should be larger for firms originating from countries with weak institutions and less stringent information disclosure rules. To test this hypothesis, we propose to estimate the relation between US cross-listings and firm's financial constraints separately for developed and

emerging markets firms. Table (3.4) reports results for developed markets sample. Using the estimates of θ_1 in each model of table (3.4), we find that US cross-listing benefits are limited to US exchange programs, which provides further support for the bonding argument. In fact, in model (1), θ_1 is negative (-0.4397) showing that investment spending is less sensitive to internal capital for exchange CL firms. This result is also economically and statistically (5% level) significant. On the other hand, in model (2), our coefficient of interest is not significant (-0.5320 with a p-value of 0.424) suggesting that private placements do not alleviate firm's financing constraints for developed markets firms. Model (3) findings show that investment spending is more sensitive to internal funds for OTC firms.

Table 3.4: US cross-listing and Investment-Cash flow sensitivity Developed markets results

This table presents the results of the following regression:

$$(I/K)_{i,t} = \beta_0 + \beta_1(CF/K)_{i,t} + \beta_2(M/B)_{i,t-1} + \beta_3(Size)_{i,t-1} + \theta_0 CL_{i,t} + \theta_1 CL_{i,t} * (CF/K)_{i,t} + \theta_2 CL_{i,t} * (M/B)_{i,t-1} + \theta_3 CL_{i,t} * (Size)_{i,t-1} + \varepsilon_{i,t}$$

Independent Variables	***Model 1*** NCL versus Exch listings	***Model 2*** NCL versus 144A listings	***Model 3*** NCL versus OTC listings
Intercept	-0.0099	-0.0158	-0.3576
	(0.929)	(0.887)	(0.001)***
Cash Flow	0.8040	0.8045	0.6786
	(0.001)***	(0.001)***	(0.001)***
Market-to-Book	0.0000	0.0000	0.0000
	(0.942)	(0.941)	(0.991)
Size	0.0073	0.0071	0.0366
	(0.030)**	(0.037)**	(0.001)***
CL	0.2406	0.1403	-0.1552
	(0.001)***	(0.001)***	(0.001)***
CL * Cash Flow	**-0.4397**	**-0.5320**	**0.1595**
	(0.026)**	**(0.424)**	**(0.001)*****
CL * Market-to-Book	0.0000	0.0086	-0.0002
	(0.953)	(0.930)	(0.920)
CL * Size	-0.0152	-0.0090	0.0010
	(0.005)***	(0.644)	(0.770)
Country dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Adjusted R^2	0.08	0.08	0.08
N	65487	65487	65487

In the case of emerging markets firms, our results show that US cross-listing benefits are not limited to exchange programs. Table (3.5) reports the coefficients estimates for emerging markets specifications. It appears that private placements (model 2) also allow emerging markets firms to face lower binding financial constraints. On the other hand, the cross-listing

impact remains larger for exchange listings. Furthermore, when we compare exchange listings effects between developed and emerging markets, our findings indicate that the degree to which US cross-listing alleviates firm financial constraints is more pronounced for firms originating from emerging markets. This additional result is consistent with our fourth hypothesis. Finally, in the case of OTC listings, the coefficient of the interaction variable $CL_{i,t}$ * $(CF/K)_{i,t}$ is positive and significant (1% level) indicating that OTC listings are associated with higher investment-cash flow sensitivity.

Table 3.5: US cross-listing and Investment-Cash flow sensitivity Emerging markets results

This table presents the results of the following regression:

$$(I/K)_{i,t} = \beta_0 + \beta_1(CF/K)_{i,t} + \beta_2(M/B)_{i,t-1} + \beta_3(Size)_{i,t-1} + \theta_0 CL_{i,t} + \theta_1 CL_{i,t} * (CF/K)_{i,t} + \theta_2 CL_{i,t} * (M/B)_{i,t-1} + \theta_3 CL_{i,t} * (Size)_{i,t-1} + \varepsilon_{i,t}$$

Investment spending divided by total assets (I/K) is the dependent variable. Cash flow/total assets (CF/K), Firm's market-to-book ratio (M/B), firm's size are the independent variables. In model (1), $CL_{i,t}$ is a dummy variable that takes the value of 1 if the firm has an Exchange ADR and 0 otherwise. In model (2), $CL_{i,t}$ is a dummy variable that takes the value of 1 if the firm has a private placement listing (Rule 144A) and 0 otherwise. In model (3), $CL_{i,t}$ is a dummy variable that takes the value of 1 if the firm has an Over-the-Counter listing (OTC) and 0 otherwise. Standard errors are adjusted for heteroskedasticity and clustering at the firm level. P-values for two-tailed tests are in parentheses. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively. Country, industry and year dummy variables are included but not reported

Independent Variables	**Model 1** NCL versus Exch listings	**Model 2** NCL versus 144A listings	**Model 3** NCL versus OTC listings
Intercept	-4.9278	-4.9034	-6.4020
	(0.001)***	(0.001)***	(0.001)***
Cash Flow	0.7024	0.7070	0.6288
	(0.001)***	(0.001)***	(0.001)***
Market-to-Book	-0.0019	-0.0019	-0.0018
	(0.419)	(0.419)	(0.454)
Size	0.4232	0.4167	0.5092
	(0.001)***	(0.001)***	(0.001)***
CL	-0.1976	-1.3959	-2.3475
	(0.609)	(0.001)***	(0.001)***
CL * Cash Flow	**-0.5901**	**-0.1318**	**0.1392**
	(0.001)***	**(0.001)*****	**(0.001)*****
CL * Market-to-Book	-0.1133	-0.0514	-0.3580
	(0.697)	(0.358)	(0.001)***
CL * Size	-0.0155	0.2540	0.1788
	(0.800)	(0.001)***	(0.001)***
Country dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Adjusted R^2	0.07	0.07	0.07
N	41342	41432	41342

To further asses any potential asymmetric impact of the cross-listing mechanism on firms' financing constraints, we also partition our sample into subsamples based on the level of investors' protection. In particular, we use the anti-director rights scores from Djankov et al. (2008) (see appendix 1 for more details) to differentiate between countries that provide strong legal protection to minority investors and countries with poor protection of minority shareholders interests. Countries with scores above the sample median fall into the category with strong protection of minority investors.

We expect firms originating from countries with poor investors protection to benefit more from the US cross-listing. Therefore, we should have more pronounced decline in the investment-cash flow sensitivity for these firms. Indeed, the results in table (3.6) suggest that the investment to cash flow sensitivity declines significantly following an ADR listing in countries with poor legal protection of minority investors. For instance, in the case of exchange cross-listings, we find a large negative and significant coefficient on the interaction between cash flow and the cross-listing dummy variable (-0.6634 with a p-value of 0.001). The coefficient of this interaction variable is not significant, however, for firms from countries that provide strong legal protection to minority investors (-0.2662 with a p-value of 0.835). Consistent with prior literature, our findings show that US cross-listing benefits are large for firms originating from countries with lower rankings of shareholders' rights.

Table 3.6: US cross-listing and Investment-Cash flow sensitivity Separate estimations based on the level of investors' protection

This table presents the results of the following regression:

$$(I/K)_{i,t} = \beta_0 + \beta_1(CF/K)_{i,t} + \beta_2(M/B)_{i,t-1} + \beta_3(Size)_{i,t-1} + \theta_0 CL_{i,t} + \theta_1 CL_{i,t} * (CF/K)_{i,t} + \theta_2 CL_{i,t} * (M/B)_{i,t-1} + \theta_3 CL_{i,t} * (Size)_{i,t-1} + \varepsilon_{i,t}$$

Investment spending divided by total assets (I/K) is the dependent variable. Cash flow/total assets (CF/K), Firm's market-to-book ratio (M/B), firm's size are the independent variables. We use the anti-director rights scores from Djankov et al. (2008) to differentiate between countries that provide strong legal protection to minority investors and countries with poor protection of minority shareholders interests. Countries with scores above the sample median fall into the category with strong protection of minority investors. Countries with scores below the sample median fall into the category with poor protection of minority investors. Standard errors are adjusted for heteroskedasticity and clustering at the firm level. P-values for two-tailed tests are in parentheses. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively. Country, industry and year dummy variables are included but not reported

Independent Variables	Countries with strong legal protection for minority investors		Countries with poor legal protection for minority investors	
	Model 1 NCL versus Exch listings	***Model 2*** NCL versus 144A listings	***Model 3*** NCL versus Exch listings	***Model 4*** NCL versus 144A listings
Intercept	-1.5112	-1.3587	-0.9886	-1.1068
	(0.011)**	(0.022)**	(0.831)	(0.810)
Cash Flow	0.5819	0.5815	0.8066	0.8210
	(0.001)***	(0.001)***	(0.001)***	(0.001)***
Market-to-Book	0.0001	0.0001	-0.0002	-0.0002
	(0.896)	(0.878)	(0.949)	(0.947)
Size	0.1545	0.1364	0.1020	0.1086
	(0.001)***	(0.001)***	(0.001)***	(0.001)***
CL	1.8282	0.7649	0.9738	-1.6881
	(0.402)	(0.001)***	(0.650)	(0.001)***
CL * Cash Flow	**-0.2662**	**0.0204**	**-0.6634**	**-0.2520**
	(0.835)	**(0.960)**	**(0.001)*****	**(0.001)*****
CL * Market-to-Book	-0.0002	-0.0542	-0.0370	-0.0532
	(0.956)	(0.846)	(0.791)	(0.117)
CL * Size	-0.1680	-0.0553	-0.0701	0.4784
	(0.335)	(0.353)	(0.658)	(0.001)***
Country dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Adjusted R^2	0.07	0.07	0.08	0.08
N	50268	50267	56562	56562

We also analyse whether the cross-listing benefits have faded after the enactment of SOX in 2002. As noted earlier, a number of recent studies examined the potential costs and benefits associated with SOX compliance. In the literature, it has been argued that SOX new rules can create significant costs for cross-listed firms that may outweigh any potential benefits. To test this hypothesis, we partition our sample into two subsamples. The first subsample includes only the pre-SOX data (1995-2001) while the second subsample covers the post-SOX data (2003-2007). Model (1) and (2) in table (3.7) report the coefficient

estimates for the pre-SOX and post-SOX periods, respectively. As expected, the results of model (1) suggest that exchange cross-listings significantly alleviate firm's financing constraints. In addition, for the post-SOX specification, the coefficient of the interaction variable $CL_{i,t} * (CF/K)_{i,t}$ remains negative (-0.6689) and significant (1% level), indicating that exchange listings still offer significant financial benefits after the enactment of SOX. These findings are consistent with recent evidence in Doidge el al.2009, Hail and Leuz, 2009, and Boubakri et al. 2010.

Table 3.7: Investment-Cash flow sensitivity for cross-listed and non cross-listed firms Separate estimations before and after the enactment of SOX

This table presents the results of the following regression:

$$(I/K)_{i,t} = \beta_0 + \beta_1(CF/K)_{i,t} + \beta_2(M/B)_{i,t-1} + \beta_3(Size)_{i,t-1} + \theta_0 CL_{i,t} + \theta_1 CL_{i,t} * (CF/K)_{i,t} + \theta_2 CL_{i,t} * (M/B)_{i,t-1} + \theta_3 CL_{i,t} * (Size)_{i,t-1} + \varepsilon_{i,t}$$

Investment spending divided by total assets (I/K) is the dependent variable. Cash flow/total assets (CF/K), Firm's market-to-book ratio (M/B), firm's size are the independent variables. $CL_{i,t}$ is a dummy variable that takes the value of 1 if the firm has an Exchange ADR and 0 otherwise. In model (1), regression estimates are for the period before the enactment of SOX (1995-2001). In model (2), regression estimates are for the period after the enactment of SOX (2003-2007). Standard errors are adjusted for heteroskedasticity and clustering at the firm level. P-values for two-tailed tests are in parentheses. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively. Country, industry and year dummy variables are included but not reported

Independent Variables	***Model 1*** Before SOX (1995-2001)	***Model 2*** After SOX (2003-2007)
Intercept	-5.1469 (0.001) ***	0.1847 (0.725)
Cash Flow	0.6658 (0.001) ***	0.7511 (0.001) ***
Market-to-Book	-0.0006 (0.870)	0.0001 (0.985)
Size	0.4276 (0.001) ***	-0.0214 (0.176)
CL	0.3650 (0.273)	0.0454 (0.817)
CL * Cash Flow	**-0.3255 (0.029) ** **	**-0.6689 (0.001) *** **
CL * Market-to-Book	0.0014 (0.812)	0.0018 (0.986)
CL * Size	-0.0747 (0.033) **	0.0051 (0.853)
Country dummies	Yes	Yes
Industry dummies	Yes	Yes
Year dummies	Yes	Yes
Adjusted R^2	0.05	0.08
N	55425	40523

3.5.3. Robustness checks

In this section, we conduct extensive robustness tests to validate our primary findings. First, we add lagged values of cash and investment as additional independent variables in our equation (2). Second, we re-estimate our regressions using fixed firm and year effects models instead of country and industry fixed effects models. Third, we propose an alternative measure of firm financial constraints. Fourth, we separate between level II and III ADRs and re-estimate our equation (2) where $CL_{i,t}$ becomes a dummy variable that takes the value of 1 if the firm has a level II ADR and 0 otherwise. The results of this additional analysis should provide some confidence that the main conclusions for exchange listings are not driven by level III programs who allow firms to raise capital and ultimately alleviate their financial constraints. Finally, we recognize that an important concern regarding our specifications is endogeneity. In fact, non US firms with lower binding financial constraints could be more likely to cross-list in US markets which could introduce a selection bias in our estimates of the relation between US cross-listings and firm's financing constraints. For instance, non US firms might anticipate the likelihood of cross-listing in the US by gradually increasing disclosure and adopting better governance practices long before the cross-listing date. We will consider two approaches to address any presence of endogeneity.

3.5.3.1. Additional control variables

We want to examine the robustness of the results presented to this point with respect to changes in model specification. Table (3.8) reports the effect of including separately lags of cash and investment expenditures. We include lagged values of cash in equation (2) to control for the fact that investment-cash flow sensitivity is likely to be lower if firms have a lot of financial slack. As suggested by Cleary and Booth (2008), lagged values of cash may have explanatory power for investment when firms build up financial slack in order to fund future investments without resorting to costly external capital. In fact, firms facing binding financing constraints will tend to accumulate and use liquidity as a buffer against these constraints (Cleary and Booth, 2008). In addition, prior year values of investment (I_{t-1}) may also have explanatory power for current investment (I_t) when investment spending is not completed within one year (multi-year project).

Indeed, in all models of table (3.8), adding lagged values of cash or investment reduces the current cash flow coefficient. This result is consistent with the argument that investment expenditures can be considered as a multiple-year spending and that firms anticipate potential future financial constraints by building up financial slack. Further, in models (1) and (2) (table 3.8), the coefficients of the interaction term $CL_{i,t}$ * $(CF/K)_{i,t}$ are negative and significant suggesting that investment spending is less sensitive to internal capital for US exchange cross-listings and private placements. Also, the financial benefits of the cross-listing decision remain larger for exchange listings. On the other hand, we are unable to document a consistent association between US cross-listing and firm financial constraints in the case of OTC listings. Overall, US exchange listings and private placements allow non US firms to strengthen their financial status and significantly alleviate their financial constraints.

Table 3.8: Investment-Cash flow sensitivity for cross-listed and non cross-listed firms: Additional results

This table presents the results of the following regression:

$$(I/K)_{i,t} = \beta_0 + \beta_1(CF/K)_{i,t} + \beta_2(M/B)_{i,t-1} + \beta_3(Size)_{i,t-1} + \beta_4 Controls + \theta_0 CL_{i,t} + \theta_1 CL_{i,t} * (CF/K)_{i,t} + \theta_2 CL_{i,t} * (M/B)_{i,t-1} + \theta_3 CL_{i,t} * (Size)_{i,t-1} + \theta_4 CL_{i,t} * Controls + \varepsilon_{i,t}$$

Investment spending divided by total assets (I/K) is the dependent variable. Cash flow/total assets (CF/K), Firm's market-to-book ratio (M/B), firm's size are the independent variables. For robustness, we include lagged values of firm investment or cash in our main regression. Cash is cash and marketable securities. In model (1), $CL_{i,t}$ is a dummy variable that takes the value of 1 if the firm has an Exchange ADR and 0 otherwise. In model (2), $CL_{i,t}$ is a dummy variable that takes the value of 1 if the firm has a private placement listing (Rule 144A) and 0 otherwise. In model (3), $CL_{i,t}$ is a dummy variable that takes the value of 1 if the firm has an Over-the-Counter listing (OTC) and 0 otherwise. Standard errors are adjusted for heteroskedasticity and clustering at the firm level. P-values for two-tailed tests are in parentheses. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively. Country, industry and year dummy variables are included but not reported

Independent Variables	***Model 1*** NCL versus Exch listings		***Model 2*** NCL versus 144A listings		***Model34*** NCL versus OTC listings	
Intercept	-0.0600 (0.843)	-1.0712 (0.022)**	-0.0337 (0.911)	-1.0318 (0.027)**	-0.2118 (0.484)	-1.3752 (0.003)***
Cash Flow	0.2362 (0.001)***	0.3972 (0.001)***	0.2398 (0.001)***	0.3973 (0.001)***	0.2302 (0.001)***	0.3772 (0.001)***
Market-to-Book	-0.0000 (0.974)	-0.0000 (0.984)	-0.0000 (0.974)	-0.0000 (0.988)	-0.0000 (0.971)	-0.0000 (0.993)
Size	0.0193 (0.027)**	0.1137 (0.001)***	0.0186 (0.033)**	0.1117 (0.001)***	0.0324 (0.001)***	0.1413 (0.001)***
Lagged Investment	0.7844 (0.001)***		0.7804 (0.001)***		0.7697 (0.001)***	
Lagged Cash		0.3784 (0.001)***		0.3808 (0.001)***		0.3345 (0.001)***
CL	-0.1971 (0.058)*	0.0091 (0.955)	-0.3569 (0.001)***	-0.5013 (0.001)***	-0.1698 (0.117)	-0.9639 (0.001)***
CL * Cash Flow	**-0.2335 (0.001)*****	**-0.3555 (0.001)*****	**-0.0849 (0.001)*****	**-0.0398 (0.001)*****	**0.0107 (0.001)*****	**-0.0984 (0.001)*****
CL * Market-to-Book	0.0000 (1.000)	0.0000 (0.990)	-0.0092 (0.663)	-0.0418 (0.205)	-0.0000 (0.992)	-0.0182 (0.191)
CL * Size	0.0092 (0.449)	-0.0173 (0.357)	0.0579 (0.001)***	0.1664 (0.001)***	-0.0236 (0.008)***	0.0361 (0.009)***
CL * Lagged Investment	0.0010 (0.987)		0.0959 (0.001)***		0.0255 (0.001)***	
CL * Lagged Cash		-0.2646 (0.008)***		-0.0440 (0.001)***		0.2355 (0.001)***
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.09	0.07	0.09	0.07	0.09	0.07
N	103969	105605	103969	105605	103969	105605

3.5.3.2. Estimation with fixed firm and year effects

We re-estimate our main equation using fixed firm and year effects. Firm fixed effects models account for time-invariant firm characteristics that are unobservable or at least difficult to measure. Therefore, introducing firm fixed effects estimation should mitigate concerns about correlated omitted variables and selection bias based on unobservable time-invariant firm characteristics (Hail and Leuz, 2009). Further, fixed time effects are included to capture aggregate business-cycle influences. Table (3.9) reports estimates of this alternative methodology. The reported firm fixed effects estimates are obtained by demeaning the observations with respect to the firm average for each variable. Year dummies are included but not reported. Again, our primary findings remain unchanged when we re-estimate our main equation using fixed firm and year effects models instead of country and industry fixed effects models.

In the case of exchange listings and private placements, the results of models (1) and (2) (Table 3.9) confirm the negative and significant association between the cross-listing mechanism and the investment-cash flow sensitivity. In addition, the positive and significant coefficient of the interaction variable $CL_{i,t} * (CF/K)_{i,t}$ in the case of OTC cross-listings further support the fact that these programs do not allow foreign firms to alleviate their financial constraints.

Table 3.9: US cross-listing and Investment-Cash flow sensitivity Fixed firm and year effects estimation

This table presents the results of the following regression:

$$(I/K)_{i,t} = \beta_0 + \beta_1(CF/K)_{i,t} + \beta_2(M/B)_{i,t-1} + \beta_3(Size)_{i,t-1} + \theta_0 CL_{i,t} + \theta_1 CL_{i,t} * (CF/K)_{i,t} + \theta_2 CL_{i,t} * (M/B)_{i,t-1} + \theta_3 CL_{i,t} * (Size)_{i,t-1} + \varepsilon_{i,t}$$

Investment spending divided by total assets (I/K) is the dependent variable. Cash flow/total assets (CF/K), Firm's market-to-book ratio (M/B), firm's size are the independent variables. In model (1), $CL_{i,t}$ is a dummy variable that takes the value of 1 if the firm has an Exchange ADR and 0 otherwise. In model (2), $CL_{i,t}$ is a dummy variable that takes the value of 1 if the firm has a private placement listing (Rule 144A) and 0 otherwise. In model (3), $CL_{i,t}$ is a dummy variable that takes the value of 1 if the firm has an Over-the-Counter listing (OTC) and 0 otherwise. All regressions include firm fixed effects and year effects. Fixed firm effects account for unobserved time-invariant relations between our explanatory variables and investment spending. Year dummies are include but not reported. P-values for two-tailed tests are in parentheses. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively.

Independent Variables	***Model 1*** NCL versus Exch listings	***Model 2*** NCL versus 144A listings	***Model 3*** NCL versus OTC listings
Intercept	-2.0291 (0.001)***	-2.2078 (0.001)***	-2.4249 (0.001)***
Cash Flow	0.5483 (0.001)***	0.5626 (0.001)***	0.4534 (0.001)***
Market-to-Book	-0.0001 (0.948)	-0.0001 (0.945)	-0.0001 (0.952)
Size	0.2164 (0.001)***	0.2098 (0.001)***	0.2405 (0.001)***
CL	-0.5207 (0.106)	-0.5775 (0.071)*	-1.3431 (0.001)***
CL * Cash Flow	**-0.8251 (0.001)*****	**-0.2791 (0.001)*****	**0.2530 (0.001)*****
CL * Market-to-Book	-0.0000 (0.988)	-0.0120 (0.697)	-0.0019 (0.881)
CL * Size	-0.1062 (0.692)	3.5101 (0.001)***	0.7321 (0.001)***
Year dummies	Yes	Yes	Yes
Adjusted R^2	0.08	0.07	0.07
N	106 829	106 829	106 829

3.5.3.3. Alternative measure of firm financial constraints

There is extensive empirical evidence supporting the argument that investment spending is more sensitive to internal funds for firms with high levels of financial constraints. However, this interpretation is not without controversy. In fact, many other contributions do not consistently support the existence of a positive relation between investments and cash flow for constrained firms. For instance, Kaplan and Zingales (1997) and Cleary (1999, 2006) challenge the conclusions of Fazzari et al. (1988) approach.

To substantiate our interpretation of the relation between US cross-listing and firm's financing constraints, we propose an alternative measure of firm financing constraints. While there are many possible methods of measuring firm's financing constraints, we use the Cleary (1999, 2006) index in our robustness checks. Following the approach advocated by Cleary (1999, 2006), firms are classified according to a beginning period financial status index (Z). This alternative measure of firm's financial constraints is determined using multiple discriminant analysis which considers different characteristics shared by a particular firm and transform them into a univariate statistic. The Cleary index relies on the following variables: current ratio (Current), debt ratio (Debt), interest coverage (Cover), net income margin (Margin), sales growth (SG), and Return on Equity (ROE). A full description of these variables is included in the Appendix 2. Extreme values of these variables are winsorized. The discriminant score (Z) is calculated according to the following equation:

$$Z = -0.11905\ \text{Current} - 1.903670\ \text{Debt} + 0.00138\ \text{Cover} + 1.45618\ \text{Margin} + 2.03604\ \text{SG} - 0.04772\ \text{ROE} \quad (3)$$

Firms with high Cleary index are supposed to be less financially constrained. Summary statistics of the Z score are presented in table (3.10). The results of this alternative measure of firm's financial constraints support our primary finding of a negative relation between cross-listing in US exchanges and the investment-cash flow sensitivity. In fact, the Z score for exchange cross-listings is -0.4066 while the same score is -1.1536 for non cross-listed firms suggesting that US exchange cross-listed firms are less financially constrained. In addition, as expected, OTC listings do not offer comparable financial benefits as exchange listings. On the other hand, based on Cleary index, Rule 144A cross-listings do not alleviate firm's financing constraints.

Table 3.10: Alternative measure of firm's financing constraints (Cleary index)

This table presents the results of the following equation:

Z = -0.11905 Current – 1.903670 Debt +0.00138 Cover + 1.45618 Margin + 2.03604 SG -0.04772 ROE

The score (Z) is calculated using discriminant analysis. A full description of the variables is included in the Appendix 2. Firms are classified according to their cross-listing status before calculation of the Cleary measure.

	Non CL firms	Exchange listings	Private listings	OTC listings
Discriminant score (Z)	-1.1536	-0.4066	-7.7530	-7.9380

3.5.3.4. Estimation based on level II ADRs

We also explore whether our exchange listings results are driven by level III programs who allow foreign firms to raise capital and ultimately alleviate their financial constraints. To test this argument, we separate between level II and III ADRs and re-estimate our main equation using a dummy variable that takes the value of 1 if the firm has a level II ADR and 0 otherwise. The results of this additional analysis (table 3.11) suggest that level II listings allow firms to alleviate their binding financing constraints. In fact, our coefficient of interest (θ_1) is negative and significant for all specifications suggesting that investment spending is less sensitive to cash flow for firms with level II ADRs.

Table 3.11: Level II ADRs and Investment-Cash flow sensitivity

This table presents the results of the following regression:

$$(I/K)_{i,t} = \beta_0 + \beta_1(CF/K)_{i,t} + \beta_2(M/B)_{i,t-1} + \beta_3(Size)_{i,t-1} + \beta_4 Controls + \theta_0 CL_{i,t} + \theta_1 CL_{i,t} * (CF/K)_{i,t} + \theta_2 CL_{i,t} * (M/B)_{i,t-1} + \theta_3 CL_{i,t} * (Size)_{i,t-1} + \theta_4 CL_{i,t} * Controls + \varepsilon_{i,t}$$

Investment spending divided by total assets (I/K) is the dependent variable. Cash flow/total assets (CF/K), Firm's market-to-book ratio (M/B), firm's size are the independent variables. For robustness, we include lagged values of firm investment or cash in our main regression. Cash is cash and marketable securities. $CL_{i,t}$ is a dummy variable that takes the value of 1 if the firm has a level II ADR and 0 otherwise.

Independent Variables	**Spec. 1** NCL versus level II ADRs	**Spec. 2** NCL versus level II ADRs	**Spec. 3** NCL versus level II ADRs
Intercept	-1.2825 (0.010)***	-0.9522 (0.041)**	0.0022 (0.994)
Cash Flow	0.7165 (0.001)***	0.3943 (0.001)***	0.2425 (0.001)***
Market-to-Book	-0.0002 (0.928)	-0.0000 (0.994)	-0.0000 (0.978)
Size	0.1534 (0.001)***	0.1052 (0.001)***	0.0157 (0.071)*
Lagged Investment			0.7867 (0.001)***
Lagged Cash		0.3960 (0.001)***	
CL	-0.3468 (0.037)**	-0.4326 (0.005)***	-0.2547 (0.011)**
CL * Cash Flow	**-0.0837 (0.001)*****	**-0.0223 (0.006)*****	**-0.0447 (0.001)*****
CL * Market-to-Book	-0.0611 (0.050)**	-0.0548 (0.060)*	-0.0248 (0.186)
CL * Size	0.1891 (0.001)***	0.1741 (0.001)***	0.0830 (0.001)***
CL * Lagged Investment			-0.0362 (0.001)***
CL * Lagged Cash		-0.0911 (0.001)***	
Country dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Adjusted R^2	0.07	0.07	0.09
N	106 829	105 605	103 969

3.5.3.5. Endogeneity

A remaining concern is endogeneity. Cross-listing in the US is not a random decision and whenever an independent variable in a regression is the result of such a choice, it raises the possibility of an endogenous relation between the dependent variable and the chosen independent variable (CL_t). The econometric concern here is that the residual errors in our

regressions turn out to be correlated with the independent variable CL_t and the interaction variables, thus producing inconsistent coefficients. To mitigate this potential endogeneity problem, we consider two different approaches. First, we apply a self-selection model that controls for this bias using Heckman's (1979) two-step estimator. Second, we use time-series data for cross-listed firms only to examine how cross-listed firms' financing constraints change after the listing date.

For the Heckman's (1979) two-step estimation, we need, in the first stage, to model the choice of cross-listing in the US through a probit model. We follow Doidge et al. 2004 and make the cross-listing decision depend on firm and country characteristics:

$$CL_i = W_i\gamma + \upsilon_i \quad \text{(listing decision equation)} \quad (4)$$

$$CL_i = 1 \text{ if } CL_i > 0 \text{ ; } 0 \text{ otherwise}$$

Where CL_i is an unobserved latent variable, and W_i is a set of variables that affect the decision to cross-list. We use three country-level variables: the legal origin (common law dummy variable), accounting standards and an index of anti-director rights from Djankov et al. (2008). The accounting standards index rates companies' annual reports for their inclusion or exclusion of 90 items and ranges from 0 to 100 with 100 as the highest standard (Doidge et al. 2004). The anti-director rights index measures the level of protection for minority shareholders. In addition to the country-level variables, we also attempt to control for firm-level variables that could help explain the cross-listing behaviour. Several studies show that larger firms are more likely to cross-list on US exchanges (NYSE and NASDAQ) because these markets require that firms (1) pay high fees and (2) meet minimum size requirements. Further, firms with high expected growth and considerable need for external funding are more likely to cross-list in the US Accordingly; we include firm size, market-to-book, and leverage (ratio of long term debt to total assets) as additional explanatory variables in the model of the cross-listing choice.

In the second stage, we estimate our main equation:

$$I_i = b_0 + X_i \beta + CL_i \theta_0 + CL_i * X_i \theta + \varepsilon_i \qquad (5)$$

Where I_i represents investment; X_i is a set of exogenous variables; and CL_i is a dummy variable that takes the value 1 if the firm has an ADR and 0 otherwise.

Table 3.12 : U.S cross-listing and Investment-Cash flow sensitivity Self-selection bias estimation

This table reports the results of the Heckman (1979) two-stage procedure. In the first stage, we specify a model of the cross-listing choice (probit model) as a function of country and firms characteristics. In the second stage we estimate our main equation. In model (1), $CL_{i,t}$ is a dummy variable that takes the value of 1 if the firm has an Exchange ADR and 0 otherwise. In model (2), $CL_{i,t}$ is a dummy variable that takes the value of 1 if the firm has a private placement listing (Rule 144A) and 0 otherwise. Regressions include country, industry, and year fixed effects. P-values for two-tailed tests are in parentheses. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively.

Probit model Dependent variable (CL)	**Model 1** Exch listings	**Model 2** private listings
Intercept	-4.0764 (0.001)***	-4.0156 (0.001)***
Size	0.3121 (0.001)***	0.2122 (0.001)***
Market-to-book	-0.0000 (0.678)	-0.0000 (0.957)
Leverage	0.0020 (0.322)	0.0003 (0.966)
Common law dummy	0.7398 (0.001)***	-0.6587 (0.001)***
Anti-director index	-0.7098 (0.001)***	0.8764 (0.001)***
Accounting standards	-0.0248 (0.001)***	-0.0226 (0.001)***
N	103830	103830
Dependent variable (Investment)	***Model 1*** NCL versus Exch listings	***Model 2*** NCL versus private listings
Intercept	-17.944 (0.007)***	-11.056 (0.092)*
Cash Flow	0.7001 (0.001)***	0.7245 (0.001)***
Market-to-Book	-0.0144 (0.627)	-0.0048 (0.881)
Size	0.9958 (0.002)***	0.5990 (0.054)*
CL	3.6326 (0.319)	-3.1902 (0.588)
CL * Cash Flow	**-0.5960 (0.001)*****	**-0.1893 (0.001)*****
CL * Market-to-Book	0.0080 (0.957)	-0.0407 (0.545)
CL * Size	-0.3170 (0.228)	0.4320 (0.302)
λ	2.6270 (0.036)**	-3.8938 (0.265)
N	103 830	103 830

Table 3.12 presents the results of the Heckman (1979) model. Our findings suggest that larger firms are more likely to cross-list in the US. We also find that legal origin, accounting standards and the level of the protection of minority shareholders are significantly related to the cross-listing mechanism. Firms from common law countries are more likely to cross-list on US exchanges (model 1). Further, firms originating from countries where investors are poorly protected and with lenient accounting standards are more likely to cross-list on US exchanges. The results of the second stage estimation suggest that our primary conclusions are robust to endogeneity.

In addition to the Heckman (1979) procedure, we propose an alternate approach that relies on time-series data for US cross-listed firms (we do not consider non cross-listed firms data). As suggested earlier, it's possible that only firms with lower binding financing constraints choose to cross-list in the US and our controls have not mitigated that effect. Therefore, we should use only our sample of ADRs listings and construct a Post-ADR dummy variable set equal to one for the years after the listing date and zero otherwise. We include this dummy variable to control for changes in the investment-cash flow sensitivity around the time of the ADR listing. The regression specifications for this additional test take the following form:

$$(I/K)_{i,t} = \beta_0 + \beta_1(CF/K)_{i,t} + \beta_2(M/B)_{i,t-1} + \beta_3(Size)_{i,t-1} + \theta_0 PostADR + \theta_1 PostADR * (CF/K)_{i,t} + \theta_2 PostADR * (M/B)_{i,t-1} + \theta_3 PostADR * (Size)_{i,t-1} + \varepsilon_{i,t} \quad (6)$$

Where PostADR is a dummy variable equal to 1 after the listing date and 0 otherwise. Equation (6) is estimated using firm fixed effects. If we are witnessing self-selection, we should not observe significant changes in the investment-cash flow sensitivity after the cross-listing date. On the other hand, if US cross-listing alleviates firm's financing constraints, the coefficient on the interaction between cash flow and the Post-ADR dummy should be negative and significant.

The results of our ADRs time series tests (table 3.13) suggest that the investment to cash flow sensitivity declines significantly after the cross-listing date indicating that our primary findings are robust to endogeneity.

Table 3.13: Investment-Cash flow sensitivity before and after the listing date

This table presents the results of the following regression:

$$(I/K)_{i,t} = \beta_0 + \beta_1(CF/K)_{i,t} + \beta_2(M/B)_{i,t-1} + \beta_3(Size)_{i,t-1} + \theta_0 PostADR + \theta_1 PostADR * (CF/K)_{i,t} + \theta_2 PostADR * (M/B)_{i,t-1} + \theta_3 PostADR * (Size)_{i,t-1} + \varepsilon_{i,t}$$

Investment spending divided by total assets (I/K) is the dependent variable. Cash flow/total assets (CF/K), Firm's market-to-book ratio (M/B), firm's size are the independent variables. PostADR is a dummy variable equal to 1 after the listing date and 0 otherwise. In model (1), regression estimates are for exchange listed firms. In model (2), regression estimates are for private placements programs. Each model includes firm fixed effects. Standard errors are adjusted for clustering at the firm level. P-values for two-tailed tests are in parentheses. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively.

Independent Variables	**Model 1** Exchange listed ADRs	**Model 2** Private placements ADRs
Intercept	-1.3694	-6.4982
	(0.093)*	(0.709)
Cash Flow	0.5376	0.6758
	(0.001)***	(0.001)***
Market-to-Book	0.0002	-1.6114
	(0.817)	(0.195)
Size	0.1298	0.9778
	(0.032)**	(0.470)
PostADR	0.9392	0.2614
	(0.294)	(0.989)
PostADR * Cash Flow	**-0.4299**	**-0.1399**
	(0.001)***	**(0.001)*****
PostADR * Market-to-Book	-0.0005	1.5658
	(0.979)	(0.209)
PostADR * Size	-0.0913	-0.3271
	(0.172)	(0.822)
Adjusted R^2	0.27	0.64
N	2421	765

3.6. Conclusion

This paper examines the hypothesis that non US firms cross-list in the US to alleviate their financial constraints. Our analysis is based on models of capital market imperfections that show that information asymmetry increases the sensitivity of investment spending to fluctuations in internal cash flow. In particular, we use the relation between investment and cash flow to test the presence and extent of financing constraints. According to Fazzari et al. (1988), when the wedge between internal and external cost of capital is large, firms are considered as financially constrained because they are effectively rationed in their access to external funding. As a result, internal capital will impact investment and we can interpret greater investment-cash flow sensitivity as evidence that firms are facing binding financial constraints.

We document several findings. First, consistent with the bonding hypothesis, we find a significant decline in the investment-cash flow sensitivity for firms that cross-list on US exchanges. These effects are sustained and exist after the SOX act. Further corroborating the bonding argument, the financial benefits of the cross-listing decision are large for US exchange listings and for firms originating from countries with weak institutions and less stringent information disclosure rules. Second, we also find evidence that private placements significantly reduce firm's financing constraints even though these programs do not require compliance with SEC disclosure rules and US GAAP. One potential explanation for this result is that private placements programs entail giving a specific group of investors (institutional investors) privileged access to firm-specific information, which in turn makes it easier for the firm to raise external capital. We also look at firms with OTC listings. Our findings suggest that OTC programs are associated with higher investment-cash flow sensitivity. Finally, our evidence is robust to many aspects of our methodology. In sum, our empirical results suggest that relaxation of firm's financial constraints is an important benefit of a US cross-listing.

APPENDIX 1

COUNTRY-LEVEL VARIABLES DESCRIPTION

Country-level variables description

This table summarizes variables for legal origin, shareholder protection and accounting standards. The common law variable represents a dummy set equal to 1 for countries falling into the common law legal system and 0 otherwise. The Anti-director rights variable is taken for Djankov et al. (2008). It represents an index that measures the level of protection for minority investors. The accounting standards variable is an index that rates companies' annual reports for their inclusion or exclusion of 90 items and ranges from 0 to 100 with 100 as the highest standard (Doidge et al. 2004).

	Common law dummy	*Anti-director rights*	*Accounting standards*
Panel A : Developed markets			
Australia	1	0.79	75
Austria	0	0.21	54
Belgium	0	0.54	61
Canada	1	0.65	74
Denmark	0	0.47	62
Finland	0	0.46	77
France	0	0.38	69
Germany	0	0.28	62
Greece	0	0.23	55
Hong Kong	1	0.96	69
Ireland	1	0.79	-
Italy	0	0.39	62
Japan	0	0.48	65
Netherlands	0	0.21	64
New Zealand	1	0.95	70
Norway	0	0.44	74
Portugal	0	0.3	36
Singapore	1	1	78
Spain	0	0.37	64
Sweden	0	0.34	83
Switzerland	0	0.27	68
UK	1	0.93	78
Panel B : Emerging markets			
Argentina	0	0.44	45
Brazil	0	0.29	54
Chile	0	0.63	52
China	0	0.78	-
Colombia	0	0.58	50
Czech Republic	0	0.34	-
Hungary	0	0.2	-
India	1	0.55	57
Indonesia	0	0.68	-
Israel	1	0.71	64
Korea (South)	0	0.46	62
Malaysia	1	0.95	76
Mexico	0	0.18	60
Pakistan	1	0.41	-
Peru	0	0.41	38
Philippines	0	0.24	65
Poland	0	0.3	-
Russia	0	0.48	-
South Africa	1	0.81	70
Taiwan	0	0.56	65
Thailand	1	0.85	64
Turkey	0	0.43	51

APPENDIX 2

FOR THE CLEARY INDEX (1999, 2006), THE FINANCIAL VARIABLES ARE CALCULATED AS FOLLOWS:

For the Cleary index (1999, 2006), the financial variables are calculated as follows:

1. Current ratio = (current assets)/ (current liabilities)
2. Debt ratio = (long term debt)/(total assets)
3. coverage ratio = (earnings before interest and taxes)/(interest expenses)
4. Net income margin = (net income)/(net sales)
5. Sales growth = $(sales_t - sales_{t-1})/ (sales_{t-1})$

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CONCLUSION

Nous avons voulu éclairer le lien entre inscriptions croisées, activités des analystes et valeur informative des prix des titres. Plus précisément, nous avons testé si les inscriptions croisées à la cote américaine et un suivi plus accru des analystes financiers se traduisent par des prix de marché qui reflètent plus d'informations au sujet des bénéfices futurs de l'entreprise. La pertinence de cette étude est double puisqu'elle cherche à lier la relation rendement-bénéfices aux mécanismes des inscriptions croisées et aux activités des analystes, un exercice qui, à notre connaissance, n'a pas été entrepris jusqu'à présent dans la littérature. Étant donné que les prix de marché des actifs financiers sont censés représenter la valeur présente des flux monétaires futurs, nous avons jugé intéressant d'étudier l'impact de ses deux phénomènes sur la relation rendement-bénéfices.

Notre premier article cherche à documenter comment l'inscription croisée à la cote américaine influe sur la relation entre le prix de marché actuel et les bénéfices actuels et futurs de l'entreprise. Si une telle inscription permet aux informations relatives aux bénéfices futurs d'être reflétées de manière plus prononcée au niveau des prix actuels, on peut conclure que le mécanisme de l'inscription croisée est associé à une meilleure accessibilité informationnelle. Notre approche méthodologique nous permet de faire une contribution importante à la littérature des inscriptions croisées puisqu'elle est appliquée pour la première fois au niveau de cette littérature. Une telle approche est basée sur les travaux de Collins et al. (1994) qui proposent de régresser les rendements actuels d'une firme sur ses bénéfices actuels et futurs. Le fait de trouver des coefficients de réponse des bénéfices futurs élevés signifie que les prix actuels reflètent plus d'informations au sujet des bénéfices futurs de l'entreprise, et par conséquent, de tels prix peuvent être considérés comme étant informatifs pour les investisseurs. Nos résultats indiquent que l'inscription croisée à une bourse US (NASDAQ et NYSE) ne permet pas d'intégrer plus d'informations sur les bénéfices futurs dans les prix de marché actuels. Ceci signifie que de telles inscriptions n'ont aucun impact sur l'environnement informationnel des firmes non américaines. D'un autre côté, nous avons

aussi documenté que les programmes d'inscriptions croisées privés (Rule 144A) et ceux qui se négocient sur le marché hors cote (OTC) n'offrent aucun bénéfice en terme d'informativité des prix. De tels résultats sont consistants avec les exigences d'informations minimales qui sont imposées aux programmes privés et hors cote.

Notre deuxième article examine le rôle informationnel des analystes financiers. En général, ces agents sont considérés comme des experts des marchés financiers dont les activités consistent, principalement, à émettre des prévisions sur les bénéfices futurs des entreprises et des recommandations d'achat ou de vente. Nous proposons, dans ce papier, d'étudier le rôle de ces intervenants en rapport avec l'hypothèse d'efficience des marchés. Il faut savoir qu'une telle question a fait l'objet de plusieurs études dans la littérature financière. Cependant, il existe très peu de recherches qui relient les activités des analystes au processus de formation des prix. Nous espérons, grâce à notre deuxième papier, remédier à une telle lacune et contribuer à une meilleure compréhension de l'impact des analystes financiers sur un tel processus. Notre approche méthodologique est la même que celle adoptée au niveau du premier papier. Par conséquent, notre but consiste à tester la relation qui peut exister entre le suivi des analystes et les coefficients de réponses des bénéfices futurs. Une association positive entre ces deux variables signifie que les activités des analystes se traduisent par des prix de marché plus informatifs. De plus, notre analyse est appliquée séparément aux entreprises des marchés émergents et celles des marchés développés. Le but de cet examen additionnel est de vérifier l'incidence des facteurs institutionnels (le système de protection des actionnaires, la réglementation de l'audit...) sur le comportement et l'efficacité des analystes financiers. Nos résultats indiquent qu'un suivi accru de la part des analystes permet aux prix des actions des firmes, originaires de marchés développés, d'incorporer plus d'informations au sujet de leurs bénéfices futurs. Dans le cas des marchés émergents, nos résultats suggèrent que les activités des analystes ne réduisent pas les asymétries d'information. Ces résultats sont robustes aux changements de différents aspects de notre méthodologie. Globalement, il semble que les analystes financiers jouent un rôle positif au niveau des marchés développés. Leurs prévisions des bénéfices futurs, au niveau de ces marchés, peuvent être considérées comme de bons indicateurs des bénéfices futurs réels de l'entreprise. D'un autre côté, le degré

de précision des prévisions faites par les analystes financiers ne permet pas aux investisseurs des pays émergents de mieux évaluer les perspectives d'avenir de la firme.

Notre troisième article vise à clarifier l'impact des inscriptions croisées sur les contraintes financières des firmes. L'intérêt de cette question provient du fait que de telles contraintes peuvent limiter tout potentiel de croissance des firmes. La notion de contraintes de financement repose sur l'existence d'un écart de coût entre le financement interne et les sources de financement externes. Ainsi, l'investissement peut dépendre de facteurs financiers tels que la disponibilité des fonds internes. La traduction empirique de ce concept, au niveau de tout un pan de la littérature, consiste à mesurer la sensibilité des dépenses d'investissements aux cash-flows de l'entreprise. Lorsque le niveau d'investissement est très sensible à toute variation des cash-flows, les firmes sont considérées comme financièrement contraintes. L'article de Fazzari et al. (1988) est le point de départ de plusieurs études qui ont analysé l'impact des contraintes financières sur le comportement des investissements. Pour évaluer l'impact des contraintes de financement sur l'investissement des firmes, ces études procèdent, en premier lieu, à une classification des firmes selon leurs coûts d'information. Ainsi, certaines recherches regroupent les entreprises en fonction de leur politique de dividende, leur taille, leur âge, la présence ou pas d'une notation de la dette...etc. Par la suite, la sensibilité des investissements aux cash-flows est mesurée pour chaque catégorie. Les résultats obtenus suggèrent que les entreprises contraintes sur le plan financier ont tendance à avoir des sensibilités plus élevées de l'investissement vis à vis des cash-flows.

Nous nous inspirons de la méthodologie proposée par Fazzari et al. (1988) pour tester l'impact de l'inscription croisée sur les contraintes financières des entreprises non US. Nos résultats indiquent que les inscriptions à l'une des bourses américaines atténuent de manière significative les contraintes de financement des sociétés non américaines. De plus, les bénéfices financiers associés aux inscriptions à des bourses US sont plus prononcés par rapport à ceux générés par les programmes privés (Rule 144A). Par ailleurs, les programmes qui se négocient sur le marché hors cote n'offrent pas d'avantages financiers similaires à ceux des programmes boursiers et privés. Nos résultats indiquent aussi que la réduction des contraintes de financement est plus prononcée pour les entreprises originaires de marchés émergents. Par conséquent, l'intercotation dans une bourse américaine peut aider les

entreprises à contourner les sources de conflits d'intérêts entre les actionnaires et gestionnaires. Il semble qu'un tel mécanisme oblige les dirigeants de l'entreprise à respecter des normes de gouvernance accrues et à renoncer à l'expropriation des actionnaires minoritaires, en contrepartie de bénéfices liés à cette opération.

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